

Technical Bulletin

Wells Regulation – Flowing Test Holes & Dewatering Wells

This technical bulletin is one in a series of seventeen ¹ on well issues created for a person who:

- may have a new test hole ² or dewatering well ³ constructed in the future, or
- currently owns a test hole or dewatering well.

The purpose of this technical bulletin is to:

- summarize the information found in the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual published by the Ministry of the Environment, April 2014 (**hereon in referred to as the “Manual”**) regarding flowing test holes and dewatering wells, and
- present the flowing well requirements in Regulation 903 (Wells Regulation), as amended, made under the Ontario Water Resources Act for a test hole or dewatering well.

Flowing wells occur when water pressure in an aquifer causes the water level to rise above the ground surface. In many cases, if uncontrolled, the water will flow out of the top of the well.

¹ A list of the seventeen technical bulletins is shown in the Additional Information Sources section near the end of this technical bulletin.

² A “test hole” means a well that, (a) is made to test or to obtain information in respect of ground water or an aquifer, and (b) is not used or intended for use as a source of water for agriculture or human consumption, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

³ A “dewatering well” means a well that is not used or intended for use as a source of water for agriculture or human consumption and that is made, (a) to lower or control the level of ground water in the area of the well, or (b) to remove materials that may be in the ground water, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

The Wells Regulation prescribes that a:

- “flowing well” means a well that has a static water level above the adjacent ground surface.
- “static water level” means the level attained by water at equilibrium in a well when no water is being taken from the well.

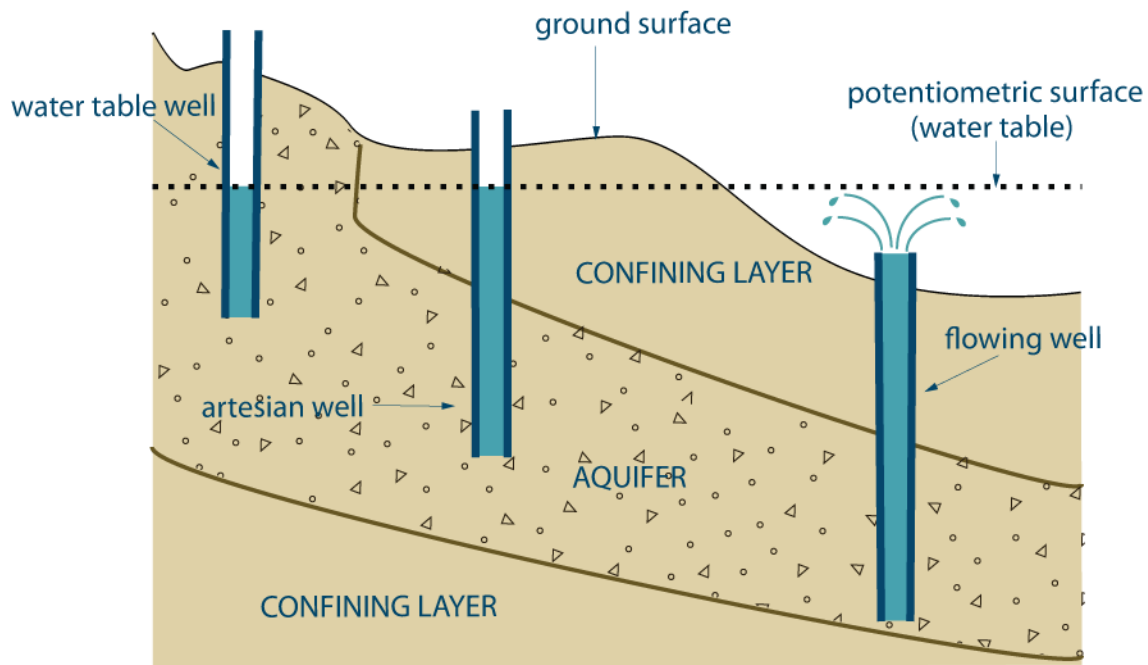


Figure 1: Geological Conditions that Create Flowing Wells

Figure 1 is not to scale, it is for illustrative purposes only and does not necessarily represent full compliance with other requirements found in the Wells Regulation

There are several things that are important to know with respect to flowing wells:

- In the majority of cases, only confined aquifers hold the potential for flowing wells.
- Strong artesian (hydrostatic head) pressure forces groundwater above the ground surface to create a flowing well.
- There are specialized construction techniques and devices that are used when constructing a well in flowing conditions to control the free flow of groundwater from the test hole or dewatering well.

- Improper construction can lower the aquifer's hydraulic pressure, waste groundwater and create flooding problems.
- Elevation and loadings (e.g. recharge, discharge) are two hydrogeological factors that create conditions for the development of flowing wells.
- Aquifer recharge events and groundwater withdrawals affect the groundwater level which may lead to intermittent flowing conditions.

It is essential to control flowing test holes and dewatering wells to:

- conserve groundwater resources,
- prevent adverse effects to the natural environment such as property damage, discharge of contaminated groundwater, flooding, sediment deposition, erosion and surface water impacts,
- preserve the pressure within the aquifer, and
- prevent the creation of a direct pathway for contaminants.

To address these concerns, the Wells Regulation provides minimum construction requirements for the construction of a flowing well.

Best Management Practice⁴ – Planning to Control the Flow

Prior to construction in an area known to have flowing conditions, it is essential that a plan be in place to control the flow of groundwater from the well.

The person constructing the well should consider retaining a Professional Geoscientist or Professional Engineer (consultant) experienced in the design of wells in flowing well conditions. If the person constructing the well is unfamiliar with the area or with flowing well conditions, it is important that a licensed well technician who works for a licensed well contractor and who is experienced with flowing wells be consulted. In some cases, installing a test hole may be appropriate to determine subsurface conditions.

⁴ Best management practices are recommended actions or steps that exceed the minimum regulatory requirements to better protect the groundwater and the natural environment but are not enforceable.

Wells Regulation Requirements for Flowing Test Holes & Dewatering Wells

If the test hole or dewatering well becomes a flowing well during well construction, the person constructing the well must:

- construct the test hole or dewatering well to accommodate and be compatible with a device that:
 - controls the discharge of water from within the well casing,
 - is capable of stopping the discharge of water from within the well casing,
 - is capable of withstanding the freezing of water in the well casing, and
 - is installed on or in the test hole or dewatering well.
- ensure that the construction of the test hole or dewatering well and the device installed will prevent any:
 - uncontrolled flow of water from the well or the well site, and
 - backflow of water into the well or well casing.

For clarification, the proper control of discharge water from a flowing well consists of:

- controlling, and if necessary, stopping the discharge of water from within the casing ⁵,
- preventing the discharge of water from around the casing by tightly sealing the space between the hole wall and the casing (annular space ⁶) and in some cases between two casings if there are multiple casings, and
- preventing groundwater originating near the well from discharging at the surface some distance away from the well.

For clarification on “casing” and “annular space” see the *Wells Regulation – Constructing New Test Holes & Dewatering Wells* technical bulletin.

⁵ “Casing” means pipe, tubing or other material installed in a well to support its sides, but does not include a well screen, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

⁶ “Annular space” means an open space between a casing or well screen and the side of a well, and includes space between overlapping casings within the well, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

Control Devices

A device to control the water from a flowing well can consist of one or many components installed in or connected to a test hole or well. For example:

- An air vacuum valve or a combination air vacuum valve and air release valve may need to be installed on a flowing well packer.
- An in-line ball-valve may need to be installed in the waterline or plumbing when using a multiple drawdown seal.

When selecting a flow control device, it is important to consider the environmental conditions (e.g. freezing), well design and water pressure within the well. Devices should be assessed to determine if they can withstand the pressure exerted by the water in the well.

There are a variety of devices that can control the flow of water from within the well casing. Chapter 11 of the Manual: *Flowing Test holes & Dewatering Wells* shows examples of devices and methods that are compliant with the Wells Regulation and some that are not compliant.

Abandonment Option

The requirements listed above do not apply if the test hole or dewatering well is abandoned according to the **Wells Regulation** (for further details see Chapter 17 of the Manual: *Abandonment: How to Plug & Seal Test Holes & Dewatering Wells*).

Costs

Every contract, between the well purchaser⁷ and the well contractor, for the construction of a test hole or dewatering well is deemed to contain a term that makes the well contractor responsible for the costs of:

- complying with the above requirements, and
- abandoning the well, if applicable.

⁷ "Well purchaser" means a person who enters into a contract for the construction of a well with a person who is engaged in the business of constructing wells, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

This is the case irrespective of whether the contract is written or verbal or whether this responsibility is explicitly written into the contract or not. The only exception is if there is a written contract between the well contractor and well purchaser that specifically releases the well contractor from these costs.

Venting Exemption

A new test hole or dewatering well in which the casing is used to transmit water out of the well (e.g., flowing well without a pump) does not need to meet air vent requirements. For further requirements for venting when a pump is installed in a flowing dewatering well see Chapter 12 of the Manual: *Equipment Installation*.

Exemption from Wells Regulation Flowing Well Requirements

The flowing well requirements of the Wells Regulation do not apply to persons who perform a well activity, including an alteration to an older or existing well that is considered a flowing well. In other words, if the test hole or dewatering well:

- is considered a flowing well before and during an alteration to a well or the removal and installation of a pump, then the flowing well requirements in section 14.7 of the Wells Regulation do not apply to the person performing the alteration or pump installation activity, or
- was not a flowing well during well construction but became a flowing well after the well construction activities had been completed and the well's structural stage was complete, then the flowing well requirements in section 14.7 of the Wells Regulation do not apply.

Other requirements, however, such as requirements for a well technician licence and well contractor licence will continue to apply, unless exempt.

Considerations of Ministry of the Environment Legislated Approval Instruments

In cases where there is an existing flowing well or a flowing well is encountered during construction, other environmental legislative requirements may be identified such as a requirement to obtain:

- a Permit To Take Water (PTTW) under subsection 34(3) of the Ontario Water Resources Act, or
- a sewage works environmental compliance approval under section 53 of the Ontario Water Resources Act for the discharge from a flowing well.

The potential requirement to obtain a PTTW from the Ministry of the Environment, or any other approval is an important consideration and should be determined prior to the construction of a new test hole or dewatering well.

A PTTW under the Ontario Water Resources Act may be required when the flow of groundwater freely discharges from a test hole or dewatering well at a rate that is greater than 50,000 Litres (11,000 Imperial gallons) on any one day. Therefore, it is important that the person constructing the test hole or dewatering well estimate the taking before constructing the well. If the estimate shows the flow will take more than 50,000 Litres on any one day, then the person constructing the test hole or dewatering well may need to obtain a PTTW from the Ministry prior to construction. If during construction the person takes more than 50,000 Litres of water on any one day without a permit, the person may be subject to enforcement (e.g., orders and charges).

More information on PTTW approvals can be found in Chapter 5 of the Manual: *Siting Considerations & Initial Planning* and on Ontario.ca.

A sewage works environmental compliance approval under the *Ontario Water Resources Act* may be required if the person discharges the water from the well owner's property and the discharge capacity exceeds 10,000 Litres (or 2,200 Imperial Gallons) per day. It is important for the person to determine if an environmental compliance approval is required before discharging the well water during the testing of the well yield. A guide to explain the sewage works process can be found on Ontario.ca.

Exempted Wells & Shallow Works

The Wells Regulation exempts certain types of wells, such as a pond or trench, from the Wells Regulation and from the sections on licensing of the Ontario Water Resources Act that pertain to wells ⁸.

A person who constructs, maintains or abandons a shallow works that meets the conditions set out in section 1.1 of the Wells Regulation:

- is exempt from the sections on licencing of the Ontario Water Resources Act that pertain to wells, ⁹ and
- need only meet the requirements found in section 1.1 of the Wells Regulation.

⁸ Sections 36 to 50 of the Ontario Water Resources Act, R.S.O. 1990, c. O. 40, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

⁹ Sections 36 to 50 of the Ontario Water Resources Act, R.S.O. 1990, c. O. 40, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

The shallow works exemption contained in section 1.1 of the Wells Regulation does not apply to a monitoring well that is constructed as part of a phase one or two environmental site assessment for a record of site condition ¹⁰.

See the *Wells Regulation – Understanding a Well, Test Hole and Dewatering Well* and *Wells Regulation – Shallows Works* technical bulletins for further information.

Water Supply Wells

Certain licensing and construction requirements for water supply wells are different from the requirements for test holes and dewatering wells as defined by the Wells Regulation. For further information on the requirements for water supply wells see the *Water Supply Wells – Requirements and Best Management Practices* Manual, published by the Ministry of the Environment, December 2009 and the Wells Regulation.

Additional Information Sources

The seventeen technical bulletins on test holes and dewatering wells are:

- Wells Regulation – Understanding the Meaning of Well, Test Hole and Dewatering Well
- Wells Regulation – Shallow Works Test Holes & Dewatering Wells
- Wells Regulation – Exempted Activities Performed on Wells, Including Test Holes & Dewatering Wells
- Wells Regulation – Test Hole and Dewatering Well Licensing
- Wells Regulation – Licensing (Class 5) for Individuals who Perform Tests on Wells
- Wells Regulation – Site Considerations & Initial Planning for Test Holes & Dewatering Wells
- Wells Regulation – Constructing New Uncased Test Holes & Dewatering Wells in Operation for No Longer than 30 Days
- Wells Regulation – Constructing New Test Holes & Dewatering Wells in Operation for No Longer than 180 Days
- Wells Regulation – Constructing New Test Holes & Dewatering Wells
- Wells Regulation – Constructing New Multi-level Monitoring Test Holes

¹⁰ Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm

- Wells Regulation – Completing the Structure of the New Test Hole or Dewatering Well
- Wells Regulation – Flowing Test Holes & Dewatering Wells
- Wells Regulation – Test Hole & Dewatering Well Maintenance
- Wells Regulation – Well Record, Reporting & Tagging for a Test Hole & Dewatering Well
- Wells Regulation – Test Hole & Dewatering Well Repairs & Alterations
- Wells Regulation – Well Abandonment - When to Plug & Seal a Test Hole or Dewatering Well
- Wells Regulation – Well Abandonment - How to Plug & Seal a Test Hole or Dewatering Well

These technical bulletins are available on Ontario.ca.

Further information on the maintenance of a test hole or dewatering well can be found in Chapter 11 of the Manual: *Flowing Test Holes & Dewatering Wells*.

A copy of the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual can be obtained on Ontario.ca.

A copy of the Ontario Water Resources Act, Regulation 903 as amended made under the Ontario Water Resources Act (Wells Regulation) and other regulations can be obtained from the e-Laws website at www.e-laws.gov.on.ca.

The publications are also available by calling the Publications Information Centre at 1-800-565-4923 or (416) 325-4000.

For further information about wells, contact the Wells Help Desk at 1-888-396-9355 (Well) or the nearest Ministry of the Environment office listed in the blue pages of the telephone directory.

Notice: This bulletin is being provided for information purposes only and is not intended, nor should it be construed as providing legal advice in any circumstances. The applicable environmental legislation, including the following, should be consulted.

- ***Ontario Water Resources Act, R.S.O. 1990, c. O. 40***
- ***R.R.O. 1990, Regulation 903 (Wells) as amended made under the Ontario Water Resources Act, R.S.O. 1990, c. O. 40***
- ***Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19***

Legislation and regulations change from time to time so it is essential that the most current versions be used.