A guide to caring for your well and protecting your family's health.

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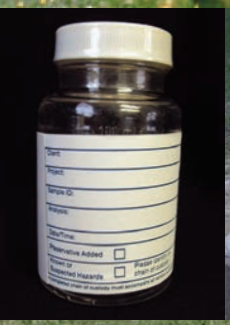

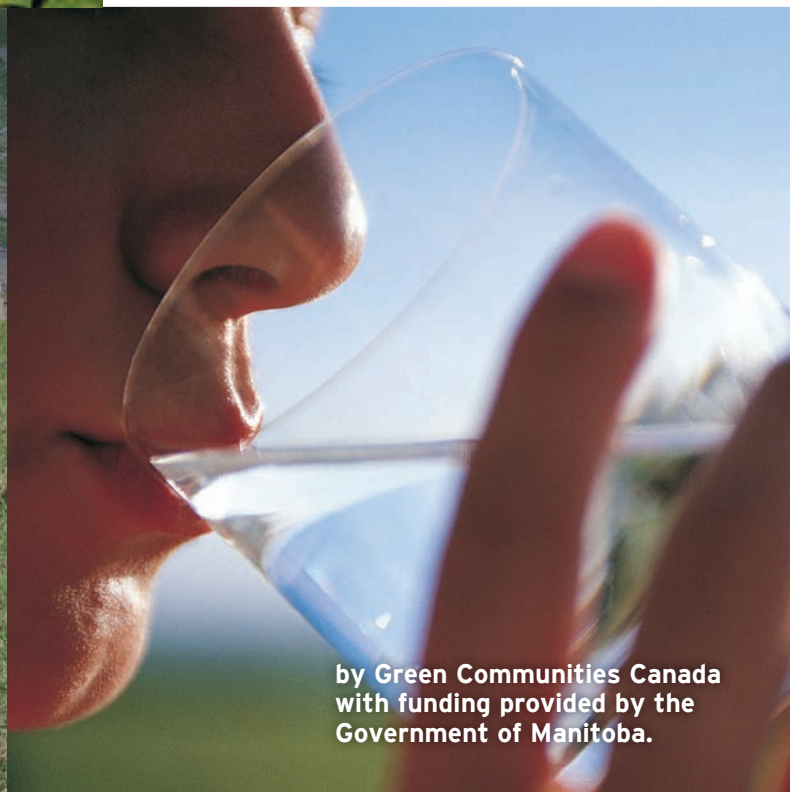

by Green Communities Canada with funding provided by the Government of Manitoba.

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The *Well Aware* booklet was compiled by Green Communities Canada, with funding provided by the Government of Manitoba.

Green Communities Canada is a national association of community organizations that create a healthier, greener world by helping Canadians make practical changes – at home, at work, and in their communities.

This booklet is for information only. Manitoba's Groundwater and Water Well Act and supporting regulations define the legal requirements for the construction and protection of water wells. Please see www.manitoba.ca/drinkingwater for more information on drinking water and well water information factsheets.

Contents

The 2017 Manitoba Well Aware booklet was prepared with input from Manitoba Sustainable Development. This version was adapted from the 2013 Manitoba Well Aware booklet, developed by Green Communities Canada with input from Manitoba Conservation and Water Stewardship, Manitoba Water Well Association, Manitoba Conservation Districts Association, Canadian Institute of Public Health Inspectors - Manitoba, and the Canadian Water Quality Association. Editorial assistance provided by: Clifford Maynes and Sharyn Inward, Green Communities Canada.

See: www.manitobawellaware.ca or www.greencommunitiescanada.org .

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.

A *multi-barrier* approach

As a private water well owner, it is your responsibility to be well aware — to protect the source, understand the basics of well maintenance and operation, to test and understand well water quality, and take necessary action to keep your water well in good running order. This booklet is a guide for individual household wells on constructing a new well, caring for an existing well, and sealing an unused well, all using a multi-barrier approach.

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

For an outline of your ongoing well maintenance responsibilities as a well owner, read the sections on protecting and inspecting your well. See pages 16 and 20. 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, understanding water quality, possible contaminants, bacterial contamination, water testing and treatment systems.

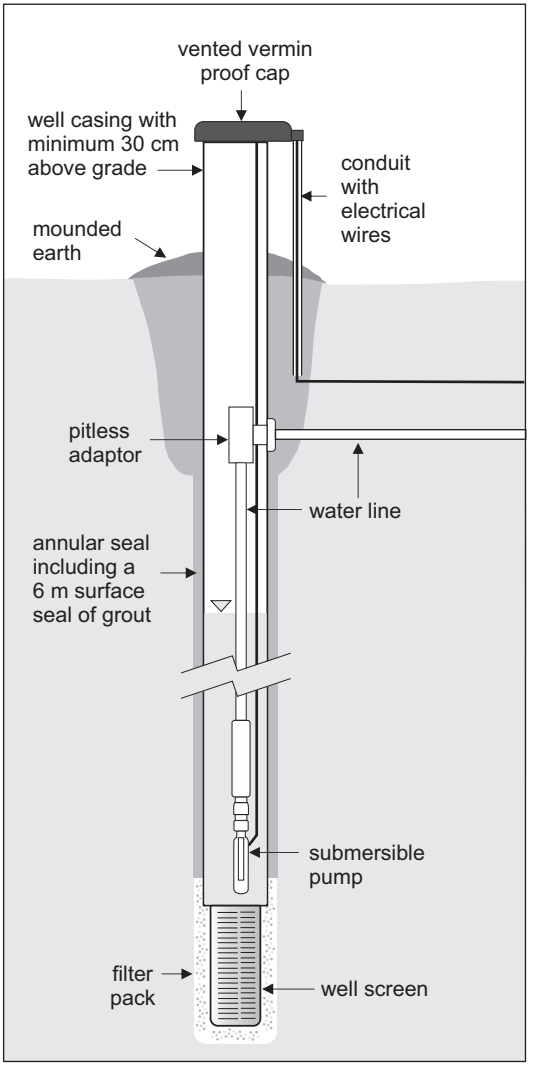
The back of the booklet includes information about water conservation, hiring a licensed contractor and using your well records. Additional resources and contacts are listed. A diary for water quality testing is also included. See page 39.

It's the law. Manitoba's Groundwater and Water Well Act and supporting General Matters and Well Standards regulations set out your obligations as a well owner in Manitoba. Once a well has been constructed, the well owner is responsible for ensuring that it is properly maintained.

Groundwater *basics*

Your well receives water from an underground water source called groundwater.

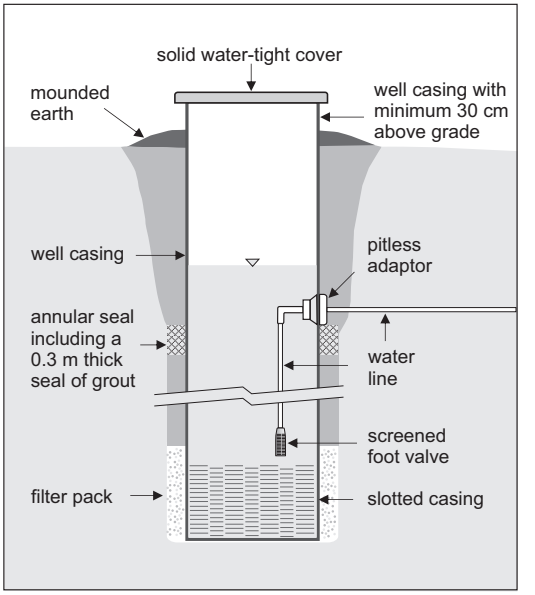
The type of well constructed depends on the local soil and groundwater conditions.



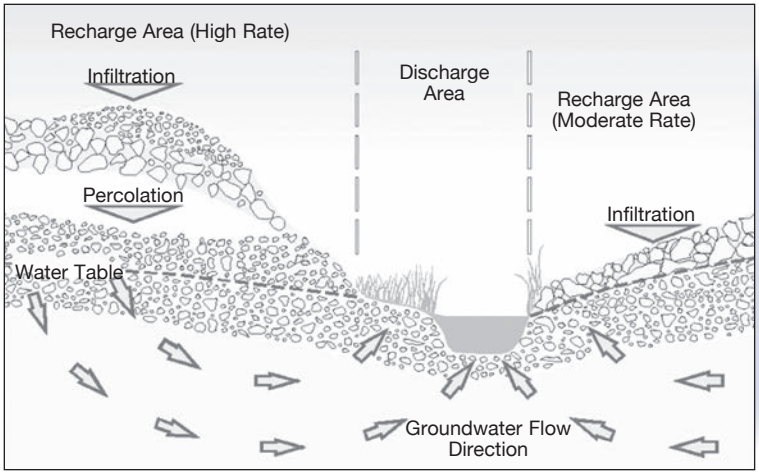
Common drilled well with submersible pump

Groundwater originates from surface water and precipitation, including rain and melting snow. Water infiltrates the earth over a period of time from days to thousands of years. Saturated layers below the water table that store and transmit significant quantities of groundwater – e.g., enough to supply a well – are called aquifers.

In Manitoba, the most common bedrock aquifer types are carbonate rock (limestone and dolomite), fractured shale and sandstone. Sand and gravel aquifer types include thin unconfined sand, thick and extensive unconfined sand and gravel (such as the Assiniboine Delta and Oak Lake Aquifers), major buried sand and gravel (such as the Winkler Aquifer) and lenses of sand and gravel.



Common bored (large diameter) well with shallow lift pump

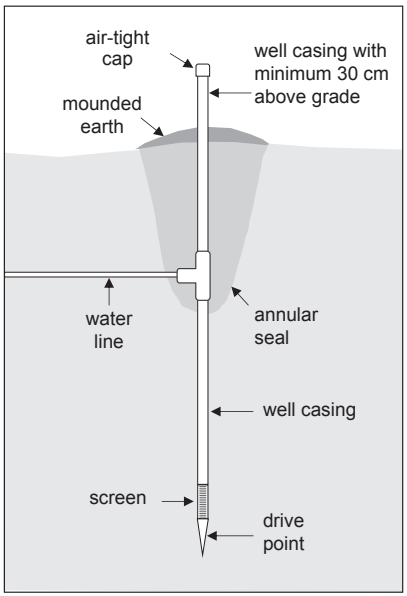


Compared to surface water, groundwater usually moves very slowly – from a few millimetres to a few metres a day. Groundwater affects the quality and quantity of surface water where it discharges into streams, rivers, wetlands, and lakes. Credit: BMP: Water Wells

Groundwater *flows*

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

The risk of well water contamination is greatest when the contaminant source is close to the well. Yet, some contaminants have been known to spread over several kilometres.



Driven point (sand point) well with shallow lift pump

Local *geology*

The type of soil and rock can influence the speed at which surface water infiltrates the groundwater and reaches your well. Your well is at lower risk if these materials effectively prevent surface contaminants from reaching the aquifer. For example, thick deposits of fine soils like clay can be more effective in preventing contamination from nearby surface activities than coarse soils like sand and gravel.

NOTE: Illustrations do not depict every circumstance and are not to scale. These diagrams are for information purposes and do not depict regulation requirements.

Well *basics*

New well *location*

Many different factors must be taken into account before choosing where to locate the well. These include:

- natural features – such as the topography (land surface) of the site, the flow of groundwater, and the location of the aquifer
- potential sources of contamination - wastewater systems, chemical and manure storage, and confined livestock
- safety - presence of overhead power lines or buried utilities

Wells should be located up hill and away from property lines. New wells must be located at least 1.5 m (5 ft) inside any property boundary.

Work with a Manitoba licensed well drilling contractor to find the most suitable location on your property. Please see the section on **Hiring a Contractor** on page 37 for specific details on who can perform well construction and related activities.

Access for new wells

Wells and well-related equipment must be sited so they can be easily reached at all times for cleaning, treatment, repair, testing, and visual examination. The person constructing the well is responsible for ensuring accessibility and identifying all structures and landscaping that may block access.

After construction, the well owner is responsible to ensure accessibility. Keep your well free and clear of debris and other obstacles such as decks, wishing wells and gardens.

Potential contaminant	Minimum setback distance from a water well
• Septic tank[1] • Vault privy[1] or Pail privy[1]	• 8 m (26 ft)
• Human grave or mausoleum • Disposal field[1] • Grey water pit[1] • Pit privy[1] • Underground fuel storage tank	• 15 m (50 ft), if the well is constructed with at least 6 m (20 ft) of casing below ground surface • 30 m (100 ft), for all other wells
• Manure storage facility[2] • Confined livestock area comprised of more than 10 animal units[2]	• 100 m (328 ft)
• Above-ground fuel storage tank • Pesticide/Fertilizer storage area	• 15 m (50 ft), if the storage tank or area has secondary containment • 30 m (100 ft), in all other cases

[1]As defined in Manitoba's Onsite Wastewater Management Systems Regulation.
[2]As defined in Manitoba's Livestock Manure and Mortalities Management Regulation.

Verify adequate separation between water wells and potential contaminants.

Setback distances help *avoid contamination*

New wells must be located at least the minimum separation distance – and preferably farther – from sources of contamination. Potential sources of contamination include other wells, compost, fuel, pesticide and fertilizer storage, manure piles and wastewater systems. Refer to the Manitoba's Well Standards Regulation for minimum setback distances that may apply to your property.

Once the well is constructed, the well owner is responsible for maintaining separation from these and other potential sources of contaminants, including a compost pile, garden, deck, or any structure.

If there are unique or complex features on your property, consider contacting a professional registered with the Association of Professional Engineers and Geoscientists of Manitoba to advise.

Depending on the type of soil or rock, groundwater may be filtered and very clean. But once an aquifer is contaminated, it may not recover for a very long time - if ever.

Risks to groundwater

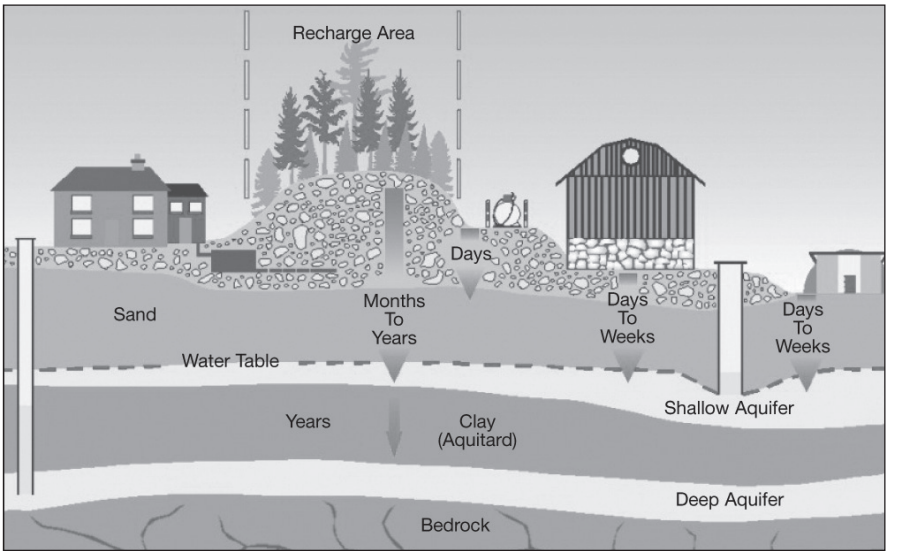
Surface spills of contaminants like fuel can infiltrate the soil and contaminate groundwater. The risk of contamination is greatest where the ground surface is highly permeable to the infiltration of water and other surface contaminants, e.g., in areas with coarse soils or fractured bedrock near or at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

Groundwater can also be contaminated by underground sources, such as leaking fuel storage tanks or malfunctioning wastewater 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 capped or sealed, or have failing casings, or if the casing deteriorates.

Deteriorating wells or unused, unsealed wells may:

- act as pathways for the movement of surface or near surface contaminants such as bacteria into aquifers
- pose a threat to children, adults, or animals who may fall into large diameter openings and become trapped or injured
- interconnect fresh groundwater with salty or mineralized groundwater zones and allow the mineralized water to enter into the fresh water zones
- present a hazard to farm machinery and vehicles
- flow uncontrollably at the surface, resulting in groundwater waste, damage to infrastructure, nuisance or flooding



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

Well *construction*

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

Over the years, well design has improved to reflect advances in technology and our understanding of potential pathways of contamination. Manitoba's Well Standards Regulation outlines minimum construction standards for water wells. Always hire a water well contractor licensed by the Province of Manitoba who is familiar with these standards.

Bored well construction

Flowing well that is not controlled.

Flowing wells

Flowing wells have a natural pressure resulting in a standing water level that is above the ground surface when the well is not in use. Flowing wells can occur in valleys or in areas where they are surrounded by ground with higher elevation. The presence of thick clay layers below the surface in these areas is another factor that can lead to a flowing well.

The construction and sealing of flowing wells can be extremely challenging and dangerous. Contact a Manitoba licensed well drilling contractor who has experience with flowing wells.

Flowing wells must include the installation of a flow control device capable of stopping the discharge. The flow control device must also be able to withstand the freezing of water in the well casing.

Following the construction of a well, the well owner is responsible for ensuring that water does not flow from the well in an uncontrolled manner.

Talk to your Manitoba licensed well drilling contractor about proper venting for your flowing well.

Well screen.
Credit: Fleming College

Well *casing* and *screen construction* for new wells

A typical well structure includes a **well casing,** i.e., pipe or other material. The casing stabilizes the hole, prevents soil from entering the well, and accommodates pumping equipment. The casing material must be new and watertight to prevent surface water and run-off from entering the well.

Steel is the strongest but is susceptible to corrosion. PVC is becoming more popular because of its resistance to corrosion. Fiberglass is now most commonly used in the construction of bored (large diameter) wells rather than steel culvert.

Depending on well type and the environment, there are different requirements that the person constructing the well must follow.

Depth of Casing:
Your well casing must extend to a depth of at least 6 m (20 ft) unless the only useful aquifer available necessitates a shallower depth for the well casing.

Intake zone
Below the casing, the intake zone allows water to move from the aquifer into the well. The type of material used to create the intake zone depends on the aquifer material:

- a manufactured well screen (most common in sand, and gravel and soft sandstone)
- mechanically slotted or perforated casing (used in loose or fractured rock)
- open hole sockets (most common in consolidated formations such as hard sandstone, shale and carbonate rock containing fractures).

The annular *seal*

Most well construction methods consist of a hole in the ground that is bigger than the well casing. The resulting gap around the casing – the annular space – must be backfilled with a suitable material including an upper surface seal of bentonite or cement grout that does not shrink or crack under the ground.

The placement of the surface seal depends on the well type and casing depth.

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.

See illustrations of annular seal on page 4.

Faulty annular seal

The entire annular space of a flowing artesian well must be sealed with neat cement grout or a suitable mixture of sand-cement or bentonite-cement grout to prevent water from moving along the outside of the casing.

Above: Vermin-proof cap for dug or bored wells.
Credit: Manitoba Water Well Association
Below: Vermin-proof cap for drilled wells.

Well Casing *stick-up*

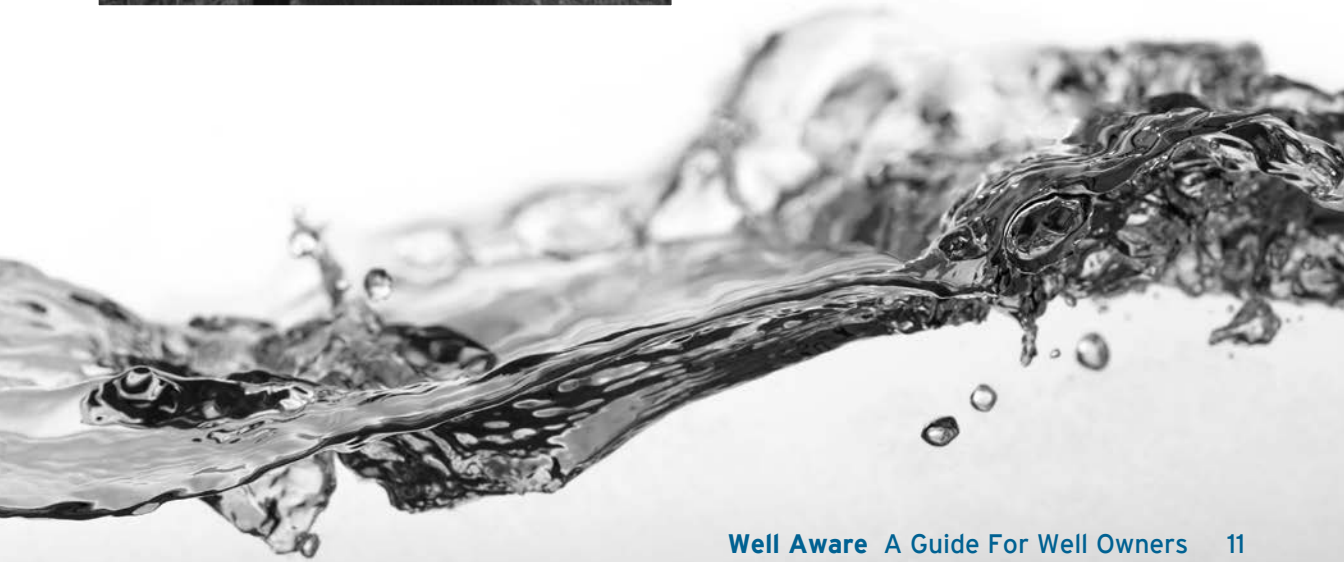
The top of your well casing must extend not less than 30 cm (1 ft) above any finished surface or the established ground surface when the well is completed.

Well *cap*

Drilled wells should have modern vermin-proof caps which have rubber gaskets and screened vents to prevent entry of "foreign material" such as vermin, insects, and decaying plant material. Modern caps also accommodate the electrical wiring necessary for your pump. Bored or dug (large diameter) wells should also have caps designed to prevent entry of foreign material into the well. If your well has an ill-fitting cap, contact a local licensed well drilling contractor to install a new vermin-proof cap.

Venting

A well must be vented to the outside atmosphere in a manner that will prevent vacuum condition from occurring and to safely disperse all gases from within the well.



Well development

A well driller must do everything reasonably possible to remove drill cuttings and drilling fluids from your well by pumping it until clean. The driller must let you know if your well cannot be pumped to a solids-free state.

Developing a well.

Well yield test

A well yield test must be performed to determine a pump-setting depth and pumping rate for your well. This information must be recorded on your well construction report.

Well hook ups

A connection to a well casing for water distribution purposes must be watertight, and with a commercially-manufactured pitless adapter/unit or well seal.

A new well for domestic purposes cannot be located in a well pit, and a well pit cannot be added to an already-constructed well that produces water for domestic purposes.

To prevent bacterial contamination, hire an experienced professional to complete the hook up of the well to your home. To ensure the proper pump size is installed, provide the pump installer with the well yield test results from the well construction report.

Example of a pitless adapter.

(See page 38 for more information about the well construction report)

Well disinfection

A well constructed for domestic purposes must be disinfected by the person who constructed the well.

Well report and tagging

A well construction report provides information about the:

- soil conditions
- type of aquifer
- well construction
- water quantity
- pumping rate
- GPS location

The well ID tag is a unique identifier that links the well in the field with the well report. Together, they provide valuable information about your well. Well tagging began in 2017.

Example of a well ID tag

A well driller must affix a well ID tag to a new well, or a modified or rehabilitated well that does not have a tag.

The well tag must remain visble at all times.

See Your Water Well Records, page 38, for more details about your well construction report.

Upgrading your well

If your well has a *water quality* or *quantity problem*

You may need to upgrade the well for the sake of your family's health and safety. Talk over your options with a Manitoba licensed well drilling contractor who is experienced with upgrades and familiar with conditions in your area.

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

If there are significant 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:

- poorly located, close to permanent sources of contamination, or at risk from flooding
- producing insufficient quantity for the intended use
- substandard and cannot be upgraded for technical reasons (e.g., a brick-lined dug well or poor structural integrity of the casing)

Drilled well in a pit.

Well *pits*

Prior to the mid-80s, well pits were commonly used to protect water line connections from freezing. Due to age and deterioration, some wells located in pits no longer provide safe potable water because the pit can easily fill with surface water, debris, and vermin. Contamination can thus be drawn into the water supply. A Manitoba licensed well drilling contractor can do a thorough assessment of your well to help you determine if your well can be upgraded or if it should be decommissioned. Upgrading may involve extending the well casing to the required height above grade, installing a pitless adapter, resealing the annular space, and decomissioning the pit.

Well *sealing*

An abandoned well means a well not currently in use and not maintained for future use. The owner of land on which an abandoned well is located must ensure that the well is sealed in accordance with the Groundwater and Water Well Act.

An abandoned well can become a direct pipeline to the aquifer for surface water, run-off or any substance that could adversely affect the quality of water in the well. It can threaten the groundwater that supplies your well, and possibly your neighbours' wells.

Abandoned wells need to be professionally sealed to close off the pathway from the surface to the aquifer.

Do not try to seal your own well – properly sealing a well is not as easy as it seems. If you simply fill up your abandoned well with sand, gravel, stones, debris, or garbage, you won't prevent the flow of surface water, run-off or other substances into the well. The material introduced into the abandoned well may even contribute to contamination.

Contact a Manitoba licensed well contractor to immediately seal a well if it is:

- not being used or maintained for future use as a well
- dry
- unfinished

Well owners may also consider contacting their local Conservation District as they may support a subsidy program to seal abandoned wells.

An unused and unmaintained well that has not been properly sealed poses health and safety hazards for animals and humans, especially children.

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 water quality problems

The following sections of this booklet will show you how to examine your well and property to reduce risks to your groundwater.

Protecting source water 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. Further, it is almost always less expensive to keep water clean than to deal with the consequences of contamination.

Well water protection *starts at home*

Start by looking around your own property to identify what could affect your well.

As part of your routine well maintenance schedule, walk the grounds within a 30 m (100 ft) radius of your well. Look for potential influences. A complete search for possible contaminants is recommended at the same time as you inspect your well (see pages 20-21).
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 waste
- gasoline, diesel, home-heating fuel
- pesticides and fertilizers (chemical or natural)
- other hazardous chemicals, including paint, solvents, barbecue starter fluid, etc.
- de-icer (used to melt ice on roads, driveways, sidewalks)
- any other substance you don't want in your family's drinking water
- organic matter such as rotting leaves or other garden debris

Drilled well with flood-protected cap

Flood prone areas

Manitoba's Groundwater and Water Well Act requires one of the following measures to help reduce the risk of well water contamination during a flood:

- extend the top of the well above the designated flood protection level
- protect the well with a dyke
- use a water-tight cap

In addition, the land around the well must be satisfactorily mounded to promote drainage away from the well.

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 leaks. Don't store these materials anywhere near your well(s).

Refuel lawnmowers and other machinery a safe distance from the well. (1 L of gasoline can contaminate up to 1 million L 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 and dispose of your used oil in an environmentally responsible manner.

Keep a bucket of absorbent material (clean sand or kitty litter) nearby to clean up spills and remove to a household hazardous waste depository. Keep a bucket nearby for quick access when spills occur.

Fuel and chemical leaks and spills can pollute groundwater.

Never hose down spills.

Wastewater *systems*

Wastewater can be either greywater or sewage or both.

Malfunctioning wastewater systems are a leading cause of private well contamination. Ensure that your system conforms to Manitoba's *Onsite Wastewater Management Systems Regulation.* Keep chemicals other than human wastewater out of the system. Pump out your septic tank every two to three years, or ask your pumper to specify the appropriate pump-out frequency. Keep your system in good running order.

See references in the back of this booklet (page 40) that can help you learn more about operation and maintenance of your wastewater system.

Above-ground *storage tanks*

If storage tanks are required, ensure they meet the minimum setback distance from your well. Check with your fuel supply company to ensure that your fuel storage tank has adequate spill containment and security measures.

Underground *storage tanks*

Underground storage tanks are used to store home heating fuel and large fuel supplies for equipment. These tanks, 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.

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

Gardens

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

Animal *wastes*

Livestock and pet wastes are a serious potential threat to well water. Ensure that your animals are kept away and down slope from your well. Clean up after them promptly. Consider using municipal weekly garbage pickup for cat litter and dog wastes. An in-ground pet waste digester from a reputable manufacturer is another option.

Get involved in protecting sources of drinking water for your community. Contact your local Conservation District or Aquifer Management Board, if one exists.

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.

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, and contaminated sites.

Inspecting your well

Manitoba's Groundwater and Water Well Act 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 possible contaminants.

If you have problems with your well water, or concerns about your well, have your well inspected by a Manitoba licensed well drilling contractor.

✓ Access

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 have 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. Do not remove the cap from a flowing well. Only a Manitoba licensed well drilling contractor with flowing well experience should remove a cap from a flowing well.

✓ Annular seal

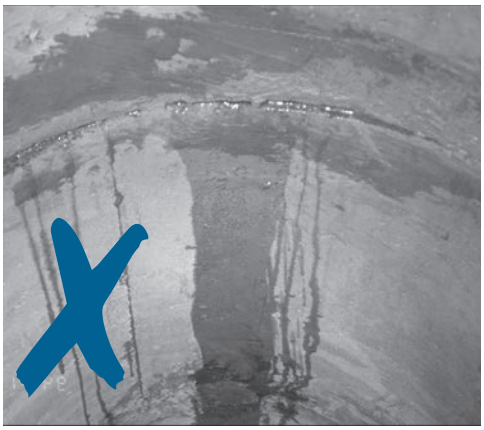
Look for problems with the sealant used to fill the annular space between the drilled hole and the well casing. A depression in the ground around the edge of the casing can indicate that the sealant has shrunk, collapsed, or cracked. If you can move the casing around by pushing it, that's not good. Cracking 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 should be repaired.

✓ Well casing – condition

Look for external signs of damage, cracking, or dislocation on your well casing. If your well has been damaged, removing the cap is not recommended. Visibility is limited and you could cause contamination or further damage, especially if you have a submersible pump. Some Manitoba licensed well drilling contractors have a down-hole closed-circuit TV camera that can be used to inspect your casing.

If you have a structurally sound well - drilled, dug or bored - you can remove the lid with care.

Be mindful of electrical wiring and debris falling into the well. Inspect the inside of the casing using a strong flashlight. Look for holes, evidence of animal infestations, or stains from casing joints that may indicate water leaking into the well.



Leaky cement casing.

✓ Well pit

Remove the lid of your well pit and look for water, debris, vermin, etc. at the bottom of the pit. (Remove the outer cover, not the well cap inside the pit.)

Do not enter the pit or breathe the gases which may fill the pit. WELL PITS ARE EXTREMELY DANGEROUS. Take extra care to ensure children do not gain access to the well pit. Only persons trained and equipped for working in confined spaces should enter a well 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. Consider upgrading or constructing a new well.

Surface water in well pit.

Understanding well water *quality*

When water flows underground, it dissolves the natural minerals in the soils and rocks. The types of dissolved solids and concentrations found in the groundwater depend on the soils and rock type, and the length of time the water has spent underground. Contributions from man-made sources can also influence natural water quality conditions.

In Manitoba, elements found in groundwater include sodium, magnesium, calcium, chloride, bicarbonate and sulphate. These elements combined make up more than 90% of the total dissolved solids in the water. Metals such as iron and manganese are also found in relatively low concentrations.

What could be *wrong with my water?*

Even though your water may seem fine, there are many contaminants you cannot taste, see, or smell. Review the following pages for information about water quality testing and solutions, and the Resources section for testing contacts.

Is *my water safe* to drink?

The water quality in Manitoba is typically good.

However, it is variable and determined by both natural conditions and man-made sources. The only sure way to know for sure what is in your water is by testing it.

Drinking contaminated well water can make you and your family members seriously ill. Any health effects may not be immediately apparent depending on the type of contamination.

Microbiological contamination may cause stomach cramps, diarrhea, nausea, vomiting, kidney disease or even death.

Chemical contamination can also make you very ill. The effects will vary depending on the particular chemical(s) and level of exposure.

Possible contaminants

If your water tests positive for bacterial contaminants it is unsafe for drinking, brushing teeth, bathing or washing vegetables that will be eaten raw.

The following are potential contaminants:

Bacterial *contaminants*

Total coliforms Coliforms are bacteria associated with environmental sources such as vegetation, tree roots, insect infestation and soil, or possibly fecal material. A low count of total coliforms (1-9) may indicate the presence of other more harmful bacteria with similar lifecycles. Retesting is recommended to confirm bacterial counts <10. A higher total coliform count (>9) is a strong indicator that disease-causing micro-organisms may be present.

E.coli *Escherichia coli* is a bacteria associated with human and animal fecal matter. Any detectable presence of *E.coli* means your water is unsafe for drinking, food preparation and brushing teeth unless boiled or treated. **Drinking *E.coli* contaminated water can make you seriously ill, and may even cause death.**

Chemical *contaminants*

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, human or animal wastes, or from soil that contains nitrogen compounds from naturally decaying organic matter. High nitrate levels are a particular concern for pregnant or nursing women and for infants less than one year old.

Metals and minerals Minerals and metals in your water can come from natural sources, or from landfills, road salts, wastewater 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.

(continued on page 24)

(Possible Contaminants continued)

Gasoline, oil and diesel fuel Test for these if you have had a spill, have a buried fuel tank near your well, or detect fuel odours or films in your water.

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 have had a spill or leak, or if you are concerned about possible back-flow through your plumbing into your well during mixing of pesticides.

Hydrogen sulphide The distinctive rotten egg smell in water that some well owners in Manitoba encounter is likely the result of sulphur-reducing bacteria. Sulphur-reducing bacteria may thrive in oxygen-deficient environments (such as deep wells or within plumbing systems, including hot water tanks). The bacteria break down sulphur compounds present in water and produce hydrogen sulphide gas (rotten egg smell) in the process.

Other *contaminants*

Trace Elements The trace elements arsenic, barium, boron, fluoride and uranium have been found at concentrations exceeding health guidelines in some Manitoba wells. Under most circumstances, these trace elements are naturally occurring as a result of groundwater coming into contact with rocks or soils containing such elements.

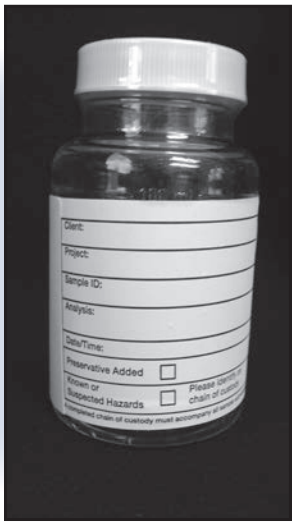
Iron and sulphur bacteria Iron bacteria and sulphur bacteria are naturally occurring organisms that may be found in groundwater. Neither type of bacteria is particularly harmful, at least not at the levels usually seen in drinking water. However, they can be a nuisance due to unpleasant tastes and odours, staining of plumbing fixtures and laundry, slimy growths and plugging of water well equipment. If you are concerned with either of these bacteria contact a professional plumber or well drilling contractor.

Sediment If the well water has been clear and clean for a significant amount of time and then it suddenly starts to produce sand/clay in the water, your well casing, screen or hook up may have corroded over time. Contact a Manitoba licensed well drilling contractor to provide you with construction options.

Water *testing*

Private well owners are responsible for testing and, if necessary, treating their water to ensure it is safe to drink. All new wells should be tested for bacteria, nitrate, trace elements, common minerals, and general water chemistry in order to determine the potability of and any health risks associated with the water. Existing private well owners are encouraged to sample routinely for bacteria and if water quality is unknown, to sample for nitrate, trace elements, common minerals, and general water chemistry.

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



Test for *bacterial contamination*

It is recommended that you test your well water at least once a year for total coliforms and *E.coli* (see page 23). Spring, once snow melt and surface runoff have finished, is a good time for testing. Another good time for testing is soon 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 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. Do not rely on your neighbour's test results – wells that are only a short distance apart can 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 (e.g., stomach cramps, diarrhea or vomiting)
- After flooding (If flooding is common in your area you need to flood proof your well. See section on "Flood prone areas" on page 17)

The Manitoba government offers a subsidy to well owners for bacteria testing. Please contact the Office of Drinking Water or visit www.manitoba.ca/drinkingwater for more information.

For information on bottle pickup and sample submission requirements, please contact one of the accredited laboratories in Manitoba or the Office of Drinking Water. Keep a careful record of well testing results (see page 39).

How to *sample* for *bacterial contamination*

The following directions apply to routine sampling for total coliforms and *E.coli*.
It is important to follow these steps or your sample may be contaminated leading to false results.
For more detailed instructions, please see Manitoba's water well fact sheet
"How to test well water for bacteria" at www.manitoba.ca/drinkingwater.

Use the water sample bottle provided by your testing laboratory to collect your sample. A preservative, sodium thiosulphate, is in the bottle. It is intended to be there. This material may cause a reaction if ingested or inhaled; therefore keep out of reach of children.

- Remove the screen (aerator) from the end of the cold water tap or faucet.
- Sterilize the end of the tap, faucet or spigot. If there are no plastic components, this can be done by flaming the end of the tap with a lighter. Alternatively, wash it with a strong disinfectant solution of 10 ml (two tsp) of unscented, detergent-free household bleach added to 1 L (four cups) of water.
- Allow the tap, faucet or spigot to run with cold water for three to five minutes before taking the sample.
- Cut the flow of water to a gentle stream to avoid splashing or overfilling the sample bottle.
- Remove the cap from the sample bottle by carefully breaking the protective seal. Do not use a sample bottle if the seal is broken or if you cannot see the preservative (white residue). *Do not rinse the bottle – it contains a preservative needed for the test.*
- Hold the cap in one hand while you fill the bottle. Do not lay the cap down or touch the inside of the cap. Keep fingers below the threaded rim of the bottle.
- Fill the bottle to the level indicated, or as directed by the laboratory. Replace the cap and tighten.
- Label the bottle and identify the location (e.g., kitchen tap – untreated well water) and the date and time the sample was taken.
- Keep the sample bottle sealed and in a cool place such as a refrigerator.

NOTE: Water samples must be kept cool. Water samples that get too warm, freeze or sit too long will give incorrect results.

- Fill out the submission form provided by the laboratory. Make sure to indicate where the sample was taken, your address and contact information (include a cell number or email address for emergency notification) on the form.
- Pack the sample in a cooler with an ice pack and packing paper to keep it cool and secure until it gets to the laboratory. If you're shipping by bus or courier, put the completed sample submission form in a sealable plastic bag, seal it and put it inside the cooler.
- Drop off the sample and completed form at the laboratory or at the bus or courier location for transport.

NOTE: Water samples must arrive at the laboratory within 24 hours of collection.

Testing for *other parameters*

Accredited private labs can provide water testing packages that include minerals, metals, bacteria, nitrate, trace elements, pesticides, solvents and fuels for a fee.
www.manitoba.ca/drinkingwater.

Test for *nitrate*

Nitrate does not create a taste or odour in water. The only way to know if well water contains nitrate is to have a water sample tested by an accredited laboratory. Well owners should use the bottle(s) provided by the laboratory and should collect samples carefully, following the instructions provided.

After the initial test when the well is new, wells should be retested for nitrate every three to five years or whenever there is a change in the taste, smell, colour or clarity of the well water, or if there is a reason to believe the water quality has changed. In areas where nitrate is a concern, or when your previous results have detected nitrate in the well water, you should consider testing for nitrate more often. If nitrate is at or near guideline levels, well owners should consider testing at different times of year to get a better understanding of seasonal variability.

For more information, please see Manitoba's fact sheet "Nitrate in Manitoba Well Water" at www.manitoba.ca/drinkingwater.

Test for *trace elements*

Trace elements (such as arsenic, barium, boron, fluoride and uranium) do not create a taste or odour in water. The only way to know if well water contains trace elements is to have a water sample tested by an accredited laboratory. Well owners should use the bottle(s) provided by the laboratory and should collect samples carefully, following the instructions provided.

All wells should be tested to ensure there are no trace element concerns. In general, well water should be tested for trace elements every three to five years in areas known to have elevated levels. More frequent testing is recommended if levels are at or near the drinking water quality standard.

For more information, please see Manitoba's series of trace element fact sheets at www.manitoba.ca/drinkingwater.

Test for *common minerals* and *general water chemistry*

In addition to sampling for bacteria, nitrate and trace elements, new or existing well owners are encouraged to sample their well for common minerals and general water chemistry if water quality is unknown. This includes sampling for parameters such as calcium, magnesium, manganese, iron, sodium, potassium, chloride, sulphate, hardness, pH and electrical conductivity. Contact an accredited laboratory for information on water testing packages. Well owners should use the bottle(s) provided by the laboratory and should collect samples carefully, following the instructions provided.

Common well water issues (e.g., staining or encrustation of plumbing fixtures and staining of laundry) are typically caused by concentrations of a mineral above the water quality aesthetic objective.

A water treatment specialist will advise on a treatment system based on the results of a common mineral and general water chemistry test. All water treatment systems should meet internationally recognized accreditation standards.

Bacterial *contamination*

TEST RESULTS

TOTAL COLIFORMS

0: safe

1 - 9: unsafe, exercise caution and retest

> 9: unsafe, contact the Office of Drinking Water

E.COLI

0: safe

1 and above: unsafe, contact the Office of Drinking Water

If you receive a serious adverse test result (total coliforms >9 or E.coli >0), or have any reason to believe your drinking water is dangerously contaminated, do not consume the water. Contact the Office of Drinking Water for advice.

Boil your water to eliminate harmful bacterial contaminants or use bottled water.

To eliminate bacterial contaminants by boiling:

- 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 chemical contamination such as nitrate, or other metals and minerals.
- Refrigerate boiled water in clean food-grade containers.
- Boiled or bottled water is safe for drinking if other contaminants are not present. It is also recommended for food washing and preparation, brushing teeth, bathing children and washing dishes.
- Untreated well water can be used **with caution** for baths, showers and laundry.

For more information on boil water advisories, see Manitoba's "Boil Water Advisory Fact Sheet #2 – Boil Water Advisory For Private Well Owners" at www.manitoba.ca/drinkingwater. In cases where *E.coli* contamination is >200 per 100mL sample refer to "Boil Water Advisory Fact Sheet #4 – Boil Water Advisory For All Domestic Water Uses".

Considerations for a *positive bacterial test*

If your well water tests positive for total coliforms or *E.coli*, consider the following:

Is there a pathway for contaminated water to enter your well?

If so, the well problem must be determined and fixed to eliminate the source and pathway of contamination into the well. See "Eliminate the cause" at right.

Was the well water sample collected according to prescribed well sampling guidelines?

If not, the bacterial results may be a false positive for the presence of bacteria. In this case, another water sample should be collected following the procedure on page 26 and tested to determine if bacteria is present.

If there appears to be no identifiable construction, maintenance or protection issue with the well, and the well water sample was collected according to the well sampling guidelines, then well disinfection and bacterial testing is recommended.

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 repeatedly exceeds drinking water standards for bacteria, there is likely an ongoing source of bacteria affecting your well. Are there issues with the location, construction, or maintenance of your well that could account for the contamination? See the previous sections of the booklet and refer to Manitoba's well water fact sheet titled "How to Reduce the Risk of Well Water Contamination". Address any problems you identify.

If you cannot detect the cause of the problem, bring in a Manitoba licensed well drilling contractor right away.

Correcting the source of the problem could be a lot cheaper than buying a home water treatment device. Treatment may be beneficial – and even necessary in some circumstances. See "Persistent bacterial problems" on page 31. But treatment should be the final option, after taking steps to reduce contaminants and improve your well.

Well *disinfection*

A newly constructed well must be disinfected by the well drilling contractor at the time of construction. The well should also be disinfected if the well hook up to the house or pump installation is completed after the initial disinfection.

Chlorination is the process of treating (disinfecting) a well and plumbing system with chlorine (such as regular, unscented household chlorine bleach) to kill or reduce certain kinds of bacteria. This includes total coliforms and *E.coli* and other nuisance bacteria (e.g., iron bacteria). Disinfecting a well will not get rid of other water quality problems such as hard water or nitrate contamination.

Chlorination is effective for getting rid of a one-time case of bacterial contamination like when repairs are done to your well. However, if you have an ongoing contamination problem (perhaps related to poor well location, construction or lack of maintenance), disinfecting the well will only fix the problem temporarily until the issue causing the problem is identified and corrected.

It is recommended you have a qualified person such as an experienced professional well driller or plumber to disinfect your well.

Persistent bacterial *problems*

There are situations where total coliform bacteria in well water are persistent and efforts to eliminate the bacteria are unsuccessful. These situations are most often related to particular soil and groundwater conditions such as shallow aquifers, or aquifers covered by water-permeable materials. Under these circumstances, low counts of total coliforms are abundant in nature and generally represent a low risk to health.

Additional factors which may affect the frequency of bacterial occurrence in well water include shallow well construction, weather conditions during or prior to sampling, type of well construction (e.g., well pits) and well condition.

Where bacteria are persistent and cannot be successfully eliminated by making well improvements or repairs, the well owner may consider effective water treatment or a safe alternative source of water.

What the *results* mean

The chart below gives two values that will help understand laboratory test results:

- **Maximum Acceptable Concentrations (MACs)** have been established for certain substances that are known or suspected to cause adverse effects on health.
- **Aesthetic Objective (AO)** quality guidelines address parameters which may affect consumer acceptance of drinking water such as taste, odour and color.

These are the current values provided by Health Canada in their October 2014 Guidelines for Canadian Drinking Water Quality – Summary Table.

Parameter	Health Limit (MAC)	Aesthetic Objective (AO)	Comment
Total Coliforms	0 per 100 mL	---	A higher total coliforms count (>9) may have adverse health effects
Escherichia coli (*E.coli*)	0 per 100 mL	---	*E.coli* can cause serious health problems
Total Alkalinity	No Health Risk	30 to 500 mg/L	Not considered harmful
Arsenic	0.01 mg/L	---	Exposure to elevated levels over a lifetime can increase the risk for some cancers
Barium	1.0 mg/L	---	Exposure to high levels may increase the potential risk for increased blood pressure
Boron	5 mg/L	---	Exposure to high levels over a long period of time may result in reproductive effects in males
Calcium	No Health Risk	See Hardness	Contributes to water hardness
Chloride	No Health Risk	250 mg/L	High levels may give water a bad taste
Copper	No Health Risk	1.0 mg/L	High levels may give water a bad taste
Electrical Conductivity (EC)	No Health Risk	---	Indicates level of dissolved salts and minerals in water

Hardness	No Health Risk	---	0 – 100 mg/L = Soft 100 – 150 mg/L = Moderately Hard 150 – 300 mg/L = Hard >300 mg/L = Very Hard
Fluoride	1.5 mg/L	---	Long term exposure above 1.5 mg/L may cause mottling of tooth enamel
Iron	No Health Risk	0.3 mg/L	High levels may give water a poor taste, bad smell and cause staining of plumbing fixtures
Lead	0.01 mg/L	---	Extended exposure may negatively effect intellectual development and behavior in infants and young children (under 6 years)
Magnesium	No Health Risk	See Hardness	Contributes to water hardness
Manganese*	No Health Risk	0.05 mg/L	High levels may give water a poor taste and cause staining of plumbing fixtures
Nitrate as Nitrogen	10 mg/L	---	Levels above 10 mg/L may cause blue-baby syndrome
pH	No Health Risk	6.5 – 8.5	High pH = water scales Low pH = water is corrosive
Potassium	No Health Risk	---	Essential to human health, but may give water a bad taste
Sodium	No Health Risk	200 mg/L	High levels may give water a salty taste
Sulphate	No Health Risk	500 mg/L	High levels may cause stomach irritation and laxative effect
Total Dissolved Solids (TDS)	No Health Risk	500 mg/L	High TDS may give water a poor taste and cause excessive scaling in pipes, water heaters and appliances
Uranium	0.02 mg/L	---	High levels can increase the risk of kidney damage
Zinc	No Health Risk	5.0 mg/L	High levels may give water a bad taste and water can develop a greasy film when boiled

*Health Canada guideline value currently under review.

Treatment *systems*

A complete analysis of the quality of your well water is needed to help select a proper treatment system. Homeowners should work with a qualified and reputable water treatment supplier when selecting a water treatment system and follow maintenance guidelines provided by the manufacturer. All water treatment systems should meet internationally recognized accreditation standards.

Water treatment systems can be divided into two groups: point-of-use and point-of entry. Point-of-use systems are portable, plumbed-in or faucet-mounted, and are used to treat the water at a single tap for drinking and cooking only. Point-of-entry devices are installed on the main water supply and treat all the water entering the home. Where there is a bacterial concern, all the water used in the home should be treated.

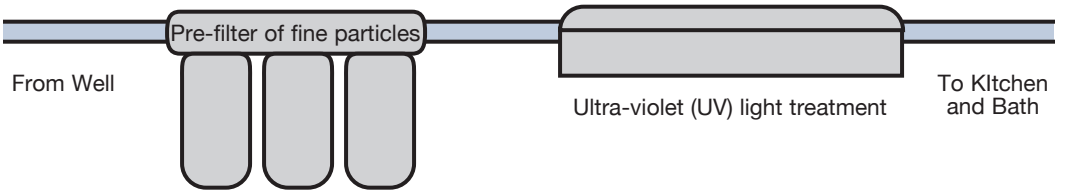
For bacteria

If your water is contaminated, it is better to remove the source of the contamination. 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 supply. A retention tank can be sized to allow 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 can inactivate microorganisms such as bacteria, viruses or parasites. A Class A system is required (NSF 55) for drinking water disinfection. Pre-filtration of water is generally required for this treatment to work properly. The light needs to be replaced and the light sleeve cleaned regularly to maintain proper function.

Example of Household Water Treatment System



For other contaminants

WARNING: the following treatment systems do not kill bacteria.

Reverse osmosis removes dissolved solids, salts, minerals that cause hardness, organic chemicals and other impurities by passing water through a membrane. Reverse osmosis can also improve the taste of water. However, the process wastes large amounts of water, which could be a concern if water supplies are limited or the septic tank is over-burdened. Reverse osmosis is commonly used only for drinking water. Regular maintenance is required. Pre-treatment may be necessary. Standard is NSF 58.

Activated carbon filters can be used with well water to improve taste and remove some contaminants. Filters come in pitcher style, tap-mounted and under-sink units. Look for a unit certified under NSF to remove target contaminants. Health Canada recommends that activated carbon filters be used only in conjunction with disinfection.

WARNING: If harmful bacteria are present, they can be trapped and multiply in a carbon filter. It is essential to flush the filter for at least 30 seconds before each use, change filters/units frequently, and carefully follow manufacturer's instructions.

Water softeners are the most common form of treatment. Hard water contains large amounts of calcium and magnesium that leave scum and residue in appliances and water pipes. Hardness can be removed with a water softening unit. Your water can have different levels of hardness, which will determine the model and size of unit you need. Softened water easily lathers and can prolong the efficiency of your appliances and water pipes. Ensure that your water softener unit regenerates when required, which is determined by usage. Some water softeners are capable of removing low levels of dissolved and/or particulate iron and manganese. Standard is NSF 44.

Oxidizing filters (iron and manganese filters) treat water with high concentrations of dissolved and/or particulate iron and manganese to eliminate rust staining from plumbing fixtures and laundry, and remove rusty or blackish colour from the water. Standard is NSF 42.

Water Conservation

An important part of taking care of your well is through water conservation. In certain areas water shortages are an issue. Water shortages may occur in summer when there is a low amount of rainfall or during a prolonged dry cycle. You can conserve water by practicing water-saving techniques, repairing leaks, and in general using water wisely.

There are numerous benefits from conserving your water, including:

- **Water supply –** Groundwater use works on a system of balance. When you tap into an aquifer and pump water from it, the natural system seeks to balance that withdrawal. The more water you remove, the longer it takes to replenish. During dry spells, especially in shallow aquifers, the system may not be able to readily replenish itself. Reducing the amount of water you use reduces the amount of stress you place on the aquifer system.
- **Equipment Cost –** Like any equipment, the more your pump and any water treatment devices are used, the quicker they wear out. This equipment can be expensive to operate so conserving water helps save operating, maintenance and replacement costs.
- **Energy Cost –** Using less water means less energy is required for pumping, heating and treating your water. Making small changes can make a big difference in your energy bill. Consider installing high-efficiency, low-flow plumbing devices to reduce both water and energy consumption.
- **Septic Systems –** Too much water going to waste and flowing through your septic system can cause problems and lower the life expectancy of the system.
- **Environmental Considerations –** In our homes, about 11 per cent of greenhouse gas emissions are created from heating and using water. Greenhouse gases contribute to climate change and by reducing your water use you can help reduce the impact on the climate.

Use Water Wisely

Most water conservation techniques are common sense. Use water saving devices such as low flush toilets, low flow shower heads, and aerators on all taps. Repair leaks quickly to avoid wasting water. Never let water run continuously while washing dishes or brushing teeth. Wash only full loads of laundry and dishes. Collect rainwater and use it to water your garden. If you must use a water hose, use a shut-off nozzle to prevent wasting water.

Consider low water landscaping, naturalization and tree planting to help reduce run-off and recharge the aquifer.

When upgrading fixture and appliances choose low-water options like low-flow toilets and front loading washing machines. For more information, see www.gov.mb.ca/sd/water_sense/local_links.html.

Hiring a *contractor*

Always hire a Manitoba licensed well drilling contractor.

Be sure the contractor working on your well has the appropriate license as required by Manitoba law.

Get more than one licensed well drilling 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.

If the contractor does not provide hook up services from the well to the house or pump installation be sure to hire an experienced professional to complete this work.

Get references and review past work before making a final decision. Ask licensed contractors about the expectations of water quality and quantity in your area and confirm this with your neighbours and/or contact Manitoba's Groundwater Management Section.

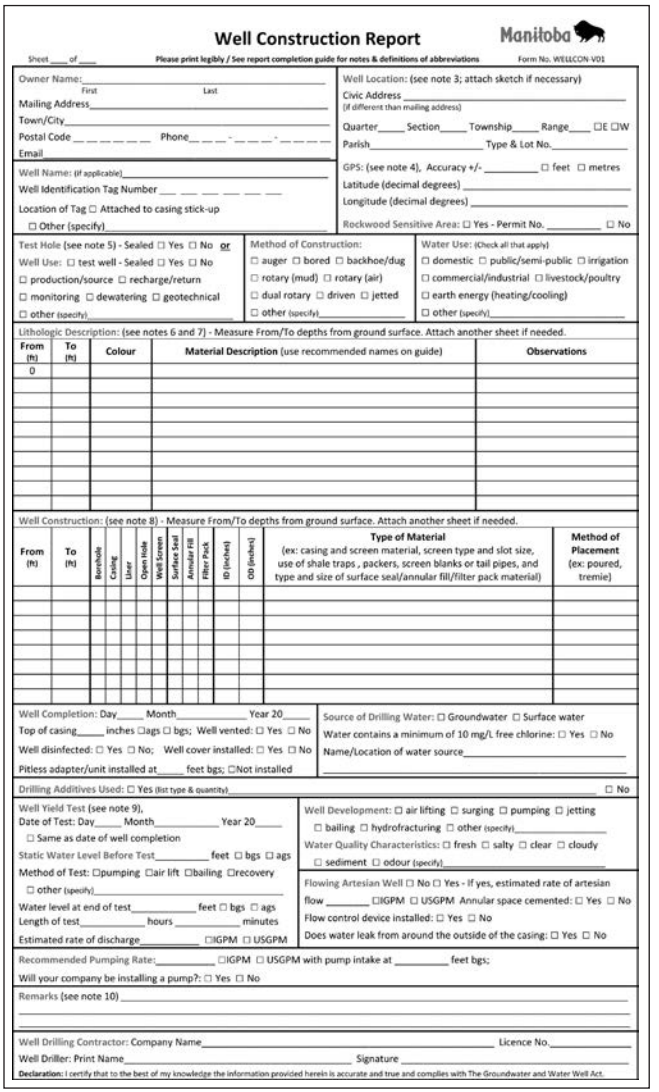
Get a signed agreement in writing to protect yourself should there be any changes in the work and/or cost.

Pay promptly when the work is completed as described in the agreement.

Contact the Manitoba Water Well Association and/or Manitoba Groundwater Management Section 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.

The word "construction" means any work in relation to digging, drilling, installing, modifying or repairing a well including the partial sealing of a well. Construction also includes installing equipment in a well or connected to it.

Your *water well* records



Well Construction Report

Manitoba

Sheet ___ of ___ | Please print legibly / See report completion guide for notes & definitions of abbreviations | Form No. WELLCON-V01

Owner Name: First Last

Mailing Address

Town/City

Postal Code ___ ___ ___ ___ ___ Phone ___ ___ ___ - ___ ___ ___ - ___ ___ ___ ___

Email

Well Location: (see note 3; attach sketch if necessary)

Civic Address (if different than mailing address)

Quarter ____ Section ____ Township ____ Range ____ ☐E ☐W

Parish ____ Type & Lot No. ____

Well Name: (if applicable)

Well Identification Tag Number ___ ___ ___ ___ ___ ___

Location of Tag ☐ Attached to casing stick-up

☐ Other (specify)

GPS: (see note 4), Accuracy +/- ____ ☐ feet ☐ metres

Latitude (decimal degrees)

Longitude (decimal degrees)

Rockwood Sensitive Area: ☐ Yes - Permit No. ____ ☐ No

Test Hole (see note 5) - Sealed ☐ Yes ☐ No or

Well Use: ☐ test well - Sealed ☐ Yes ☐ No

☐ production/source ☐ recharge/return

☐ monitoring ☐ dewatering ☐ geotechnical

☐ other (specify)

Method of Construction:

☐ auger ☐ bored ☐ backhoe/dug

☐ rotary (mud) ☐ rotary (air)

☐ dual rotary ☐ driven ☐ jetted

☐ other (specify)

Water Use: (Check all that apply)

☐ domestic ☐ public/semi-public ☐ irrigation

☐ commercial/industrial ☐ livestock/poultry

☐ earth energy (heating/cooling)

☐ other (specify)

Lithologic Description: (see notes 6 and 7) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Colour	Material Description (use recommended names on guide)	Observations
0				

Well Construction: (see note 8) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Borehole	Casing	Liner	Open Hole	Well Screen	Surface Seal	Annular Fill	Filter Pack	ID (inches)	OD (inches)	Type of Material (ex: casing and screen material, screen type and slot size, use of shale traps , packers, screen blanks or tail pipes, and type and size of surface seal/annular fill/filter pack material)	Method of Placement (ex: poured, tremie)

Well Completion: Day ____ Month ____ Year 20____

Top of casing ____ inches ☐ags ☐ bgs; Well vented: ☐ Yes ☐ No

Well disinfected: ☐ Yes ☐ No; Well cover installed: ☐ Yes ☐ No

Pitless adapter/unit installed at ____ feet bgs; ☐Not installed

Source of Drilling Water: ☐ Groundwater ☐ Surface water

Water contains a minimum of 10 mg/L free chlorine: ☐ Yes ☐ No

Name/Location of water source

Drilling Additives Used: ☐ Yes (list type & quantity) ☐ No

Well Yield Test (see note 9),

Date of Test: Day ____ Month ____ Year 20____

☐ Same as date of well completion

Static Water Level Before Test ____ feet ☐ bgs ☐ ags

Method of Test: ☐pumping ☐air lift ☐bailing ☐recovery

☐ other (specify)

Water level at end of test ____ feet ☐ bgs ☐ ags

Length of test ____ hours ____ minutes

Estimated rate of discharge ____ ☐IGPM ☐ USGPM

Well Development: ☐ air lifting ☐ surging ☐ pumping ☐ jetting

☐ bailing ☐ hydrofracturing ☐ other (specify)

Water Quality Characteristics: ☐ fresh ☐ salty ☐ clear ☐ cloudy

☐ sediment ☐ odour (specify)

Flowing Artesian Well ☐ No ☐ Yes - If yes, estimated rate of artesian flow ____ ☐IGPM ☐ USGPM Annular space cemented: ☐ Yes ☐ No

Flow control device installed: ☐ Yes ☐ No

Does water leak from around the outside of the casing: ☐ Yes ☐ No

Recommended Pumping Rate: ____ ☐IGPM ☐ USGPM with pump intake at ____ feet bgs;

Will your company be installing a pump?: ☐ Yes ☐ No

Remarks (see note 10)

Well Drilling Contractor: Company Name ____ Licence No. ____

Well Driller: Print Name ____ Signature ____

Declaration: I certify that to the best of my knowledge the information provided herein is accurate and true and complies with The Groundwater and Water Well Act.

Well records provide valuable information about well location, construction and water quantity.

Within 45 days of finishing your new well – or in some cases making alterations to an existing well – the person constructing the well must provide you with a copy of your well construction report. Each well must have its own well report. Contents include construction details, well yield test results, static water level, and a geological log that describes the soil and/or bedrock conditions and geographic location.

If you don't have the report for your existing well, contact the Manitoba Groundwater Management Section or the driller. Well reports are entered under the name of the original well owner and by an ID number on a well tag attached to your well (beginning in 2017).

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 upon sale of the property.

Water quality testing diary

Date Tested:	Parameters:	Result:
2011-10-17 sample	minerals/metals/bacteria	normal

Resources

GENERAL RESOURCES

Manitoba Water Well Association. Membership includes licensed well drillers, pump installers, manufacturers and suppliers, and groundwater scientists and engineers.
204-589-6166, www.mwwa.ca.

Manitoba Sustainable Development.
Groundwater Management Section provides information on well construction reports, groundwater publications, well construction, sealing of unused wells, and related acts and regulations.
204-945-6959, groundwater@gov.mb.ca

Office of Drinking Water provides information on drinking water safety, well water quality, factsheets and water treatment devices. 204-945-5762, www.manitoba.ca/drinkingwater. Regional office location and contact information is available online.

Manitoba Conservation Districts Association.
The association provides a leadership role and unified voice between districts, Manitoba Sustainable Development and partners in watershed management in Manitoba.
204-570-0164, www.mcda.ca, info@mcda.ca

Canadian Water Quality Association provides information to consumers regarding treatment devices, systems and applications. 1-866-383-7617, www.cwqa.com. Consumers can click on Ask an Expert for specific questions.

WATER TESTING

Accredited private labs can provide water testing packages that include minerals, metals, bacteria, nitrate, trace elements, pesticides, solvents and fuels for a fee. www.manitoba.ca/drinkingwater.

WELL REPORTS

Manitoba Sustainable Development.
Groundwater Management Section has well construction reports available free to the owner of the well. Legal location or street address, and last name of the original well owner are extremely helpful to track your record.
204-945-6959, groundwater@gov.mb.ca.

WATER TREATMENT DEVICES

Health Canada provides information regarding water treatment devices. 1-866-225-0709, www.hc-sc.gc.ca, search: removal of taste, odours, and chemicals, and disinfection of water.

NSF International, an independent, not-for-profit testing organization, provides information on and certification of various consumer products including bottled water and drinking water treatment, www.nsf.org. Or call their Consumer Information Office at 1-800-673-8010.

The Canadian Water Quality Association provides information to consumers regarding treatment devices, systems and applications. 1-866-383-7617, www.cwqa.com. Consumers can Ask an Expert directly via website.

WASTEWATER SYSTEMS

Onsite Wastewater Systems Installers of Manitoba Inc. represents certified installers of onsite wastewater management systems in Manitoba.
204-771-0455, http://www.owsim.com.

Manitoba Sustainable Development.
Environmental Programs and Strategies – Onsite Wastewater Management Systems Program provides information related to the installation of wastewater management systems in Manitoba, including the 2011 Homeowner's Manual for Onsite Wastewater Management Systems. 204-794-1176, www.manitoba.ca/conservation/envprograms/wastewater.

Courtesy of:

Be Well Aware

Checklist

- new wells are properly constructed and located a safe distance from contaminants
- existing wells are properly inspected, maintained, and upgraded as necessary
- potential contaminants are kept a safe distance from your well
- well water is regularly tested for bacteria, and is screened initially and periodically for other contaminants
- unused wells are properly plugged and sealed

Take care of your well and your groundwater – for the sake of your family, your neighbours, and future generations.

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Green Communities CANADA

MANITOBA WATER WELL ASSOCIATION

Manitoba Conservation Districts Association

CANADIAN INSTITUTE of PUBLIC HEALTH INSPECTORS

CWQA CANADIAN WATER QUALITY ASSOCIATION

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