

Well Construction Regulations

made under Sections 66 and 110 of the

Environment Act

S.N.S. 1994-95, c. 1

O.I.C. 2007-483 (September 7, 2007), N.S. Reg. 382/2007

Interpretation

Citation

1 These regulations may be cited as the Well Construction Regulations.

Definitions

2 In these regulations, the following definitions apply:

(a) “Act” means the Environment Act;

(b) “ANSI” means the American National Standards Institute;

(c) “annular space” means the space between

(i) the outside of a well casing and in-situ geologic materials, or

(ii) 2 well casings of different diameter;

(d) “apron” means the impermeable seal made of either concrete or bentonite that surrounds a dug well casing;

(e) “aquifer” means a saturated, permeable geologic unit capable of transmitting useful quantities of water to wells and springs;

(f) “ASTM” means the American Society for Testing Materials;

(g) “AWWA” means the American Water Works Association;

(h) “certificate holder” means a person who holds a valid certificate of qualification under these regulations;

(i) “Class I well pump installer” means a person who holds a valid certificate of qualification to install, repair or modify pumps and pumping equipment issued in accordance with Section 8;

(j) “Class II well pump installer” means a person who holds a valid certificate of qualification to install, repair or modify pumps and pumping equipment issued in accordance with Section 7;

(k) “clay” means an extremely fine grained, cohesive soil material that meets the classification for clays as determined under ASTM standard ASTM D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), and has a relatively low permeability capable of meeting a laboratory-tested value for hydraulic conductivity of no greater than 10^{-6} cm/s;

(l) “contamination” means an alteration or variation of the physical, chemical, biological or aesthetic properties of water that causes or may cause an adverse effect;

(m) “decommission” means to permanently fill in and seal a well to eliminate the well as a source of water, or as a potential physical hazard and to prevent vertical movement of water within the well;

(n) “debris” means material that is abandoned at a well construction or pumping equipment installation site without the registered owner of the site’s permission, but does not include drill cuttings and drilling wastewater;

(o) “drilled well” means a well that is constructed by drilling a hole in the aquifer using a drill, such as a rotary drill, cable tool or jet drill;

(p) “drive shoe” means a commercially manufactured forged or tempered steel sleeve with a cutting edge that is attached to the bottom of a drive pipe or well casing to act as a cutting edge or protector for the lower edge of the drive pipe or well casing as it advances and to make a good seal with the rock formation in the well;

(q) “dug well” means a well that is constructed by digging a hole into the aquifer either manually or mechanically;

(r) “flowing well” means a well from which water overflows periodically or year round without the use of pumping equipment;

(s) “grout” means a stable and impervious bonding material that is capable of preventing the vertical movement of water

(i) along the outside of a well casing,

(ii) between well casings and well liners, and

(iii) in decommissioned wells;

(t) “high solids bentonite grout” means a type of grout consisting of a mixture of powdered or granular bentonite clays and water, that contains at least 20% bentonite solids by weight;

(u) “innovative well” means an alternative type of well that has not been approved for use in the Province and is being installed or constructed for evaluation purposes;

(v) “innovative pumping equipment” means an alternative type of pump or pumping equipment designed for water wells that has not been approved for use in the Province and is being installed or constructed for evaluation purposes;

(w) “NSF” means the National Sanitation Foundation;

(x) “on-site sewage disposal system” means an on-site sewage disposal system as defined in the On-site Sewage Disposal Systems Regulations made under the Act;

(y) “pitless adaptor” means a device that is designed to attach to a well casing below the frost line to

(i) provide a watertight connection where the waterline passes through the well casing,

(ii) prevent contaminants from entering the well casing through the water line connection, and

(iii) provide access to pumping equipment in the well and in the well casing;

(z) “pumping equipment” means pumps and materials used or intended to be used to help withdraw or obtain groundwater from a well and includes all of the following:

(i) seals and other safeguards for protecting groundwater from contamination,

(ii) fittings, piping, electrical cables and controls for providing facilities for a potable water supply, and

(iii) equipment, other than equipment for treating the water supply, in the well and connected accessories as far as the shut-off valve at the outlet to the pressure tank;

(aa) “well” means an artificial opening in the ground made for the purpose of obtaining groundwater supply and includes the well casing and any attached parts, but does not include constructed ponds or dugouts;

(ab) “well cap” means the secure cover of a well;

(ac) “well casing” means a water-tight length of pipe that is used to line and support the upper portion of a well and to prevent surface or subsurface contaminants from entering the well;

(ad) “well digger” means a person who holds a valid certificate of qualification to dig, repair, modify or decommission a dug well issued in accordance with Section 5;

(ae) “well driller” means a person who holds a valid certificate of qualification to drill, repair, modify or decommission drilled wells issued in accordance with Section 4;

(af) “well liner” means a water-tight length of pipe installed inside a well casing that is used to line the well, prevent the collapse of geological material in the well and seal off the well from any contamination sources or for repair or modification purposes;

(ag) “well pump installer” means a Class I well pump installer or a Class II well pump installer who holds a valid certificate of qualification to install, repair or modify pumps and pumping equipment issued in accordance with Sections 7 and 8;

(ah) “well screen” means a tubular, porous device attached at the end of a well casing and designed to allow water into the well and keep sediment out.

References to codes and standards as amended

3 A reference to a code or standard in these regulations is a reference to the latest edition of the code or standard as amended, and as adopted by the Province.

Certificates of Qualification

Well drillers

4 (1) Except as provided in subsections (2) and (3), a person must hold a certificate of qualification for a well driller to do any of the following:

(a) hold themselves out as a well driller;

(b) drill or operate a machine for the purpose of drilling a well;

(c) construct a drilled well;

(d) repair a drilled well;

(e) modify a drilled well;

(f) decommission a drilled well.

(2) A certificate of qualification is not required for an individual to perform any of the tasks listed in clauses (1)(b) to (f) on lands that they own or lease.

(3) A certificate of qualification is not required for a person assisting a well driller if the person is under the supervision of the well driller while performing any of the tasks listed in clauses (1)(b) to (f).

(4) A person must be at least 18 years old and must meet all of the following qualifications to be issued a certificate of qualification as a well driller:

(a) they must have at least 4000 hours of work experience in operating a well drilling machine while under the supervision of a well driller;

(b) they must successfully complete an exam in well drilling and demonstrate knowledge of the Act, these regulations and any guidelines issued or adopted by the Department that relate to well drilling, all to the satisfaction of the Department;

(c) they must successfully complete a field test that demonstrates their practical knowledge of drilled well construction to the satisfaction of the Department.

(5) A well driller constructing a drilled well or an individual constructing a drilled well on lands that they own or lease must ensure that the drilled well is constructed, and the well casing, well liner or well screen is installed in the drilled well in accordance with the Act, these regulations and any guidelines issued or adopted by the Department that relate to well drilling.

Well diggers

5 (1) Except as provided in subsections (2) and (3), a person must hold a certificate of qualification for a well digger to do any of the following:

- (a) hold themselves out as a well digger;
- (b) manually dig or operate machinery to dig a well;
- (c) construct a dug well;
- (d) repair a dug well;
- (e) modify a dug well;
- (f) decommission a dug well.

(2) A certificate of qualification is not required for an individual to perform any of the tasks listed in clauses (1)(b) to (f) on lands that they own or lease.

(3) A certificate of qualification is not required for a person who is assisting a well digger if the person is under the supervision of the well digger while performing any of the tasks listed in clauses (1)(b) to (f).

(4) A person must be at least 18 years old and must meet all of the following qualifications to be issued a certificate of qualification as a well digger:

- (a) they must have at least 2000 hours of work experience in operating excavation equipment;

(b) they must provide proof of on-site work experience in constructing at least 3 dug wells while under the supervision of a well digger;

(c) they must successfully complete an exam in well digging and demonstrate a knowledge of the Act, these regulations and any guidelines issued or adopted by the Department that relate to well digging, all to the satisfaction of the Department;

(d) they must successfully complete a field test to demonstrate practical knowledge of dug well construction to the satisfaction of the Department.

(5) A well digger constructing a dug well or an individual constructing a dug well on lands that they own or lease must ensure that the dug well is constructed and the well casing is installed in the dug well in accordance with the Act, these regulations and any guidelines issued or adopted by the Department that relate to well digging.

Well digger and well driller machinery identification

6 (1) A well driller and a well digger must mark all of the following in a conspicuous place on each piece of machinery they use for well drilling or well digging:

(a) their name;

(b) their address;

(c) the number issued to them on their certificate of qualification.

(2) A figure or letter required to be marked on machinery must be at least 50 mm in height.

Class II well pump installers

7 (1) Except as provided in subsection (2), a person must hold a certificate of qualification for a Class II well pump installer, or a Class I well pump installer, to do any of the following:

(a) hold themselves out as a Class II well pump installer;

- (b) install a pump with a single-phase motor drive of up to and including 1½ HP in a well;
- (c) repair a pump with a single-phase motor drive of up to and including 1½ HP in a well;
- (d) modify pumping equipment for a pump with a single-phase motor drive of up to and including 1½ HP in a well;
- (e) modify a well during the installation of pumping equipment for a pump with a single-phase motor drive of up to and including 1½ HP.

(2) A certificate of qualification is not required for an individual to perform any of the tasks listed in clauses (1)(b) to (e) on lands that they own or lease.

(3) A certificate of qualification is not required for a person who is assisting a Class II well pump installer if the person is under the supervision of a Class I well pump installer or a Class II well pump installer while performing any of the tasks in clauses (1)(b) to (e).

(4) Except as provided in subsection (5) for a person who holds a journeyman's certificate of qualification, a person must meet all the following qualifications to be issued a certificate of qualification as a Class II well pump installer:

(a) they must have at least 3000 hours of general work experience while under the supervision of Class I well pump installer or a Class II well pump installer;

(b) they must have specific experience in installing at least 20 well pumps while under the supervision of a Class I well pump installer or a Class II well pump installer within the 5 years immediately before they apply for the certificate;

(c) they must successfully complete an exam in Class II well pump installation and demonstrate knowledge of the Act, these regulations and any guidelines issued or adopted by the Department that relate to pumping equipment installation, all to the satisfaction of the Department.

(5) A person who holds a journeyman's certificate of qualification under the Plumber Trade Regulations made under the Apprenticeship and Trades Qualifications Act and who meets the qualifications in clause (1)(c) [(4)(c)] may be issued a certificate of qualification as a Class II well pump installer.

(6) Any tasks performed by a Class II well pump installer under their certificate of qualification must be in accordance with the Act, these regulations and any guidelines issued or adopted by the Department that relate to pumping equipment installation.

Class I well pump installers

8 (1) Except as provided in subsection (2), a person must hold a certificate of qualification for a Class I well pump installer to do any of the following:

- (a) hold themselves out as a Class I well pump installer;
- (b) install a pump of over 1½ HP single-phase motor drive, or multi-phase motor drive of any size, in a well;
- (c) repair a pump of over 1½ HP single-phase motor drive, or multi-phase motor drive of any size, in a well;
- (d) modify pumping equipment for a pump of over 1½ HP single-phase motor drive, or multi-phase motor drive of any size, in a well;
- (e) modify a well during the installation of pumping equipment for a pump of over 1½ HP single-phase motor drive, or multi-phase motor drive of any size.

(2) A certificate of qualification is not required for a person who is assisting a Class I well pump installer if the person is under the supervision of a Class I well pump installer while performing any of the tasks in clauses (1)(b) to (e).

(3) A person must meet all the following qualifications to be issued a certificate of classification [qualification] as a Class I well pump installer:

(a) they must hold a certificate of qualification for a Class II well pump installer;

(b) they must have at least 1000 hours of general work experience installing single- or multi-phase motor drive water pumps greater than 1½ HP while under the supervision of a Class I well pump installer;

(c) they must successfully complete an exam in theoretical aspects of Class I well pump installation to the satisfaction of the Department.

(4) Any tasks performed by a Class I well pump installer under their certificate of qualification must be in accordance with the Act, these regulations and any guidelines issued or adopted by the Department that relate to pumping equipment installation.

Well digger and well driller machinery identification

9 (1) An application for a certificate of qualification under these regulations must be

(a) on a form approved by the Department; and

(b) accompanied by proof of commercial general liability insurance.

(2) A certificate of qualification issued under these regulations expires on December 31 of the calendar year for which it is issued unless a shorter period is specified on the certificate of qualification.

(3) An applicant who fails to meet the qualifications for a certificate of qualification under these regulations cannot reapply for a certificate of qualification for at least 90 days after the date of the initial application.

Renewing certificate of qualification

10 A certificate holder may apply to renew their certificate of qualification by following the application requirements of Section 9 and providing proof that they have participated in and successfully completed a continuing education program established or adopted by the Department.

Refusal to issue or renew certificate of qualification

11 (1) An application for a certificate of qualification or for renewal of a certificate of qualification under these regulations may be refused by the Minister if the applicant or certificate holder fails to comply with the Act, these regulations, or any term or condition imposed by their certificate of qualification.

(2) The Minister must notify an applicant or certificate holder in writing of a refusal to issue or renew a certificate of qualification together with reasons for the decision.

Financial security for certificate holder

12 (1) When deciding whether an applicant must provide financial security, the Minister must consider the past performance of the applicant and any indication that the applicant poses a risk for causing an adverse effect when drilling, digging, constructing, repairing, modifying or decommissioning a well or installing, repairing or modifying pumping equipment.

(2) When deciding whether an applicant must provide financial security, the Minister may consider recommendations from the On-site Services Advisory Board established under the On-site Services Advisory Board Regulations made under the Act.

Certificate of qualification in possession

13 (1) A certificate holder must carry their valid certificate of qualification while performing any task that requires the certificate of qualification under these regulations.

(2) A certificate holder must present their valid certificates of qualification to an inspector or an owner of a property where the certificate holder is working when requested.

(3) A certificate holder must notify the Department in writing of any change to their address or to any other identifying information provided with their application no later than 14 days after the date of the change.

Location of Wells

Surface water must not enter well

14 (1) A person must not construct a well in a manner or location that could allow surface water to enter the well or aquifer.

(2) The owner of a well that is constructed in a location where surface water run-off passes over or near the opening of the well must ensure that all of the following are done:

(a) the area immediately surrounding the well is filled with clay or clean earth for a distance of at least 4.5 m in all directions from the well;

(b) the area immediately surrounding the well is graded to an elevation of at least 610 mm above the highest known surface water level.

Well must be accessible

15 A well must be located and maintained so that it can be accessed to clean, repair or inspect the well or test or treat the water supply in the well.

Distances from sources of potential contamination

16 (1) A person must construct a well so that it is located far enough away from a source of potential contamination to prevent contamination of the well.

(2) Except as provided in Section 18, a person must not construct a well closer than the minimum distances from sources of potential contamination as set out in the following table:

Source of Potential Contamination

Type of Well

Minimum Distance from Well

cesspool (receiving raw sewage)

drilled well or dug well

61 m

on-site sewage disposal system

drilled well

15.2 m

dug well

30.5 m

sewer of tightly jointed pipe or equivalent material, sewer-connected foundation or floor drain, or water treatment discharge point

drilled well

15.2 m

dug well
30.5 m

sewer with secondary containment, roof drainage discharge point, non-sewer-connected foundation or floor drain, or cistern
drilled well or dug well
3 m

pumphouse floor drain
drilled well or dug well
610 mm

above-ground petroleum storage tank system with a capacity of 1200 L or less
drilled well
5 m

dug well
15.2 m

above-ground petroleum tank storage system with a capacity of greater than 1200 L
drilled well or dug well
15.2 m

underground petroleum storage tank system
drilled well or dug well
15.2 m

outer boundary of any public road or public highway
drilled well or dug well
6.1 m

solid waste management facility, landfill, former dump site or other significant source of potential contamination
drilled well or dug well
61 m

No wells constructed in basements

17 Except as provided in Section 18, a person must not construct a well in the basement of a building.

Exemptions for alternative well locations

18 (1) An owner, or a certificate holder or registered professional hydrogeologist on behalf of an owner, may submit an application in writing to the Minister to request acceptance of a well location that is

(a) in a basement; or

(b) closer to a source of potential contamination than set out in subsection 16(2).

(2) An applicant under subsection (1) must provide details in writing for all of the following:

(a) reason or reasons an alternative well location is requested or is necessary;

(b) how the alternative well location will still ensure that no adverse effects occur to groundwater or surface water;

(c) for a well that a person proposes to construct in a basement, how proper drainage, accessibility in accordance with Section 15, and protection from contamination sources can be achieved.

(3) The Minister may accept an alternative well location under this Section in writing if, in the opinion of the Minister, the information provided shows that it is not likely to create an adverse effect.

(4) The Minister may place terms and conditions on an acceptance of an alternative well location.

(5) The Minister may refuse to accept an alternative well location in writing if any of the following apply:

(a) allowing the alternative well location would violate the intent of the Act or these regulations;

(b) the reasons for the alternative well location result from willful or intentional disregard of the Act or these regulations;

(c) the minimum clearance distances set out in subsection 16(2) can be met.

(6) The Minister must give the applicant the reasons, in writing, for refusing to accept an alternative well location.

Well Construction and Materials

Requested notification of Department before constructing, repairing or modifying well

19 (1) If requested by an inspector or the Department, a well driller or well digger must notify the Department of their intent to drill, dig, construct, repair or modify a well no later than 24 hours before they begin the work.

(2) A notice to the Department under subsection (1) must include all of the following:

(a) the name and the number issued to the well driller or well digger on their certificate of qualification;

(b) the nature and location of the work to be conducted;

(c) the site owner's name, address and phone number;

(d) the anticipated work schedule;

(e) a phone number for the well driller or well digger while on site.

(3) An individual who intends to drill, dig or construct a well on lands they own or lease must notify the Department no later than 24 hours before they begin the work.

(4) A notice to the Department under subsection (3) must include all of the following:

(a) the name, address and on-site phone number of the individual conducting the work;

- (b) the nature and location of the work to be conducted;
- (c) the site owner's name, address and phone number;
- (d) the anticipated work schedule.

Wells constructed to prevent adverse effects

20 A person must not construct a well so that it causes or may cause an adverse effect.

Drilling, constructing, repairing and modifying drilled wells

21 (1) A well casing must be installed in each drilled well.

(2) A well casing, well liner or well screen installed in a drilled well must be installed so that all of the following requirements are met:

- (a) the well casing is at least 6.1 m long;
- (b) the well casing extends at least 152 mm above the ground surface when the well is completed;
- (c) there is a minimum annular space of 25 mm outside the well casing and in between well casings and well liners of different diameters;
- (d) the well casing is adequately sealed and prevents water or any other substance from leaking into the well from an annular space, the drive shoe or the well casing interface with subsurface geologic materials;
- (e) for a steel well casing, a drive shoe is attached to the bottom of the well casing and is firmly sealed with the bedrock or consolidated geologic formations;

(f) except when remediating a well under clause (g), a seal of high solids bentonite grout or other grout extends upward in the annular space for at least 1 m from the base of the well casing and seals the annular space;

(g) for a well liner that is installed to repair or modify a well to remediate well water contamination, a seal of high solids bentonite grout or other grout extends upward in the annular space from the base of the well liner to as near surface as is practical;

(h) any remaining volume of the outer borehole annulus is filled in with grout, drill cuttings or impermeable soil to the ground surface and prevents surface water from entering the annular space;

(i) well casing is welded or otherwise connected to any well screen used;

(j) any natural or manufactured filter pack materials used in conjunction with a well screen are developed after installation and are made of material suitable for potable water applications;

(k) any additives, such as water, stabilization muds or foams used do not contain toxic substances.

(3) Any water used for constructing a drilled well must be from one of the following:

(a) a municipal water supply that holds a valid approval;

(b) a public drinking water supply that is registered with the Department and is monitored and tested in accordance with the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations made under the Act;

(c) a non-registered drinking water supply that is monitored and tested in the same manner as [a] registered public drinking water supply under the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations made under the Act and that meets the health-related concentration limits for substances listed in the current edition of the Guidelines for Canadian Drinking Water Quality, published by the federal Department of Health.

(4) Test records for a non-registered drinking water supply referred to in clause (3)(c) must be kept at the registered address of the well driller for at least 2 years.

Well casings in drilled wells

22 A well casing used in a drilled well must meet all the following material requirements:

- (a) it must be made of new material that is free of contamination;
- (b) it must be made of either steel or thermoplastic;
- (c) it must have an inside diameter of at least 152 mm;
- (d) all steel well casings must conform to one of the following standards:
 - (i) for carbon steel well casings, ASTM standard ASTM A589, Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe, for Type IV Water-Well Casing Pipe, Grade B, or
 - (ii) for steel pipes, ASTM standard ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless, for Type E, Grade B pipes;
- (e) a steel well casing with an inside diameter of 152 mm must have a wall thickness of at least 4.7 mm;
- (f) a thermoplastic well casing with an inside diameter of 152 mm must have a wall thickness of at least 7.1 mm, and must conform to ASTM standard ASTM F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80;
- (g) a thermoplastic well casing with an inside diameter of greater than 152 mm must have a wall thickness that meets or exceeds the specifications set out for standard dimension ratio (SDR) 17, or Schedule 80 of ASTM standard ASTM F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.

Well liners in drilled wells

23 A well liner used in a drilled well must meet all of the following requirements:

- (a) it must be made of new material and free of contamination;
- (b) it must be made of steel or thermoplastic;
- (c) it must have an inside diameter of at least 102 mm;
- (d) all steel well liners must conform to one of the following standards:
 - (i) for carbon steel well casings, ASTM standard ASTM A589, Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe, for Type IV Water-Well Casing Pipe, Grade B, or
 - (ii) for steel pipes, ASTM standard ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless, for Type E, Grade B pipes;
- (e) a steel well liner with an inside diameter of 102 mm must have a wall thickness of at least 3.6 mm;
- (f) a thermoplastic well liner with an inside diameter of 102 mm must have a wall thickness of at least 6.0 mm and must conform to ASTM standard ASTM F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80;
- (g) a thermoplastic well liner with an inside diameter of greater than 102 mm must have a wall thickness that meets or exceeds the specifications set out in the standard dimension ratio (SDR) 17, or Schedule 80 in ASTM standard ASTM F480, Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.

Well screens in drilled wells

24 A well screen used in a drilled well in unconsolidated or unstable geologic formations must be

- (a) properly designed to meet supply requirements for the well; and
- (b) manufactured from materials designed to be used for potable water supplies.

Well caps in drilled wells

25 (1) Except as provided in subsection (2) for a flowing well, a well cap that is used in a drilled well must meet all of the following requirements:

- (a) it must be made of suitable durable materials and not deteriorate in sunlight;
- (b) it must be fitted with a gasket for sealing and attaching it to the top of a well casing that prevents anything from entering the well through the gasket;
- (c) it must be vermin-proof;
- (d) it must contain a vent that is
 - (i) at least 12 mm in diameter, and
 - (ii) shielded and screened in a manner that prevents any solid or liquid substance from entering into the well;
- (e) it must incorporate a sealing device to accommodate power cables into the well.

(2) A well cap for a flowing drilled well must meet all of the following requirements:

- (a) it must be made of suitable durable materials and not deteriorate in sunlight;

(b) it must be fitted with a gasket for sealing and attaching it to the top of a well casing that prevents anything from entering the well through the gasket;

(c) it must be vermin-proof.

Digging, constructing, repairing and modifying dug wells

26 (1) A well casing must be installed in each dug well.

(2) A dug well must be constructed so that all the following requirements are met:

(a) the well casing is at least 1.8 m long;

(b) the well casing extends at least 152 mm above the ground surface at the well;

(c) drainage of surface water at the well head is away from the well;

(d) there is a concrete or hydrated bentonite apron at least 152 mm thick around the well that

(i) is placed below the frost line but above the water table, and

(ii) extends a minimum distance of 914 mm from the perimeter of the well and has a minimum slope of 21 mm/m;

(e) the annular space from the bottom of the well up to the apron is filled with natural or manufactured filter pack materials suitable for potable water applications;

(f) all joints in the well casing above the apron are water-tight and sealed with a non-toxic sealer suitable for potable water applications;

(g) the annular space above the apron is filled to the ground surface with one of the following, preventing surface water from entering the well:

- (i) cement grout,
- (ii) concrete,
- (iii) bentonite or other clays,
- (iv) a commercial grout;

(h) piping connections to the well casing below ground are water-tight and sealed with a durable non-toxic sealer suitable for potable water applications;

(i) piping connection excavations are filled with one of the following, preventing surface water from entering the well:

- (i) cement grout,
- (ii) concrete,
- (iii) bentonite or other clays,
- (iv) a commercial grout;

(j) any additives used, such as water, stabilization muds or foams, do not contain toxic substances.

(3) Any water used for constructing a dug well must be from one of the following:

(a) a municipal water supply that holds a valid approval;

(b) a public drinking water supply that is registered with the Department and is monitored and tested in accordance with the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations made under the Act;

(c) a non-registered drinking water supply that is monitored and tested in the same manner as registered public drinking water supplies under the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations made under the Act and meets the health-related concentration limits for substances listed in the current edition of the Guidelines for Canadian Drinking Water Quality published by the federal Department of Health.

(4) Test records for a non-registered drinking water supply referred to in clause (3)(c) must be kept at the registered address of the well digger for at least 2 years.

Well casings in dug wells

27 A well casing used in a dug well must meet one of the following material requirements:

(a) a well casing made of precast concrete rings with grooved joints must be made of materials suitable for potable water applications;

(b) steel or thermoplastic well casings must meet the material requirements for well casings in drilled wells in Section 22.

Filter pack materials in dug wells

28 Any natural or manufactured filter pack materials used in a dug well must consist of one of the following types of materials, all of which must be clean, relatively uniformly graded and free of substances that may cause contamination:

(a) sand;

- (b) washed gravel consisting of granule-size, pebble-size or cobble-size stone;
- (c) crushed and washed rock consisting of granule-size, pebble-size or cobble-size stone.

Sealing materials in dug wells

29 Sealing material for joints in concrete ring seals used to construct a dug well must be made from one of the following:

- (a) a sand and cement mortar mix;
- (b) a flexible sealing compound that is certified non-toxic by the manufacturer.

Aprons in dug wells

30 An apron used in a dug well must be made of one of the following:

- (a) concrete poured in place;
- (b) bentonite chips or pellets that have been hydrated after they are put in place by wetting with water.

Well caps in dug wells

31 (1) Except as provided in subsection (2) for flowing dug wells, a well cap used in a dug well must meet all of the following requirements:

- (a) for a dug well with a concrete well casing, it must be made of reinforced concrete and be at least 75 mm thick;
- (b) for a dug well with a steel or plastic well casing, it must
 - (i) be made of suitable durable materials and not deteriorate in sunlight,

(ii) be fitted with a gasket for sealing and attaching it to the top of a well casing that prevents anything from entering the well through the gasket,

(iii) be vermin-proof,

(iv) contain a screened vent of at least 12 mm in diameter, and

(v) incorporate a sealing device to accommodate power cables to the well.

(2) A well cap for a flowing dug well must meet all of the following requirements:

(a) it must be made of suitable durable materials and not deteriorate in sunlight;

(b) for a dug well with steel or plastic casing, it must be fitted with a gasket for sealing and attaching it to the top of a well casing that prevents anything from entering the well through the gasket;

(c) it must be vermin-proof.

Well completion

32 After a well driller, a well digger or an individual conducting work on lands that they own or lease has finished drilling, digging, constructing, repairing or modifying a well they must immediately do all of the following:

(a) remove and properly dispose [of] all debris from in and around the well;

(b) conduct a basic yield test if required under Section 33;

(c) disinfect the well;

(d) seal the upper open end of the well casing with a well cap or hand pump in a manner that prevents any substance from entering the well that could impair the quality of the water in the well;

(e) create a slightly mounded ground surface around the top of the well capable of draining away immediate surface precipitation, in addition to meeting the requirements of Section 14, when necessary;

(f) complete a well construction record, as required in Section 46.

Basic yield tests

33 (1) A well driller, a well digger or an individual conducting work on lands that they own or lease must conduct a basic yield test under this Section before finishing construction on any of the following wells:

(a) a new well;

(b) a well that has been modified or repaired by methods that are expected to change the water yield of the well.

(2) A basic yield test to estimate the sustainable volume of water a well may produce over time must be one of the following:

(a) a bail or air lift test of at least 1 hour's duration;

(b) a pumping test of at least 2 hours' duration.

(3) A well driller, a well digger or an individual conducting work on lands that they own or lease must monitor and record all of the following for a basic yield test:

(a) the static water level in the well immediately before the test;

(b) the subsequent yield rate of the basic yield test;

(c) water level recovery measurements after pumping stops for

(i) an equivalent duration to the basic yield test, or

(ii) the amount of time it takes for at least 95% of the original water level to be recovered.

(4) An owner who anticipates a water withdrawal rate of greater than 23 000 L per day must comply with any approval requirements under the Activities Designation Regulations made under the Act.

Modifications and repairs to well

34 If a well is being repaired or modified to prevent or stop an adverse effect to groundwater, any materials or methods used must meet these regulations.

Modifications to well required by inspector

35 (1) If, in the opinion of an inspector, a well is not constructed as required by these regulations and the well construction may result in an adverse effect to groundwater, the inspector may require the well to be modified as the inspector considers necessary to bring the well construction into compliance.

(2) An inspector must notify either the certificate holder who constructed the well or the owner in writing of any modification required to a well and of the date by which the modification must be completed.

(3) A certificate holder or owner must complete the required modification to the satisfaction of the inspector by the date specified in the written notice.

Pumping Equipment Installation and Materials

Requested notification of Department before constructing, repairing or modifying pumping equipment

36 (1) If requested by an inspector or the Department, a well pump installer must notify the Department of their intent to install pumping equipment no later than 24 hours before they begin the work.

(2) A notice to the Department under subsection (1) must include all of the following:

(a) the name and the number issued to the well pump installer on their certificate of qualification;

(b) the nature and location of the work to be conducted;

(c) the site owner's name, address and phone number;

(d) the anticipated schedule of work;

(e) a phone number for the well pump installer while on site.

Installing, repairing and modifying pumps or pumping equipment

37 (1) All installations, repairs or modifications of pumping equipment within a well, or in-line as far as the shut off valve at the outlet to the pressure tank, must be done in accordance with all of the following:

(a) the Act;

(b) these regulations;

(c) the National Plumbing Code of Canada, 2005 issued by the Canadian Commission of Building and Fire Codes of the National Research Council;

(d) CSA standard CSA C22.1-06, Canadian Electrical Code, Part I (20th edition), Safety Standard for Electrical Installations.

(2) Before any pumping equipment is installed in a well, the well must first be assessed to determine the diameter of the well, the depth of the well and the static water level.

(3) The diameter of pumping equipment installed in a well must be at least 25 mm smaller than the diameter of the open borehole, well casing and well screen.

(4) A hand pump installed in a well must be mounted to the well casing or pump mounting sleeve in a manner that seals the top of the well casing or sleeve and prevents any solid or liquid substance from entering the well.

(5) A water sampling port or a tap must be installed in a well at a point between the well pump and any water treatment device.

Pitless adaptors

38 (1) Except for a well that contains a hand pump, a pitless adaptor must be installed in any new drilled well.

(2) A pitless adaptor must not be installed so that different metals contact each other.

(3) A hole cut into the well casing for a pitless adaptor must be sufficiently smaller than the pitless adaptor sealing gasket to create a completely water-tight seal and must be cut in the well casing with equipment, such as a circular hole saw or a cutting or welder's torch used with a template.

(4) A pitless adaptor must meet all of the following:

(a) it must incorporate a sealing gasket to form a water-tight connection;

(b) it must have a quick connection that allows easy removal of pumping equipment within the well;

- (c) it must be made of durable materials suitable for potable water application[s].

Plastic pipes and fittings used for installing pumps

39 Plastic pipes and any fittings used for installing pumping equipment must conform to either NSF/ANSI standard NSF/ANSI 14, Plastic Piping System Components and Related Materials, or ANSI/AWWA standard ANSI/AWAA C901, Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service.

Pumping equipment installation completion

40 After installing or repairing pumping equipment in a well, a person must immediately do all of the following:

- (a) remove all debris from within and around the well;
- (b) disinfect the well;
- (c) seal the upper open end of the well casing with a well cap or hand pump in a manner that prevents any substance from entering the well that could impair the quality of the water in the well;
- (d) complete a pump installation record for each pump installed, as required in Section 48.

Innovative Wells and Innovative Pumping Equipment

Exemptions for innovative wells and innovative pumping equipment

41 (1) Despite any other requirement in these regulations, a certificate holder or a registered professional hydrogeologist may, on behalf of an owner, submit an application in writing to the Minister to request acceptance for an innovative well or innovative pumping equipment that does not meet the requirements of these regulations.

- (2) An applicant under subsection (1) must provide details in writing for all of the following:

(a) reasons why an innovative well or innovative pumping equipment is requested or is necessary;

(b) how an innovative well or innovative pumping equipment will still ensure that no adverse effects occur to groundwater or surface water.

(3) The Minister may accept an innovative well or innovative pumping equipment under this Section in writing if, in the opinion of the Minister, the information provided shows that it is not likely to create an adverse effect.

(4) The Minister may place terms and conditions on an acceptance of an innovative well or innovative pump, including specifying which provisions of these regulations the installation of the well or pumping equipment must meet.

(5) The Minister may refuse to accept an innovative well or innovative pumping equipment if any of the following apply:

(a) allowing the innovative well or innovative pumping equipment would violate the intent of the Act or these regulations;

(b) the reason or reasons for the innovative well or innovative pumping equipment result from willful or intentional disregard of the Act or these regulations.

(6) The Minister must give the applicant the reasons, in writing, for refusing to accept an innovative well or innovative pumping equipment.

Maintaining and Decommissioning Wells

Maintaining well to prevent adverse effects

42 (1) An owner of a well must maintain the well so that it does not cause an adverse effect.

(2) A person must not allow lubricants, hydraulic fluids or other materials derived from petroleum or other substances that may cause an adverse effect to be placed in a well or to spill into a well.

Controlling flow of water in flowing wells

43 An owner of a flowing well must ensure that an appropriate certificate holder installs any well modifications, well grouting, pumping systems, well packers or well caps necessary to stop and control the flow of water and to ensure that water is not discharged immediately around the well head.

Wells maintained for present or future use

44 An owner of a well that is maintained for present or future use must ensure that the well is capped in accordance with requirements for well caps in Sections 25 and 31 and as required by clause 32(1)(d).

Decommissioning wells

45 (1) The Minister may require a well to be decommissioned in accordance with the Water Well Decommissioning Guidelines issued by the Department if it is causing, or has the potential to cause, an adverse effect.

(2) An owner of a well that is required to be decommissioned by the Minister or an owner of a well that is not being maintained for present or future use must ensure that the well is immediately decommissioned by sealing it in a manner that prevents the vertical movement of water into the well in accordance with the Water Well Decommissioning Guidelines issued by the Department.

(3) A well driller, a well digger or an individual conducting work on lands that they own or lease who decommissions a well must complete a well decommissioning record, as required in Section 47.

Records

Well construction record

46 (1) A well construction record must be completed on a form supplied by the Department and include all of the following information:

- (a) the name of the well owner or client for whom the work was done;

(b) the name, phone number and civic address of the well driller or well digger who conducted the work or, if the work was conducted by an individual on lands that they own or lease, the individual who conducted the work;

(c) the community of the well location, as indicated on the form;

(d) the property identification number, civic address and lot number for where the well is located, if available

;

(e) the global positioning system coordinates for the well location;

(f) for a drilled well, a stratigraphic description of geology encountered during drilling;

(g) well construction information required by the form, including well casing, well liner type and length, well screen type and length and well depth;

(h) the clearance distances from the well to features listed on the form;

(i) a description of any alternative location or innovative well as accepted by the Minister;

(j) the results of the basic water yield test required by Section 33;

(k) the final status of the well;

(l) the water use anticipated for the well;

(m) for a drilled well, the method of drilling used to construct the well;

(n) the date the well was completed.

(2) The well driller, well digger or individual who conducted the work must sign the completed well construction record.

Well decommissioning record

47 (1) A well decommissioning record must be completed on a form supplied by the Department and include all of the following information:

(a) the name of the well owner or client for whom the work was done;

(b) the name, phone number and civic address of the well driller or well digger who conducted the work or, if the work was conducted by an individual on lands that they own or lease, the individual who conducted the work;

(c) the community of the well location, as indicated on the form;

(d) the property identification number, civic address and lot number for where the well is located, if available;

(e) the global positioning system coordinates for the well location;

(f) a description of any pumping equipment, well cap and well casing removed;

(g) well decommissioning information required by the form, including all of the following:

(i) the well depth and diameter before decommissioning,

(ii) the water level before decommissioning,

- (iii) the depth of well casing cutoff or removal,
- (iv) the depth of placement and volume of grout and backfill material;
- (h) the type of grouting and backfill material used;
- (i) the date the well decommissioning was completed.

(2) The well driller, well digger or individual who conducted the work must sign the completed well decommissioning record.

Well pump installation record

48 (1) A pump installation record must be completed on a form supplied by the Department and include all of the following information:

- (a) the name of the well owner or client for whom the work was done;
- (b) the name, phone number and civic address of the well pump installer who conducted the work or, if the work was conducted by an individual on lands that they own or lease, the individual who conducted the work;
- (c) the community of the well location, as indicated on the form;
- (d) the property identification number, civic address and lot number for where the well is located, if available;
- (e) the global positioning system coordinates for the well location;
- (f) a description of the pumping equipment;

- (g) details of the pumping equipment installation;
- (h) a description of any innovative pumping equipment as accepted by the Minister;
- (i) the water use anticipated and well record number, if known;
- (j) the date the pumping equipment installation was completed.

(2) The well pump installer or individual who conducted the work must sign the completed pump installation record.

Copies of records

49 A certificate holder or individual who is responsible for completing a well construction record under Section 46, a well decommissioning record under Section 47 or a pump installation record under Section 48 must do all of the following:

- (a) deliver a copy of the record to the owner after the well construction, well decommissioning or pump installation is completed;
 - (b) deliver the record to the Department after the well construction, well decommissioning or pump installation is completed
- (i) immediately on request by the Department, or
- (ii) by January 31 of the calendar year following installation; and
- (c) keep a copy of the record for at least 2 years after the date the well construction, pump installation or well decommissioning is completed.

Please send comments to: regofregs@gov.ns.ca

Last updated: 25-10-2007