

Water Sustainability Act Information Session: **Groundwater Protection**

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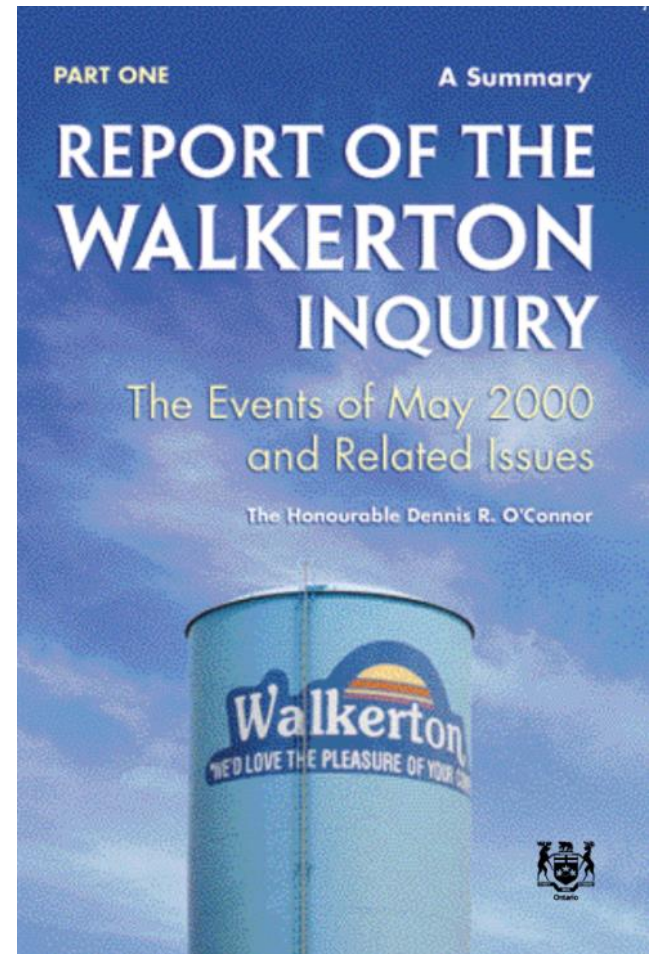
Session Objectives

- Introduce GWPR standards for well construction, maintenance and operation, decommissioning, reporting and well pump installation
- Communicate the roles and responsibilities under the GWPR for well drillers, well pump installers, well owners, and professionals / consultants



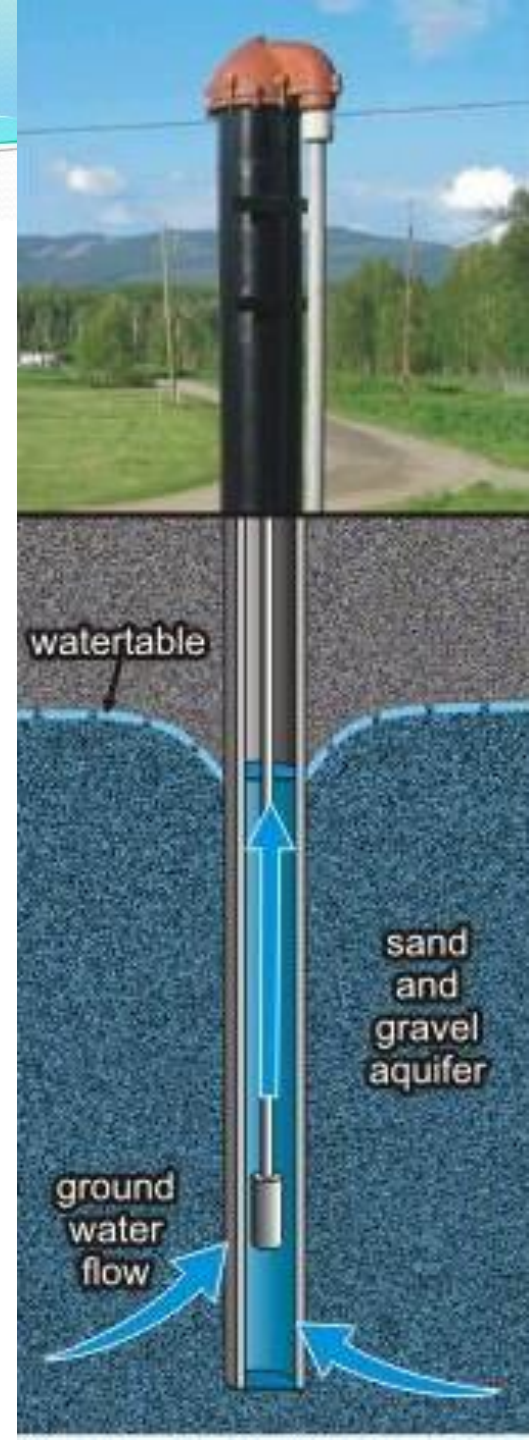
Ground Water / Groundwater Protection Regulation History

- Post-Walkerton emphasis on source protection and well construction standards
- GWPR “basics” 2004 under the *Water Act*
- 2016 GWPR “expanded” under the *Water Sustainability Act (WSA)*



GWPR Purpose

To promote sustainable use and protection of BC's aquifers by specifying requirements for wells to be properly constructed, maintained, and, at the end of their service, deactivated and decommissioned.



GWPR follows the life cycle of a well

- Part 1 Interpretation and application
- Part 2 Well drillers and well pump installers
- Part 3 Well construction
- Part 4 Well caps and well covers
- Part 5 Well pumps and related works
- Part 6 Well identification
- Part 7 Well operation and maintenance
- Part 8 Artesian flow
- Part 9 Well deactivation and decommissioning
- Part 10 Well reports
- Part 11 General (records retention and offences)

The WSA defines a “well”

Artificial opening in the ground made for

- Water supply
- Testing/monitoring groundwater
- Recharging/dewatering
- Remediating groundwater
- Geoexchange (not geothermal!)
- Geotechnical use

Wells regulated by the WSA and GWPR

Class of well	Category or subclass
Water supply	All*
Monitoring	Temporary, Permanent
Recharge/Injection	Drilled, bored Driven, jetted, excavated
Dewatering	Temporary, Permanent
Drainage	All*
Remediation	Temporary, Permanent
Geotechnical	Borehole, Test pit*
Closed-loop geoexchange	All*

Wells exempt from *most* requirements

- Test pits
- Drainage wells
- Horizontal closed loop geoexchange wells < 5m deep
- Water source wells in NE BC diverting “deep groundwater” for oil and gas purpose

Must comply with requirements for:

- Stopping/controlling artesian flow
- Submitting reports for flowing artesian wells
- Decommissioning test pits
- Prohibiting/remediating foreign matter in wells
- Wells on Crown land

Artificial openings *not* regulated by WSA & GWPR

- Building drains, sumps
- Ditches, infiltration trenches
- Pre-fab vertical drains, sand drains, strip drains for soil consolidation
- Seismic relief holes
- Mineral exploration drill holes
- Geothermal wells
- Oil and gas wells



Roles and responsibilities well drillers and well pump installers

- Registration and qualifications for activities
- Minimum standards for well construction, decommissioning and reporting
- Requirements for flowing artesian wells
- Minimum standards for well pumps

Registration & Qualification for Activities



Registration of drillers & pump installers

GWPR under the *Water Act*

Qualifications for Registration:

- BC Water Well Driller (ITA)
- BC Well Pump Installer (ITA)
- Equivalent from other province/territory
- CGWA

Restrictions by well class

- Drillers can drill all classes of wells and install pumps

GWPR under the WSA

Qualifications for Registration:

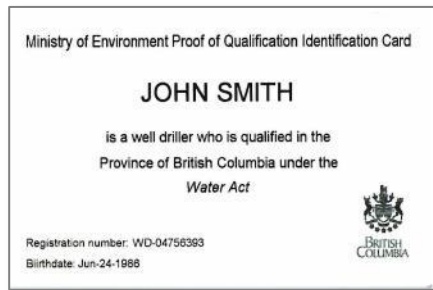
- All current qualifications plus...
- BC Geotechnical/Environmental driller (ITA)
- BC Geoexchange Driller (ITA)

Restrictions by well class

- Newly registered drillers restricted according to qualification
- Previously registered drillers continue to be permitted to drill any class of well and install pumps

WSA restricts well construction, decommissioning and pump installation to:

- Well drillers and well pump installers registered with the province (GWPR part 2)



- Professional hydrogeologists or geotechnical engineers
- Exceptions:
 - constructing and decommissioning excavated wells up to 15m deep;
 - decommissioning any well up to 5m deep



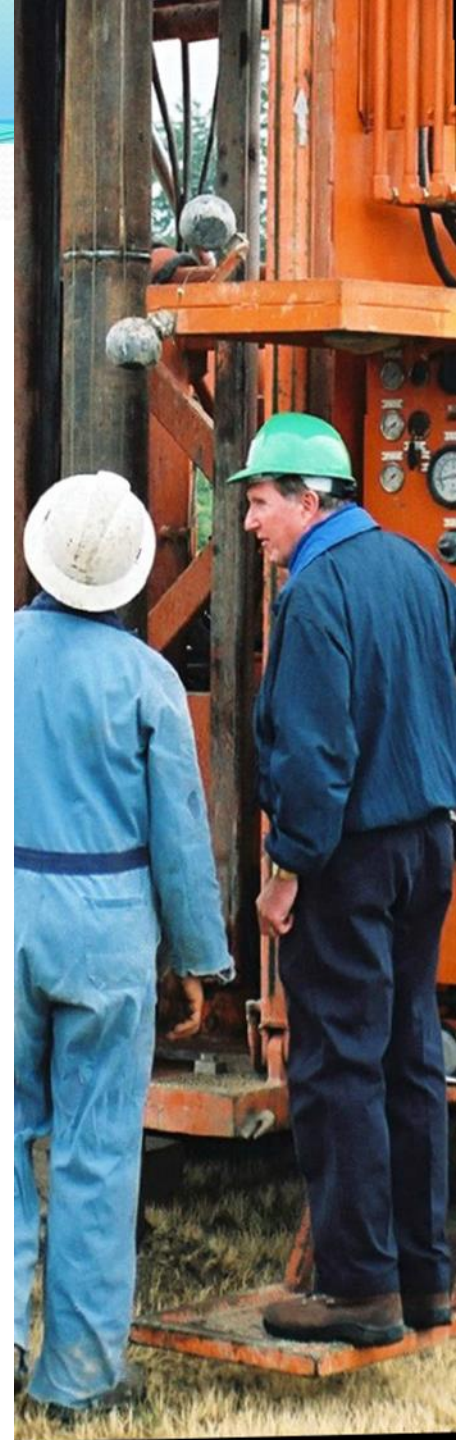
Class of well/well pump	Water well driller	Geotech/ Env'l driller	GX driller	Well pump installer
Water supply well	✓			
Monitoring well	✓	✓		
Recharge/injection well	✓			
Dewatering well	✓			
Remediation well	✓	✓		
Geotechnical well	✓	✓		
Closed-loop geoexchange well			✓	
Well pump in water supply, injection or dewatering well	✓			✓

Minimum Standards for Well Construction, Decommissioning & Reporting



Water for well drilling

- Written consent to use private land/works
- No permanent/semi-permanent works; existing wells only
- Limit of 10 m³ per day **unrecorded** water
 - 5 consecutive days
 - 10 days in a month
- Not from certain streams
 - Wetland, sensitive stream or stream in a park
 - Lake < 1 hectare or stream < 5m wide
 - Existing water reservation
 - Active temporary protection order

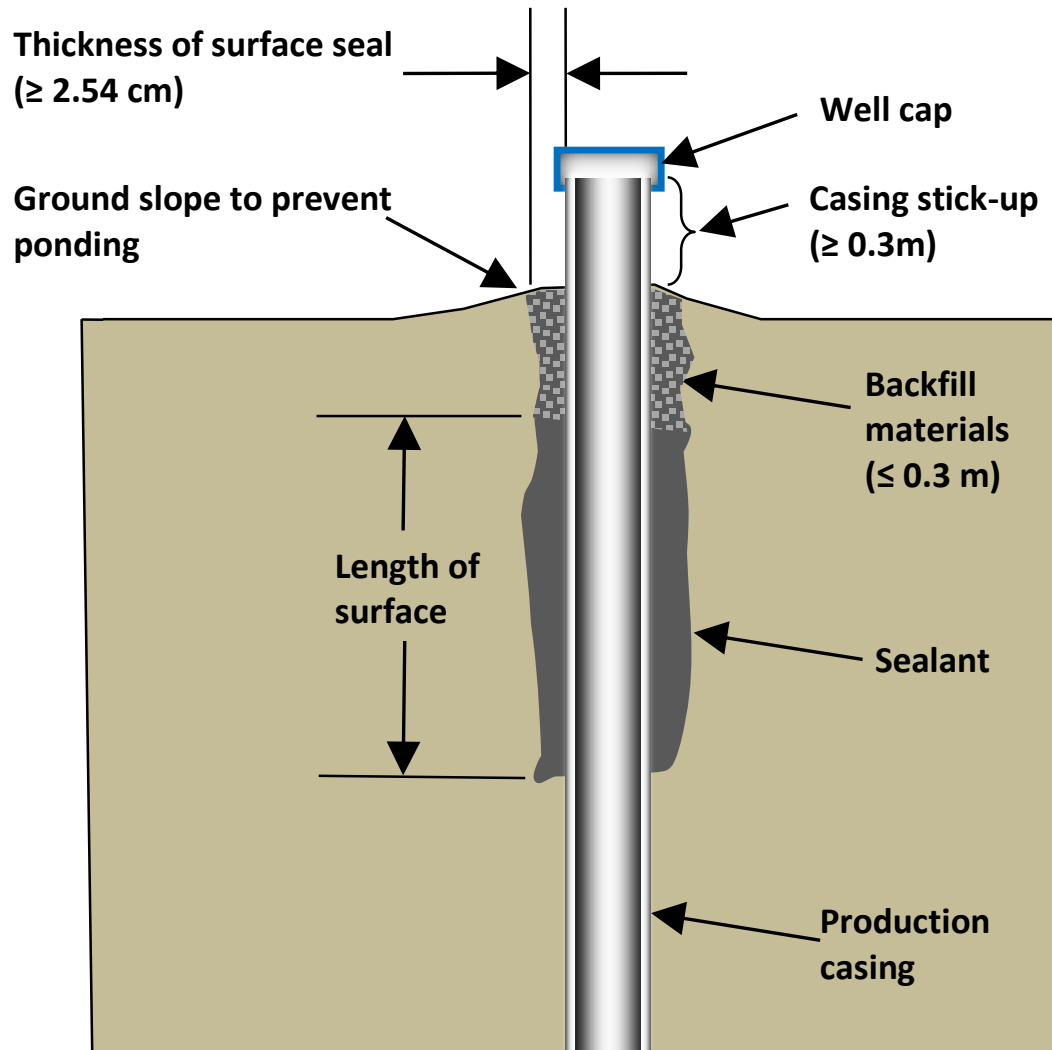


New water supply well must be at least 15m from existing well

- Minimize risk of well interference
- Owner can drill one additional well within 15m of the existing well
- If not feasible, professional can recommend a closer setback

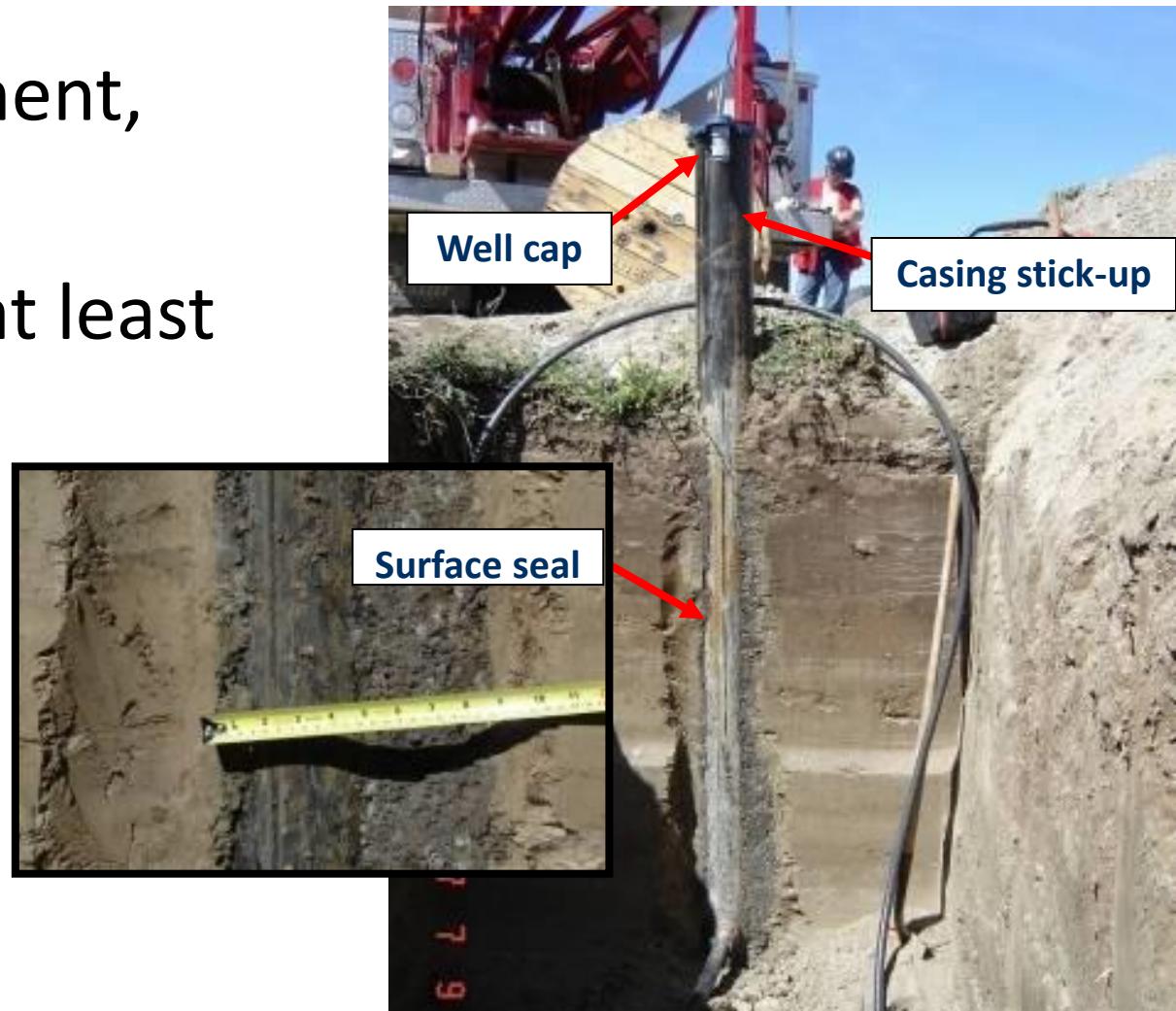


GWPR prescribes minimum well construction requirements for sanitation and aquifer protection



Any well with a casing must have a surface seal

- Effective, permanent, continuous
- 1 inch thick and at least 1m in length
- For water supply wells, 5m in length or as long as possible up to 5m



Thermoplastic piping must be certified for drinking water use

Casings, liners, drop pipes, sounding tubes must be certified for use for drinking water by:

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

Wells must have a well cap to prevent water and foreign matter from entering the well



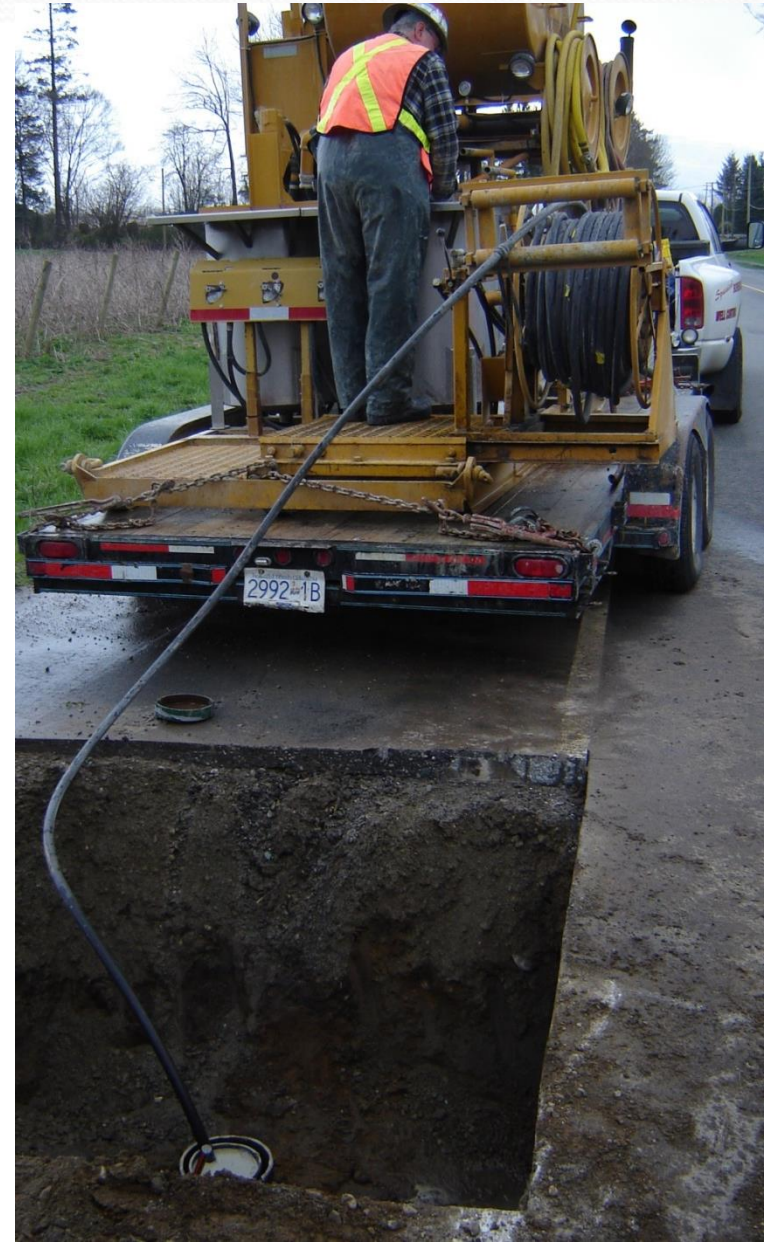
Well ID plates link the well to the well record



- Person responsible for constructing a well must attach ID plate
- Also applies to an owner of a well supplying a water supply system
- Obtained from the comptroller
- Plainly visible
- Report on well construction report or well ID report

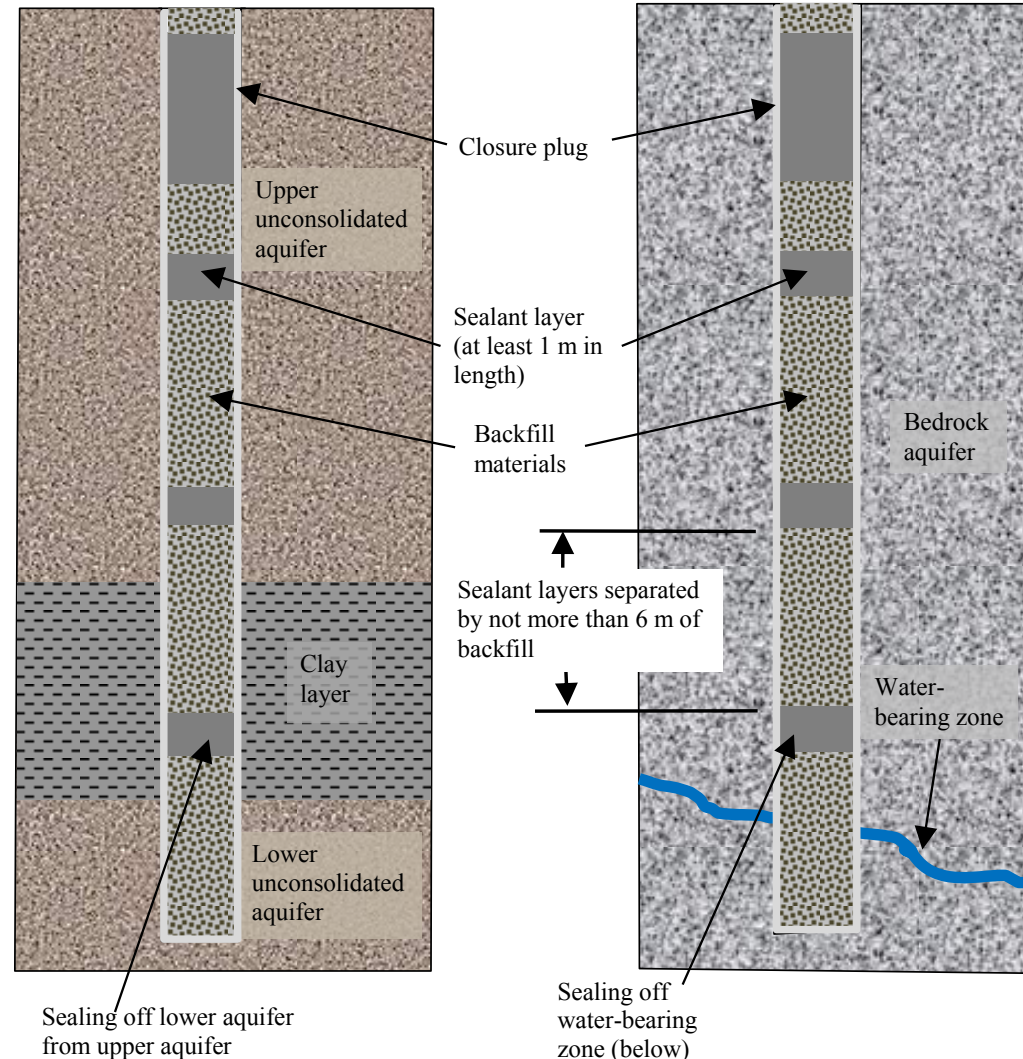
Unused wells must be deactivated or decommissioned after 5 years

- Wells can be deactivated for up to five years
- Decision maker can extend deactivation period
- Deactivation means
 - Turn off pump or disconnect pump handle
 - Take equipment out of operation (e.g. monitoring, geoexchange)
 - Control artesian flow
 - Continue to maintain until decommissioned

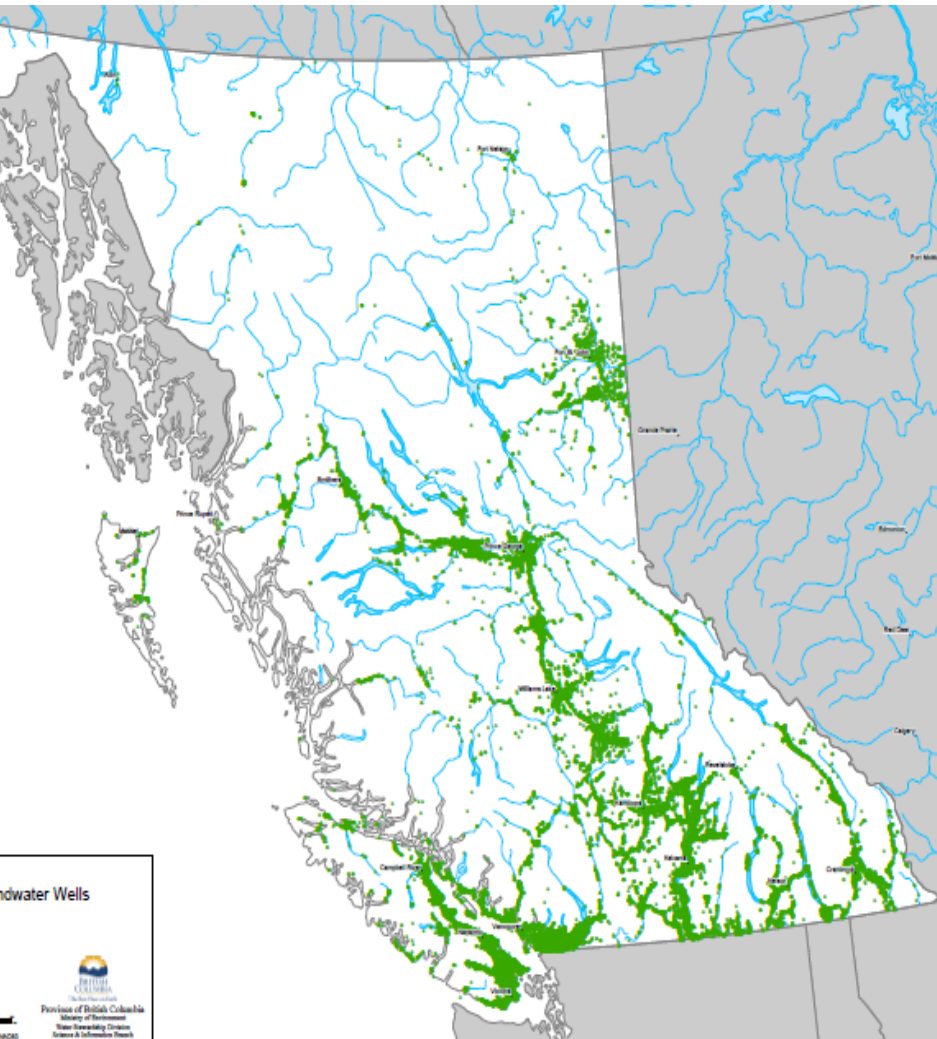


Wells deactivated for 5 years must be decommissioned

- Remove pump/equipment
- Fill well with sealant and backfill materials
- Seal off known aquifers
- Install closure plug
- Geoexchange well: remove circulation fluid
- Alternative specifications possible



Well driller must submit well construction and decommission reports



- Owner & driller details
- Well location
- Dates of work
- Lithology
- Well depth & diameter
- Construction details
- Well yield
- Well class & use
- Artesian flow

Requirements for Flowing Artesian Wells



Artesian flow must be stopped or brought under control (WSA s. 52, 53)

Responsible parties:

- Driller at time of construction
- Well owner or land owner for existing well

“Under control” means:

- Clear of sediment
- Entirely conveyed through casing (if applicable)
- Can be turned off indefinitely
- Does not pose a threat to property, public safety or the environment



“Qualifications” for controlling artesian flow are based on experience

To stop/control a flowing artesian well, a well driller must:

- Be qualified to work on the class of well
- Have competency based on their “training, experience, knowledge, or skills”

A driller who is not “qualified” can work under supervision

Additional requirements for artesian wells

- Equip wellhead prevent backflow
- Measure & report shut-in pressure
- Submit well construction & decommission reports



Minimum standards for well pumps



Installation of well pumps in water supply wells, dewatering wells and injection wells

- Installed by, or under supervision of:
 - A registered well pump installer
 - A registered water well driller
 - A professional
- No restrictions on installing pumps in monitoring, geotechnical, or remediation wells



GWPR well pump installation standards



- Do not move casing or damage surface seal
- Fill visible annular spaces
- Protect pump with liner in unstable hole
- Prevent entry of foreign matter
- Equip well to prevent backflow

GWPR well pump installation standards

- Use non-toxic lubricants & solvents
- Disinfect well after installing permanent or removing temporary pump
- Wellhead modification must meet regulatory requirements & alternative specifications



New GWPR requirements for hand pumps

- Hand pumps must meet all requirements of a well cap.
- Owners of existing water supply wells equipped with a hand pumps that do not comply will have 2 years to upgrade



Roles and responsibilities of well owners

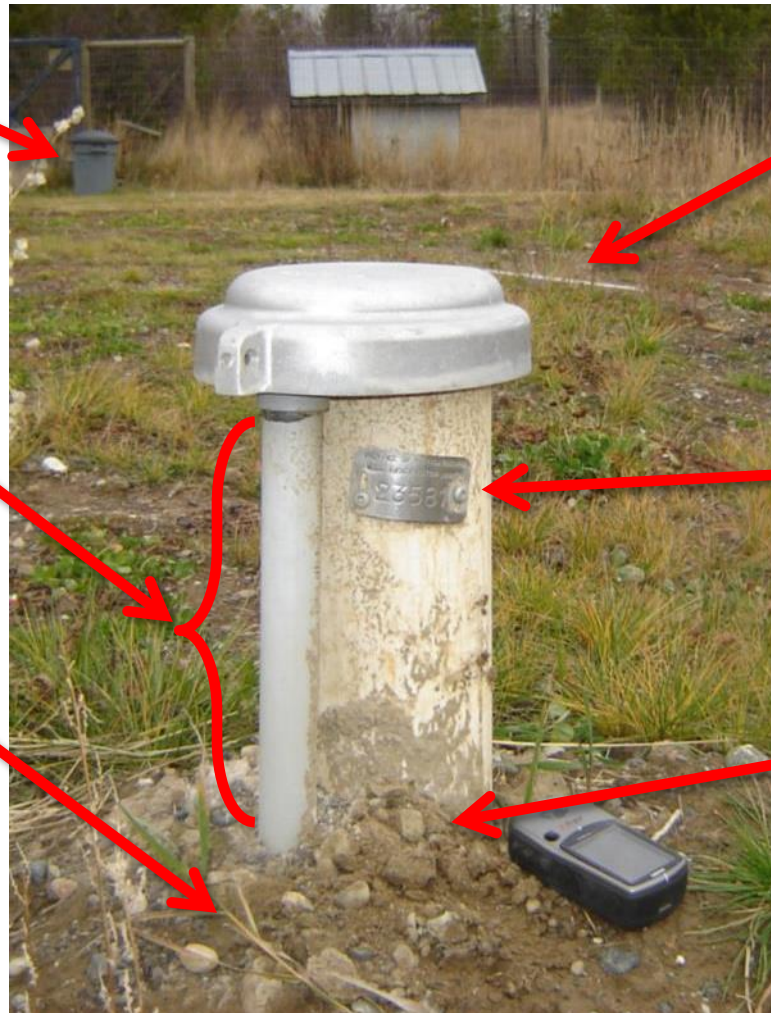


Well owners must maintain wells in good condition and promptly carry out repairs

Store contaminants >3m away and prevent from traveling within 3m of wellhead

Maintain 0.3m stick up and protect from damage

Keep ground sloped so water does not pond and is conveyed away from wellhead



Maintain access to wellhead for inspections

Keep area clear of obstructions and vegetation

Replace ID plate if lost or damaged

Maintain surface seal and fill any visible annular space with sealant

Prevent foreign matter from entering a well

- Refuse
- Carcasses
- Human/animal waste
- Pesticides/fertilizers
- Construction debris
- Chemicals (paint, fuels, etc.)
- Flood waters and debris



Additional well maintenance requirements

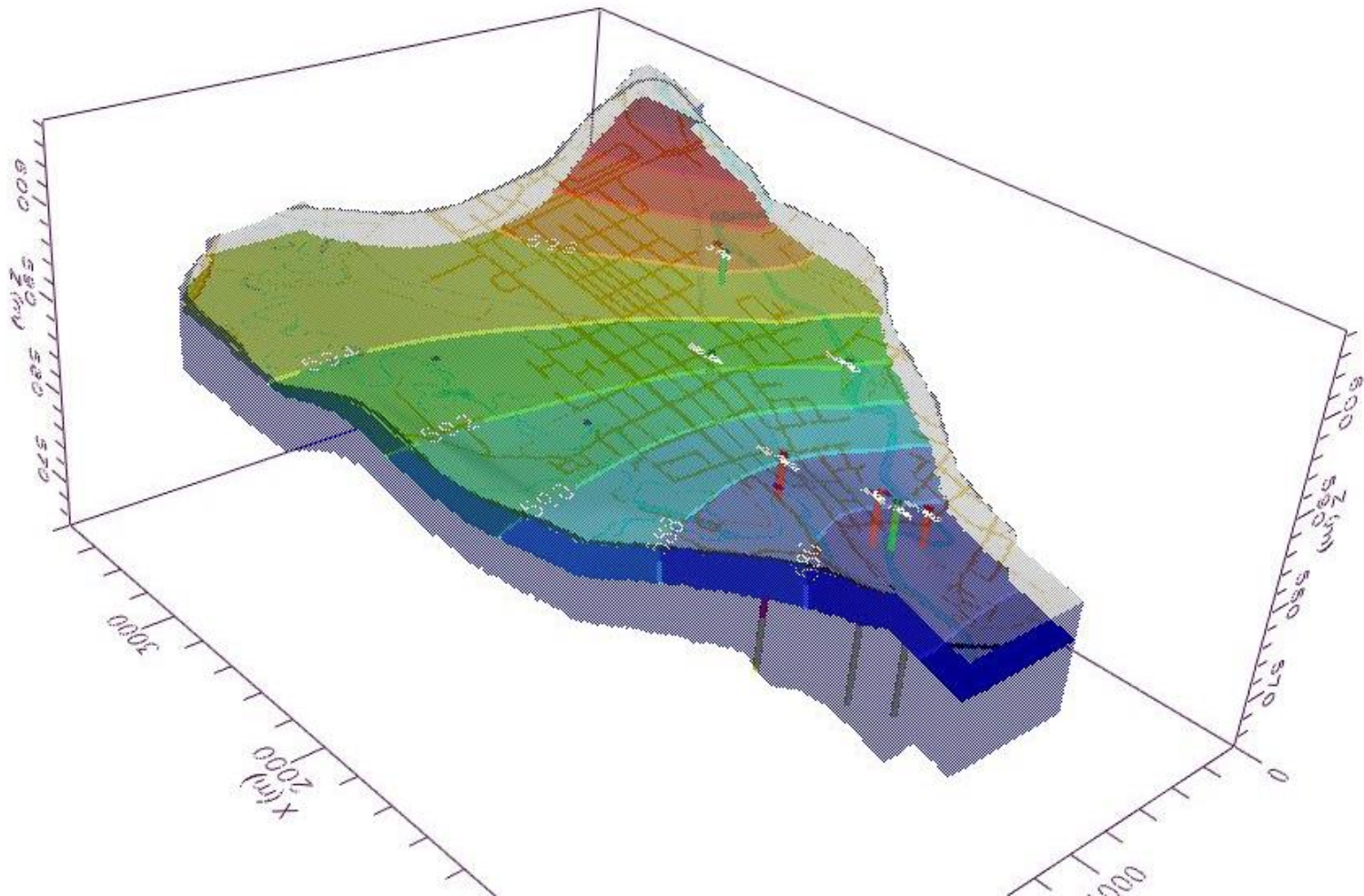
- Protect equipment installed to control artesian flow & prevent backflow
- Prevent water ponding & maintain drainage
- Follow alternative specification requirements



Special requirements for water supply system owners

- Must attach well ID plate if well doesn't have one
- Must submit well ID report
- Prevent entry of foreign matter
- Protect well and wellhead from flood, ice and erosion damage

Roles and responsibilities of professionals / consultants



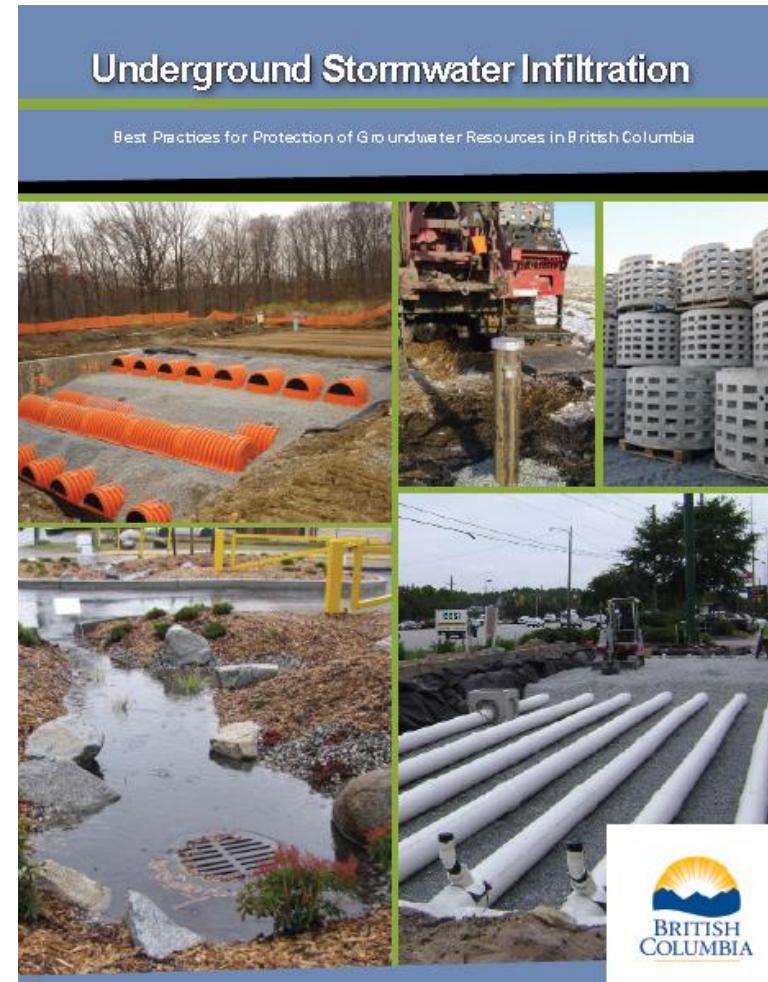
Alternative specifications

- Under *Water Act*, professional could implement alternative specifications
- Alternative specifications for siting and decommissioning only
- Must be prepared by a professional and accepted by engineer (government)
- Engineer may apply terms and conditions



Siting recharge/injection wells for infiltrating urban runoff to ground

- Professional must design
- Infiltration point above water table
- Horizontal distance from existing water supply wells
- Does not adversely affect water quality
- For **treated** stormwater, engineer may exempt vertical setback requirement



Alternative means of controlling artesian flow

- Exceptional circumstances; “not practicable”
- Report on alternative management
 - Prepared by professional
 - Assess conditions, evaluate options, propose management strategy
 - Submit to comptroller or water manager
- SDM must be satisfied of no threat to property, public safety, or the environment

Pumping tests must be carried out by a professional if required

- Well yield test
 - Approximate estimate of yield
 - Required in well construction report
- Pumping test
 - Well yield and aquifer characteristics
 - Can be required for an authorization or by an order



Must not construct well pit for new/altered water supply wells

Except when designed/constructed:

- By a professional;
- So water that enters the well pit does not pond in the well pit and is conveyed away;
- Under supervision of the professional who designed it;
- Design and as-built drawings must be submitted to the comptroller.



Questions?



