

Green Facts

The protection of water quality in bored and dug wells.

The purpose of this Green Facts sheet is to assist people who rely on bored and dug wells for their water to achieve acceptable water quality. Improper well construction or a failure to carry out routine preventive maintenance on wells can result in contaminated water. In July 2007, Ontario amended Wells Regulation 903 to improve clarity and functionality and to ensure wells are properly constructed to better safeguard public health and our groundwater resources. These amendments became effective on December 31, 2007.

Ontario's Wells Regulation (Reg. 903, under the *Ontario Water Resources Act*) requires well contractors and well technicians who construct wells to be licensed by the Ministry of the Environment, and sets minimum construction standards to which all well contractors and well technicians, including private homeowners, must adhere. Although well construction and upgrading work can be done by a private well owner working on their own property, employing a licensed well contractor is strongly advised to ensure that proper minimum well construction standards are met and

protection of the water supply is achieved.

The regulation also states that “the well owner shall maintain the well at all times after the completion of the well’s structural stage in a manner sufficient to prevent the entry into the well of surface water and other foreign materials.”

Because some bored and dug wells are constructed using different types of equipment and are particularly susceptible to deterioration of their sanitary integrity, maintenance on these types of wells is especially important.

Factors contributing to the deterioration of dug well water quality

A poorly constructed or maintained well can result in the bacterial and/or chemical contamination of well water. The most common cause of these quality problems is foreign materials or poor-quality surface waters in the immediate vicinity of a well having direct access into the well. In Ontario, bored wells are usually constructed

by a bucket or auger-type rotary machine, whose boring operations produce holes of 76 centimetres or more in diameter. Bored wells are usually cased or lined with concrete having an inside diameter of 60 centimetres or more. Large diameter wells can also be constructed with other types of equipment, such as backhoes. The well casing can consist of steel, galvanized steel casing or fibre-reinforced plastic.

All joints around the casing or liner of a bored or dug well must be sealed using materials prescribed in the regulation to ensure maximum protection of the water supply. Indicators that the well sealing may be inadequate and that surface contamination may be gaining access to the well include:

- the presence of coliform bacteria in counts exceeding recommended limits set by health authorities;
- changes in the appearance or physical quality of the water such as turbidity, colour, taste or odour, especially after a rainstorm or snow melt;
- rapid or large changes in the well water level, especially after a rainstorm or snow melt;
- cascading or seeping of water and/or staining along the inside of the casing above the water level in the well;
- the presence of biological material such as animals, insects or roots in the well;
- the presence of unsealed or parted joints or cracks in the well casing wall or cover;

- the settlement of the ground surface around the top of the well;
- the presence of roof drainage pipes into the top of the well;
- the absence of a solid, watertight well cover set at an appropriate height above the ground surface; or
- changes in the chemical quality of the well water as detected through laboratory analysis

Preventive maintenance measures

It is important that well owners be aware of the measures that should be taken for the care and maintenance of a well to ensure it provides good quality water. The following measures are key:

Protect against contaminants

To safeguard a well supply from contamination, do not do anything near the well that might result in contamination. Do not store, use or dispose of refuse, manure, petroleum products, salt, fertilizers, pesticides, paints or any other potential contaminants in the vicinity of the well. When mixing pesticides or paints, the water supply line from the pressure system should be equipped with a backflow prevention device to prevent chemicals from flowing backwards down into the well.

Do not try to conceal the well with flower boxes, a garden or trees or place bird feeders nearby.

Watch for signs of damage

The well casing must be securely in place and watertight. If damaged or cracked, it must be replaced immediately since it will give contaminants direct access to the well. The well casing must be a minimum of 40 centimetres above the highest point on the ground surface. The top of the well casing in a dug or bored well must be covered with a solid, watertight well cover sufficient to prevent the entry of surface water and other foreign materials into the well.

No unsealed openings should exist in the wall or along the joints of concrete-tile casing from the well cap to a depth of 6 metres for new well construction. If any unsealed openings are found, they must be made watertight with a mastic sealing material that is approved for potable use by NSF International. Applying this from the outside of the casing is preferable.

Corrosion or other damage can occur and will allow surface waters or shallow seepage waters to enter directly into the well.

The annular space from the bottom of a dug well to a depth not closer than 2.5 metres to the ground surface must be filled with clean, washed gravel or sand or native materials that were excavated from the hole. The annular space from the top 2.5 metres to the ground surface must be filled with a suitable sealant that provides enough structural strength to support the weight of persons and vehicles that may move over the area after it is filled. Call a licensed well contractor with employees holding valid well technician licences (Class 2 – Well

Digging and Boring) if settlement of the sealant has occurred.

If the land surface around the well is depressed or susceptible to flooding, it should be raised and regraded so that it slopes away from the well, with the well casing also being raised if necessary.

If the land surface has been regraded, or if the casing has settled, check to see if the well casing extends 40 centimetres above the highest point within a three-metre radius of the well. If not, extend the casing to the required height and ensure the ground still slopes away from the well.

The well water's surface should be inspected, and any debris found floating in the surface of the water removed from the well. Under no circumstances should a well owner enter a well.

The connections through the well casing for pump and electrical lines must be made watertight and properly sealed. If the seal has failed, the material outside the casing may have to be excavated, a new seal installed, and the material carefully replaced.

All wells that have been repaired should be chlorinated. It is strongly recommended that the well water is tested for potability immediately after the chlorinated water has been evacuated out of the well and confirmed safe to drink before the well water is consumed.

Do not tamper with or remove any well tags.

A well record must be completed and submitted to the Ministry of the Environment for well construction, alteration including a well tag replacement. All abandoned wells must be plugged and sealed in accordance with the Wells Regulation and reported on a well record.

Additional information sources

You can obtain a copy of Regulation 903 from the e-Laws web site at www.e-laws.gov.on.ca or by calling Publications Ontario at **1-800-668-9938**. The following information sheets are available from the Ministry of the Environment's web site or by calling its Public Information Centre:

- The protection of water quality in drilled wells
- The protection of water quality in jetted or driven point wells
- Important facts about water well construction
- Managing your water well in times of water shortage

For further information about wells contact the Water Well Help Desk at **1-888-396-9355** (Toll Free in Ontario) or your nearest Ministry of the Environment office listed in the blue pages of your telephone directory.

You can also call the ministry's Public Information Centre at **1-800-565-4923** or **416-325-4000** or visit the ministry's Web site at www.ontario.ca/environment.