Professional qualification of construction contractors

Competency profile

2.1 - Contractor – Drilled wells

Régie du bâtiment Québec

This document was produced with the collaboration of the team of competency assessment advisors (Direction de la qualification) of the Régie du bâtiment du Québec.

In this document, the masculine gender is used without discrimination and solely for the sake of brevity.

Changes to the content may be made at any time.

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Introduction

The person who passes the exam can act as a guarantor for construction work included in subclass 2.1 - Contractor – Drilled wells.

This competency profile is based on the scope of application of the *Building Act*, as well as on Section (21-22-23 or 24) of the *Regulation respecting the professional qualification of contractors and owner-builders*.

Subclass definition

2.1 - Contractor – Drilled wells

This subclass authorizes construction work relating to well drilling and water catchment, as well as similar or related construction work.

Module 1 – Definitions and types of systems

Elements of competency covered in this module:

1. Define and explain concepts and terms related to water catchment works
2. Describe the characteristics of different types of water catchment works

Module 1 – Definitions and types of systems

Elements of competency	Skills required
1. Define and explain concepts and terms related to water catchment works	1.1. Explain the hydrological cycle
	1.2. Understand the characteristics of aquifers and groundwater movement phenomena
	1.3. Define “water requirement”: “instantaneous flow rate” and “average operating flow rate”
	1.4 Define “watertight wastewater treatment system” and “non-watertight wastewater treatment system”
	1.5. Define concepts related to “vulnerability of aquifers,” “hydrofracturing” and “cementation”
	1.6. Define “static level” and “dynamic level”
	1.7. Define specific capacity and describe a pumping test
	1.8. Define the different parts of a water catchment work: casing, drive shoe, perforated casing, lid, catchment drain, overflow, etc.
	1.9. Identify the units of measurement associated with water catchment works: l/min (gal/min)
	1.10. Identify the characteristics of cut materials (gravel, sand, clay, rock, etc.)
2. Describe the characteristics of different types of water catchment works	2.1. Describe the main characteristics of a tube well and its application
	2.2. Describe the main characteristics of a shallow well and its application

Elements of competency	Skills required
	2.3. Describe the main characteristics of a wellpoint and its application
	2.4. Describe the main characteristics of a spring catchment and its application

Module 2 – Legislative, normative and regulatory framework

Elements of competency covered in this module:

3. Situate work on water catchment works in relation to the various codes and standards in force

Module 2 – Legislative, normative and regulatory framework

Elements of competency	Skills required
3. Situate work on water catchment works in relation to the various codes and standards in force	3.1. Know the *Groundwater Catchment Regulation* (R.S.Q., c. Q-2, r.1.3) (purpose, scope)
	3.2. Identify the types of work requiring a municipal permit and those requiring ministerial approval
	3.3. Situate the municipality's role in applying the *Groundwater Catchment Regulation* (R.S.Q., c. Q-2, r.1.3)
	3.4. Identify the organizations (and their compliance standards) that affix their marks to components of water catchment works to guarantee compliance (ASTM)
	3.5. Determine the qualifications required for workers to carry out the work

Module 3 – Plans and specifications

Elements of competency covered in this module:

4. Read and interpret plans and specifications for a water catchment work
5. In the case of work without plans and specifications, determine the type of water catchment work to be installed and its location

Module 3 – Plans and specifications

Elements of competency	Skills required
4. Read and interpret plans and specifications for a water catchment work	4.1. Locate the exact drilling site on a sketch
	4.2. Read and interpret the cutaway view of the water catchment installation
	4.3. Interpret information relating to water catchment works in specifications
5. In the case of work without plans and specifications, determine the type of water catchment work to be installed and confirm its location	5.1. List the characteristics of the site that are related to the standards of the *Groundwater Catchment Regulation* (R.S.Q., c. Q.2, r1.3), (watertight and non-watertight wastewater treatment system, cultivated parcel, watercourse, raising facility, animal waste storage, area subject to flooding)
	5.2. Gather information about the site where the work is to be installed: soil types, types of structures in the area, groundwater level, hydrological context of the area, etc.
	5.3. Assess water requirements
	5.4. Determine the type of work to be installed
	5.5. Ensure that the margins required by the *Groundwater Catchment Regulation* (R.S.Q., c. Q.2, r1.3) are respected

Module 4 – Standards and execution of work

Elements of competency covered in this module:

6. Plan and organize work related to water catchment works
7. Install a tube well
8. Seal unused catchment works
9. Install a shallow well Install a wellpoint
10. Install a spring catchment
11. Complete the work
12. Retrofit existing wells
13. Seal unused catchment works
14. Ensure health and safety in connection with installation of water catchment works

Module 4 – Standards and execution of work

Elements of competency	Skills required
6. Plan and organize work related to water catchment works	6.1. Order and receive the materials required for the type of catchment work selected (comply with manufacturer's specifications, etc.)
	6.2. Determine the logical order of work for the installation of water catchment works
	6.3. Ensure that all required permits and authorizations have been obtained
	6.4. Plan site access
	6.5. Characterize the equipment and machinery used during the work: cleanliness, no oil leaks, etc.
7. Install a tube well	7.1. Choose the right drilling technique and equipment
	7.2. Explain how machinery works and the role of different components in a piece of machinery
	7.3. Explain the characteristics and role of the materials used in drilling
	7.4. Select materials and perforated casing opening according to site granulometry
	7.5. Know the conformity marks for casing
	7.6. Identify casing design characteristics
	7.7. Explain the standards for anchoring casing in rock
	7.8. Explain design details when rock is less than 5 m from the natural ground surface

Elements of competency	Skills required
	7.9. Describe situations where a well sealant is required
	7.10. Explain trade practice for obtaining an adequate seal when necessary
	7.11. Describe best practice for geothermal well installation
	7.12. Manage drill cuttings
8. Install a shallow well	8.1. Identify casing design characteristics
	8.2. Explain the role of the annular space, its minimum dimensions and the characteristics of its filling material
	8.3. Explain why an unsaturated zone is desirable and how to ensure its presence
	8.4. Manage cuttings
9. Install a wellpoint	9.1. Identify the design characteristics of a wellpoint
	9.2. Explain the purpose of an unsaturated zone and how to ensure its presence
	9.3. Know the conformity marks for casing
10. Install a spring catchment	10.1. Identify the design characteristics of a spring catchment
	10.2. Characterize horizontal installation of the catchment drain (depth, soil preparation, ditch)
	10.3. Select materials and drain openings according to site granulometry

Elements of competency	Skills required
11. Complete the work	11.1. Define and explain the various development techniques
	11.2. Carry out pumping tests associated with water catchment works
	11.3. Clean and disinfect the catchment work
	11.4. Establish catchment work coordinates: latitude-longitude or UTM X and Y (using GPS)
	11.5. Produce a compliant drilling report on time
	11.6. Advise the owner of their regulatory obligations: soil preparation, water analysis, etc.
12. Retrofit existing wells	12.1. Name the modifications that require upgrading of the existing installation
	12.2. Name the upgrades that should be recommended to the owner in accordance with best practice
13. Seal unused catchment works	13.1. Explain situations where plugging is required
	13.2. Know how to seal a tube well
	13.3. Know how to seal a wellpoint
	13.4. Know how to seal a shallow well
14. Ensure health and safety in connection with installation of water catchment works	14.1. Name the risks associated with the installation, inspection and maintenance of water catchment works: noise, dust, working at heights, power lines, presence of gas in the soil, etc.

Elements of competency	Skills required
	14.2. Explain the precautions to be taken when installing a water catchment work