

Groundwater Protection Regulation

HANDBOOK

THE BC GROUND WATER ASSOCIATION

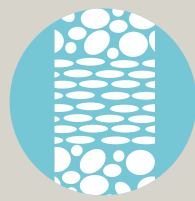


VERSION 1 | SEPTEMBER 2017

Types of Wells
These icons will be used throughout the handbook to indicate which wells are being referred to.

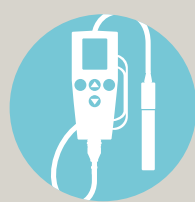


WATER SUPPLY
WELLS

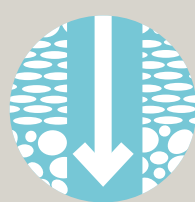


GEOTECHNICAL
WELLS

including
boreholes and
test pits



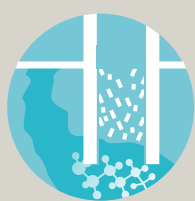
MONITORING
WELLS



RECHARGE AND
INJECTION WELLS



DEWATERING
AND DRAINAGE
WELLS



REMEDICATION
WELLS



CLOSED-LOOP
GEOEXCHANGE
WELLS

Glossary of abbreviations and administrative terms

Acting under the supervision

“Acting under the direct supervision” means:

- Confirming in advance the supervisory relationship and methods of communication
- The supervisor has considered the hydrogeological and drilling conditions likely to be encountered
- The supervisor is aware of all relevant actions taken by the supervised person
- The supervisor has the ability to provide directions at appropriate stages throughout the activity, and does so where needed
- The supervisor is able to appraise the work
- The supervisor is ultimately responsible for the work completed
- In some cases, this may require physical presence by the supervising person on the site when work is in progress.

Comptroller

A public service employee designated by the minister as the Comptroller of Water Rights to exercise the powers and perform the duties of the Comptroller of Water Rights under the WSA.

Domestic purpose

Domestic purpose includes the use of water by occupants of one or more private dwellings located on a single parcel for:

- drinking water, food preparation and sanitation;
- fire prevention;
- providing water to animals or poultry kept for household use, or as pets; and/or
- irrigation of a garden (including a lawn) not exceeding 1 000 m² on the same parcel or a parcel immediately adjacent to the dwelling

It does **not** include multi-family apartment buildings, hotels or strata titled or cooperative buildings.

Engineer

A public service employee, or an employee of a government corporation who is a professional engineer, or a professional geoscientist registered under the Engineers and Geoscientists Act or a holder of limited licence under the Engineers and Geoscientists Act acting within the scope of the limited licence, and who is designated as an engineer by the Comptroller.

Groundwater Statutory Official

A hydrogeologist or groundwater protection Officer of a given natural resource region of British Columbia.

GWPR

The Groundwater Protection Regulation, BC Regulation 39/2016.

Officer

A public service employee or an employee of a government corporation that exercises the powers and perform the duties required for an officer under the WSA.

Professional

A professional engineer (P.Eng), or a professional geoscientist (P.Geo), who is registered under the Engineers and Geoscientists Act, or holds a limited licence under the Engineers and Geoscientists Act and acts within the scope of the limited licence.

Qualified

For a well driller or a well pump installer, means one who has the qualifications prescribed as required to perform or supervise an activity in relation to a well or well pump.

Register

A register maintained by the Comptroller that identifies all registered well drillers and well pump installers authorized to operate in British Columbia.

Registration number

The number recorded in the Register by the Comptroller for a specified well driller or well pump installer.

Water manager

A public service employee or an employee of a government corporation that exercises the powers and perform the duties required for a water manager under the WSA.

Water supply system

A domestic water system that serves other than only one single-family residence.

Well driller

Within the scope of this handbook, a person who is registered in the BC Register of Well Drillers. This person has the qualifications required to perform or supervise an activity in relation to the well or well pump.

Well pump installer

Within the scope of this handbook, a person who is registered in the BC Register of Well Pump Installers. This person has the qualifications required to perform or supervise an activity in relation to the well or well pump.

WSA

The Water Sustainability Act, Bill 18 – 2014.

WSR

The Water Sustainability Regulation, BC Regulation 36/2016

Introduction

The British Columbia Ground Water Association is a not for profit organization representing well drillers, well pump installers, technical professionals, manufacturers and suppliers, and others working in the groundwater industry in the province of British Columbia. We strive to provide technical and professional leadership in the protection, promotion, and responsible development of groundwater resources.

This Handbook was designed to be a practical tool for well owners, contractors and professionals to:

- Explain their responsibilities in relation to wells, as set out by the Groundwater Protection Regulation (GWPR) that came into force under the Water Sustainability Act (WSA) in February 2016;
- Provide quick access to specific information related to well siting, construction, testing, operation, maintenance, deactivation, decommissioning, and reporting using simple language and clear illustrations;
- Point industry professionals to additional informational resources, recommended industry practices, and other legislation that relates to wells (e.g. the Water Sustainability Regulation under the Water Sustainability Act).

The intent of the GWPR is to protect groundwater and aquifers. The standards for well siting, construction, testing, operation, maintenance, deactivation, and decommissioning as laid out in the GWPR are minimum standards. More stringent alternate specifications can be determined by a registered well driller, a registered well pump installer or a qualified professional, based on their professional judgment and assessment of site specific conditions.

All persons dealing with wells and groundwater issues must ensure they are aware of, and comply with, the WSA, the GWPR and all other applicable federal, provincial and local government laws, as well as orders and directions provided by officials acting under them.

This Handbook is a summary only of the opinions of its authors at the time of writing, and is not intended as a complete statement of the law, or as legal advice. Neither the writers nor the BCGWA make any representation that any information in this Handbook is complete or accurate, or that any practice suggested herein will be appropriate in any particular circumstance, or that any suggested practice will lead to any particular result. Neither the writers nor the BCGWA accept any responsibility or liability for any error or omission in this Handbook, or for any use or misuse hereof. Any person relying upon any information in this Handbook does so at his or her own risk.

If there are any discrepancies between this Handbook and the WSA, the GWPR, other laws, or orders and directions issued by officials acting under them, then this Handbook should not be relied upon to the extent of any such discrepancy.

The suggested practices presented in this Handbook are suggested practices only, and do not supplement or modify any legal requirement. They have been compiled in good faith in consultation with experienced industry practitioners, and represent the best opinions of the writers at the time of writing.

If you have any questions about the WSA, GWPR or any other relevant law you should consult a representative of the BC Ministry of Environment or the BC Ministry of Forests, Lands, and Natural Resource Operations, and/or legal counsel.

Funding for the production of this Handbook was provided by the BC Ministry of Environment.

The Handbook was produced by GW Solutions Inc. and Capewell Design, who were retained by the BC Ground Water Association. Acknowledgement is also made to Geoexchange BC for partnering with the BC Groundwater Association from the proposal to the completion stage.

Many people were involved in the writing and editing of this Handbook. The BCGWA would like to thank Mike Wei, Ben Robinson, Sylvia Barroso, and Lindsay Macfarlane of the Ministry of Environment and Ministry of Forests, Lands, and Natural Resource Operations for their contributions to shaping the Handbook's structure and content. Other valuable contributors include Doug Geller, Michael Payne, David Mellis, Blaine Matuga, David Slade, Jim Clark, Bill Tuytel, and Scott Steward.

We sincerely hope that this Handbook will be of service to all working with and relying on groundwater resources, including tradesmen, technical professionals, and well owners and operators.



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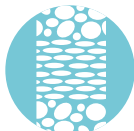




Well Classes



1. **Water supply wells** (GWPR 1, 4, 5, 14, WSA S49)
2. **Geotechnical wells** (GWPR 1, 3, 4, 5, 14, WSA S49),
3. **Monitoring wells** (GWPR 1, 5, 14, WSA S49),
4. **Recharge or Injection wells** (GWPR 1, 5, 14, WSA S49),
5. **Dewatering and drainage wells** (GWPR 1, 3, 4, 5, 14, WSA S49),
6. **Remediation wells** (GWPR 1, 5, 14, WSA S49),
7. **Closed-loop Geoexchange wells** (GWPR 1, 4, 5, 14, WSA S49),
8. **Permanent or temporary wells** (GWPR 1, 73, 74)



Eight (8) classes of wells are regulated under the Groundwater Protection Regulation (GWPR): water supply wells, geotechnical wells, monitoring wells, recharge and injection wells, dewatering and drainage wells, remediation wells, and closed-loop geoexchange wells. They differ in purpose, usage and characteristics. Specific requirements related to one or several particular well(s) can apply.



If a well is in more than one class or subclass of well, then the highest applicable standards and requirements of the GWPR apply.



Numbers in brackets refer to the corresponding GWPR or WSA sections.





CHAPTER 1 | WATER SUPPLY WELLS

Definition:

A water supply well is used for the purpose of exploring for, diverting or using groundwater, but does not include a drainage well, dewatering well or remediation well.

Examples of water supply wells:

- private domestic well
- community well (i.e. part of a water supply system that supplies more than one single family residence)
- irrigation well
- water bottling facility well
- open-loop geoexchange well

Exemption: Diversion and use of deep groundwater for oil and gas purpose is not subject to the GWPR, except for:

- requirements regarding artesian flow (*Tab 4.3, Tab 6.4*);
- reporting requirements for decommissioning flowing artesian wells (*Tab 7.2*); and
- prohibition of introducing foreign material into well (*Tab 6.1*)

Deep groundwater means:

- groundwater that is found below the base of fish scales marker, or if there is no base of fish scales marker, below strata that are older than the base of fish scales marker, and at a depth greater than 300 m (1,000 ft); or
- groundwater that is found at a depth greater than 600 m (2,000 ft).

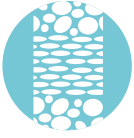
Who can construct a water supply well?

Persons qualified to construct a water supply well are indicated in *Table 1*.

Table 1: Person(s) authorized to construct a water supply well



Class of well	Category or subclass	Who can construct?
Water supply well	All, except flowing artesian wells	<ul style="list-style-type: none"> • Well driller, classified as water well driller • Person acting under the supervision of: <ul style="list-style-type: none"> - a well driller, classified as a water well driller - a professional who has competency in the field of hydrogeology or geotechnical engineering
Water supply well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Water supply well	Excavated (dug) wells < 15 m (50 ft) deep, except flowing artesian	Anyone



CHAPTER 2 | GEOTECHNICAL WELLS

Definition:

A geotechnical well is used for the purpose of obtaining geotechnical, hydrological, hydrochemical or stratigraphical information, but does not include a monitoring well or a well that involves water transfer (e.g. pumping or injecting water).

There are two subclasses of geotechnical wells:

- boreholes; and
- test pits

A borehole is a drilled geotechnical well that is intended to remain in use for its intended purpose for a maximum of 30 days after construction.

A test pit is an excavated geotechnical well that is intended to remain in use for its intended purpose for a maximum of 30 days after construction.

Examples of geotechnical wells:

- borehole drilled to assess soil stratigraphy or collect soil samples for a geotechnical or environmental assessment
- holes drilled or excavated to assess soil mechanical characteristics
- hole drilled or excavated to conduct a geophysical investigation

Exemptions:

Test pits are exempt from the requirements of the GWPR, except:

- requirements regarding artesian flow (*Tab 4.3, Tab 6.4*);
- requirements regarding decommissioning test pits (*Tab 7.2*);
- reporting requirements for decommissioning flowing artesian wells (*Tab 7.2*); and
- prohibition of introducing foreign material (*Tab 6.1*).

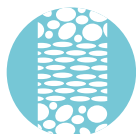
Exclusions:

- Seismic relief holes, including stone columns and stone densification points, and drill holes for the purpose of mineral exploration are NOT considered geotechnical wells.

Who can construct a geotechnical well?

Persons authorized to construct a geotechnical well are indicated in *Table 2*.

Table 2: Person(s) authorized to construct a geotechnical well



Class of well	Category or subclass	Who can construct?
Geotechnical well	All, except flowing artesian wells	<ul style="list-style-type: none"> • Well driller, classified as geotechnical / environmental driller or water well driller • Person acting under the supervision of: <ul style="list-style-type: none"> - a well driller, classified as a geotechnical / environmental driller or water well driller - a professional who has competency in the field of hydrogeology or geotechnical engineering
Geotechnical well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Geotechnical well	Test pits, except flowing artesian	Anyone
Geotechnical well	If the well does not penetrate an aquifer and no artesian flow is encountered	Anyone



CHAPTER 3 | MONITORING WELLS

Definition:

A monitoring well is used for the purpose of obtaining groundwater quality samples, monitoring the depth to groundwater, and/or assessing hydrogeological conditions. It may be equipped with monitoring instrumentation.

Examples of monitoring wells:

- well drilled to assess water quality
- well drilled to monitor water table elevations

Who can construct a monitoring well?

Persons authorized to construct a monitoring well are indicated in *Table 3*.

Table 3: Person(s) authorized to construct a monitoring well



Class of well	Category or subclass	Who can construct?
Monitoring well	All, except flowing artesian wells	<ul style="list-style-type: none"> Well driller, classified as water well driller or geotechnical / environmental driller Person acting under the supervision of: <ul style="list-style-type: none"> a well driller, classified as a water well driller or geotechnical / environmental driller a professional who has competency in the field of hydrogeology or geotechnical engineering
Monitoring well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Monitoring well	Excavated (dug) well < 15 m (50 ft) deep, except flowing artesian	Anyone



CHAPTER 4 | RECHARGE AND INJECTION WELLS

Definition:

An injection well is used to convey water into a geological formation, **with** the aid of a pump.

A recharge well is used to convey water into a geological formation, **without** the aid of a pump, and includes soakaway pits that are unfilled and cased.

Examples of recharge or injection wells:

- well drilled or dug to convey urban runoff into the ground or treated municipal wastewater
- recharge well for the purpose of artificially recharging an aquifer

Who can construct a recharge or injection well?

Persons authorized to construct a recharge or injection well are indicated in *Table 4*.

Table 4: Person(s) authorized to construct a recharge or injection well



Class of well	Category or subclass	Who can construct?
Recharge or injection well	All, except flowing artesian wells	<ul style="list-style-type: none"> • Well driller, classified as water well driller • Person acting under the supervision of: <ul style="list-style-type: none"> - a well driller, classified as a water well driller - a professional with competency in the field of hydrogeology or geotechnical engineering
Recharge or injection well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Recharge or injection well	Excavated (dug) well < 15 m (50 ft) deep, except flowing artesian	Anyone



CHAPTER 5 | DEWATERING AND DRAINAGE WELLS

Definition:

A dewatering well is used to divert or convey groundwater by pumping in order to:

- facilitate an excavation;
- stabilize an area of land, a building or any other improvement; or
- reduce water pressure in a geological formation.

A drainage well is used to divert or convey groundwater by gravity and without pumping.

Examples of drainage wells:

- pressure relief or 'seep' well installed at the base of an excavation to dissipate upward porewater pressure from an underlying confined aquifer
- well installed at the toe of a levee, dam, or tailings impoundment to relieve excess porewater pressure and prevent piping

Exemptions:

Drainage wells are exempt from the requirements of the GWPR, except:

- requirements regarding artesian flow (*Tab 4.3, Tab 6.4*);
- reporting requirements for decommissioning flowing artesian wells (*Tab 7.2*); and
- prohibition of introducing foreign material (*Tab 6.1*).

Exclusions:

The following artificial openings are not considered drainage wells:

- Drains, including building perimeter drains, curtain drains, French drains and backfilled soakaway pits;
- Sumps in buildings that are part of the drainage systems of the buildings;
- Shallow and linear ditches or infiltration trenches; and
- Prefabricated vertical drains, vertical strip drains, wick drains and sand drains for facilitating soil consolidation prior to building construction.

Who can construct a dewatering or drainage well?

Persons authorized to construct a dewatering or drainage well are indicated in *Table 5*.

Table 5: Person(s) authorized to construct a dewatering or drainage well



Class of well	Category or subclass	Who can construct?
Dewatering well	All, except flowing artesian wells	<ul style="list-style-type: none"> • Well driller, classified as water well driller • Person acting under the supervision of: <ul style="list-style-type: none"> - a well driller, classified as a water well driller - a professional with competency in the field of hydrogeology or geotechnical engineering
Dewatering or drainage well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Drainage well	Except flowing artesian	Anyone
Dewatering or drainage well	Excavated (dug) well < 15 m (50 ft) deep, except flowing artesian	Anyone



CHAPTER 6 | REMEDIATION WELLS

Definition:

A remediation well is used for the purpose of removing or treating of contaminants that have entered an aquifer.

Who can construct a remediation well?

Persons authorized to construct a remediation well are indicated in *Table 6*.

Table 6: Person(s) authorized to construct a remediation well



Class of well	Category or subclass	Who can construct?
Remediation well	All, except flowing artesian well	<ul style="list-style-type: none"> Well driller, classified as water well driller or geotechnical / environmental driller Person acting under the supervision of: <ul style="list-style-type: none"> a well driller, classified as a water well driller or geotechnical / environmental driller a professional who has competency in the field of hydrogeology or geotechnical engineering
Remediation well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow
Remediation well	Excavated (dug) well < 15 m (50 ft) deep, except flowing artesian	Anyone



CHAPTER 7 | CLOSED-LOOP GEOEXCHANGE WELLS

Definition:

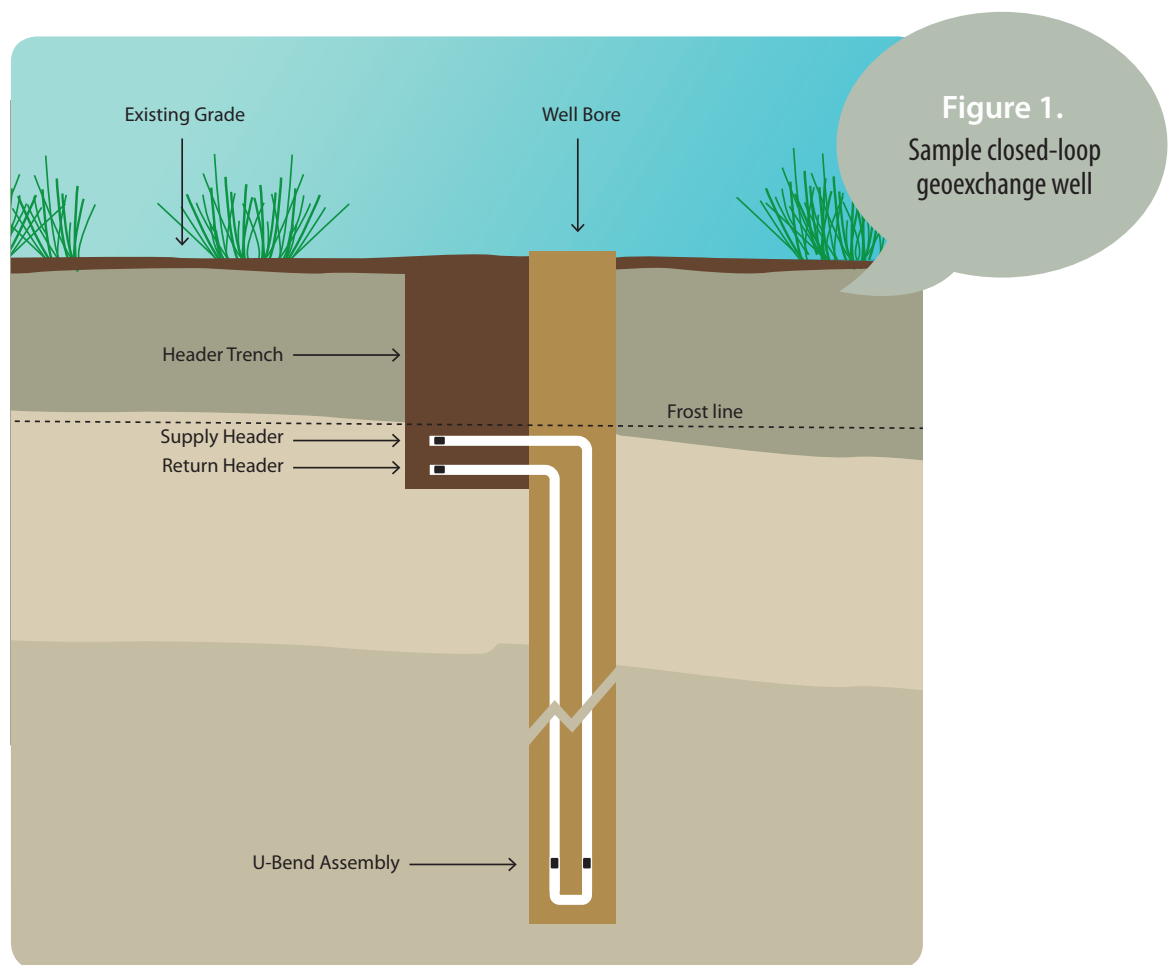
A closed-loop geotexchange well is used for the purpose of heat exchange in a closed-loop geotexchange system wherein there is no transfer of water between an aquifer and the well. *Figure 1* shows a simple schematic of a closed-loop geotexchange well.

A horizontal closed-loop geotexchange well that is less than 5 m deep is exempt from the requirements of the GWPR, except:

- requirements regarding artesian flow (*Tab 4.3, Tab 6.4*);
- reporting requirements for decommissioning flowing artesian wells (*Tab 7.2*); and
- prohibition of introducing foreign material (*Tab 6.1*).

Who can construct a closed-loop geotexchange well?

Persons authorized to construct a closed-loop geotexchange well are indicated in *Table 7*.



This figure only shows a single loop; closed-loop geotexchange systems are typically comprised of multiple loops.

Table 7: Person(s) authorized to construct a closed-loop geoechange well



Class of well	Category or subclass	Who can construct?
Closed-loop geoechange well	All, except flowing artesian well	<ul style="list-style-type: none"> • Well driller, registered after Feb 29, 2016, classified as a geoechange well driller • Well driller, registered before Feb 29, 2016, classified as water well driller • Person acting under the supervision of: <ul style="list-style-type: none"> - a well driller, classified as a geoechange well driller (registered post-2016) or a water well driller (registered pre-2016) - a professional with competency in the field of hydrogeology or geotechnical engineering
Closed-loop geoechange well	Flowing artesian wells	Same as above but the well driller or professional must also have competency in stopping and controlling artesian flow

CHAPTER 8 | PERMANENT OR TEMPORARY WELLS

A permanent well is intended to be in service for a period of more than 90 days after construction.

A temporary well is intended to be in service for a maximum period of 90 days after construction.

If a temporary well is intended to remain in service for more than 90 days, then the well owner must make it a permanent well that meets the requirements of the GWPR for that class of well.

Note:

By definition, geotechnical wells (boreholes and test pits) are temporary wells, as they must not remain in service for more than 30 days.

If a borehole is intended to remain in service for more than 30 days, then the well owner must make it a temporary or permanent well that meets the requirements of the GWPR for that class of well (e.g., borehole to monitoring well).

Test pits must not remain in service for more than 30 days, and must be decommissioned in accordance with the decommissioning requirements of the GWPR.

Registration Of Well Drillers And Well Pump Installers

1. Qualifications for Activities in relation to Wells
2. Registration Application Process
3. Frequently Asked Questions related to Registration
4. Registration Approval Process
5. Change of Information
6. Obtaining Certification in BC
7. Frequently asked questions related to Obtaining Certification in BC

This tab refers to Part 2 of the GWPR and S49-50 of the WSA.

CHAPTER 1 | QUALIFICATIONS FOR ACTIVITIES IN RELATION TO WELLS

Constructing, altering and decommissioning wells, and installing well pumps, are restricted activities in British Columbia. In most cases, these activities must be performed or directly supervised by person listed on the [Register of Well Drillers](#) or [Register of Well Pump Installers](#).

Under the WSA and the GWPR, a registered well pump installer, water well driller, geoexchange driller, and geotechnical / environmental driller are each qualified to perform a specific set of activities, as listed in *Table 1*.

Well drillers registered prior to February 29, 2016 will be able to continue to drill the types of well they were permitted to drill before this date. For example, anyone already registered as a water well driller can continue to drill any class of well and install well pumps.

Specific qualifications for activities related to flowing artesian wells:

When flowing artesian conditions are encountered during well construction, the artesian flow must be stopped or controlled by:

- a registered well driller who has competency or experience in stopping or controlling artesian flow; or
- a registered well driller who is supervised by another registered well driller or professional who has competency or experience in stopping or controlling artesian flow.

A well pump installer is not authorized to decommission or deactivate a flowing artesian well.

Table 1: Qualifications for activities for groundwater trades

Trade	Qualifications for activities
Water well driller	<ul style="list-style-type: none"> • Constructing any class of well other than a closed-loop geotreatment well (if registered after Feb 29, 2016) • Deactivating or decommissioning any class of well • Disinfecting any class of well • Installing / repairing / removing / testing a well pump or wellhead of a water supply well, dewatering well, injection well or remediation well • Conducting a flow test on a well • Installing a liner in a water supply well • Redeveloping, rehabilitating, or hydrofracturing a well
Geotreatment driller	<ul style="list-style-type: none"> • Constructing a closed-loop geotreatment well • Decommissioning or deactivating any class of well
Geotechnical / environmental driller	<ul style="list-style-type: none"> • Constructing a monitoring well, geotechnical well or remediation well • Decommissioning or deactivating any class of well
Well pump installer	<ul style="list-style-type: none"> • Installing / repairing / removing / testing the well pump or a wellhead of a water supply well, dewatering well, injection well or remediation well • Conducting a flow test on a well • Disinfecting any class of well • Decommissioning or deactivating any class of well, other than a flowing artesian well • Installing a liner in a water supply well
Excavation contractor	<ul style="list-style-type: none"> • Excavating test pits and dug wells under certain circumstances

CHAPTER 2 | REGISTRATION APPLICATION PROCESS

To apply to be listed on the Register of Well Drillers or Register of Well Pump Installers, you must:

- Be at least 19 years old, and
- Be certified by a recognized authority

You must also hold one of the accepted certifications corresponding to the trade you are applying for (*Table 2*).

You must complete the [Application for registration form](#) (*Tab 9.2*), collect the following documentation:

- A proof of age proving the applicant is at least 19 years old (e.g., copy of birth certificate, driver's licence, passport), and
- A copy of the certificate(s) of qualification (CoQ)

and then submit the completed form and documentation by mail to:

Deputy Comptroller
Ministry of Environment
PO Box 9362 Stn Prov Govt
Victoria B.C.
V8W 9M2

Or by email to GroundWater@gov.bc.ca

Table 2: Accepted certifications

Class of driller or well pump installer	Accepted certifications
Water well driller	<ul style="list-style-type: none"> • As a Water Well Driller by the Province of BC through the ITA • An equivalent certificate issued by another province or territory of Canada • If certified prior to April 26, 2013, as a Ground Water Drilling Technician issued by the Canadian Ground Water Association
Geoexchange driller	<ul style="list-style-type: none"> • As a Geoexchange Driller by the Province of BC through the ITA • An equivalent certificate issued by another province or territory of Canada
Geotechnical / environmental driller	<ul style="list-style-type: none"> • As a Geotechnical/Environmental Driller by the Province of BC through the ITA • An equivalent certificate issued by another province or territory of Canada
Well pump installer	<ul style="list-style-type: none"> • As a Well Pump Installer by the Province of BC through the ITA • An equivalent certificate issued by another province or territory of Canada • If certified prior to April 26, 2013, a certificate as a Ground Water Pump Technician of a particular class issued by the Canadian Ground Water Association.

CHAPTER 3 | FREQUENTLY ASKED QUESTIONS RELATED TO REGISTRATION

Can I register for multiple trades?

Yes. You can apply for registration for multiple trades (e.g., Geotechnical Driller and Geoexchange Driller) if you provide the information required for each, including appropriate certification.

Is there a fee for registration?

No. Submission of an application for registration is free.

Can my drilling company be registered?

No. The GWPR only allows the registration of individual well drillers and well pump installers.

Does the Province recognize certification from other provinces?

Yes. Certification issued by another province or territory may be accepted on a case-by-case basis to ensure consistency in qualifications (for example, a water well driller certificate issued by Alberta's Red Deer College would be accepted). For more information on what may be accepted contact GroundWater@gov.bc.ca.

What are my responsibilities once I become registered?

You are responsible for knowing, understanding and complying with the standards and requirements set out in the WSA and the GWPR for drilling, constructing, reporting, maintaining and decommissioning wells, and installing pumps and other works. You should also be aware that there are requirements under other regulations for working on a well that may affect you. For more information, visit What You Need to Practice in BC.

You are also responsible for showing your proof of qualification (i.e., the identification card issued to you upon successful registration) to statutory officials upon request. You are also responsible for contacting the comptroller within 60 days of any changes to your information in the register or if you are no longer actively working in Canada as a well driller or well pump installer.

What are the consequences if I do not register? If you are not registered with the province, you are not legally permitted to perform most well drilling or pump installation activities in B.C. However, you can work as an unregistered well driller or well pump installer under the direct supervision of a registered well driller, registered well pump installer, or a professional with a competency in hydrogeology or geotechnical engineering. If you are unregistered and work without direct supervision, you are in contravention of the WSA and may be subject to enforcement procedures.

Can a person ever be taken off the Register for shoddy work?

No. You can only be removed from the Register if you:

- Fail to meet a requirement for registration (e.g., falsifying experience or evidence);
- Fail to maintain a requirement for registration; or
- Are no longer actively working in Canada as a well driller or well pump installer.

Issues related to shoddy work will be addressed through compliance and enforcement actions.

More information related to registration can be found at the Information for [Well Drillers & Well Pump Installers](#) web page. Questions related to registration can be emailed to GroundWater@gov.bc.ca.

CHAPTER 4 | REGISTRATION APPROVAL PROCESS

Well drillers:

If your registration is approved,

- you will be added to the Register of Well Drillers by the comptroller
- you will receive a congratulatory letter acknowledging your registration and an identification card that states your class(es) of well driller (i.e., water well driller, geotechnical / environmental or geoexchange driller) and constitutes your proof of qualifications.

Well pump installers:

If your registration is approved,

- you will be added to the Register of Well Pump Installers by the comptroller
- you will receive a congratulatory letter acknowledging your registration and an identification card that constitutes your proof of qualifications.

CHAPTER 5 | CHANGE OF INFORMATION

If you are registered as a water well driller, geoexchange driller, geotechnical/environmental driller or well pump installer, you must advise the comptroller in writing, within 60 days of any changes to the information listed on the Register, or if you are no longer actively working in Canada as a well driller or as a well pump installer.

A driller or well pump installer who is no longer operating heavy equipment but regularly supervises the work of other drillers or pump installers is considered to be 'actively working.'

CHAPTER 6 | OBTAINING CERTIFICATION IN BC

A Certificate of Qualification (CoQ) for well drillers and well pump installers can be obtained from the Province of BC through the Industry Training Authority (ITA). The ITA issues CoQs for well pump installers and for all classes of well drillers (water well driller, geotechnical/environmental driller, and geoexchange driller).

If you have extensive experience working in a trade (in BC or elsewhere) but have never been certified in Canada, you can apply to challenge the ITA certification exam. You must demonstrate at least 4,860 hours of applicable work experience performing job tasks associated with your trade.

It is possible to hold a CoQ for more than one trade. If you already hold a CoQ for a particular trade, you may be credited hours of work experience when applying for a CoQ for another trade, as set out in *Table 3*.

Table 3. Possible credited hours of work experience for holders of additional CoQs

Trade Certificate Type	Hours of Trade-Related Work Experience Required	Possible Credited Hours for holders of other CoQs			
		CoQ Water Well Driller	CoQ Geotechnical/ Environmental Well Driller	CoQ Geoexchange Well Driller	CoQ Well Pump Installer
CoQ Water Well Driller	4,860		2,430	2,430	1,600
CoQ Geotechnical/ Environmental Well Driller	4,860	3,610		3,240	510
CoQ Geoexchange Well Driller	4,860	3,900	3,900		1,210
CoQ Well Pump Installer	4,860	1,940	490	980	

CHAPTER 7 | FREQUENTLY ASKED QUESTIONS RELATED TO OBTAINING CERTIFICATION IN BC

Who is eligible to apply?

You must demonstrate that you have at least 4,860 hours of applicable work experience performing job tasks associated with your trade. For example, if you are a geotechnical/environmental well driller, you must have experience performing at least 70% of the job tasks listed in the Occupational Analysis Chart of the Geotechnical/Environmental Well Driller Program, available on the ITA's [Geotechnical/Environmental Well Driller](#) web page.

How do I apply?

You must submit to the ITA a completed Challenge Application Form, the application fee, and either an Employer Declaration form (if working for someone else) or a Statutory Declaration form (if self-employed). These are available on the ITA page specific to your trade.

How long does it take to get an answer on challenging the exam?

The assessment process can take 6 to 8 weeks. If you are approved to challenge the ITA exam, you will be notified by email and asked to schedule your exam at that time. If you are not approved, you will receive a notification letter via email stating the reason for the non-approval.

Where and how do I schedule my exam?

ITA offers regularly scheduled exam sessions throughout the year at 12 locations around the province. If you can't write your exam at one of these sessions, ITA can arrange for you to write your exam at one of the 60 Service BC offices around the province. You can schedule your exam up to 90 days in advance. It's a good idea to register early, since exam sessions are filled on a first-come, first-serve basis. For more information on how to schedule your exam visit the ITA's [Writing Your Exams](#) web page.

How long after I am approved do I have to write the exam?

You have one year from the date your application is approved.

What mark do I need to pass?

70% on a multiple-choice exam.

What happens if I fail the exam - can I rewrite?

Yes. You may re-write your exam during the 1-year approval period, however, proof of upgrading and re-write fees may apply. If you do not pass the exam within the 1-year period, you will need to reapply and pay the application fee again. Visit ITA's [Rewrites](#) web page for the steps you need to take to rewrite an exam.

What if English is not my first language?

If English is your second language, you may apply to the ITA to use a:

- Translator/Interpreter (at the applicant's expense) during your exam. ITA must receive your application 30 days before your exam. You will be given an additional hour to write your exam.
- Translation Dictionary during your exam. ITA must receive your application 30 days before your exam. You will NOT be given extra exam time to use a translation dictionary.

For additional information on exam accommodations visit the ITA's [Accommodations: ESL & Disability Options](#) web page.

Before You Drill Or Alter

1. Information on existing wells and aquifers
2. Well siting and setbacks (GWPR 18, 19, other regulations)
3. Physical and Environmental hazards
4. Flowing artesian conditions
5. Wells in pits (GWPR 36, 37)
6. Short term diversion or use of groundwater and surface water for well drilling (WSR Part 4)

A significant amount of the material presented in this tab is NOT part of the GWPR, and represents suggested industry practices and other regulatory requirements to consider before you drill or alter a well to ensure that it successfully achieves its intended purpose and does not negatively impact other water users, public health and safety, or the environment.

Numbers in brackets refer to the corresponding GWPR or WSA sections.

CHAPTER 1 | INFORMATION ON EXISTING WELLS AND AQUIFERS

Before constructing a well on a property, consider the local hydrogeological conditions, such as the type of aquifer, the depths of water producing units, the depth of the water table, the reported yield of nearby wells, etc. This information may be accessed from the following sources:

BC Water Resources Atlas and iMapBC

The BC Water Resources Atlas is a mapping tool that allows you to look up information on a single well, aquifer, or stream in relation to other features (e.g. roadways, topography, geology). For access to a wider selection of geospatial information related to BC's natural resources, use iMapBC.

The Provincial Groundwater Observation Well Network

The Provincial Groundwater Observation Well Network provides access to past and current groundwater levels measured in monitoring wells operated by the Province, via an interactive map.

WELLS Database

The WELLS database provides information on a particular water well, such as borehole lithology, well depth and diameter, driller estimated well yield, and the water level at the time of drilling.

EcoCat

The Ecological Reports Catalogue (EcoCat) is an online catalogue of technical reports from a variety of professionals. Some of these reports describe aquifer mapping and testing activities.

Before constructing a well that will require a licence under the WSA (*Tab 5*) (i.e., a non-domestic well), contact your regional water manager (Ministry of Forests, Lands and Natural Resource Operations) so that you are aware of existing water use limitations in the area ahead of time.

CHAPTER 2 | WELL SITING AND SETBACKS

BEST PRACTICES

Conduct an on-site consultation before sending the drilling rig to the site to verify rig accessibility, setbacks from features, and to confirm drilling location.

**Horizontal setbacks for new water supply wells:**

To safeguard the quality and quantity of the groundwater resource, new water supply wells used to supply water for domestic purposes must be sited at least the following distances from existing features (*Table 1, Figure 1*):

- 6 m (20 ft) from the nearest private dwelling (*Health Hazards Regulation*);
- * 15 m (50 ft) from an existing water supply well that is used or intended to be used (GWPR), unless:
 - the owner of the proposed well also owns the existing water supply well and only one well is proposed to be drilled, or
 - it is not practicable to do so. In this case, a professional with competency in hydrogeology can prepare alternative specifications for the siting of the new well, so that the existing uses of the existing water supply well will not be adversely affected. These alternative specifications must be submitted to and accepted by an engineer;
- 30 m (100 ft) from a known or probable source of contamination (e.g. cesspool, privy vault, manure heapstable, pig sty) (*Health Hazards Regulation*);
- * 120 m (400 ft) from an existing cemetery or a dumping ground (e.g., landfill), unless contamination of the well would be impossible because of the physical conformation (*Health Hazards Regulation*).

BEST PRACTICES

- 50 m (165 ft) from the shoreline of a saltwater body. Wells less than 500 m (1,650 ft) from the coastline are at risk of drawing in saltwater (see *Best Practices for Prevention of Saltwater Intrusion*).



Setbacks for new features relative to existing water supply wells:

To safeguard public health and groundwater quality, the discharge area of a new sewerage system or stormwater infiltration system must be sited at least the following distances from an existing water supply well (*Table 1, Figure 1*):

- * 30 m (100 ft) for a sewerage system with a maximum daily design flow of less than 22.7 m³/day (*Sewerage System Regulation, Sewerage System Standard Practice Manual*);
- * 60 m (200 ft) for a sewerage system with a maximum daily design flow of less than 22.7 m³/day, from a high pumping rate community well (i.e. a well or well group that supplies water to more than 500 persons or is pumped for more than 3 months at a rate exceeding 190 L/min (50 USgpm)) (*Sewerage System Standard Practice Manual*);
- * 90 m (300 ft) for a sewerage system with a maximum daily design flow of less than 22.7 m³/day, from a high pumping rate community well completed in an unconfined aquifer (*Sewerage System Standard Practice Manual*);
- 60 m (200 ft) for a sewerage system that has a maximum daily flow of between 22.7 and 37 m³/day, regardless of whether the water supply well is completed in a confined or unconfined aquifer (*Municipal Wastewater Regulation*);
- 90 m (300 ft) for a sewerage system that has a maximum daily flow greater than or equal to 37 m³/day (*Municipal Wastewater Regulation*);
- * 300 m (1,000 ft) for a sewerage system that has a maximum daily flow greater than or equal to 37 m³/day, from a water supply well completed in an unconfined aquifer (*Municipal Wastewater Regulation*);
- The zone of influence of the domestic water supply well must not include the point of discharge of a non-disinfected effluent (*Municipal Wastewater Regulation*).
- 60 m (200 ft) for an underground stormwater infiltration system (*Underground Stormwater Infiltration - Best Practices for Protection of Groundwater Resources in BC*)

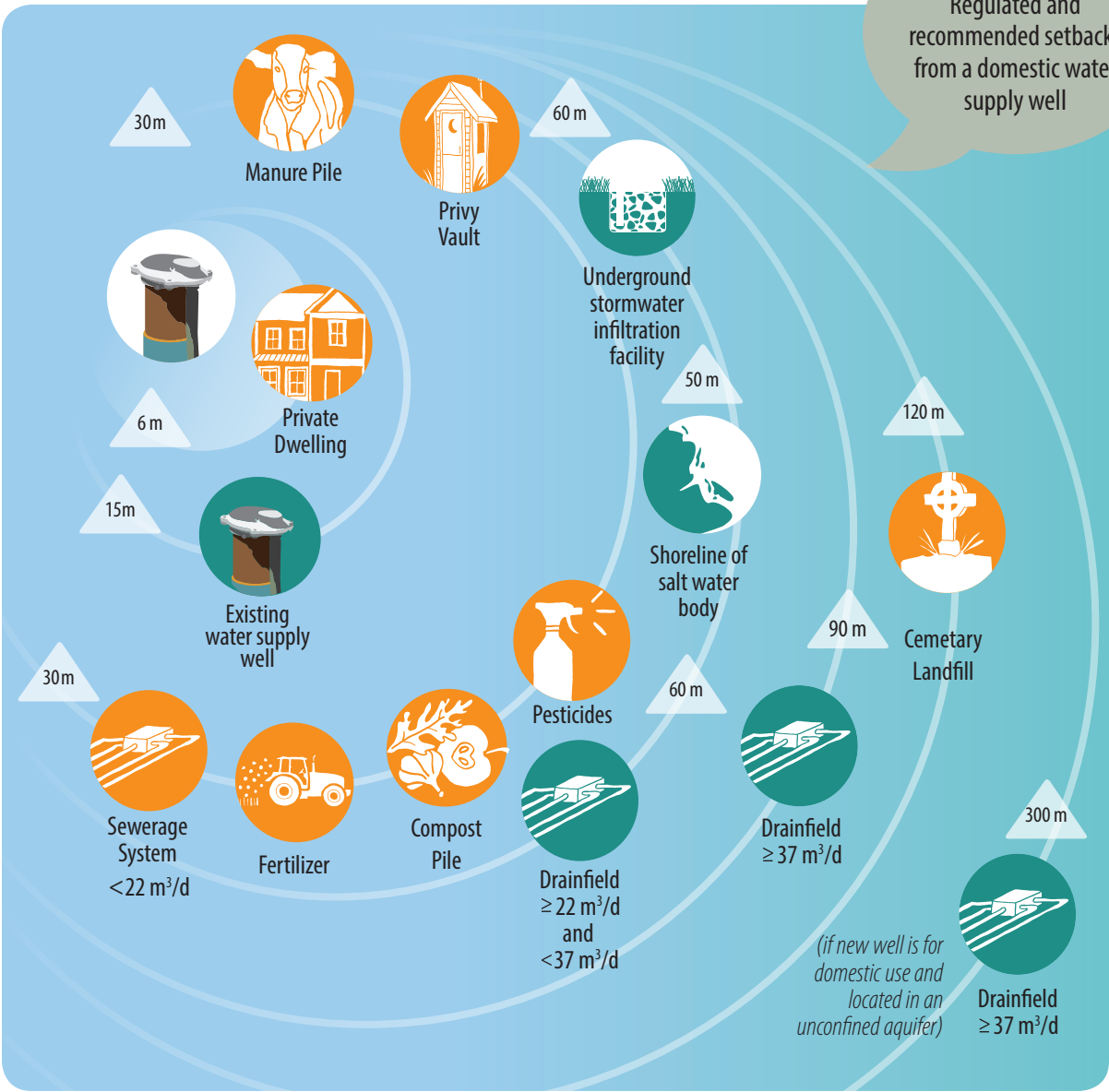
If one or more of the above setback distances applies to a well, the most conservative (greatest) setback distance should be used.

Setbacks marked with an asterisk (*) may be reduced following consultation with a professional with competency in hydrogeology and/or a local regulatory authority. In these cases, refer to the corresponding regulations and/or guidelines, as special conditions may apply. It is recommended that the professional consult with the appropriate regulatory authority before a hydrogeological study is initiated. For setbacks from sewerage systems under the SSR, refer to *APEGBC's Professional Practice Guidelines for Onsite Sewerage Systems*.

Table 1: Summary of minimum horizontal setbacks from water supply wells

Horizontal Setback		Feature	Regulation	Guideline		Comments
(m)	(ft)					
6	20	Private dwelling	HHR	-		
15	50	Existing water supply well	GWPR	-	*	
30	100	Known or probable source of contamination	HHR	-		
120	400	Cemetery or dumping ground	HHR	-	*	
50	160	Shoreline of a saltwater body	-	Best Practice		
30	100	Sewerage system maximum daily flow < 22.7 m ³ /day	SSR	SSSPM	*	
60	200	Sewerage system maximum daily flow < 22.7 m ³ /day	SSR	SSSPM	*	From a 'high pumping rate community well'
90	300	Sewerage system maximum daily flow < 22.7 m ³ /day	SSR	SSSPM	*	From a 'high pumping rate community well' completed in an unconfined aquifer
60	200	Sewerage system 22.7 m ³ /day ≤ maximum daily flow < 37 m ³ /day	MWR	-		
90	300	Sewerage system maximum daily flow ≥ 37 m ³ /day	MWR	-		
300	1,000	Sewerage system maximum daily flow ≥ 37 m ³ /day	MWR	-	*	From a water supply well completed in an unconfined aquifer
Zone of influence of the well	Zone of influence of the well	Point of discharge of a non-disinfected effluent	MWR	-		
60	200	Underground stormwater infiltration facility		Best Practice		

Figure 1.
Regulated and recommended setbacks from a domestic water supply well





Siting water supply wells near surface water:

There is no regulated setback for a well from a **freshwater stream, river, lake or wetland** in the GWPR. However, many municipalities set out riparian setbacks in their bylaws.

Consider the likelihood of **hydraulic connection** between the source aquifer and nearby stream(s), and the environmental flow needs of the stream(s). A well that is hydraulically connected to a stream is reasonably likely to cause a change in flow in that stream when it is pumped.

Environmental flow needs of a stream (EFN) refer to the volume and timing of water flow required for proper functioning of the aquatic ecosystem. For more information, refer to the Province's *Determining the Likelihood of Hydraulic Connection* guidance document, and the Province's *EFN policy*. It is prudent to site a non-domestic well farther from a stream that has a high likelihood of being hydraulically connected with the source aquifer, especially if there are existing *Water Reservations* or *Water Allocation Restrictions* for that aquifer or stream.

There is no regulated setback for a well from a **saltwater body**. Water supply wells sited within 500 m (1,650 ft) of the coastline are at risk of drawing in saline water, particularly in areas of low to moderate grade, on peninsulas, and in areas of high groundwater demand. In these areas, avoid drilling within 50 m (165 ft) of the coastline. Refer to the Province's *Best Practices for Prevention of Saltwater Intrusion*.

Siting water supply wells near potential contaminant sources:

Septic fields, septic tanks, leaking sewer lines, agricultural waste stockpiles, and surface water are potential sources of pathogens to groundwater. Consider a well's potential exposure to pathogens when you decide on its location and depth. Shallow wells less than 15 m (50 ft) deep that are located in a flood prone area or within 150 m (500 ft) of the natural boundary of a stream or lake and wells within 300 m (1,000 ft) of a probable source of enteric viruses can be at risk. Drinking water officers who issue permits for public water supply systems refer to the Ministry of Health's *Guidance Document for Determining Ground Water at Risk of Containing Pathogens* when making a determination of water treatment measures needed to protect the water consumer.

Consider the direction of groundwater flow when siting a well. Locate the well up-gradient (i.e., up the groundwater flow path) from potential contaminant sources, where possible. Groundwater generally flows from higher ground to lower ground.



Siting water supply wells to facilitate access:

Consider how drill rigs and other heavy equipment will access the well for future inspection, repair and maintenance activities. For this reason:

- Keep wells outside of buildings, basements and sheds.
- If a pump house is to be constructed, locate it at least 3 m (10 ft) from the well. Tie in any overhead power lines servicing the pump house on the side opposite the well (*Photos 1 and 2*), or route them underground.
- A well sited near a driveway is usually easier to access than a well sited in a back yard (decks, patios, landscaping, and pools can get in the way). Ditches, banks, fences, property lines, trees, sheds, crops, and soft, wet ground can also impede well access.
- Site wells near roadways at least 3 m (10 ft) from the road surface, and protected from vehicular damage using a post, boulder, or cement barrier.



Photo 1. Pump house with power line obstruction



Photo 2. Well too close to power pole



Siting permanent dewatering wells:

Permanent dewatering wells must be at least 15 m away from an existing water supply well unless:

- the owner of the proposed well also owns the existing water supply well and only one additional well will be drilled; or
- it is not practicable to do so. In this case, a professional with competency in hydrogeology can prepare alternative specifications for siting of the new well, so that the use(s) of the existing water supply well will not be adversely affected. These alternative specifications must be submitted to and accepted by an engineer.

Reporting requirements:

Any accepted alternative specifications regarding the siting of a new well must be included in the well construction report, if such a report needs to be submitted to the comptroller (*Tab 4.10*).



Siting recharge and injection wells:

Recharge and injection wells for the purpose of conveying urban runoff into the ground must be designed by a professional with competency in hydrogeology or geotechnical engineering to prevent any significant adverse impact on groundwater quality. The design must include:

- A minimum horizontal distance between the proposed well and an existing water supply well, and
- A minimum vertical distance between the point of infiltration of the proposed well and the water table below, to ensure that the point of infiltration is above the water table at all times.

For all recharge and injection wells, if the point of infiltration of water is below the seasonal high water table, then the design must be submitted to and accepted by an engineer.

Refer to the Province's *Underground Stormwater Infiltration: Best Practices for Protection of Groundwater Resources in BC*.



Siting closed-loop geexchange wells:

Determine whether the project is being designed by a professional or by the contractor. Many municipalities require engineered schedules for residential geexchange system construction. Know the differences and requirements for each.

All closed-loop geexchange wells and piping should be a minimum of 1.5 m (5 ft) away from structure foundations and from buried water and wastewater piping. Ensure they are buried a sufficient depth below ground surface to avoid freeze concerns. Where these separations cannot be maintained, insulation may be required.

Spacing between wells is a critical design factor. Make sure you have enough space for the number of wells needed. Do not alter well spacing without contacting the design engineer or revising the contractor design parameters.

Check whether a formation thermal conductivity test is required for the site. If not, use the first well report to determine the approximate thermal conductivity of the ground and design the borefield accordingly. If ground conditions vary significantly, make sure this is accounted for in the field design. All wells should be the same depth to ensure balanced flow.

Consult the GeoExchange BC *Professional Guidelines* for more information.

CHAPTER 3 | PHYSICAL AND ENVIRONMENTAL HAZARDS

Ensure that safety is the number one priority on all sites. Hold regular “tailgate” safety meetings to review site specific safety and environmental hazards. Develop a site safety plan and communication procedures (e.g. contacts list) in case of emergency (e.g. how to guide first responders to a remote drill site). Larger, more complex sites usually have an indoctrination meeting to inform all personnel of site safety policies.

Perform and document daily rig inspections, as required by Work Safe BC. Ensure that all members of the drill crew have necessary training and that this training is documented.

Before you drill or excavate a well you must ensure that there are no buried utilities at the proposed location. Buried infrastructure may include:

- Electric cables
- Gas – oil – steam pipelines
- Communication CATV lines
- Water pipelines
- Sewer pipelines

To locate underground utilities at a proposed location, contact BC OneCall by phone (1-800-474-6886) or through their website (www.bconecall.bc.ca) at least 3 working days before you start work.

BC OneCall will provide you with a map showing the location(s) of buried utilities, or will send a technician on site to mark them. At some sites, you may need to hire a professional utility locator, or ‘daylight’ buried utilities. Ensure all drilling locations are clearly marked and drill only in areas confirmed to be at least 1.5m (5 ft) from buried utilities.

Check minimum limits of approach to overhead powerlines with BC Hydro.

Devise a plan for keeping drill cuttings, development water, and turbid discharge water out of nearby watercourses (e.g. excavated settling basin or settling tank, silt fencing).

At known or potentially contaminated sites, discuss what contaminants are expected and how to control exposures as required.

CHAPTER 4 | FLOWING ARTESIAN CONDITIONS

Flowing artesian wells occur when the water level in the well rises naturally above the ground surface or the top of the well casing, either intermittently or continuously (*Figure 2*). Flowing artesian wells can occur in unconsolidated or bedrock aquifers. The WSA requires that flowing artesian wells be brought “under control”.

In most cases, this is safer, easier and less costly if flowing artesian conditions are identified ahead of time by means of pre-drilling assessment. This may involve one or more of the following tasks:

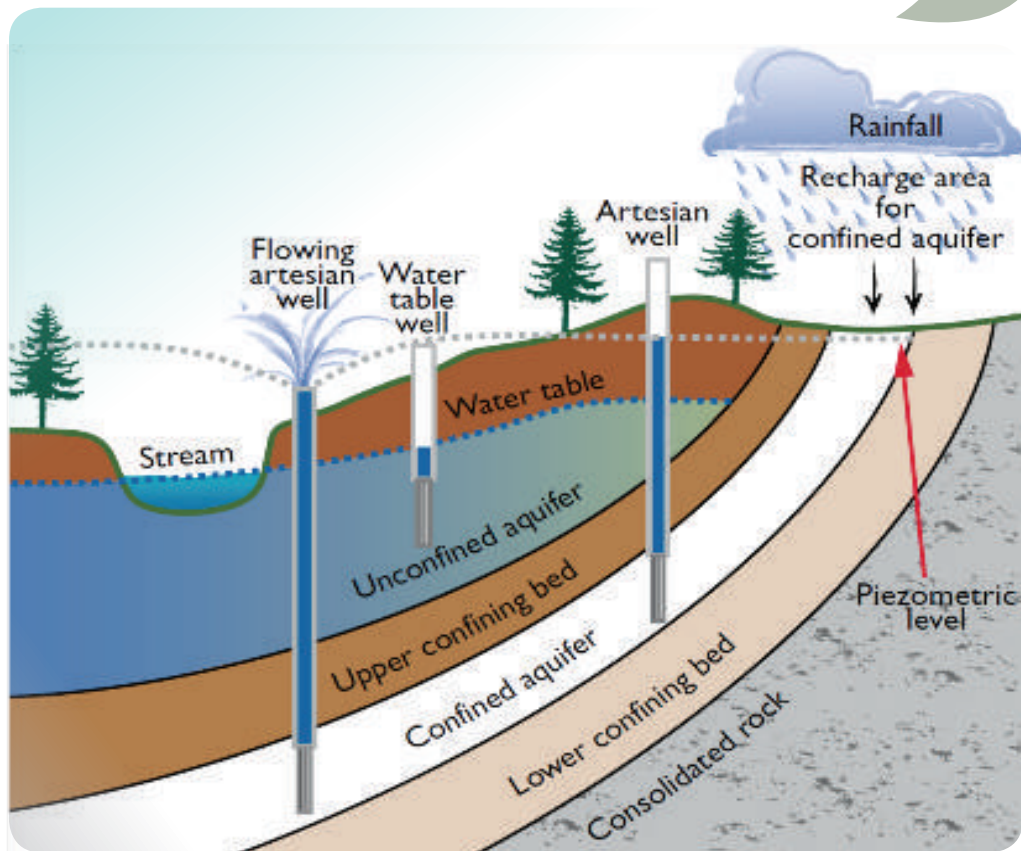
- Search the *BC Water Resources Atlas* or *iMapBC* for artesian wells in the area. Look for wells that have a reported static water level at or near the ground surface. Also check for any *Flowing Artesian Conditions Advisories* in the area.
- Talk to other well owners, well drillers, well pump installers, professionals, and government staff that have done work in the area. A few spot water level measurements in neighboring wells can tell you where to expect the groundwater level to be.
- Consider your hydrogeological setting. Are you located in a valley bottom, or near the base of a large hill? Are there any wetlands or springs nearby? Are there waterbodies upslope of the well site? These areas have a greater potential to host flowing artesian wells.
- Consider the time of year. Some wells flow for only part of the year in response to aquifer recharge periods (e.g. spring in the Interior, winter on the Coast), or when nearby wells are not operating. These wells typically have a static water level slightly below ground surface for the remainder of the year.
- A geophysical survey or smaller diameter pilot holes can be used to pre-identify flowing artesian conditions.

Discuss the outcome of your pre-drilling assessment with your client. If the well is potentially a flowing artesian well, or where knowledge of subsurface conditions is limited, propose a proper drilling plan and a modified well design that is suited to flowing artesian conditions, with the ability to mechanically stop, or ‘shut-in’ the flow when necessary (*Tab 4.3*).

For more information, consult the Province’s *Flowing Artesian Wells* guidance document.

BEST PRACTICES

Figure 2.
Geological and
topographical controls
affecting flowing
artesian wells
(source: BCMoE)



CHAPTER 5 | WELLS IN PITS

New well sumps, well pits and pump houses must be designed so that water entering the well sump, pump house or well pit is conveyed away from the wellhead.



Construction of new well pits is prohibited for new water supply wells, unless it is designed and supervised by a professional with competency in hydrogeology or geotechnical engineering to ensure that:

- water does not pond in the well pit; and
- any water that enters the well pit is conveyed away from the pit in a manner that is not likely to cause an adverse impact on groundwater quality.



The above does not apply to a well sump, pump house or well pit for a monitoring well if it is designed by a qualified professional with competency in hydrogeology or geotechnical engineering in order to prevent any adverse impact on the groundwater quality.

CHAPTER 6 | SHORT-TERM DIVERSION OR USE OF GROUNDWATER AND SURFACE WATER FOR WELL DRILLING

(Water Sustainability Regulation)

A professional or a well driller can divert and use groundwater or surface water for drilling, altering, developing, rehabilitating or decommissioning a well, without a short-term use authorization or licence, in keeping with certain limitations.

Limitations for a short-term diversion and use of water for drilling:

- Water cannot be diverted:
 - for more than 5 successive days,
 - for more than 10 days per month, or
 - at a rate of more than 10 m³/day (2640 USgal/day)
- Water cannot be diverted from:
 - a wetland,
 - a stream less than 5 m (15 ft) wide,
 - a stream within a protected area, or
 - a lake less than one hectare in size
 - a stream or aquifer under a Water Reservation, a Treaty First Nation Water Reservation or a Nisga'a Water Reservation (see table listing [Water Reservations in BC](#)),
 - a sensitive stream (see listing in [Schedule B of the Water Sustainability Regulation](#)),
 - a stream that is dedicated agricultural water under a plan regulation,
 - a stream that is subject to a significant water shortage, or
 - a stream or aquifer that is subject to a fish population protection order or a critical environmental flow protection order.

Sensitive streams and Water Reserves can also be located using the [BC Water Resources Atlas](#) and [iMapBC](#).

Well Construction

1. Casings and liners (GWPR 20, 21)
2. Surface seals (GWPR 22 to 27)
3. Controlling Artesian flow (GWPR 15, 66 to 68, WSA S52,53)
4. Screen, well development, disinfection and flow testing (GWPR 28 to 32, WSA S57)
5. Saltwater intrusion
6. Wellhead completion (GWPR 33 to 37)
7. Well caps and well covers (GWPR 38 to 42, WSA S54)
8. Well identification (GWPR 53 to 56, 75, WSA S55)
9. Well pumps and related works (GWPR 43 to 52)
10. Well reporting (GWPR 76, 77, WSA S57)

Numbers in brackets refer to the corresponding GWPR or WSA sections.

CHAPTER 1 | CASINGS AND LINERS

Definitions:

Casing: a pipe installed in a borehole to support the sides of the well. It includes production casing and surface casing. The production casing is the innermost casing that conducts the water. The surface casing surrounds the production casing and may be temporary or permanent.

Liner: a pipe installed in an open borehole to protect the well pump or other works in the well from damage.

Requirements:

The casing or liner must be composed of new material only or used material in like-new condition.

The casing or liner must be strong enough to withstand the pressure exerted on the casing or liner during installation and during the operation of the well.

If a thermoplastic casing or liner is installed in a water supply well, it must be approved or certified by one of the following for use for drinking water:

- Canadian Standards Association
- Underwriters' Laboratories of Canada
- ASTM International
- NSF International



BEST PRACTICES

For water supply wells, select a casing diameter that is large enough to accommodate the size of pump required to produce the desired flow, and other well components (e.g. drop pipe, check valve, sounding tube).

In bedrock wells, install a liner in cases or areas where rock stability is poor and there is risk of rock fragments or debris falling into the well. The liner is usually set to rest on the bottom of the hole, with slotted sections near water-bearing fractures. Slots positioned below the elevation of the pump allow water to flow upward over the pump motor, providing cooling.

CHAPTER 2 | SURFACE SEALS

What is a surface seal?

A surface seal is a seal that is installed in the annular space around the outside of the outermost casing or between multiple casings.

A surface seal prevents contaminants from migrating downward into the aquifer along the length of the casing.

The surface seal must be completed with an appropriate sealant (i.e., a non-toxic, commercially available material or mixture of materials). Commonly used sealants include:

- Bentonite clay
- Bentonite clay and water mixture
- Bentonite clay and sand and water mixture
- Neat cement grout
- Sand cement grout
- Concrete grout

Native materials (e.g. clay, silt, till) are not recommended for sealing annular spaces of drilled wells.

BEST PRACTICES



For drilled wells, select the sealant based on the thickness of the annular space and the length of seal that will be saturated. Avoid creating void space due to “bridging” or excessive shrinkage of sealant.

Bentonite is commonly used as a sealant, due to its high solids content and minimal shrinkage properties. However, it is not necessarily suitable for counteracting upward artesian pressures.

For geoexchange wells, choose the right type of sealant for the project, such as thermally enhanced (silica sand or graphite based) standard lower solids (20% minimum) grout, neat cement or mixed cement. Consult the [Geoexchange BC Professional Guidelines](#) for more information.

Requirements:

Requirements for surface seals are illustrated in *Figures 1 to 4*. The surface seal must be:

- permanent and continuous;
- capable of preventing the entry of any foreign matter from the ground surface into the well or the aquifer;
- installed in all annular spaces of the well (between casings or between the casing and the formation); and
- at least 2.54 cm (1 inch) thick (including wall thickness of the surface casing if the casing is left in place)

All openings in the production casing that are within the length of the surface seal, must be made watertight with non-toxic materials. Openings include joints, lifting holes, perforations, and pitless adapter holes.



Minimum length of the surface seal:

- For all wells: 1 m (3 ft)
- For water supply wells:
 - 5 m (16 ft), unless
 - the depth of the well is less than 5 m (16 ft), in which case the surface seal must be the greatest possible length.
 - the method of drilling is by driving, in which case the surface seal must be at least 1 m (3 ft) in length.
 - if bedrock is encountered within 5 m (16 ft) of ground surface, the surface seal must be at least 5 m (16 ft) in length and extend at least 1 m (3 ft) into competent bedrock (*Figure 3*)
- For closed-loop geexchange wells:
 - the entire length of the ground loop, from the bottom upward



The surface seal may extend to within 0.3 m (1 ft) of the ground surface to accommodate backfill material above the surface seal, but must still comply with the minimum length requirements.



For water supply wells, select a surface casing that is at least 10 cm (4 inches) larger than the production casing. This creates a large enough annular space for emplacement of sealant (e.g. using tremie line) and ensures a seal that is at least 2.54 cm (1 inch) thick. Center the casing in the hole before placing the surface seal. A thicker or longer surface seal may be necessary based on site specific conditions.



Where unconsolidated materials overlie bedrock, seal the casing into the bedrock to keep foreign material out of the uncased open hole.



For monitoring wells and remediation wells in a contaminated site setting, seal along aquitards between overlying aquifers in order to avoid cross-contamination via a preferential pathway along any annular space.

Multiple annular spaces:

If an outer annular space is created during the installation of the surface casing:

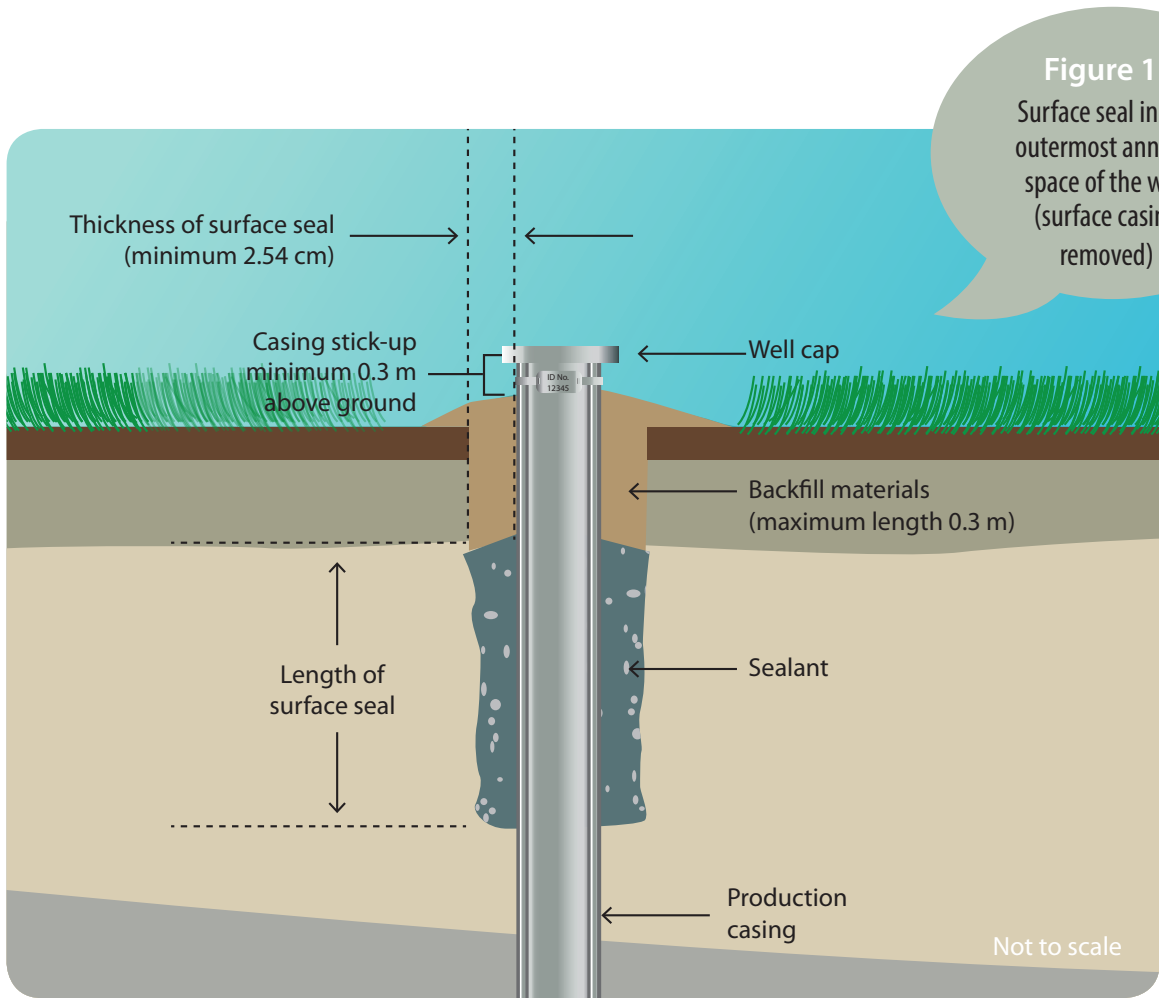
- the surface casing must be removed, and sealant placed between the next outermost casing (e.g. production casing) and the geological formation (*Figure 1*).
- If the surface casing cannot be removed (*Figure 2*), then:
 - The immediate area around the surface casing must be excavated to at least 1 m (3 ft) depth, and sealant placed to completely seal the excavated area.
 - The next outermost annular space (e.g., between the production casing and the surface casing) must also be sealed to the minimum length required.

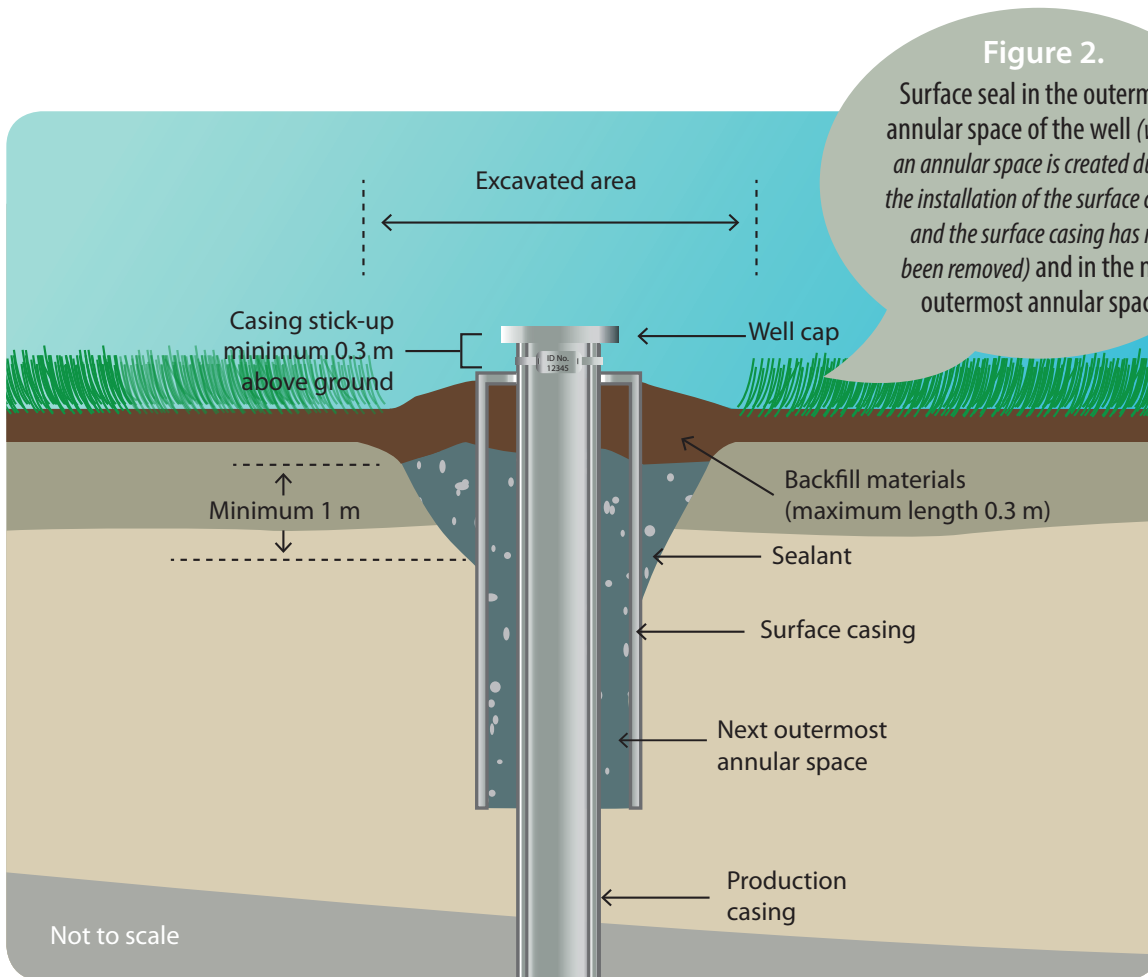
Any open annular space between multiple casings must be effectively capped or sealed.

Alteration of existing wells:

If altering a well impairs the integrity of the existing surface seal or creates a visible annular space, the person responsible must restore the seal and make sure the annular space is sealed.

If altering the structure (e.g., depth, diameter, screen assembly) of a well that has a casing but no surface seal, the person in charge must install a surface seal that is at least 1 m (3 ft) in length or extends to bedrock (whichever is shorter), and is at least 2.54 cm (1 inch) thick.





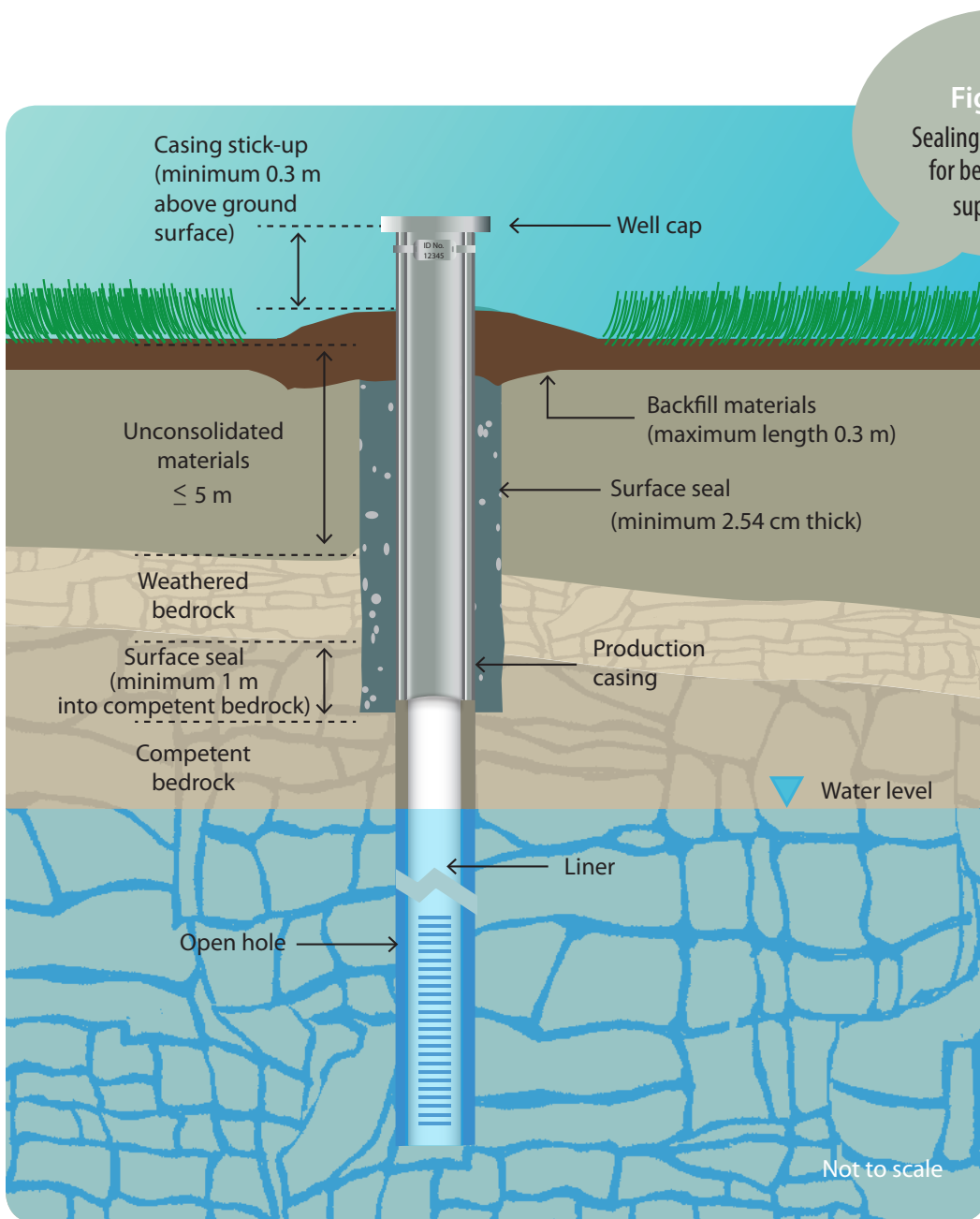
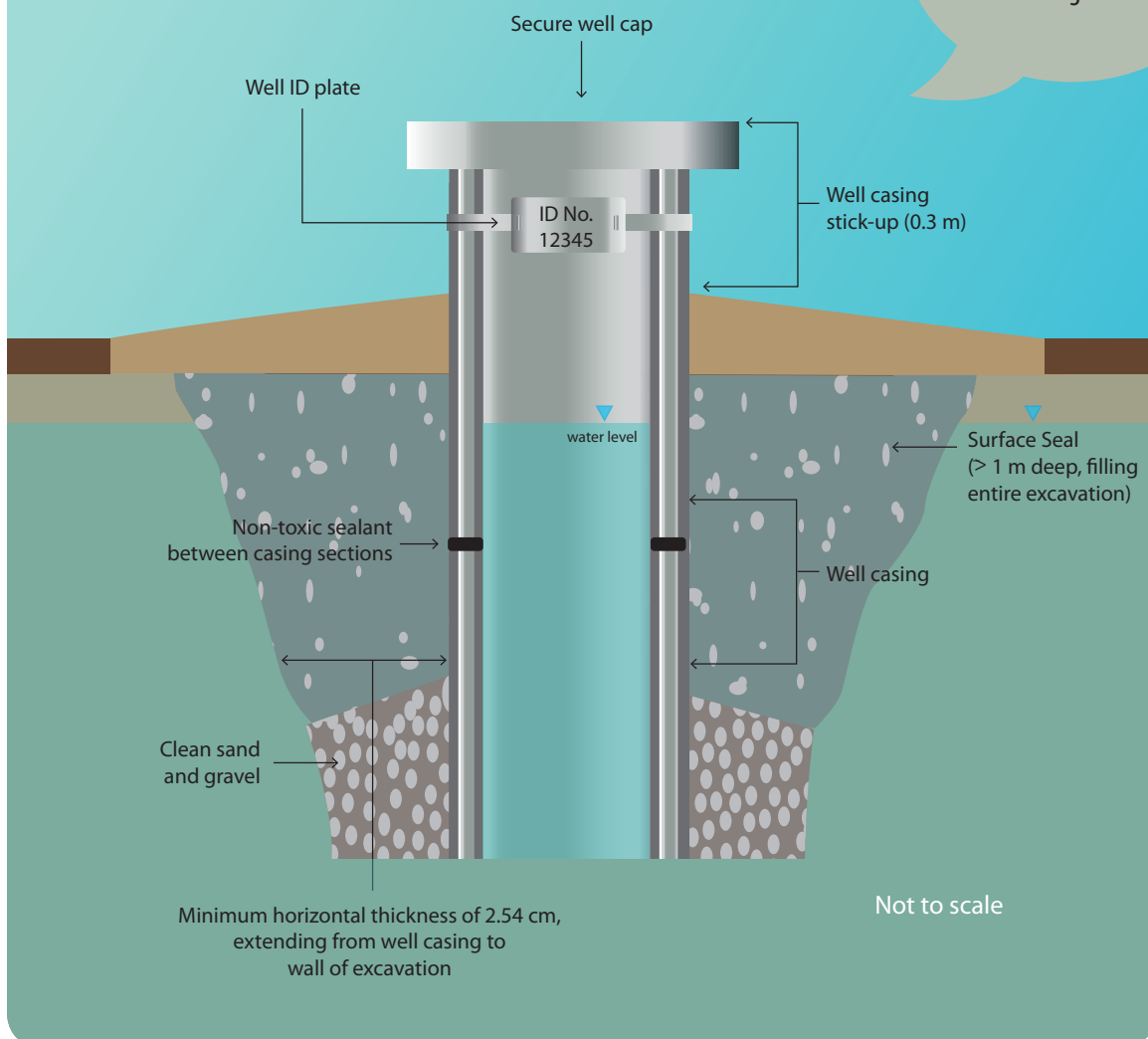


Figure 3.
Sealing requirements for bedrock water supply wells

Figure 4.
Sealing requirements
for dug wells



CHAPTER 3 | CONTROLLING ARTESIAN FLOW

Definition:

A flowing artesian well is a well in which water, without the aid of a pump:

- naturally rises above the ground surface or the top of the casing, and
- is observed to flow naturally, either intermittently or continuously.

Interpretation of “under control”:

Artesian flow is “under control” when it:

1. is clear of sediment,
2. is conveyed through the production casing to the well head,
3. can be indefinitely stopped, without leakage onto the ground surface or into another aquifer penetrated by the well, and
4. does not pose a risk to property, public safety or the environment.

Requirements:

If a well driller or a professional encounters artesian conditions while constructing or supervising the construction of a well, the well driller or professional must ensure, as soon as practicable, that:

- the artesian flow is stopped or brought under control; or
- steps are taken to ensure the flow will be stopped or controlled if the well flows periodically.

If a person other than a well driller or professional encounters flowing artesian conditions (continuous or potentially intermittent) while constructing a well, that person must notify the well owner. The well owner must then engage a well driller or professional (who is competent in stopping or controlling artesian flow) to stop or control the flow. If the owner is not known, the land owner must do so.

If the well driller or professional fails to stop or control the flow, the well owner must hire another well driller or professional (who is competent in stopping or controlling artesian flow) to do so.

The well driller or professional who encounters or takes steps to control the artesian flow must advise the well owner (and the land owner, if applicable) of the steps taken.

If the artesian flow cannot be brought ‘under control,’ then the well must be decommissioned according to the GWPR (*Tab 7.2*), and in a manner that prevents leakage onto the ground surface or into another aquifer penetrated by the well.

If, due to exceptional circumstances, it is not practicable to bring the artesian flow ‘under control’ or to decommission the well, the flow may be managed in another manner, so long as it does not pose a threat to property, public safety or the environment, and is approved by the decision maker. In this scenario, a professional with competency in hydrogeology or geotechnical engineering must assess and record the artesian flow conditions and must submit an artesian flow management report to the decision maker. This report must include the information indicated in Schedule 1 (*Tab 9.3*).

A flowing artesian well must be equipped with a device that prevents the flow of water back into the well (*Figure 5*).

The equipment installed to control artesian flow must be protected from damage caused by freezing conditions.

Reporting requirement:

The well driller or professional must measure the shut-in pressure or static water level, and record that measurement on the well construction report.

The following constitute general recommendations for constructing a water supply well in a known flowing artesian aquifer. No two flowing artesian wells are alike; therefore, design the well based on site-specific conditions in consultation with a professional with competency in the field of hydrogeology.

An appropriate well design is the best means of achieving artesian flow that is ‘under control.’ Such a design takes into consideration the drilling method, the depth and nature of the aquifer (unconsolidated or bedrock), the anticipated pressure and flow rate, and the presence and thickness of any confining layers. For example, controlling artesian flow in a shallow, highly productive unconsolidated aquifer is more challenging than controlling artesian flow in a deep, less productive bedrock aquifer.

In many cases, a flowing artesian well will require a more robust annular seal(s) than the 2.54 cm (1 inch) thick and 5m (16.4 foot) long ‘surface seal’ described in the GWPR (*Tab 4.2*). Select the sealant material and thickness and length of the seal to counteract the highest anticipated artesian pressure. Consider using multiple casings to emplace the annular seal(s) (*Photo 1*). To illustrate their importance, the following example is given for a well drilled using a dual mode air rotary rig in a confined, unconsolidated artesian aquifer. The surface casing is advanced part way into the confining layer, and a second casing is telescoped inside the surface casing. An appropriate sealant is placed in the annular space as the surface casing is retracted from the hole. The resultant annular seal between the second casing and the formation is allowed adequate time to cure. The production casing is then telescoped inside the second casing and advanced into the artesian aquifer. Ultimately, the annular space between the production casing and the second casing is also sealed. Consider the following when drilling water supply wells in known flowing artesian aquifers:

- Use a sealant that has a higher density than bentonite (e.g. neat cement, cement with additives, cement-bentonite grout). Know how to adequately mix and place your sealant. Consider using a positive displacement pump that can pump sealant at a higher flow rate and higher pressure.
- Centre the casing in the hole or casing to ensure even placement of the sealant.
- Select a casing material that is appropriate for the anticipated pressures, the possibility of freezing conditions, the type of sealant utilized, and the depth of the well.

- Have a plan and materials on hand to safely divert the flow away from the well (e.g. pre-excavated trench, hose, flow control fittings, valves)
- Avoid mechanically stopping or 'shutting-in' the flow all at once.
- Take the time to explain to the well owner his or her responsibilities for maintaining control of the flow (*Tab 6.4*).
- Special precautions may be necessary during the installation of a pump, pitless adapter, or any flow control device inside the production well casing.
- Methods and equipment to keep the flow under control may include: a spool-type pitless adapter designed for flowing well control, an inflatable packer type device, or an elevated flow tank with air gap. Add adequate warning labels to all flowing wells fitted with a packer type device to prevent injury if the device is removed.
- *Figure 5* presents an example of a flowing artesian wellhead design. Other configurations may be appropriate, depending on the drilling method used and the site conditions.
- For more information, consult:

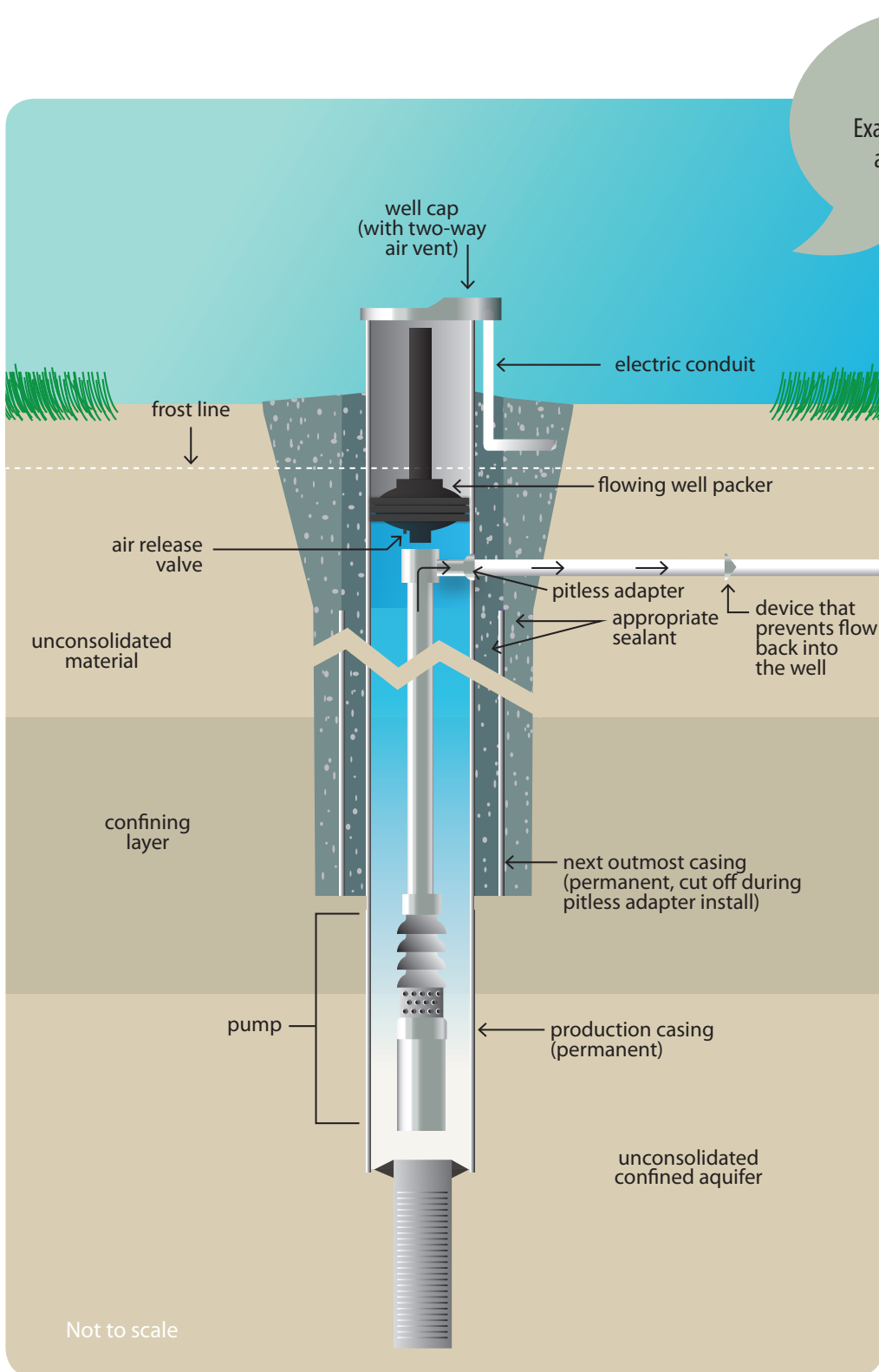
[Flowing Artesian Wells](#) guidance document - BC Ministry of Environment;

[Flowing wells](#) guidance document - Ontario Ministry of the Environment and Climate Change;

[Flowing Well Handbook](#) - Michigan Department of Environmental Quality Water Bureau



Photo 1. Example of a newly constructed flowing artesian well with multiple casings



Note: this is an example of a flowing artesian well design. Actual components, including flowing well packer, type of sealant, length and thickness of seals, should be selected based on site-specific conditions and in consultation with a professional.



CHAPTER 4 | WELL SCREENS, WELL DEVELOPMENT, DISINFECTION AND FLOW TESTING

Screen installation for a water supply well:

A screen assembly includes the screen, a closed bottom, and other components, including a riser pipe, packer, screen blank or tail pipe.

The screen assembly must be securely attached to the production casing.

The screen assembly must be made of durable material capable of withstanding the soil and water pressure and water quality conditions.

The screen must have slot openings that are appropriately sized so that sand or other unconsolidated material are not drawn into and build up inside the well (*Photo 2*).

A screen is not required:

- for an excavated well;
- if the unconsolidated material at the bottom of the production casing is coarse enough to allow the well to be developed so that:
 - the bottom of the production casing is stable, and
 - the depth of the well does not change as a result of sand or other unconsolidated material being drawn in during operation of the well.

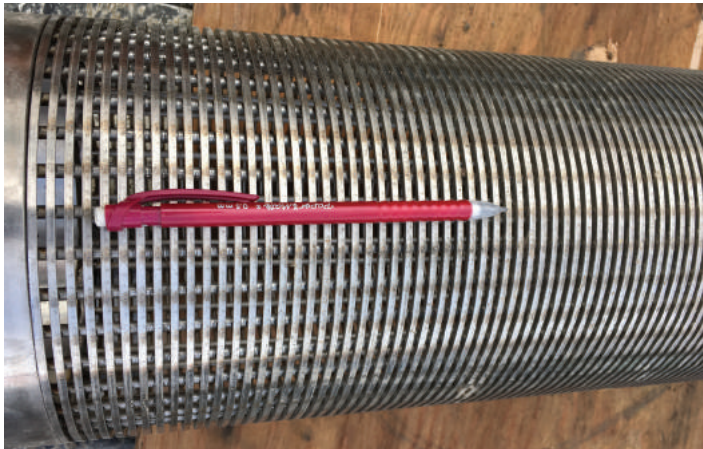


Photo 2. Example of a V-wire continuous slot well screen

The screen is the most important element of a well. Combined with an adequate development, it will control how energy efficient a well is (i.e. how much it will cost to pump water).

For private domestic water supply wells, screen slot size is usually selected based on a visual analysis of aquifer samples. For larger capacity industrial, municipal, or irrigation wells, slot size is usually selected based on grain size (sieve) analyses in consultation with a professional with competence in hydrogeology.

Select a slot size and screen length that creates enough open area for water to flow into the well smoothly (laminar or non-turbulent flow), while blocking formation materials from entering the



well. Select an open area and well pumping rate to maintain screen entrance velocities below 0.03 m/sec (0.1 ft/sec).

Screens placed in well graded, coarse-grained aquifers can be completed with naturally developed sand packs. Slot sizes for naturally developed sand packs are generally selected to allow 50 to 60 percent of the formation material to pass through the screen. Smaller slot sizes may be chosen if, for example: (1) there is doubt about the integrity of the formation samples, (2) it is possible that the screen may corrode over time, (3) the aquifer is thin or (4) the aquifer is overlain by loose, finer-grained material.

Screens placed in uniformly graded, fine-grained aquifers or highly stratified aquifers may require an artificial sand pack. An artificial sand pack is a specially graded sand and gravel mixture that is placed in the annular space between the screen and the formation. It is generally coarser-grained and less uniform than the formation material. This facilitates the selection of a larger slot size while limiting the potential for fine-grained material to enter the well. Select a slot size that retains about 90 percent of the artificial sand pack material.

For more information on well screen design, consult *Groundwater & Wells, Third Edition*.

BEST PRACTICES



Development of water supply wells:

The water supply well must be developed in a way that prevents:

- significant collapse of the ground surface around the well;
- damage to the surface or annular seal.

The main objective of well development is to create an efficient well by enhancing the permeability of the aquifer surrounding the well screen. This minimizes energy loss as water flows towards and into the well, and can reduce the energy demand of the pump. Well development also removes fine particulates from the formation in order to achieve a sand-free discharge, which in turn protects the pump, water distribution lines, and/or treatment system from damage. Mechanical surging, air-lift pumping, overpumping, and jetting are some of the methods used for well development.

For a private domestic well, spend at least 3 hours on well development. Start slowly and increase in intensity of development over time, particularly in finer-grained aquifers. This will help to avoid clogging or damage of the well screen. Larger diameter wells with longer screens in finer aquifer material, typically require longer periods of well development.

Injecting air through the screen is not recommended.

Monitor the volume of sediment removed during development. If large volumes of sediment are removed, monitor the ground surface around the well for subsidence or damage to the surface seal.

For more information on well development, consult *Groundwater & Wells, Third Edition*.

BEST PRACTICES



Disinfection of water supply wells:

After drilling, altering, developing, rehabilitating or installing or removing a well pump from a water supply well, the person responsible must disinfect the groundwater in the well to destroy micro-organisms introduced by the activity.

A well owner may choose to disinfect his own pump and well.

Disinfect all drilling and monitoring equipment after use in order to prevent the transfer of micro-organisms between wells.

Well disinfection prevents harmful bacteria from propagating inside the well and distribution system. The Province's [Water Well Disinfection using the Simple Chlorination Method](#) brochure outlines steps for disinfecting a water well. Public Health Ontario also offer a useful [Well Disinfection Tool](#) to calculate the appropriate dosage of chlorine for a given well configuration.

Do not flush spent chlorinated water into your septic system or into a ditch, storm-drain or stream that could be fish-bearing. Chemicals such as ascorbic acid or sodium ascorbate (both forms of Vitamin C) can be used to inactivate the chlorine prior to discharge.

If microbiological problems persist in the well water, look for and eliminate other potential sources (e.g. ponded water, compromised surface seal, missing cap).

To disinfect a flowing artesian water well, consider temporarily extending the production casing above the artesian head, or capping or sealing the well to stop the flow and increase chlorine contact time. If injecting a chlorine solution into the well using a drop pipe or hose, pump it through a water-tight fitting in the wellhead.

BEST PRACTICES



Use of acids, lubricants, bactericides or other similar substances in water supply wells:

If acids, lubricants, bactericides or similar substances are used to drill, alter, develop or rehabilitate a water supply well, the well must be flushed until the remaining concentration of these substances in the well would not prevent the use of the well for its intended purpose (e.g. domestic).

The flushed discharge must be disposed of in a manner that does not pose a threat to the aquatic ecosystem of a stream or an aquifer, or to property, public safety or the environment.



Well yield tests for water supply wells and permanent dewatering wells:

The person responsible for drilling or altering a water supply well or a permanent dewatering well must:

- conduct a well yield test,
- include details of the well yield test in the well construction report.

If there is not sufficient water in the well to conduct a yield test, then a yield test is not required.



BEST PRACTICES

A well yield test is a short flow test typically carried out by the well driller after the well has been drilled and developed. It may involve pumping, bailing, or air lifting the well for a short period (e.g. 4 hours), and is intended to give an estimate of the yield of the well.

For private domestic wells, a well yield test may be used to choose the appropriate size and placement of a submersible pump. Note that a short-duration (e.g. 1 hour) well yield test may overestimate the yield of a water supply well if it is intended to be pumped for longer periods or at a higher flow rate. Well yield also varies seasonally.

Record the static water level, flow rate, duration of pumping, and the pumping water level at the end of the pumping period. Monitor recovery until the water level has recovered to within 85% of the original static water level.

Pumping tests:

If a pumping test is required to support an application for an authorization or by order of the comptroller, then a professional hydrogeologist must:

- design the test,
- perform or directly supervise the test, and
- interpret the results of the test.

A temporary well pump can be installed to carry out the pumping test.

Reporting requirements:

A [pumping test report](#) should be submitted to the well owner (*form in Tab 9.4*).

BEST PRACTICES

A pumping test (also referred to as an aquifer test) is a longer flow test typically conducted by a well pump installer. It is intended to provide a more accurate estimate of the well's sustainable (or "safe") yield, the potential impact of pumping the well on other wells (drawdown interference), and the hydraulic properties of the aquifer (e.g. transmissivity, storativity).

Pumping tests generally involve pumping the well at a constant rate for 24 hours (in overburden aquifers) to 72 hours (in bedrock aquifers), and recording water levels in the pumped well (and sometimes nearby wells or streams). Some constant rate tests are preceded by a variable rate test (or step test), wherein the well is pumped at incrementally higher rates for short periods, in order to choose the appropriate rate for the constant rate test and determine the well efficiency. >

(continued)

After pumping has ceased, water level recovery measurements are recorded until the water level has risen to within 85% of the static water level, or for as long as the well was pumped.

For more information on planning and conducting a pumping test, consult MOE's [Guide to Conducting Well Pumping Tests](#).

New wells intended to supply water for non-domestic purposes typically require a well pumping test and a hydrogeological report prepared by a professional as part of the licence application (Tab 5) and other regulatory permits. For more information, consult MOE's [Guidance for Technical Assessment Requirements in Support of an Application for Groundwater Use in British Columbia](#).

For any type of flow test, make sure discharge of water:

- is far enough away or downgradient so that water doesn't re-circulate into the aquifer (for unconfined aquifer) during the test;
- is not directly discharged into a stream (which would disturb aquatic life);
- does not pose a risk to property, public safety or the environment.

CHAPTER 5 | SALTWATER INTRUSION



For water supply wells located within 500 m (1,650 ft) of the coastline, monitor the electrical conductivity (salinity) of the well discharge during drilling. If a significant increase in electrical conductivity is noted, stop and test the chloride concentration of the groundwater.

If a saline zone is encountered during drilling, it may be necessary to seal the well below a certain depth to prevent this water from entering a shallow freshwater aquifer. In general, try to avoid:

- drilling within 50 m of the coastline,
- drilling wells deeper than 60 m (200 ft) in coastal zones or
- hydrofracturing wells in areas less than 100 m (328 ft) from the coastline.

When testing a well within 500 m (1,650 ft) of the coastline, avoid pumping it at a higher flow rate or for a longer time than is absolutely necessary. Monitor the electrical conductivity at regular intervals and be prepared to stop the test if a significant increase is observed. In some situations, monitoring of sentinel wells between the shoreline and the pumping well may be warranted.

Refer to the Province's *Best Practices for Prevention of Saltwater Intrusion* brochure, or seek advice from a professional with competency in hydrogeology when constructing or testing a well in coastal areas.

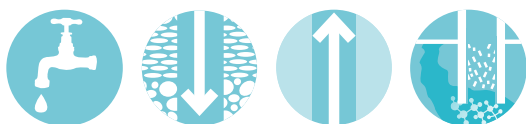
BEST PRACTICES

CHAPTER 6 | WELLHEAD COMPLETION

General requirements:

Thermoplastic casing must be completely protected from damage and material breakdown at and above the ground surface.

The immediate ground area around the well must be sloped so that water does not pond around the wellhead.



For water supply wells, recharge or injection wells, permanent dewatering wells, and remediation wells; the casing stick-up must be continuous and extend at least 0.3 m (1 ft) above ground surface or above the floor of the well sump, well pit or pump house.

BEST PRACTICES

Install a two-way vent to equalize the air pressure between the inside of the production casing and the atmosphere. This prevents creation of a vacuum or excess air pressure when the water level changes, and allows naturally occurring gases to vent to the atmosphere.

Consider insulating the well from freezing conditions in colder climates.

For geexchange wells, secure the ground loop from damage and vandalism. Heat fusion caps or barbed plugs are best. Test holes may require protective road boxes.

Well in a well sump, well pit or pump house:

Definition:

A well pit is an excavated opening in the ground, lined with concrete, metal or wood that contains a wellhead that is below ground surface (*Photo 3*).



Photo 3. Example of a well in pit

Requirements:

New well sumps, well pits and pump houses must be designed and constructed so that water entering the well sump, pump house or well pit is conveyed away from the wellhead.

The above does not apply to a well sump, pump house or well pit for a monitoring well, as long as it is constructed in accordance with a design by a professional in hydrogeology or geotechnical engineering that prevents adverse impacts to groundwater quality.

**Well pit restriction for water supply wells:**

Construction of a new well pit is prohibited for new or existing water supply wells, unless it is designed by a professional in hydrogeology or geotechnical engineering, to ensure that:

- water does not pond in the well pit; and
- any water that enters the well pit is conveyed away in a manner that is not likely to adversely impact groundwater quality.



BEST PRACTICES

Wherever possible, convey water away from the well pit without the aid of a pump.

The professional who designed the well pit must supervise the construction and prepare as-built drawings of the well pit.

If altering a water supply well that has an existing well pit:

- the well pit must be removed, or
- the person in charge must ensure the water does not pond in the well pit and that any water that enters the well pit is conveyed away in a manner that is not likely to adversely impact groundwater quality.

Figure 6 (next page) shows the minimum requirements for wells completed below ground surface.

Reporting requirement:

For a water supply well, design and as-built drawings of the well pit must be submitted to the owner and comptroller within 90 days of construction.

BEST PRACTICES

Most wells are equipped with a submersible pump to deliver water to the user. The pump is attached to a steel or thermoplastic drop pipe, which in turn is connected via a pitless adapter to a buried distribution line (*Photo 4 - next page*). The pitless adapter eliminates the need for less sanitary and hazardous well pits.

For guidance on upgrading an existing well in a pit, consult the Province's brochure [Upgrading Wells in Pits](#).

Figure 6.
Minimum requirements for wells completed below ground surface

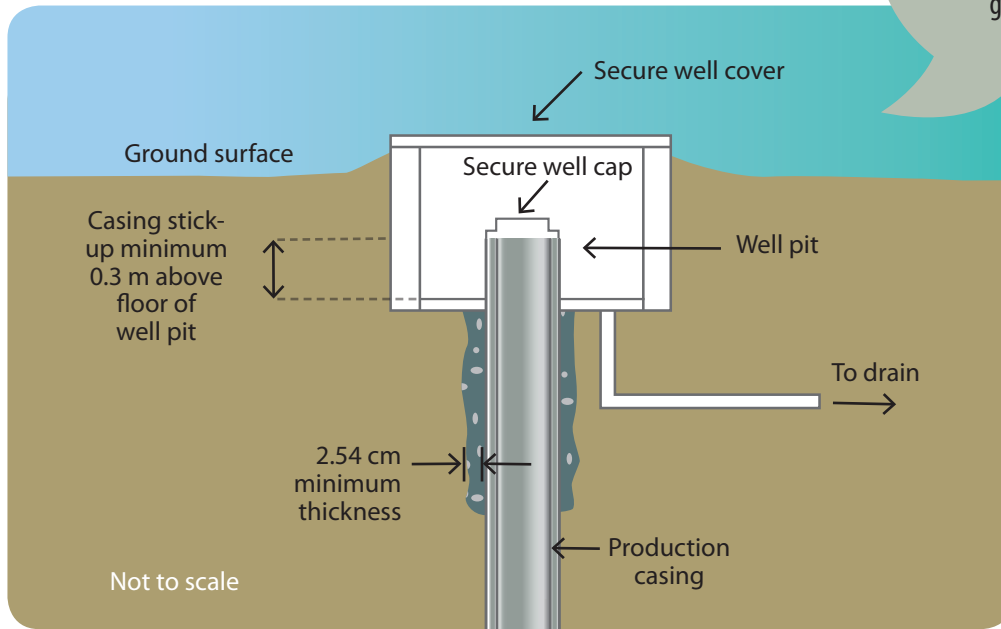


Photo 4. Example of a pitless adaptor

CHAPTER 7 | WELL CAPS AND WELL COVERS

Definitions:

Well cap: a secure cap or lid that prevents vermin, contaminants, debris or other foreign objects or substances from entering the interior of the production casing.

Well cover: a secure cover, lid or structure that prevents vermin, contaminants, debris or other foreign objects or substances from entering the well.

A well owner can install a well cap, a well cover, a valve or vent that is part of the wellhead on his or her own well.

Requirements:

Well cap:

For water supply wells, monitoring wells, recharge or injection wells, dewatering wells, and remediation wells:



A well cap must be securely attached to the top of the production casing, in a way that:

- prevents entry into the well of any surface water, foreign matter, persons or animals;
- stops or minimizes artesian flow.

The well cap must be commercially manufactured or fabricated from durable material suited to that application and local environmental conditions.

A steel plate welded to the top of the production casing may be used as a well cap for a well that is not yet in service.

If there is an annular space between well casings, the annular space must be capped with a permanent and watertight well cap.

BEST PRACTICES

Caps for domestic water supply wells are typically made of aluminum (*Photo 5*), and caps for larger diameter municipal/industrial wells are typically made of cast-iron or steel. Thermoplastic is NOT a commonly used material.



Photo 5. Aluminium well cap on a domestic well



Well cover:

For water supply wells, monitoring wells, recharge or injection wells, dewatering wells, and remediation wells:

If the top of the casing is below the ground surface, a well cover has to be installed at or above the surface of the ground, in a way that prevents entry of any surface water, foreign matter, persons or animals into the well.



The well cover must be commercially manufactured or fabricated from durable material having strength suited to the location of the well cap and the local environmental conditions.



If it is not practicable to attach a well cap or install a well cover according to the requirements, then a well driller, a well pump installer or a professional can design and install an effective well cap or well cover in a way that:



- prevents entry into the well of any surface water, foreign matter, persons or animals;
- stops or bring under control artesian flow.

The GWPR prohibits anyone from removing a well cap or well cover, except when:



- inspecting, developing, disinfecting, maintaining, repairing or altering the well or any works associated with the well,
- installing, re-installing, removing or testing a well pump,
- conducting a well yield or pumping test,
- measuring the water level in the well,
- taking a water sample from the well, or
- undertaking other activities that require temporary removal of the well cap or well cover.



CHAPTER 8 | WELL IDENTIFICATION

Purpose:

To identify a well on the ground and link it with its record in the Province's WELLS Database. An example of a well identification (ID) plate is shown in *Figure 7*.



Which class of well requires an Identification plate?

If a person is drilling a new well or altering an existing well that does not have an ID plate, then an ID plate may be required, as indicated in *Table 1*.



Table 1. Classes of wells requiring an ID plate

Class of well	Category or subclass	Well ID plate required?
Water supply	All water supply wells (including excavated wells)	Yes
Monitoring	Temporary	No
	Permanent	No
Recharge or Injection	Made by drilling or boring	Yes
	Made by driving, jetting or excavating	No
Dewatering	Temporary	No
	Permanent	Yes
Remediation	Temporary	No
	Permanent	No
Geotechnical	Borehole or test pit	No
Closed-loop geoexchange	All closed-loop geoexchange wells	No
All classes of well	All flowing artesian wells	If required above

Where to get ID plates:

Well ID plates are available without charge from the deputy comptroller at Groundwater@gov.bc.ca

Who can attach an ID plate:

Any well owner, professional hydrogeologist, well driller, or well pump installer can attach an ID plate.

Where to attach an ID plate:

The ID plate must be securely attached to the casing, well cap or well cover, so that it is plainly visible. Alternatively, the ID plate can be attached to the discharge pipe, the pump motor housing, the stand at the top of the well, the pump house, or a nearby post.

Reporting requirements:

A well owner who attaches an ID plate to a well supplying a water supply system must submit a [well identification report](#) (Tab 9.5) to the comptroller, within 90 days. The well owner must retain the identification report until the well is decommissioned.

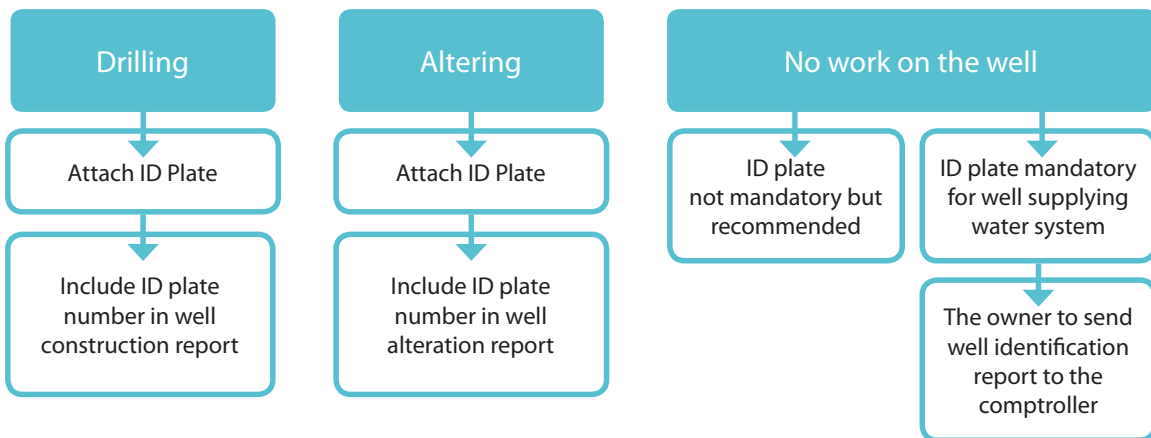
A person responsible for drilling or altering a well that requires an ID plate, must report the well ID number in the well construction or alteration report (Tab 9.6).



Does a well identification plate need to be attached to a water well that has been drilled and immediately closed (e.g. dry well)?

If a water supply well is deemed unsuitable or inadequate and is immediately decommissioned before ever being used, the Province will not require an ID plate to be attached and removed. However, a well construction and decommissioning report must be completed and submitted to the comptroller.

The well ID process in a nutshell for wells requiring an ID plate:





CHAPTER 9 | WELL PUMPS AND RELATED WORKS

“Related works” includes the pump motor, pump column, pitless adapter and sounding tube. A sample water well design, including well pump and related works, is shown on *Figure 8*.

Permanent vs. Temporary well pump

A permanent well pump is intended to remain installed in a well for more than 90 days.

A temporary well pump is intended to remain installed in a well less than 90 days.

A well pump installer, well driller (classified as water well driller) or a person working under the supervision of a well pump installer, well driller (classified as a water well driller) or a professional, can:

- install, maintain, repair, remove or test a well pump or wellhead,
- conduct a flow test,
- disinfect a well pump.

A well owner can install a flow meter on his or her own well.

Requirements:

A well pump and related works must be installed in a well in a manner that:

- does not cause damage to or movement of the casing during the installation or operation of the pump;
- prevents the entry of any foreign material; and
- allows proper disinfection of the well, well pump and related works.

The well pump must be protected by a liner in cases or places where the walls of the well are unstable (e.g. borehole in fractured bedrock).

The well must be equipped with a device that prevents the flow of water back into the well.

If a hand pump is installed, the person responsible must ensure the well cap still prevents the entry of water or foreign matter into the water supply well and still prevents or minimizes artesian flow.

Thermosplastic liners, drop pipes or sounding tubes installed in water supply wells must be approved or certified by one of the following:

- Canadian Standards Association;
- Underwriters’ laboratories of Canada;
- ASTM International; or
- NSF International.



BEST PRACTICES

For water supply wells used to supply water for domestic purposes, the following materials can be used for liners, drop pipe, or sounding tubes:

- stainless steel
- PVC (polyvinyl chloride) marked with “NSF-PW” or “NSF-61”
- municipal series 200 PE (polyethylene)
- black steel

Galvanized steel is generally not recommended, due to the potential to leach lead and other metals into the water.

The pitless adapter must be constructed with materials that will not adversely impact water quality and must be installed in a manner that will prevent corrosion. The connection or seal between the pitless adapter and the production casing must be watertight.

Lubricants or solvents that may be used for installing, maintaining or repairing the well pump, must be non-toxic.

If the installation of a pump or related works in a well impairs the integrity of the surface seal, then the surface seal must be repaired or replaced according to the surface sealing requirements.

If the installation of a pump or related works in a well that does not have a surface seal creates an annular space around the well, then the annular space must be sealed.

If the installation of a pump or related works requires modification of the wellhead, the person responsible must ensure that, after the modification, the wellhead meets the requirements listed in *Tab 4.6*.

Groundwater in the well must be disinfected after installing a permanent well pump or removing a temporary well pump.

BEST PRACTICES

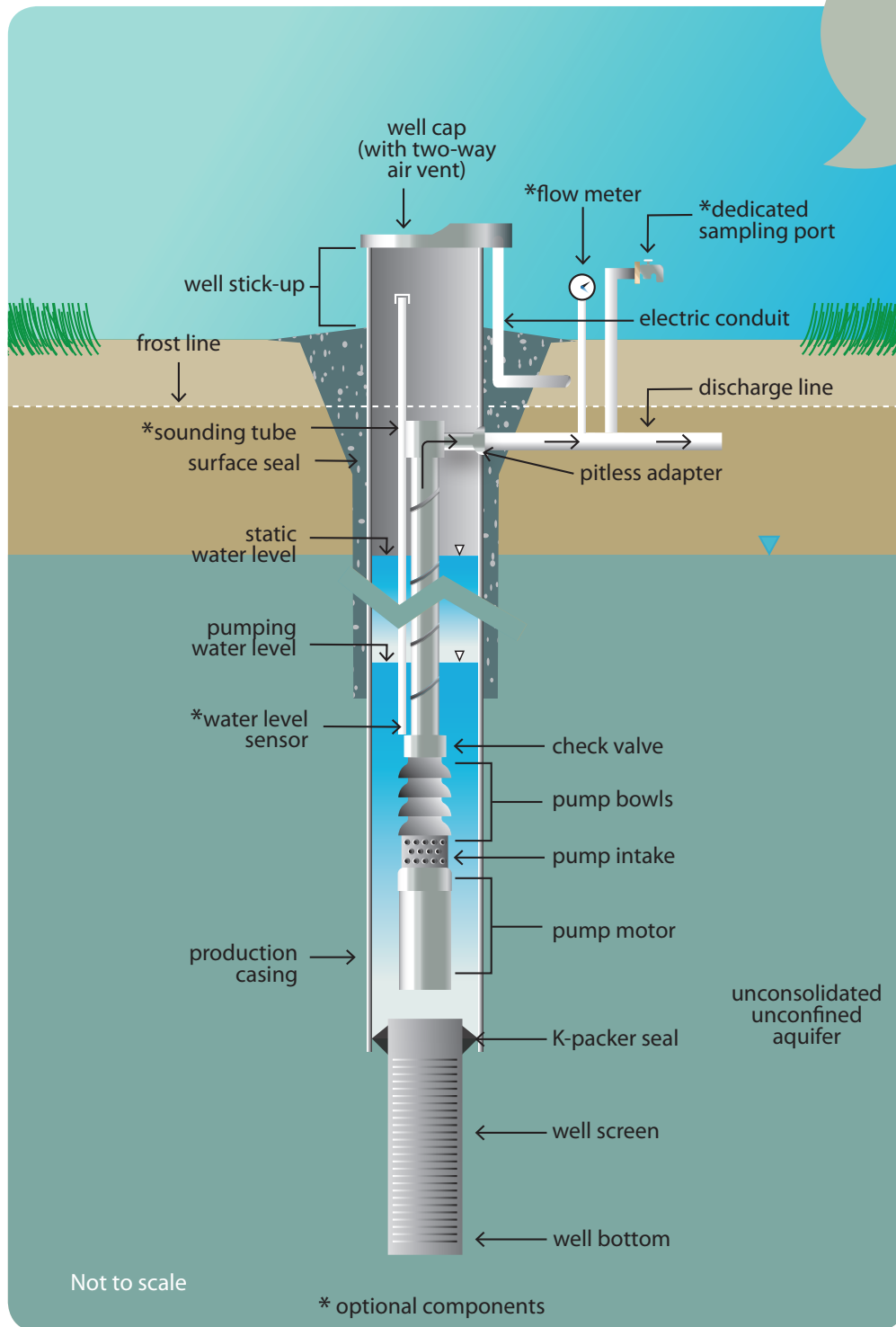
In cold climates, install the pitless adapter below the frost line.

When installing a pitless adapter on a flowing artesian well, be careful not to compromise the control of the artesian flow. In these situations, consult with the driller who drilled the well and/or a professional. If the artesian flow is NOT under control, advise the well owner to hire a qualified well driller to bring the flow under control.

Reporting requirements:

A [pump installation report](#) should be filled out (*Tab 9.7*) and submitted to the well owner.

Figure 8.
Sample water
well design



This is an example well design. Actual well components should be selected based on site-specific conditions.



When installing a well pump in a water supply well:

- Select the pump based on the diameter of the well, flow requirements, system head, friction losses, power supply, estimated well yield, and desired yield.
- Obtain a copy of the well record from the well owner. Sound the well to confirm the depth of the static water level, K-packer (if present), and well bottom.
- Consider available well yield or well pumping test results, drawdown interferences from nearby wells, and any seasonal or long-term water level variations in the aquifer when selecting a pump set depth.
- Consider setting the pumping rate below the well's estimated yield in order to minimize the likelihood of pump damage from breaking suction, cavitation and/or drawing sediment into the well.
- Position the pump above the well screen to ensure water flow past the motor for cooling. In situations where the pumping water level approaches the pump intake, the pump can be set inside the screen or inside a blank 'tail pipe' below the screen, if it can be fitted with a 'shroud' or 'flow inducer sleeve' to direct water over the motor. Install a shut-down probe above the screen to prevent the pumping water level from dropping into the screen. This will prevent aeration of the water (which can enhance biological growth), sand pumping, pump damage, and other issues.
- For deep wells having a long water column above the well screen, setting the pump as deep as possible could result in excessive power consumption, and delay detection (and correction) of any well performance problems.
- Install large capacity pumps in such a way that the weight of the pump and drop pipe are fully supported at ground surface on a foundation independent of the well casing.
- Exercise caution when installing pumps in 'sucking and blowing' wells or in wells producing natural gases.
- Calculate the distance to the electrical service, and the wire gauge required to meet (Canadian) electrical codes. Know what permits are required to adhere to electrical safety regulations/standards. When the pump is running, take amperage readings to check power consumption.
- Run the discharge to waste until it is clear of sediment prior to hooking it up to the supply system.
- Record the flow rate and water level drawdown in the well at that flow rate (i.e. difference between the static water level and the pumping water level). This will provide a baseline measurement of the well's specific capacity. Specific capacity is calculated as the flow rate divided by the water level drawdown in the well at a given time (e.g. after 30 minutes of pumping at a constant rate). When measured regularly, specific capacity is a key indicator of changes in the condition and performance of a well.
- Consider installing a sounding tube, as it is very useful for well monitoring and maintenance activities (e.g. measurement of water levels and downhole application of chemicals). Secure a 2.54 cm (1 inch) diameter sounding tube (or smaller for private domestic wells) to the pump drop pipe and extend it downward to the top of the pump. Place an elbow or pin at bottom of tube to prevent the loss of equipment down hole.
- Take pictures and record the coordinates of the installed pump and related works, including the well ID Plate number. Submit a pump set record to the well owner. MOE offers a [Well Pump Installation Report](#) form for this purpose (Tab 9.7).

CHAPTER 10 | WELL REPORTING

Well identification report:



A well owner who attaches an ID plate to a well supplying a water supply system must submit a *well identification report* (Tab 9.5) to the comptroller, within 90 days. The well owner must retain the identification report until the well is decommissioned.

Well construction / alteration report:

Requirements for which type of well needs a well construction or alteration report and to whom the report must be submitted are presented in *Table 2*.

A copy of a *well construction / alteration report*, and information on what needs to be included (Schedule 3 of the GWPR) are provided in *Tab 9.6*.



Any accepted alternative specifications regarding the siting of a water supply well or a permanent dewatering well must be included in the well construction report, when such a report has to be submitted to the comptroller and well owner (*Table 2*).



Any accepted design of a recharge or injection well must be included in the well construction report, when such a report has to be submitted to the comptroller and well owner (*Table 2*).



The professional must also prepare as-built drawings of the recharge or injection well.

The well construction / alteration report must be submitted to the required person(s) within 90 days of constructing or altering the well.

The well construction or alteration report must be retained:

- for at least 10 years, by the person responsible for drilling or altering the well, and
- until the well is decommissioned, by the well owner.

Table 2. Reporting requirements

Class of well	Category or subclass	Well construction/ alteration report required?	Person to whom report must be submitted	
      	Water supply	All water supply wells	Yes	To the comptroller and well owner
	Monitoring	Temporary	No	NA
		Permanent	Yes	To the well owner
	Recharge or Injection	Made by drilling or boring	Yes	To the comptroller and well owner
		Made by driving, jetting or excavating	No	NA
	Dewatering	Temporary	No	NA
		Permanent	Yes	To the comptroller and well owner
Remediation	Temporary	No	NA	
	Permanent	Yes	To the well owner	
Geotechnical	Borehole	Yes	To the well owner	
Closed-loop geoechange	All closed-loop geoechange wells	Yes	One well construction report per geoechange system to the comptroller and a report for every well in that system to the well owner	
All classes of well	All flowing artesian wells	Yes	To the comptroller and well owner	



Groundwater Licensing

1. What is a groundwater licence?
2. Licensing requirements
3. How to apply for a licence
4. Licence processing and changes

CHAPTER 1 | WHAT IS A GROUNDWATER LICENCE?

A groundwater licence is an authorization to divert, store and use groundwater from an aquifer. It is not needed to drill or test a well, or for a well that is not in use. Pumping water out of a well is considered to be 'diverting' water from an aquifer.

A water license specifies the water source, the works associated with the water use, the water use purpose, the maximum quantity of water that can be used, where the water can be used, and when the water can be used.

See the Province's [Licensing Groundwater Users](#) brochure for more information.

CHAPTER 2 | LICENSING REQUIREMENTS

Who needs a licence?

All non-domestic groundwater users require a licence. Those already using groundwater on or before February 29, 2016 are considered to be 'existing' users, and those who started using groundwater after February 29, 2016 are considered to be 'new' users.

Non-domestic groundwater users using groundwater for a period not exceeding 24 months require a short term use approval.

What does non-domestic mean?

The following water uses are considered non-domestic, and require a license or a short term use approval:

- Conservation (of fish or wildlife)
- Industrial purpose
- Irrigation purpose (to nourish crops or forage)
- Land improvement purpose (e.g. to protect land, develop a park, or reclaim or drain land)
- Mineralized water purpose (e.g. for bottling of mineralized water, use in bathing pools)
- Mining purpose (to recover minerals or move earth materials)
- Oil and gas purpose (to produce petroleum or natural gas)
- Power purpose (to generate electricity or other power)
- Storage purpose (to impound or retain water for later use)
- Waterworks purpose (to supply water for use by another person or entity)

Domestic groundwater users do not require a licence. Domestic purpose includes the use of water by occupants of one or more private dwellings located on a single parcel for:

- drinking water, food preparation and sanitation;
- fire prevention;
- providing water to animals or poultry kept for household use, or as pets; and/or
- irrigation of a garden (including lawn) not exceeding 1 000 m² on the same parcel or a parcel immediately adjacent to the dwelling.

Domestic purpose does NOT include use of water in multi-family apartment buildings, hotels or strata titled or cooperative buildings.

When do you need to apply for a licence?

- Before beginning to use groundwater, for 'new' non-domestic groundwater users
- Before March 1, 2019 for 'existing' non-domestic groundwater users. There is a 3-year transition period in which to apply: from February 29, 2016 to March 1, 2019. Within this period, the licence date of precedence will be based on evidence of date of first use. If an existing non-domestic groundwater user applies for a licence after March 1, 2019, they will likely be treated as a 'new' water user and their licence date of precedence will be based on the date of the application.

CHAPTER 3 | HOW TO APPLY FOR A LICENCE

How do you apply for a licence?

Submit an online application to [FrontCounterBC](#).

You may want to [create a BCeID](#) (i.e., electronic identification number used for BC government services), in order to save your application and finish it later.

What information do you need to provide?

As part of your application for a licence, you will be asked to provide information on:

- The intended purpose(s) for which the water is used and the quantity of water used for each purpose,
- Who owns the land on which you are using the water,
- Where the well and associated works are located (including a map with relevant information),
- Evidence of date of first use (for existing groundwater users), etc.

The water manager may require a hydrogeological assessment by a professional with competence in hydrogeology.

What are the associated costs?

There are [application fees and annual rental fees](#) associated with groundwater licensing. The amount depends on the water use purpose and volume licensed.

Water rentals start accruing on February 29, 2016 for existing non-domestic groundwater users, regardless of their licence application date.

Application fees and annual rental fees are generally not required from:

- Provincial or Federal Ministries
- First Nations using water on reserve land
- A person or entity that is exempt under a First Nations treaty (including the Nisga'a's Final Agreement)
- Uses approvals and permits processed by the BC Oil and Gas Commission

CHAPTER 4 | LICENCE PROCESSING AND CHANGES

What happens after submitting an application?

1. Receiving the application:

FrontCounter BC staff makes sure application is complete and processes the application fee (if applicable).

2. Consultations and referrals:

Other parties may be contacted, including government agencies, affected landowners, other licensees, community groups, First Nations, etc.

3. Technical review:

A technical review is completed to make sure there is enough water at the source to issue a license without affecting the existing water rights of others.

4. Decision:

A Water Manager with the Ministry of Forests, Lands and Natural Resource Operations will decide whether to grant water licence based on (2) and (3).

How do you abandon or make changes to an existing licence?

For more information on:

- Abandonment, or
- Amendments, including:
 - change of purpose
 - change of works
 - extension of term
 - extension of time for construction of works or to make beneficial use of water
 - apportionment
 - transfer of appurtenancy
 - mortgage security

contact FrontCounter BC at 1-877-855-3222 or visit their [Groundwater](#) web page.

Well Operation And Maintenance

1. **Wellhead protection** (GWPR 57, 58, 59, 62, 63, WSA S59)
2. **Well operation** (GWPR 60, 61, WSA S58-S59)
3. **Wellhead maintenance** (GWPR 39, 41, 56, 64, 65)
4. **Controlling artesian flow** (GWPR 68, WSA S53)
5. **Registration of existing domestic water supply wells**
6. **Alteration, modification and change of use of a well** (GWPR 6, WSA S1)
7. **Retention of records and transfer of information by well owner** (GWPR 19, 81)

Well operation and maintenance requirements apply to wells that are in use, in service, or deactivated. A well is considered to be in service if the well is used regularly or on a periodic basis, or the well is kept active as a backup water supply. The well owner is responsible for maintaining and operating their well in accordance with all applicable laws and regulations, including the GWPR. In many situations, he or she will hire a qualified person to maintain the well.

Numbers in brackets refer to the corresponding GWPR or WSA sections.

CHAPTER 1 | WELLHEAD PROTECTION

A person must not introduce or allow to be introduced into a well any of the following “foreign matter”:

- Refuse
- Carcasses
- Human or animal waste
- Pesticides or fertilizers
- Herbicides and fungicides
- Paint and paint products
- Liquid fuels and fuel additives
- Lubricants and solvents, other than water
- Material, natural or otherwise, from construction or demolition
- Flood debris and flood waters

The above list is not exhaustive and any other naturally occurring matter, such as clay, silt, or rock is considered foreign matter if introduced in such amounts that it has a significant adverse impact on a well, aquifer or stream.

The above does not apply to materials or substances introduced during well disinfection, operation, repair, or decommissioning activities, or for substances used for groundwater remediation purposes or any prescribed or authorized activities.

A well owner must maintain the area around the wellhead so that:

- water does not pond around the wellhead,
- the wellhead is accessible,
- no foreign matter enters the well, and
- any foreign matter is kept at least 3 m (10 ft) from the wellhead (for water supply wells).



A well that supplies water to a water supply system must be maintained in a manner that prevents any foreign matter from entering the well, either through the top of the well or an annular space. It must also remain protected from physical damage caused by flood debris, ice, or erosion.

Well sumps, well pits and pump houses must be maintained in such a manner that any water entering the well sump, well pit or pump house is conveyed away from the wellhead.

A hand pump must be installed in a manner that prevents the entry of surface water or foreign matter into the well. If the well is flowing artesian, the hand pump must also prevent or minimize the flow of water from the well. A hand pump that does not meet these requirements must be upgraded or replaced before March 1, 2018.

BEST PRACTICES

Be careful not to introduce any contaminants into the well during well monitoring and sampling activities (e.g. when installing pressure transducers, water level sounder, camera, etc.). Disinfect any down-hole equipment before each use, and disinfect the well after removal of any temporarily installed equipment.

CHAPTER 2 | WELL OPERATION

A well owner must not operate a well in a manner that adversely impacts:

- the quality of water in, or
- the existing uses of water diverted from that aquifer, another aquifer, or a hydraulically connected stream.

A well owner must not operate a well in a manner that causes intrusion of saline groundwater, sea water or contaminated water into that aquifer, another aquifer, or a hydraulically connected stream.

BEST PRACTICES

Wells located within 500 meters of the coastline are at greater risk of saltwater intrusion. Well owners in these areas can monitor the salinity of their water using a variety of methods. These include laboratory testing of water samples for specific conductivity and/or chloride, and on-site monitoring of specific conductivity using hand-held meters, specialized pressure transducers, or in-line meters.

If saltwater intrusion occurs as a result of well operation in a coastal area, a number of mitigation measures can be considered (e.g., reduce pump depth, reduce pumping rate and increase pumping frequency, increase water storage during wet periods).

Refer to Province's [Best Practices for Prevention of Saltwater Intrusion](#) brochure for additional information.

A well owner must operate a well in accordance with any existing alternative specifications accepted by an engineer.



BEST PRACTICES

Consider installing instrumentation to monitor pumping rates, cumulative volumes pumped, and pump run times in order to effectively monitor well and pump performance over time, and track the volume of groundwater pumped. This is particularly important for higher capacity water wells used for industrial and waterworks purposes.

Conduct water quality analyses at least once per year for potable water quality parameters and any potential contaminants (e.g. nitrates, hydrocarbons). Document any changes in the aesthetic properties of the water over time (e.g. taste, odour, colour).

CHAPTER 3 | WELLHEAD MAINTENANCE

The well owner must ensure that:

- the integrity of the surface seal and any annular seal is maintained;
- the production casing remains continuous with a minimum stick-up of 30 cm (12 inches) above final grade for water supply wells, recharge or injection wells, permanent dewatering wells and remediation wells;
- thermoplastic casings and liners remain protected from damage and material breakdown;
- the well cap and well cover remain securely attached and in good condition;
- the area immediately around the wellhead is kept clear of obstructions (including vegetation) that could interfere with the inspection, alteration, repair, or maintenance of the well;
- the steel plate remains welded to the production casing, if the well is not yet in service; and
- the ID plate remains visible and securely attached. Report any loss or damage of the ID plate within 30 days, and request a replacement identification plate from the comptroller.

BEST PRACTICES

Inspect the condition of the wellhead at least once per year. Look for any cracks or holes in the well casing that could allow surface water to enter the well. Check that the vent in the well cap allows the passage of air but not vermin.

Check for any ground settlement or any void space around the well casing that would indicate a compromised or absent surface seal (*Photo 1*).

Never use a well casing as a ground for the electrical service or lightning. Use a dedicated grounding rod.



Photo 1. Visible void space around well

CHAPTER 4 | CONTROLLING ARTESIAN FLOW

The owner of a flowing artesian well (or the land owner, if the well owner is not known), must ensure that equipment installed to control artesian flow is:

- maintained in a manner that keeps the artesian flow under control and prevents any backflow into the well,
- protected from damage caused by freezing conditions,
- not removed from the well, except for the temporary inspection, repair, or replacement of the equipment, and
- replaced promptly if removed.

If artesian flow is not stopped or under control, then the owner of a well must engage a well driller (who has competency in stopping or controlling artesian flow, or who is supervised by the same) to stop the flow or bring the flow under control.

If, due to exceptional circumstances, it is not practicable to bring the artesian flow under control or to decommission the well, the flow may be managed in another manner, so long as it does not pose a threat to property, public safety or the environment, and is approved by the decision maker. In this scenario, a professional with competency in hydrogeology or geotechnical engineering must assess and record the artesian flow conditions and must submit an Artesian Flow Management Report to the decision maker. This report must include the information indicated in Schedule 1 (*Tab 9.3*).

A well owner must operate a flowing artesian well in accordance with any existing alternative specifications indicated in an Artesian Flow Management Report, if applicable.



CHAPTER 5 | REGISTRATION OF EXISTING DOMESTIC WATER SUPPLY WELLS

The owner of an existing domestic water supply well is encouraged to register his or her well. The owner can contact [FrontCounter BC](#) or search the [WELLS database](#) to find out if the well is already registered. Domestic water supply wells (constructed after 2008) should be automatically registered as part of the (mandatory) submission of the well construction report to the comptroller.

Registering a domestic well facilitates consideration of the well owner's right to 2,000 litres of groundwater per day (per private dwelling) in water allocation decisions. It also facilitates consideration of the owner's right to 250 litres of groundwater per day for 'essential household use' during times of water scarcity.

The owner of a non-domestic water supply well does not need to register his or her well, as this is done automatically as part of the licensing process (*Tab 5*).

To register an existing domestic water supply well, submit a [Domestic Well Registration Form](#) (*Tab 9.8*) to the comptroller by mail or email:

Deputy Comptroller
Ministry of Environment
PO Box 9362 Stn Prov Govt
Victoria B.C.
V8M 9M2
Email: Groundwater@gov.bc.ca

CHAPTER 6 | ALTERATION, MODIFICATION AND CHANGE OF USE OF A WELL

Altering a well means:

- undertaking a structural change to a well in terms of the well's depth, diameter or screen assembly,
- installing a surface seal in a well that does not have one, or
- hydrofracturing a well to enhance groundwater supply from the well.

Examples of altering a well:

- drilling deeper or increasing the well's diameter
- hydrofracturing (e.g. to increase yield)
- changing the well screen
- decommissioning part of the well (backfilling)

Requirements:

The regulatory requirements for an altered well are the same as for new wells with respect to construction, operation, deactivation and decommissioning.

Reporting requirements:

Classes of wells that require a well alteration report, and to whom the report must be submitted are presented in *Table 2 of Tab 4.10*. A copy of a [well alteration report](#) is provided in *Tab 9.6*.

The well alteration report must be submitted within 90 days of altering the well.

It must be retained:

- for at least 10 years by the person responsible for altering the well, and
- until the well is decommissioned, by the well owner

Modifying a well means:

making a change, other than an alteration, to a well or wellhead. These modifications must meet all regulatory requirements with respect to construction, operation, deactivation and decommissioning.

Examples of modifying a well or wellhead:

- upgrading a well in a pit
- raising or lowering the top of the well casing
- changing the well cap
- installing a flow meter
- installing a sounding tube
- installing a liner in a bedrock well

Change of use:

When the use or purpose of a well is changed, the well owner must ensure that the well meets the minimum regulatory requirements for that new use or purpose.

If that new purpose requires an authorization (e.g. licence) to operate the well, this must also be obtained.

Examples of change of use:

- A borehole converted to a piezometer or a monitoring well
- A remediation well converted to a monitoring well
- An irrigation well converted to a domestic or drinking water well

CHAPTER 7 | RETENTION OF RECORDS AND TRANSFER OF INFORMATION BY WELL OWNER

The well owner must keep all of the following:

- the well construction report,
- the well alteration report,
- the well identification report,
- the flow test report,
- as-built drawings of a recharge or injection well,
- as-built drawings of a well in well pit,

until that well is decommissioned.

The well owner must keep the well decommissioning report for 10 years after the well is decommissioned.

When the ownership of a well changes, the well owner must transfer all information and records to the new well owner, including any reports listed above.

Well owners are advised to create a dedicated file of information related to their well. This file can also include:

- A sketch showing where the well is located
- A copy of the original well driller's log
- Pump set records
- Water level and flow rate measurements (continuous or intermittent) taken when pump was running and idle
- Water quality laboratory analyses
- Photos, videos, model and serial numbers of any installed equipment
- Past invoices, receipts
- Contact info for contractors and professionals that worked on the well

BEST PRACTICES



Well Deactivating and Decommissioning

1. **Requirements for deactivating wells** (GWPR 14 – 16, 69, 70, WSA S56)
2. **Requirements for decommissioning wells** (GWPR 14 – 17, 69, 71 to 74, 78 – 80, WSA S52, S55, S56)

Difference between deactivation and decommission:

- **Deactivation:** to take the well temporarily out of service
- **Decommission:** to take the well permanently out of service

Numbers in brackets refer to the corresponding GWPR or WSA sections.

CHAPTER 1 | REQUIREMENTS FOR DEACTIVATING WELLS

If a well has not been used for 5 years, the owner must then deactivate or decommission it. However, the owner may choose to deactivate or decommission the well sooner. This does not apply to wells that are actively maintained for use as a backup water supply.

Exception for flowing artesian wells:

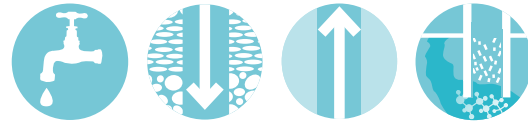
If a flowing artesian well is being managed in accordance with alternative specifications, then the requirements for deactivating the well will apply only when it is possible to do so in accordance with the recommendations of a professional, as accepted by an engineer.

Who can deactivate a well?

Any person, including the well owner, can deactivate a well, other than a flowing artesian well. A flowing artesian well must be deactivated by a well driller who has competency or experience in stopping or controlling artesian flow; or who is supervised by the same.

Requirements:

To deactivate a water supply well, injection well, dewatering well, or remediation well:



- Shut off the power supply to the well pump or remove or disconnect the manual pump handle.

To deactivate a flowing artesian well:

- Shut off the power supply to the well pump or remove or disconnect the manual pump handle,
- Prevent any flow of water back into the well,
- Stop any artesian flow through the casing, and
- Prevent any leakage of the artesian flow at ground surface or into another aquifer.

To deactivate a recharge well:

- Install equipment that prevents water, contaminants and foreign matter from entering the well through the top of the well.

To deactivate a monitoring well:

- Take out of operation any equipment used for monitoring (e.g. level logger, sounding tube).

To deactivate a closed-loop geoechange well:

- Take out of operation any equipment used for the geoechange system.

Requirements pertaining to well maintenance (*Tab 6*) still apply to a deactivated well. These include keeping foreign matter out of the well, maintaining the wellhead, and keeping the well identification plate clearly visible.



CHAPTER 2 | REQUIREMENTS FOR DECOMMISSIONING WELLS

A well must be decommissioned no later than 5 years after it has been deactivated, or 10 years after it was put out of service.

If the well is being maintained as a deactivated well for later use, then the comptroller or water manager may extend the 5-year period.

Exception for flowing artesian wells:

If a flowing artesian well is being managed in accordance with alternative specifications, then the requirements for decommissioning the well will apply only when it is possible to do so in accordance with the recommendations of a professional, as accepted by an engineer.

Who can decommission a well?

Any person can decommission:

- A drilled well that is no deeper than 5 m, or
- An excavated well that is no deeper than 15 m,

except if the well is a flowing artesian well.

A well driller or a well pump installer can decommission any class of well, other than a flowing artesian well.

A flowing artesian well must be decommissioned by a well driller who has competency or experience in stopping or controlling artesian flow, or who is supervised by the same.

Requirements (*Figure 1*):

All equipment and instrumentation in the well, including the well pump, must be removed if practicable.

The identification plate must be removed, and if a well decommission report is required for that class of well (*Table 1*), the plate must be submitted along with the report to the comptroller.

Well casings may be left in place.

The well must be filled throughout its depth with layers of sealant and backfill materials, in a way that prevents the vertical movement of liquids within the well or within any annular spaces (*Photo 1*).

All known water-bearing zones (e.g., fractures) and aquifers should be sealed off to prevent mixing of groundwater between aquifers or water-bearing zones.

Layers of sealant, in the uncased portion of the well, must be:

- at least 1 m long (3 ft),
- separated by a maximum of 6 m (20 ft) of backfill materials

Sealant must be placed in a manner that ensures the integrity and continuity of the seal.

Any entry points or openings in the well must be filled with sealant.

A closure plug must be installed with a length of:

- 1 m (3 ft) for all wells;
- 5 m (16 ft) for water supply wells or wells that were used at any time as a water supply well.

The top of the closure plug may be installed up to 0.3 m (1 ft) below ground surface. Backfill material can be used above the closure plug.

If it is not practicable to comply with the requirements for decommissioning a well, alternative specifications for decommissioning a well may be prepared by a professional, and submitted to an engineer for approval. These alternative specifications must ensure that groundwater from different aquifers or different water-bearing zones does not mix.



Photo 1. Filling of the well with bentonite chips during decommissioning



Additional requirements for decommissioning closed-loop geexchange wells:

The circulation fluids from the ground loops in the system must be removed.

Additional requirements for decommissioning flowing artesian wells:

The person responsible for decommissioning a flowing artesian well must:

- stop the artesian flow through the casing, and
- prevent any leakage of artesian flow at ground surface or into another aquifer.

Suggested practices for decommissioning flowing artesian water wells:

- Do not decommission a flowing artesian well unless until all potential consequences of doing so have been considered.
- Older flowing wells may be more difficult to decommission, due to restricted access, saturated ground, corroded casing, etc.
- Be prepared to handle the flow from the well immediately after removing any flow control devices.
- Consider extending the well casing above the artesian head to stop the flow.
- Consider pumping from nearby 'depressurization' wells to lower the artesian head inside the well to be decommissioned.
- Know how to adequately mix and place your sealant (e.g. from the bottom up using a tremie line). Consider using a positive displacement pump that can pump sealant at a higher flow rate and higher pressure.

For more information, consult the Province's guidance document: [Flowing Artesian Wells](#)

Temporary wells:

A temporary well must be decommissioned within 90 days of drilling, or be made into a permanent well that complies with applicable requirements of the WSA and GWPR.

Geotechnical wells:

A borehole must be decommissioned within 30 days of drilling, or be made into a temporary or permanent well that complies with applicable requirements of the WSA and GWPR.

A test pit must be decommissioned within 30 days of excavation, by backfilling with backfill materials.

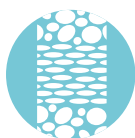
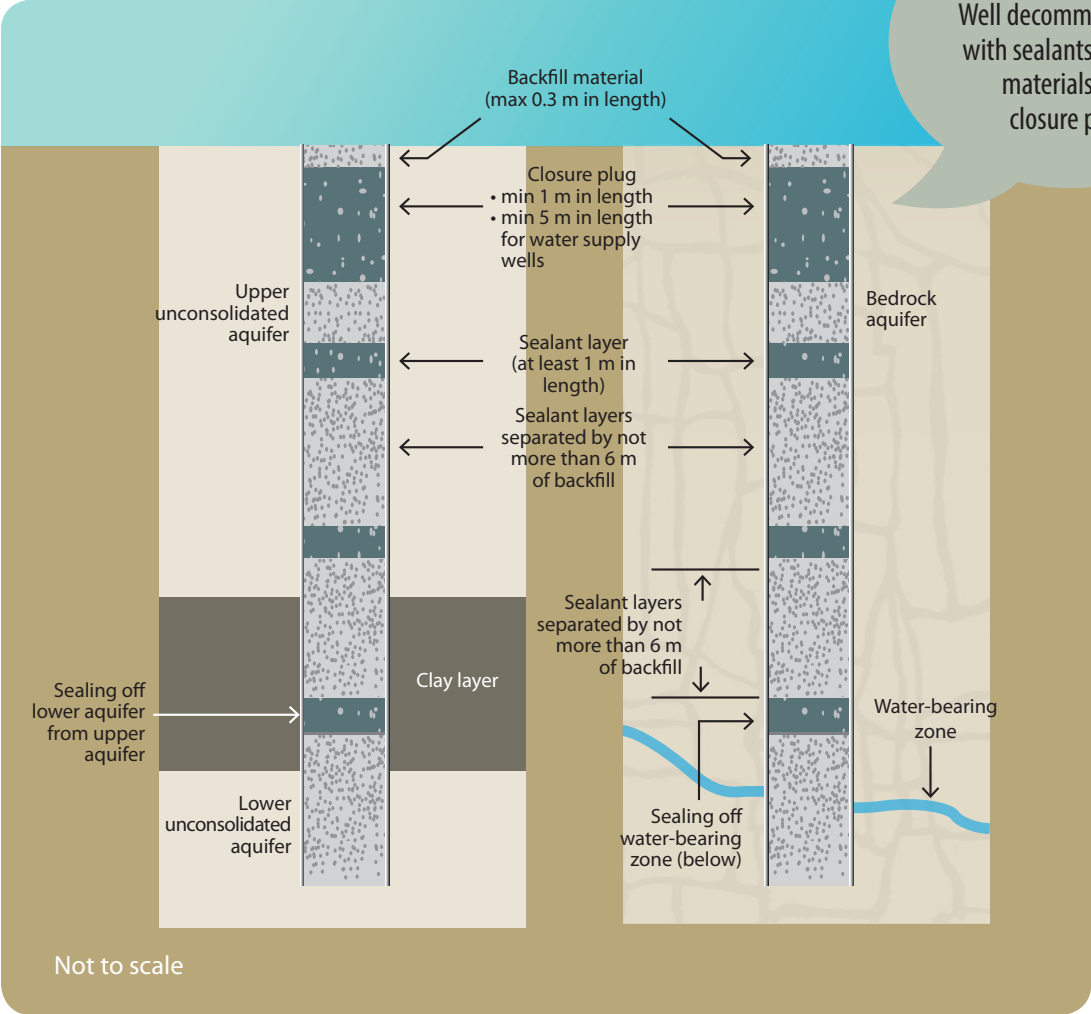
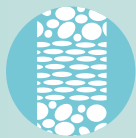


Figure 1.
Well decommissioning
with sealants, backfill
materials and
closure plug





Suggested practices for decommissioning geotechnical boreholes:

If the borehole penetrates fine grained material (clay or silt) and remains open (or is held open by casing), bentonite chips or coated bentonite pellets can be poured into the borehole from surface (*Photo 1*).

In the case of auger drilling, sealant can be placed at discrete intervals by packing the bottom 1.5 m (5 ft) of auger flights with bentonite chips, pushing the auger to the targeted closure plug depth, and reversing auger rotation while retracting the auger string from the hole. Subsequent plugs can be placed in the same manner, alternating with native material.

If the borehole penetrates coarse grained material (sand and gravel) and/or does not stay open, consider placing the first closure plug at the slough level.

If the drilling method does not involve continuous casing advancement (e.g. solid stem auger) and a closure plug(s) must be installed below the slough level, advance tremie rods (using a drop off tip to prevent soil ingress during advancement) to the desired depth and then place the sealant (typically bentonite powder based) using a grout pump. Even for drilling methods involving continuous casing advancement, the use of tremie rods is preferred for accurate placement of sealant at specific depths over the length of the borehole.

In most situations, the upper part of the borehole remains open and can be filled by pouring in bentonite chips from surface. Add water, if necessary, to properly hydrate the bentonite. Add a surface plug in the top 0.3 m (1 ft) using material suited to the intended land use (e.g. concrete or asphalt cold-patch).

BEST PRACTICES










Suggested practices for decommissioning monitoring wells:

Ideally, monitoring well casings and screens used for environmental investigations should be removed during well decommissioning. This may be possible if the well casing is not brittle, and if the surface seal was not created with a cement-type grout.

Reporting requirements for the person responsible for decommissioning the well:

Classes of well requiring a well decommission report and the person to whom the report must be submitted are presented in *Table 1*.

Table 1. Reporting requirements for well decommissioning

Class of well	Category or subclass	Well decommission report required?	Person to whom report must be submitted	
      	All water supply wells	Yes	To the comptroller and well owner	
	Monitoring	Temporary	No	NA
		Permanent	Yes	To the well owner
	Recharge or Injection	Made by drilling or boring	Yes	To the comptroller and well owner
		Made by driving, jetting or excavating	No	NA
	Dewatering	Temporary	No	NA
		Permanent	Yes	To the comptroller and well owner
Remediation	Temporary	No	NA	
	Permanent	Yes	To the well owner	
Geotechnical	Borehole	Yes	To the well owner	
Closed-loop geoexchange	All closed-loop geoexchange wells	Yes	One well decommission report per geoexchange system to the comptroller and a report for every well in that system to the well owner	
All classes of well	All flowing artesian wells	Yes	To the comptroller and well owner	

The form and information to include in a *well decommission report* is available in *Tab 9.6*.

The well decommission report must be submitted to the person(s) indicated in *Table 1* within 90 days of decommissioning the well.

The well decommission report must be retained by the person responsible and the well owner for at least 10 years.

Compliance and Enforcement

1. Compliance and Enforcement Framework
2. Common Offences and Fines
3. Remediation orders (WSA S60)

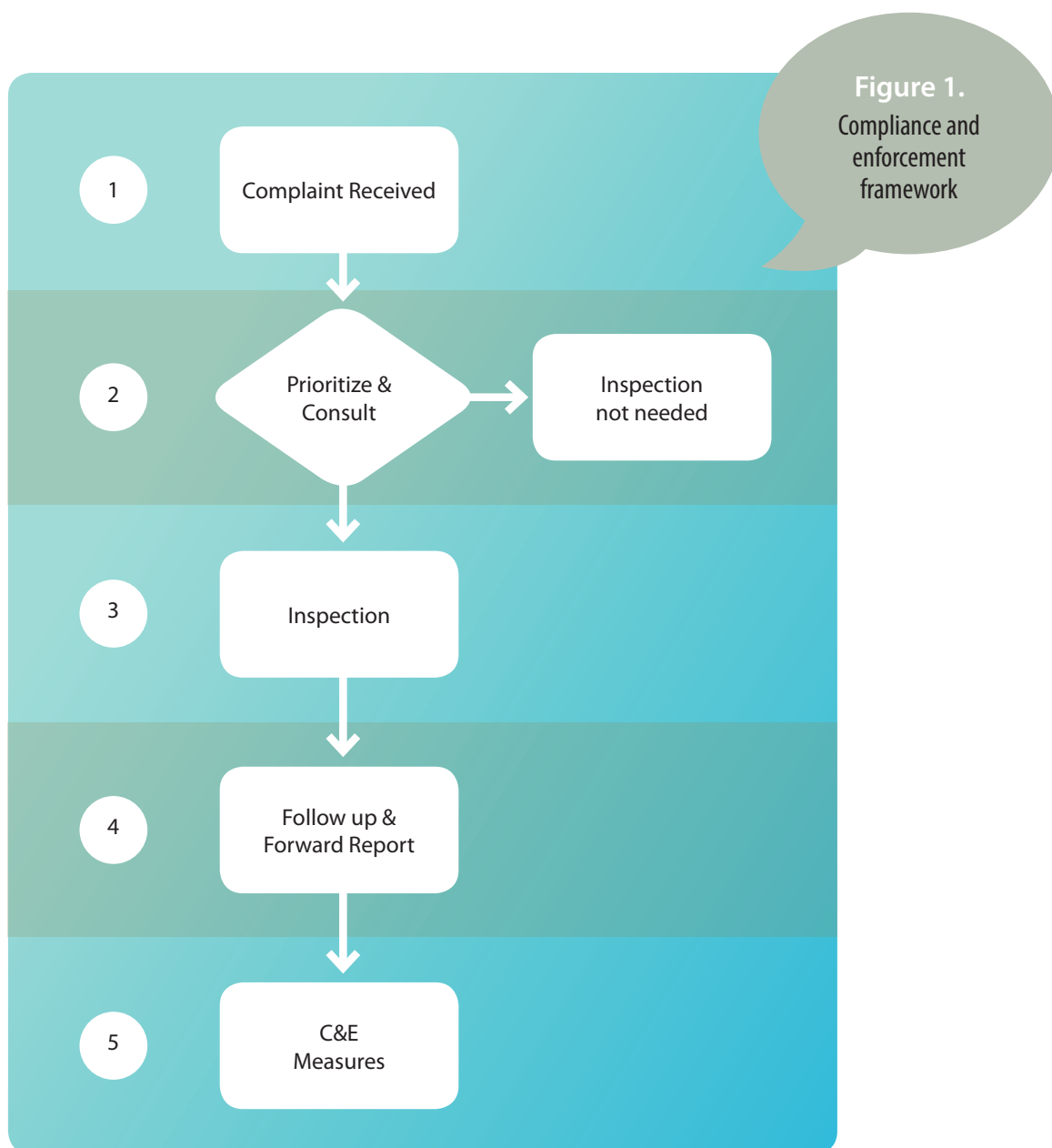
CHAPTER 1 | COMPLIANCE AND ENFORCEMENT FRAMEWORK

Steps 1 through 5 of the compliance and enforcement framework are described below and on *Figure 1*:

1. A complaint is received in one of two ways:
 - a. Filling out a [Natural Resource Violation Reporting form](#) online.
 - b. Calling the 'Report all Poachers and Polluters' line: **1-877-952-7277**
2. The complaint is vetted by a natural resource officer. The officer will collect information by talking to the complainant and any other relevant stakeholders.
3. The natural resource officer will consult with the regional groundwater statutory official if the issue relates to wells and groundwater. They will jointly determine whether a well inspection is necessary.
4. During the well inspection, additional information will be recorded.
5. Following the inspection, the information will be reviewed in the context of the legislation, and a report will be sent to the well owner.
6. If non-compliance is identified, the appropriate compliance and enforcement measures will be determined by the groundwater statutory official and natural resource officers.

Compliance and enforcement measures include education, letters, Orders, and tickets. The enforcement measures selected will depend on the facts of the case. For example, first time offences of low risk may result in education and/or a letter instead of a fine, whereas repeat or high-risk offences may result in a letter and fine.

Compliance cases are tracked and managed in the West Coast Joint Compliance Committee, which consists of staff in Water Protection, Water Authorizations, Ecosystems and Compliance and Enforcement (Natural Resource Officers) that meet on a bi-weekly basis. The purpose of the committee is to review compliance cases and coordinate joint efforts between the different sections. Cases are tracked from discovery of non-compliance through to resolution.



CHAPTER 2 | COMMON OFFENCES AND FINES

Anyone found to have committed an offence listed in *Table 1* below may be fined up to the total ticketed amount.

Table 1 shows common offenses with corresponding fines, victim surcharge levies and ticketed amounts (*Schedule 2 of the Violation Ticket Administration and Fines Regulation*, Section 106).

Table 1. Common offences and fines

Section of the WSA	Offense	Fine (\$)	Victim Surcharge Levy (\$)	Ticketed Amount (\$)
106 (4) (o)	Construct a well, close a well or install a well pump or wellhead without holding the required qualifications	350	53	403
106 (4) (o)	Disinfect a well without holding the required qualifications	100	15	115
106 (4) (o)	Perform an activity in relation to a well, other than constructing, closing or disinfecting a well or installing a well pump or wellhead, without holding the required qualifications	200	30	230
106 (5) (g)	Fail to deactivate a well when required	200	30	230
106 (5) (g)	Fail to decommission a well when required	350	53	403
106 (5) (k)	Introduce, allow or cause to be introduced into a well any foreign matter or contaminant	350	53	403
107 (1) (d)	Fail to comply with a remediation order in relation to foreign matter in a well	500	75	575
106 (5) (c)	Fail to secure well cap or well cover or remove well cap or well cover when not authorized	200	30	230
106 (5) (d)	Fail to replace well cap or well cover when required	200	30	230
106 (5) (a)	Fail to stop or bring artesian flow under control or give notice as and when required	350	53	403
106 (5) (b)	Fail to engage a qualified well driller or a professional or to ensure that that person stops or brings artesian flow under control	350	53	403
106 (5) (e)	Fail to attach an identification plate to a well or wellhead or to remove identification plate when required	100	15	115
106 (5) (h)	Fail to maintain, retain, produce or submit a well report when required	200	30	230
107 (1) (g)	Drill or alter a well, install a well pump or conduct a flow test when prohibited	500	75	575
106 (4) (q) (i)	Fail to comply with the requirements when constructing or decommissioning a well	350	53	403
106 (4) (q) (i)	Fail to comply with the requirements when deactivating a well	100	15	115
106 (4) (q) (i)	Fail to comply with the requirements when disinfecting a well	100	15	115
106 (4) (q) (ii)	Fail to comply with the requirements when installing a well pump or wellhead	350	53	403
106 (4) (q) (ii)	Fail to comply with the requirements when performing activities in relation to a well pump or a wellhead or conducting a flow test or disinfecting a well pump	200	30	230

CHAPTER 3 | REMEDIATION ORDERS

An engineer may order a person to stop introducing foreign matter, remove foreign matter, or to take measures (as directed by the engineer) to remediate or mitigate the effects of introducing foreign matter into a well.

The following qualifications or exemptions may apply to the engineer's Order:

- If the engineer cannot ascertain who introduced foreign matter into a well, the engineer may issue an Order against the well owner or the land owner (if the well owner cannot be ascertained).
- If the engineer considers that the effects of an introduction of foreign matter cannot be remediated, or cannot be fully remediated, at the location of the introduction, that engineer may order the person to take compensatory mitigation measures, in place of or supplemental to other remediation measures, on a different part of the aquifer into which the introduction was made.

The comptroller or a water manager may authorize a government or other individual to undertake actions to comply with an Order, if the person who introduced foreign matter fails to comply and failure may adversely impact water in an aquifer or other hydraulically connected water body. The person who introduced the foreign matter will be liable for associated costs of those actions.

In a prosecution, it is not necessary for the engineer, water manager or comptroller to prove that the contaminant, matter or substance, if diluted or its concentration is reduced subsequent to the introduction into the well, continued to cause (or is likely to cause) a significant adverse impact on water quality or existing water uses.

Reports, Forms and Schedules

1. Submit a report to the comptroller
2. *Application for registration* (for well drillers and well pump installers)
3. Information in Artesian Flow Management Reports (Schedule 2 of GWPR)
4. *Pumping test report*
5. *Well identification report for water supply system* (for well owner)
Schedule 2. Information in well identification reports (Schedule 3 of GWPR)
6. *Well construction /alteration/decommission report*
Schedule 3. Information in well construction reports (Schedule 4 of GWPR)
Schedule 4. Information in well decommission reports (Schedule 52 of GWPR)
7. *Well pump installation report*
8. *Domestic well registration form* (for well owner)

CHAPTER 1 | SUBMIT A REPORT TO THE COMPTROLLER

Construction, Alteration and Decommission Reports must be submitted through the online portal [eWELLS](#), or by mail to the Deputy Comptroller.

You will need to register for a BCeID, when you first enter the eWELLS platform.

Other completed reports must be submitted by mail or emailed to:

Deputy Comptroller

Ministry of Environment

PO Box 9362 Stn Prov Govt

Victoria B.C.

V8W 9M2

Email: Groundwater@gov.bc.ca



APPLICATION FOR REGISTRATION

As a Water Well Driller, Geoexchange Driller,
Geotechnical/Environmental Driller or Well Pump Installer
in the Province of British Columbia

1. Type of Registration

- Water Well Driller
- Geotechnical/Environmental Driller
- Geoexchange Driller
- Well Pump Installer

2. Contact Information

Applicant's Name: _____

Company Name: _____

Company Address: _____

Company Phone No.: _____ **Company Fax No.:** _____

Email Address (if available): _____

Cell Phone No. (if available): _____

3. Proof of Age (enclose photocopy with application)

Please indicate which type of document you are providing as proof of age with your application.

Proof of Age (e.g. birth certificate, driver's licence, passport): _____

4. Type of Certification (enclose photocopy with application)

Well Driller

- Certificate as a *Water Well Driller* issued by the Province of BC
- Certificate as a *Geoexchange Driller* issued by the Province of BC
- Certificate as a *Geotechnical/Environmental Driller* issued by the Province of BC
- An equivalent certification issued by another province or territory of Canada
- A certificate as a *Ground Water Drilling Technician* issued by the Canadian Ground Water Association before April 26, 2013

Well Pump Installer

- Well Pump Installer Certificate* issued by the Province of BC
- An equivalent certification issued by another province or territory of Canada
- A certificate as a *Ground Water Pump Technician* issued by the Canadian Ground Water Association before April 26, 2013

5. Important Information

1. A person may apply to the Deputy Comptroller of Water Rights for registration as a **water well driller, geoexchange driller, geotechnical/environmental driller or well pump installer** in the Province of British Columbia **providing proof that the applicant is at least 19 years of age** and has certification.
2. **Upon acceptance and approval of this application** by the Deputy Comptroller of Water Rights, the applicant will be registered as a *Water Well Driller, Geoexchange Driller, Geotechnical/Environmental Driller or Well Pump Installer* in BC and will receive an identification card indicating the registration they hold. There is **no charge** for this application or for inclusion in the *Register of Well Drillers or the Register of Well Pump Installers*.
3. The Deputy Comptroller of Water Rights **may remove from the register** of *Well Drillers* or the register of *Well Pump Installers* any person who:
 - Fails to meet all of the necessary requirements for registration,
 - Fails to maintain a requirement for registration (applies on or after November 1, 2010),
 - Is no longer actively working in Canada as a qualified well pump installer, or
 - Is deceased.
4. A person listed as a *Water Well Driller, Geoexchange Driller, Geotechnical/Environmental Driller or Well Pump Installer* in the register **must advise** the Deputy Comptroller of Water Rights in writing **within 60 days of any changes** to the information on the register or if they are no longer actively working in Canada as a well driller or as a well pump installer.
5. It is the responsibility of a *Water Well Driller, Geoexchange Driller, Geotechnical/Environmental Driller or Well Pump Installer* to obtain any other relevant certification and permits required to perform their work and to follow any applicable regulations.

6. Signature of declaration

I have read and understand the above and declare that the statements made in this application are true:

Signed: _____ Date: (mm/dd/yy): _____

7. Mailing Information

Completed applications for registration as a *Water Well Driller, Geoexchange Driller, Geotechnical/Environmental Driller or Well Pump Installer*, together with supporting evidence or documentation, **should be forwarded by mail to:**

Deputy Comptroller of Water Rights
Watershed & Aquifer Science Section
Ministry of Environment
PO Box 9362 STN PROV GOVT
Victoria BC V8W 9M2

Before submitting, have you:

- Completed and signed your application form?
- Provided a copy of your proof of age?
- Provided a copy of your certificate of qualification?

Internal Use Only

Date received: _____ Approved/Not Approved (if not approved state reasons): _____

Signed: _____ Date (mm/dd/yy): _____

Deputy Comptroller of Water Rights

CHAPTER 3 | INFORMATION IN ARTESIAN FLOW MANAGEMENT REPORTS (Schedule 1 of the GWPR)

Required information

1 A report by a professional in respect of artesian flow management required under section 67 [report on artesian flow management] of this regulation must include

- (a) the following information relating to the owner, location and identification of the well:
 - (i) the name and mailing address of the owner of the well;
 - (ii) the property on which the well is located, described by its site address, legal description or parcel identifier number (PID);
 - (iii) either
 - (A) the universal transverse mercator (UTM) zone and the UTM coordinates of the well recorded to the nearest metre, or
 - (B) the latitude and longitude of the well recorded in decimal degrees to at least 5 decimal places, or recorded in degrees, minutes and seconds with the seconds recorded to at least 2 decimal places;
 - (iv) if a well identification plate is attached to the well, the well identification number,
- (b) the following information relating to actions taken to mitigate or remediate damage caused by artesian flow:
 - (i) a description of the assessment of artesian flow, including rate of flow, artesian pressure, site conditions and visible impacts;
 - (ii) a description of the construction of the well and the observed state of the artesian flow in respect of the well, including a scaled drawing that shows the construction and the observed state;
 - (iii) in respect of any actions taken to attempt to stop or bring the artesian flow under control, or remediate any damage caused by the artesian flow, a description of the following:
 - (A) any actions taken by the professional or, to the knowledge of the professional, by another person;
 - (B) the timeline for the actions;
 - (C) if known, the name and contact information of another person who took the actions;
 - (D) any observations, or proof, of the actions taken by another person under clause (A);
 - (E) any material, including sealant, added into the flowing artesian well;
 - (F) the reasons for the failure of the attempts to stop or bring the artesian flow under control,

- (c) an evaluation by the professional in respect of the following:
- (i) a description of the proposed manner of managing the artesian flow, including the following:
 - (A) the exceptional circumstances that make it not practicable to stop or bring the artesian flow under control under section 52 (1) (a) or (b) [controlling artesian flow during construction] of the Act;
 - (B) the method by which the flow of water will be prevented from flowing back into the well;
 - (C) if the well will be altered, modified or configured differently, a description of what is proposed and a scaled drawing of the well;
 - (D) the anticipated work plan and timeline for implementation;
 - (E) the estimated reduction of artesian flow;
 - (F) options, if any, for managing the artesian flow other than the proposed manner;
 - (G) any potential threats to property, public safety or the environment that may be posed by the proposed manner;
 - (H) any other potential impacts that may be caused by the proposed manner, including to any public or private lands or activities, to infrastructure, to stream water, to any aquifer, to other water users or holders of water rights or to wildlife, fisheries, habitats or other ecosystems;
 - (I) options, if any, for potential remediation of any adverse impacts that may be caused by the proposed manner, such as those described in clauses (G) and (H);
 - (J) the estimated cost of managing the artesian flow in accordance with the proposed manner, including maintenance and monitoring costs that may be anticipated;
 - (K) the estimated cost of stopping or bringing the artesian flow under control;
 - (ii) any conclusions as to whether the proposed manner of managing the artesian flow
 - (A) would be more suitable than stopping or bringing the artesian flow under control, and
 - (B) would not pose a threat to property, public safety or the environment;
 - (iii) the reasons or basis for the conclusions under subparagraph (ii), including the following:
 - (A) an evaluation of the risks and consequences of the proposed manner of managing the artesian flow as compared to other options;
 - (B) an evaluation of the likelihood that the proposed manner of managing the artesian flow will satisfy the requirements of section 52 (6) of the Act, and

(d) the following information:

- (i) the name and business contact information of the professional;
- (ii) a summary of the professional's experience with controlling or managing artesian flow.

Other information requirements

2 Section 1 of this Schedule does not limit any other provision of this regulation that may require the inclusion of information in a report in respect of artesian flow management.



Pumping Test Report

Stamp company name/address/
phone/fax/e-mail here.

Ministry Well ID Plate Number: _____

Ministry Well Tag Number: _____

Red lettering indicates minimum mandatory information. Requirements for flow reports are found in Part 5 of the *Water Act*, available at: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/index.html#leg.

Owner name: _____

Mailing address: _____ Town _____ Prov. _____ Postal Code _____

Well Location: Address: Street no. _____ Street name _____ Town _____

or **Legal description:** Lot _____ Plan _____ D.L. _____ Block _____ Sec. _____ Twp. _____ Rg. _____ Land District _____

or **PID:** _____ and **Description of well location (attach sketch, if nec.):** _____

NAD 83: Zone: _____ and **UTM Easting:** _____ m or **Latitude:** deg: _____ min: _____ sec: _____

(Datum must be set to NAD83) **UTM Northing:** _____ m **Longitude:** deg: _____ min: _____ sec: _____

Ground elevation: _____ (ft) asl Method: GPS Differential GPS Level survey Other (specify): _____

Class of well (see Table 1): _____ **Sub-class of well:** _____

Water supply wells: indicate intended water use: private domestic water supply system irrigation commercial or industrial other (specify): _____

Pumping Test Summary Information

Type of well pump:

- Submersible Jet (end-suction)
- Vertical turbine Other (specify) _____

Depth of pump setting: _____ ft (btoc)

Type of Pumping Test:

- Constant Rate Step Test Other (specify) _____

Method of water level measurement:

- Water level sounder Datalogger Air line
- Wetted tape Other (specify) _____

Reference datum for water level measurements:

- Top of casing Ground level Other (specify) _____
- Final stick-up: _____ in

Method of flow measurement:

- Flow meter Orifice 45-gallon drum 5-gallon pail
- Other (specify) _____

Start date of pumping test: _____ (YYYY/MM/DD)

Static water level: _____ ft

Duration of pumping: _____ hrs **Duration of recovery:** _____ hrs

Well yield estimated from pumping test: _____ USgpm

Available drawdown: _____ ft Specific Capacity: _____ USgpm/ft

Method of estimating long-term well yield from pumping test:

Pumping test data sheet(s) attached:

Person conducting the pumping test (please print):

Name (first, last): _____

Company name: _____

Registration number of person responsible*: _____

Consultant (if applicable; please print): _____

* Fill in the registration of the Qualified Well Driller/Pump Installer. If the test was conducted by a driller/pump installer who is not registered, the Qualified Well Driller/Pump Installer who is directly supervising the work should fill in their registration number.

Declaration:

The pumping test has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.

PLEASE NOTE: The data recorded in this pumping test report reflect conditions at the time of the test. Water levels, well performance, estimated long-term well yield and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities, and condition of the works, which may change over time.

Signature of Person Responsible:

X _____

Note: Well reports submitted to the Deputy Comptroller, or retained by the person responsible, as required under the *Water Act* shall be considered part of Provincial Government records and are subject to the *Freedom of Information and Protection of Privacy Act*.

Return Completed Report and Data Sheets to:

Deputy Comptroller Ministry of Environment, Water Stewardship Division
Watershed & Aquifer Science Section
PO Box 9362 Stn Prov Govt Victoria BC
V8W 9M2

Questions? If you have any questions about the *Water Act* or this report form, please contact your local Ministry of Environment office.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Table 1: Classes and Sub-Classes:

Class	Sub-class (if applicable)
Water supply	Domestic; Non-domestic
Monitoring	Temporary; Permanent
Recharge or injection	
Dewatering	Temporary; Permanent
Remediation	Temporary; Permanent
Geotechnical	Borehole; Test pit; Closed loop geothermal

Table 2: Definitions of Abbreviations

aslabove sea level	lgpmImperial gallons per minute	PIDParcel Identifier
btocbelow top of casing	ininches	Rg.Range
degdegrees	l/slitres per second	sec.seconds
D.L.District Lot	mmetres	Sec.Section
ftfeet	mmminute	Twp.Township
hhhour	minminutes	USgpm.....US gallons per minute
hrshours	no.number	UTMUniversal Transverse Mercator Grid

Table 3: Recommended Minimum Frequency for Water Level Measurements for Pumping Tests

The recommended minimum frequency for water level measurements during pumping and during recovery is shown below:

Well being pumped	Observation well
<p><u>During pumping:</u></p> <ul style="list-style-type: none"> • Every minute for the first 10 minutes* • Every 2 minutes from 10 minutes to 20 minutes* • Every 5 minutes from 20 minutes to 50 minutes* • Every 10 minutes from 50 minutes to 100 minutes* • Every 20 minutes from 100 minutes to 200 minutes* • Every 50 minutes from 200 minutes to 500 minutes* • Every 100 minutes from 500 minutes to 1000 minutes* • Every 200 minutes from 1000 minutes to 2000* • Every 500 minutes from 2000 minutes to 5000 minutes* • Every 24 hours from 5000 minutes onward* • Final water level measurement just prior to end of pumping 	<p><u>During pumping:</u></p> <ul style="list-style-type: none"> • Every 10 minutes for the first 100 minutes* • Every 50 minutes from 100 minutes to 500 minutes* • Every 100 minutes from 500 minutes to 1000 minutes* • Every 500 minutes from 1000 minutes to 5000 minutes* • Every 24 hours from 5000 minutes onward* • Final water level measurement just prior to end of pumping
<p><u>During recovery:</u></p> <ul style="list-style-type: none"> • Every minute for the first 10 minutes after end of pumping** • Every 2 minutes from 10 minutes to 20 minutes after end of pumping** • Every 5 minutes from 20 minutes to 50 minutes after end of pumping** • Every 10 minutes from 50 minutes to 100 minutes after end of pumping** • Every 20 minutes from 100 minutes to 200 minutes after end of pumping** • Every 50 minutes from 200 minutes to 500 minutes after end of pumping** • Every 100 minutes from 500 minutes to 1000 minutes after end of pumping** • Every 200 minutes from 1000 minutes to 2000 minutes after end of pumping** • Every 500 minutes from 2000 minutes to 5000 minutes after end of pumping** • Every 24 hours from 5000 minutes onward** 	<p><u>During recovery:</u></p> <ul style="list-style-type: none"> • Every 10 minutes for the first 100 minutes after end of pumping** • Every 50 minutes from 100 minutes to 500 minutes after end of pumping** • Every 100 minutes from 500 minutes to 1000 minutes after end of pumping** • Every 500 minutes from 1000 minutes to 5000 minutes after end of pumping** • Every 24 hours from 5000 minutes onward**

* Time since the start of pumping or time immediately after a step change in pumping

** Not required if time is beyond the specified duration of recovery measurements

Duration of Water Level Measurements during Recovery

Duration of pumping or when 90% of recovery is reached.

Pumping Test Recovery Data Sheet

Pumping test recovery data sheet for: _____ (include well name)

Pumping well Observation well, include well ID plate number (if available): _____ and distance to pumping well: _____ ft or m (circle)

Type of pumping test: Constant rate Step Other (specify): _____

Date and time at end of pumping (YYYY/MM/DD; hh:mm): _____ Static water level prior to pumping: _____ ft

Water level at end of pumping: _____ ft

Time since pumping started (min) (enter to the nearest minute)	Time since pumping stopped (min) (enter to the nearest minute)	<u>Time since pumping started</u> Time since pumping stopped	Measured water level (m or ft)	Residual drawdown (m or ft)	Remarks or observations (e.g. weather observations)

Notes: Residual drawdown is the difference between the measured water level during recovery and the static water level prior to pumping.

CHAPTER 5 | WELL IDENTIFICATION REPORT FOR WATER SUPPLY SYSTEM

Information in well identification reports (schedule 2 of GWPR)

Required information

1 A well identification report required under section 75 [*well identification reports by owner of well supplying water supply system*] of this regulation must include

- (a) the following information relating to the owner and location of the well:
 - (i) the name, mailing address, telephone number and, if available, the email address of the owner of the well that is for the purpose of supplying a water supply system;
 - (ii) the name of the well, if any;
 - (iii) the name of the water supply system;
 - (iv) the property on which the well is located described by its site address, legal description or parcel identifier number (PID);
 - (v) either
 - (A) the universal transverse mercator (UTM) zone and the UTM coordinates of the well recorded to the nearest metre, or
 - (B) the latitude and longitude of the well recorded in decimal degrees to at least 5 decimal places or recorded in degrees, minutes and seconds with the seconds recorded to at least 2 decimal places,
 - (iv) if a well identification plate is attached to the well, the well identification number,
- (b) the following information relating to the well identification plate:
 - (i) the well identification number;
 - (ii) a description of where the well identification plate is attached;
 - (iii) the name of the person attaching the well identification plate;
 - (iv) the date of attachment of the well identification plate, and
- (c) a copy of
 - (i) any available well construction report relating to the well, or
 - (ii) any information on the depth and diameter of the well.

Other information requirements

2 Section 1 of this Schedule does not limit any other provision of this regulation requiring the inclusion of information in a well identification report.



Well Identification Report For Water Supply System (Schedule 2)

To register your water supply system well, please complete the following information. The information provided will be added to the Provincial WELLS Database, which is accessible at <http://a100.gov.bc.ca/pub/wells/public/>.

Owner Information

Owner Name: _____

Mailing Address: _____ Town _____ Prov. _____ Postal Code _____

Email Address: _____ Phone No.: _____

Well Location Information

If the address of the well location is the same as above, please check []

Address: _____ Town _____

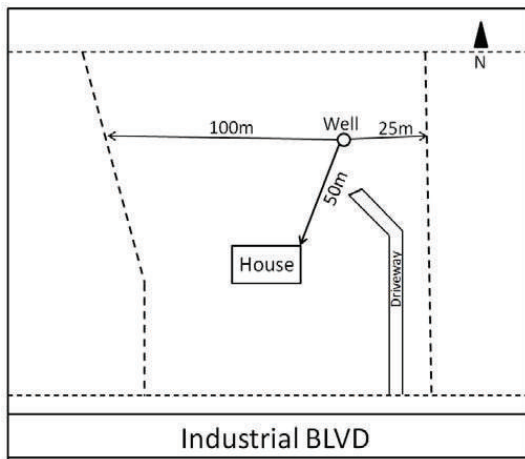
Legal description (available from the property tax assessment notice):

Lot: _____	Block: _____	Range: _____
Plan: _____	Section: _____	Land District: _____
District Lot: _____	Township: _____	PID: _____

Description of well location on the property _____

Please provide or attach a sketch or picture of where the well is located on your property relative to the road and any other structures.

Example Sketch



Well Location Sketch



GPS Coordinates of the Well

Coordinates for the well can be determined by using a GPS unit or by using a mapping application such as Google Earth.

Latitude (e.g., 49.20184°): _____

Longitude (e.g., 122.58376°): _____

OR

UTM Zone (NAD83): _____ UTM Easting: _____ UTM Northing: _____

Source of coordinates (*check one*): GPS [] Google Earth [] Other (please specify) [_____]

Well Information

If the well construction report is available, please attach to this form. Attached Not Available

Well Identification Plate Number (steel plate attached to well): _____

Date of Well Identification Plate Attachment (YYYY/MM/DD): _____

Name of Person Who Attached Well Identification Plate to the Well: _____

Description of where the well identification plate is attached (e.g., *well casing or well cap*): _____

Water Supply System Name (e.g., Township of Langley) _____

Name of the Water Supply System Well (e.g., well #8): _____

Well depth (ft): _____ Well Diameter (in): _____

General Information

1. Requirements for Schedule 2 Reports, including the publication of information (including personal information), are found in Part 3 of the *Water Sustainability Act* and Part 16 of the Groundwater Protection Regulation and can be found at:

<https://www2.qa.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/groundwater-protection-regulation>

2. Well Reports submitted to the Deputy Comptroller, or retained by the person responsible, as required under the *Water Sustainability Act* and the Groundwater Protection Regulation, shall be considered part of the Provincial Government records and subject to the *Freedom of Information and Protection of Privacy Act*.

3. The current Ministry Standard datum for mapping geodetic use is the North American Datum of 1983 (NAD 83). To determine GPS coordinates, set the datum to NAD 83.

Send Completed Forms To

Mailing Address:

Deputy Comptroller
Ministry of Environment
PO Box 9362 Stn Prov Govt
Victoria BC V8W 9M2

Email:

GroundWater@gov.bc.ca

Schedule 3 - Information in well construction report

Required information

1 A well construction report required under section 76 [*well construction reports submitted to both comptroller and well owner*] or 77 [*well construction reports submitted to well owner only*] of this regulation must include

- (a) the following information relating to the owner and location of the well:
 - (i) the name and mailing address of the owner of the well;
 - (ii) the property on which the well is located, described by its site address, legal description or parcel identifier number (PID);
 - (iii) either
 - (A) the universal transverse mercator (UTM) zone and the UTM coordinates of the well recorded to the nearest metre, or
 - (B) the latitude and longitude of the well recorded in decimal degrees to at least 5 decimal places or recorded in degrees, minutes and seconds with the seconds recorded to at least 2 decimal places,
- (b) the following information relating to the type of work, class of well and method of drilling:
 - (i) whether the report relates to the drilling of, or an alteration to, the well;
 - (ii) the class and, if applicable, category or subclass of the well;
 - (iii) if the well is a water supply well, the intended use or purpose of the water supply well;
 - (iv) the method of drilling the well,
- (c) the following information relating to geological materials and their water-bearing characteristics:
 - (i) a description of the geological materials encountered during drilling or alteration, including the depth at which the materials are encountered and whether they are water-bearing;
 - (ii) if the well is drilled into bedrock, the depth of water-bearing zones, if any, encountered in bedrock and their estimated flow,
- (d) the following information relating to the construction of the well:
 - (i) the details of casings used, if any, including surface casing;
 - (ii) if a drive shoe was used;
 - (iii) the diameter of the hole;
 - (iv) the total depth drilled;
 - (v) the finished well depth;
 - (vi) the type and depth of any backfill materials or sealant placed in the well;
 - (vii) the details of the surface seal and the method of its installation, if a surface seal was installed;

- (viii) the details of the screen assembly and filter pack material, if any;
- (ix) the details of liner used, if any,
- (e) if the well was developed, the following information relating to the development of the well:
 - (i) the method of development;
 - (ii) the duration of development,
- (f) if a well yield test was conducted, the following information relating to the well yield test:
 - (i) the method, rate and duration of well yield testing;
 - (ii) the drawdown in water level at the end of well yield testing;
 - (iii) the well yield estimated from the test;
 - (iv) if the well was hydrofractured, any increase in well yield resulting from hydrofracturing,
- (g) the following information relating to the completion of the well:
 - (i) if a casing was installed, the final length of the casing stick-up;
 - (ii) the static water level or shut-in pressure level, whichever is applicable;
 - (iii) whether the well was disinfected;
 - (iv) the type of well cap used, and if a well cover was also used, the type of well cover used,
- (h) if a well identification plate is required, the following information:
 - (i) the well identification number;
 - (ii) the location where the well identification plate is attached,
- (i) if available, the well tag number,
- (j) the following information relating to the person responsible for drilling or altering the well:
 - (i) the name, address, telephone number and, if applicable, registration number of the person responsible for drilling or altering the well;
 - (ii) the name and, if applicable, registration number of the person who drilled or altered the well, if different from the person referred to in subparagraph (i),
- (k) the starting and completion dates of the work,
- (l) a copy of alternative specifications relating to the well, if any, made under section 18 (3) [siting of water supply wells and permanent dewatering wells] of this regulation, including the engineer's acceptance and the terms and conditions, if any, relating to the alternative specifications,
- (m) a copy of the documentation referred to in section 19 (2) [siting of recharge wells and injection wells] of the regulation, including the design, the engineer's acceptance and the terms and conditions, if any, and
- (n) a copy of any drilling authorization for the well.

Other information requirements

2 Section 1 of this Schedule does not limit any other provision of this regulation requiring the inclusion of information in a well construction report.

Schedule 4 - Information in well decommission reports

Required information

1 A well decommission report required under section 78 [well decommission reports submitted to both comptroller and well owner], 79 [well decommission reports submitted to well owner only] or 80 [well decommission reports for flowing artesian wells] of this regulation must include

- (a) the following information relating to the owner and location of the well:
 - (i) the name and mailing address of the owner of the well;
 - (ii) the property on which the well is located, described by its site address, legal description or parcel identifier number (PID);
 - (iii) either
 - (A) the universal transverse mercator (UTM) zone and the UTM coordinates of the well recorded to the nearest metre, or
 - (B) the latitude and longitude of the well recorded in decimal degrees to at least 5 decimal places or recorded in degrees, minutes and seconds with the seconds recorded to at least 2 decimal places,
- (b) the following information relating to the well:
 - (i) if a well identification plate is attached to the well, the well identification number;
 - (ii) if available, the well tag number;
 - (iii) the class and, if applicable, category or subclass of the well;
 - (iv) the diameter of the hole;
 - (v) the depth of the well;
 - (vi) the method of drilling, if known;
 - (vii) the diameter and material of the casing or liner, if any;
 - (viii) the reason for decommissioning;
 - (ix) the method of decommissioning;
 - (x) the details of decommissioning, including the depths, types and amounts of sealant and backfill materials, and any remaining casing,
- (c) the following information relating to the person responsible for decommissioning the well:
 - (i) the name, address, telephone number and, if applicable, registration number of the person responsible for decommissioning the well;
 - (ii) the name and, if applicable, registration number of the person who decommissioned the well, if different from the person referred to in subparagraph (i),
- (d) the starting and completion dates of the work,

(e) a copy of alternative specifications relating to the well, if any, made under section 72 [alternative specifications for decommissioning wells] of this regulation for the decommissioning of the well, including the engineer's acceptance and the terms and conditions, if any, relating to the specifications, and

(f) if the well is a water supply well, a drilled recharge well, a drilled injection well or a permanent dewatering well, a copy of any available well construction report relating to the well.

Other information requirements

2 Section 1 of this Schedule does not limit any other provision of this regulation requiring the inclusion of information in a well decommission report.



- Well Construction Report
Well Closure Report
Well Alteration Report

Stamp company name/address/ phone/fax/e-mail here, if desired.

Ministry Well ID Plate Number:
Ministry Well Tag Number:
Confirmation/alternative specs. attached
Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name:
Mailing address:
Well Location: Address: Street no. Street name Town Prov. Postal Code
Legal description: Lot Plan D.L. Block Sec. Twp. Rg. Land District
PID: Description of well location (attach sketch, if nec.):

NAD 83: Zone: UTM Easting: m Latitude (see note 3):
UTM Northing: m Longitude:

Method of drilling: air rotary cable tool mud rotary auger driving jetting excavating other (specify):
Orientation of well: vertical horizontal Ground elevation: ft (asl) Method (see note 4):

Class of well (see note 5): Sub-class of well:

Water supply wells: indicate intended water use: private domestic water supply system irrigation commercial or industrial other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16) table with columns: From ft (bgl), To ft (bgl), Relative Hardness, Colour, Material Description, Water-bearing Estimated Flow (USgpm), Observations

Casing details table with columns: From ft (bgl), To ft (bgl), Dia in, Casing Material / Open Hole, Wall Thickness in, Drive Shoe

Screen details table with columns: From ft (bgl), To ft (bgl), Dia in, Type (see note 18), Slot Size

Surface seal: Type: Depth: ft
Method of installation: Poured Pumped Thickness: in
Backfill: Type: Depth: ft
Liner: PVC Other (specify):
Diameter: in Thickness: in
From: ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: Screen Open bottom Uncased hole
Screen type: Telescope Pipe size
Screen material: Stainless steel Plastic Other (specify):
Screen opening: Continuous slot Slotted Perforated pipe
Screen bottom: Bail Plug Plate Other (specify):
Filter pack: From: ft To: ft Thickness: in
Type and size of material:

Developed by:
Air lifting Surging Jetting Pumping Bailing
Other (specify): Total duration: hrs
Notes:

Final well completion data:
Total depth drilled: ft Finished well depth: ft (bgl)
Final stick up: in Depth to bedrock: ft (bgl)
SWL: ft (btoc) Estimated well yield: USgpm
Artesian flow: USgpm, or Artesian pressure: ft

Well yield estimated by:
Pumping Air lifting Bailing Other (specify):
Rate: USgpm Duration: hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Type of well cap: Well disinfected: Yes No
Where well ID plate is attached:

Obvious water quality characteristics:
Fresh Salty Clear Cloudy Sediment Gas
Colour/odour: Water sample collected:

Well closure information:
Reason for closure:
Method of closure: Poured Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Well driller (print clearly):
Name (first, last) (see note 19):
Registration no. (see note 20):
Consultant (if applicable; name and company):

Date of work (YYYY/MM/DD):
Started: Completed:
Comments:

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the Water Act and the Ground Water Protection Regulation.

Signature of Driller Responsible
PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

General

1. Requirements for well construction and well closure reports are found in Part 5 of the *Water Act* and the Ground Water Protection Regulation. Part 5 of the act and regulation are at: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/index.html#leg.
2. The current Ministry standard datum for mapping and geodetic use is the North American Datum of 1983 (NAD 83). To determine GPS coordinates using a Global Positioning System (GPS), set the datum to NAD 83.
3. For latitude and longitude coordinates, provide coordinates either in degree, minutes and seconds (e.g., 50° 2' 21.037") or decimal degrees (e.g., 50.039175°).
4. For the method of determining ground elevation, enter: GPS, differential GPS, level, altimeter, 1:50,000 map, 1:20,000 map, 1:10,000 map or 1:5,000 map.
5. The classes and sub-classes of wells are shown below:

Class	Sub-class (if applicable)
Water supply	Domestic; Non-domestic
Monitoring	Temporary; Permanent
Recharge or injection	
Dewatering or drainage	Temporary; Permanent
Remediation	Temporary; Permanent
Geotechnical.....	Borehole; Test pit; Special type of hole; Closed loop geothermal
6. Well reports submitted to the Deputy Comptroller, or retained by the person responsible, as required under the *Water Act* and the Ground Water Protection Regulation, shall be considered part of the Provincial Government records and subject to the *Freedom of Information and Protection of Privacy Act*.

How to Fill Out the Lithologic Description Table

7. Each row in the lithologic description table represents either a depth interval or depth in the well.
8. A row could represent a depth interval (e.g., from 0 feet to 12 feet), such as for a geologic stratum or a specific depth (e.g., 120 feet), such as for a depth location of a water-bearing fracture.
9. For a depth interval, enter the relative hardness of the material in the column "Relative Hardness," if applicable: Very Hard (VH), Hard (H), Dense (D), Stiff (ST), Medium (M), Loose (L), Soft (S), Very Soft (VS).
10. For a depth interval, enter the letter for the overall colour of the geologic material in the column "Colour," if applicable: White (W), Grey (Gy), Blue (Bl), Green (G), Yellow (Y), Brown (Br), Red (R), Tan (T), Black (Bk).
11. For each depth interval, enter the description of the geologic materials encountered during drilling in the column "Material Description." Material descriptions should be chosen from the following recommended list of materials:

Surficial materials (approximate range of particle size)	Bedrock materials
boulders (greater than 10 inches)	conglomerate
cobbles (2 1/2 inches to 10 inches)	sandstone
gravel (80 slot to 2 1/2 inches)	shale
coarse sand (25 slot to 80 slot)	siltstone
medium sand (10 slot to 25 slot)	limestone
fine sand (2 slot to 10 slot)	crystalline
silt (less than 2 slot)	granite
clay (much less than 2 slot)	basalt
till (variable particle size)	volcanic
organics (e.g., top soil, wood, peat)	bedrock
12. In describing the material, list the material in order from greatest to least and indicate what materials occur in trace (less than 5%) amounts. The word "and" means both materials occur in approximately equal amounts (e.g., "gravel and coarse sand, trace silt").
13. Under the column "Water-bearing Estimated Flow (USgpm)," use "D" for "dry," "W" for "wet," or enter the estimated flow in USgpm.
14. If a water-bearing fracture is encountered, the depth of the fracture should be recorded in a row and the estimated flow of water in the fracture can be entered in the column "Water-bearing Estimated Flow (USgpm)."

How to Fill Out the Closure Description Table and the Well Closure Information Section

15. Each row in the closure description table represents either a depth interval (e.g., from 0 feet to 12 feet) or depth (e.g., 120 feet) in the well.
16. For a depth interval, enter the type of backfill or sealant material(s) in the column "Material Description."
17. Indicate in "Details of closure" whether casing(s) or screen(s) were pulled or left in place. If casing(s) were left in place, indicate whether it was perforated or ripped.

Screen Details

18. "Type" includes riser pipe, K-packer, screen, screen blank, or tail pipe.

Well Driller

19. Fill in the name of the driller who constructed the well.

Registration Number of Driller Responsible

20. Fill in the registration number on the Qualified Well Driller identification card. If the work was completed by a driller who is not registered as a Qualified Well Driller, the Qualified Well Driller who is directly supervising the work should fill in their registration number on their Qualified Well Driller identification card. The Qualified Well Driller signs the form.

Definitions of Abbreviations

asl	above sea level	ft	feet	PID	Parcel Identifier	USgpm	US gallons per minute
bgl	below ground level	hrs	hours	Rg	Range	UTM	Universal Transverse
btoc	below top of casing	in	inches	Sec	Section		Mercatator Grid
Dia	Diameter	NAD 83	North American	SWL	static water level		
D.L.	District Lot	Datum (1983)		Twp	Township		

Return Completed Forms to:

Ground Water Data Technician
Water Stewardship Division, Ministry of Environment
PO Box 9362 Stn Prov Govt
Victoria BC V8W 9M2

updated: Jan. 18, 2007



Ministry of Environment

Well Pump Installation Report

Stamp company name/address/
phone/fax/e-mail here.

Ministry Well ID Plate Number: _____

Ministry Well Tag Number: _____

Permanent well pump for: New well Existing well
Permanent well pump: New Repaired

Red lettering indicates minimum mandatory information
See reverse for notes & definitions of abbreviations

Owner name: _____

Mailing address: _____ Town _____ Prov. _____ Postal Code _____

Well Location: Address: Street no. _____ Street name _____ Town _____
or **Legal description:** Lot _____ Plan _____ D.L. _____ Block _____ Sec. _____ Twp. _____ Rg. _____ Land District _____
or **PID:** _____ and **Description of well location (attach sketch, if nec.):** _____

NAD 83: Zone: _____ and **UTM Easting:** _____ m or **Latitude:** deg: _____ min: _____ sec: _____
(Datum must be set to NAD83) **UTM Northing:** _____ m **Longitude:** deg: _____ min: _____ sec: _____

Class of well (see note 4): _____ **Sub-class of well:** _____

Water supply wells: indicate intended water use: private domestic water supply system irrigation commercial or industrial other (specify): _____

Diameter of well: _____ in **Depth of well:** _____ ft (bgl)

Well Pump Installation Information

<p>Type of well pump: <input type="checkbox"/> Submersible <input type="checkbox"/> Jet (end-suction) <input type="checkbox"/> Vertical turbine <input type="checkbox"/> Other (specify) _____</p> <p>Manufacturer of well pump: _____</p> <p>Model of well pump: _____ Horsepower: _____</p> <p>Number of stages: _____</p> <p>Riser column size: _____ in Shaft size: _____ in</p> <p>Depth of pump intake: _____ ft (btoc)</p> <p>Nominal pumping rate: _____ USgpm</p> <p>Static water level: _____ ft (btoc)</p> <p>Pumping water level: _____ ft (btoc)</p> <p>Pumped rate: _____ USgpm Pumped duration: _____ hrs</p> <p>Artesian flow: _____ USgpm or Artesian pressure: _____ ft</p> <p>Sounding tube installed: <input type="checkbox"/> Yes <input type="checkbox"/> N/R</p> <p>Level Transmitter: _____ ft Setting Depth: _____ ft</p> <p>Raw water sampling tap installed: <input type="checkbox"/> Yes <input type="checkbox"/> N/R</p> <p>Water sample collected (see note 6): <input type="checkbox"/> Yes <input type="checkbox"/> N/R</p> <p>Well head completion after pump installation: <input type="checkbox"/> Pitless adaptor Type of well cap: _____ <input type="checkbox"/> Sanitary well seal</p> <p>Well pump and works disinfected after installation: <input type="checkbox"/> Yes <input type="checkbox"/> N/R</p> <p>Final stick-up: _____ in</p> <p>Depth to top of casing (if below ground level): _____ in</p>	<p>Details of any modifications made to the wellhead or other comments: _____ _____ _____ _____ _____ _____ _____</p> <p>Well Pump Installer (please print): Name (first, last): _____ Company name: _____ Registration number of person responsible: _____ Consultant (if applicable): _____ Date of well pump installation (YYYY/MM/DD): _____</p> <p><u>Declaration:</u> The well pump installation work has been done in accordance with the requirements in the <i>Water Act</i> and the Ground Water Protection Regulation.</p>
---	--

Note: The information recorded in this well pump installation report describes the works that exist on completion of well pump installation. Water levels, pumping rates, and water flows are not guaranteed as they are influenced by a number of factors, including natural variability, human activities, and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy

General:

1. Requirements for well pump installation reports are found in Part 5 of the *Water Act*, available at: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/index.html#leg.
2. The current Ministry standard datum for mapping and geodetic use is the North American Datum of 1983 (NAD 83). To determine GPS coordinates using a Global Positioning System (GPS), set the datum to NAD 83.
3. For latitude and longitude coordinates, provide coordinates in degree, minutes and seconds (e.g., 50° 2' 21.037").
4. The classes and sub-classes of wells are shown below:

Class	Sub-class (if applicable)
Water supply	Domestic; Non-domestic
Monitoring	Temporary; Permanent
Recharge or injection	
Dewatering or drainage	Temporary; Permanent
Remediation	Temporary; Permanent
Geotechnical	Borehole; Test pit; Closed loop geothermal

5. Well reports submitted to the Deputy Comptroller, or retained by the person responsible, as required under the *Water Act* and the Ground Water Protection Regulation, shall be considered part of the Provincial Government records and are subject to the *Freedom of Information and Protection of Privacy Act*.
6. A water sample may be collected during well pump installation on behalf of the person responsible for collecting the water sample for water quality analysis.

Registration Number of Person Responsible:

7. Fill in the registration number found on the Qualified Well Pump Installer or Qualified Well Driller identification card. If the work was completed by someone who is not registered, the Qualified Well Pump Installer or Qualified Well Driller who is directly supervising the work should fill in their registration number. The Qualified Well Pump Installer or Qualified Well Driller signs the form.

Definitions of Abbreviations:

bglbelow ground level	ininches	Rg.Range
btocbelow top of casing	mmetres	secseconds
degdegrees	minminutes	Sec.Section
D.L.District Lot	no.number	Twp.Township
ft.....feet	N/Rnot required	USgpmUS gallons per minute
hrshours	PIDParcel Identifier	UTMUniversal Transverse Mercator Grid

Contact Information:

8. If you have any questions about the *Water Act* or this report form, please contact your local Ministry of Environment office.

Form Submission:

There are no requirements to submit completed form to the Ministry of Environment. Form is to be filled out for:

1. Well owner
2. Your own records

Updated: Feb 7, 2008



Domestic Well Registration Form

This form is intended for registering groundwater wells that are used for domestic water use purpose only. Domestic use of groundwater is exempt from the requirement for obtaining a water license or use approval and paying provincial fees and rentals. Registering your well creates a record of the location of your well and your water use. It helps to ensure that your use is considered by decision makers when dealing with other licence applications.

Domestic purpose is defined in [Section 2 of the Water Sustainability Act](#) as water used for the occupants of a private residence for household uses (e.g., not a multi-family apartment building, hotel, strata or cooperative building) including: drinking water, food preparation, sanitation, fire prevention, water for animals kept for household use or as pets, or irrigation of a garden not exceeding 1000m².

If unsure whether your use is considered to be domestic purpose, or to start your licence application if the well is used for any other purpose, please visit Front Counter BC (<http://www.frontcounterbc.ca/Start/ground-water/>).

Owner Information

Well Owner Name: _____

Mailing Address: _____ Town _____ Prov. _____ Postal Code _____

Email Address: _____ or Phone No.: _____

Well Location Information

If the address of the well location is the same as above, please check

If not, at least one of the three following property descriptors must be provided

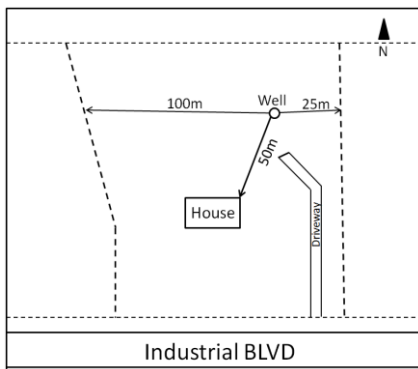
1) Address: _____ Town _____

2) Legal description (available from the property tax assessment notice):

Lot: _____	Block: _____	Range: _____
Plan: _____	Section: _____	Land District: _____
District Lot: _____	Township: _____	

3) PID: _____

Description of well location on the property _____



Well location map. Attach with the well registration form a sketch or diagram (e.g., property assessment drawing) showing where the well is located on the property relative to the property boundaries, a road or any other structures on the land.

Example Sketch

GPS Coordinates of the Well

Coordinates for the well can be determined by using a GPS unit, a cell phone app, or by using a mapping application such as iMapBC or Google Earth.

Latitude (e.g., 49.20184°): _____ Longitude (e.g., 122.58376°): _____

OR

UTM Zone (NAD83): _____ UTM Easting: _____ UTM Northing: _____

Source of coordinates (check one): GPS Google Earth Other (please specify) [_____]

Well Information

If the well construction report is available, please attach to this form. Attached Not Available

If no well construction report is available, complete the following information:

Well Identification Plate Number (steel plate attached to some wells): _____

Date well drilled (YYYY/MM/DD): _____

If the date the well was drilled is unknown, provide the date you took possession of the property (YYY/MM/DD): _____

Drilling Company: _____

Method of Drilling: Drilled Excavated or Dug

Well depth (ft): _____ **Well Diameter (in):** _____

Disclaimer

Red lettering indicates information that **must** be provided for the well and the domestic use to be registered.

The information provided on this form, including personal information, will be added to the Provincial WELLS Database, which is accessible to the public at <http://a100.gov.bc.ca/pub/wells/public/>.

Information relating to the well and well owner submitted to the Deputy Comptroller in this form shall be considered part of the Provincial Government records and subject to the *Freedom of Information and Protection of Privacy Act*.

For more information related to the [Water Sustainability Act](#) or [Groundwater Protection Regulation](#), please visit <http://gov.bc.ca/water>.

Signature of Declaration

I have read and understand the above and declare that the information provided on this form is true to the best of my knowledge. I understand and consent that the information on this form will be published and made publically available. Digital signatures are acceptable.

Signed: _____ **Date** (YYYY/MM/DD): _____

Send Completed Forms To

Before Submitting:

- Ensure your well is used for domestic purposes only.
- Complete all required information.
- Attach a sketch or map depicting where the well is located on the property.
- Provide any supporting documentation (e.g., well construction report) if available.
- Sign the well registration form.

Mailing Address:

Deputy Comptroller
Ministry of Environment
PO Box 9362 Stn Prov Govt
Victoria BC V8W 9M2

Email:

GroundWater@gov.bc.ca

Ministry Contacts and Related Legislation

1. Ministry contacts
2. Related legislation

CHAPTER 1 | MINISTRY CONTACTS

Ministry of Environment

Deputy Comptroller	Deputy Comptroller Ministry of Environment PO Box 9362 Stn Prov Govt Victoria B.C. V8W 9M2 Email: Groundwater@gov.bc.ca
Website	http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/groundwater-wells

Ministry of Forests, Lands and Natural Resource Operations

Front Counter BC	Phone: Toll free: 1-877-855-3222* From outside North America: +1-778-372-0729 Email: FrontCounterBC@gov.bc.ca Physical Locations: http://www.frontcounterbc.gov.bc.ca/locations/
Website	http://www.frontcounterbc.gov.bc.ca/index.html

*Callers will be redirected to respective regional offices based on location.

CHAPTER 2 | RELATED LEGISLATION

Legislation name	Responsible ministry or government agency	Description of legislation
<i>Water Sustainability Act</i>	MOE/FLNRO	The WSA is the principal law for managing the diversion and use of water resources.
<i>Groundwater Protection Regulation</i>	MOE/FLNRO	Regulates well construction, maintenance, deactivation, and decommissioning and recognises the individuals qualified to do work on wells.
<i>Water Sustainability Regulation</i>	MOE/FLNRO	Regulates water licences and approvals, and directing the allocation of surface water and groundwater.
<i>Water Protection Act</i>	MOE/FLNRO	Affirms the Province's ownership of surface water and groundwater, and sets limits for bulk water exports.
<i>Drinking Water Protection Act</i>	MOH/Health Authorities	Regulates all water systems other than single-family dwellings. The Act sets out certain requirements for drinking water operators and suppliers to ensure the provision of safe drinking water to their customers.
<i>Drinking Water Protection Regulation</i>	MOH/Health Authorities	Provides additional context to the Act through definitions, standards, exemptions, and requirements.
<i>Riparian Areas Regulation</i>		Regulates development in riparian areas. See regulation for list of Regional Districts where regulation applies.
<i>Environmental Management Act</i>	MOE	Regulates industrial and municipal waste discharge, pollution, hazardous waste and contaminated site remediation.
<i>Environmental Assessment Act</i>	MOE	Regulates the administration and application of the Environmental Assessment Process.
<i>Petroleum and Natural Gas Act</i>	MEM	Regulates the disposition, administration and management of petroleum and natural gas.
<i>Petroleum and Natural Gas Regulation</i>	MEM	Regulates the disposition, administration and management of petroleum and natural gas.
<i>Geothermal Resources Act</i>	MEM	Regulates development and use of geothermal resources 80 degrees C and above. Low-medium temperature uses are not governed by the Act.
<i>Geothermal Drilling and Production Regulation</i>	MEM	Regulates construction, maintenance and decommissioning of geothermal wells.
<i>Oil and Gas Activities Act</i>	BCOGC	Regulates oil and gas and related activities in B.C., including wells, facilities, oil refineries, natural gas processing plants, pipelines and oil and gas roads, through permits, authorizations, orders and regulations.
<i>Drilling and Production Regulation</i>	BCOGC	Regulates drilling, completion and production operations.



Groundwater Protection Regulation

HANDBOOK

THE BC GROUND WATER ASSOCIATION

