

Monitoring Well Installation, Maintenance and Decommissioning Standard

1. PURPOSE

To reduce the risk of groundwater contamination within the City of Saskatoon by providing guidance to landowners, developers and City of Saskatoon (City) staff on the minimum standard for installing, maintaining and decommissioning groundwater monitoring wells.

The installation, maintenance and decommissioning of monitoring wells are the responsibility of the landowner whose land they are installed on, except for monitoring wells installed through the City's *License and Encroachment Agreement for Installation of Boreholes/Monitoring Wells*. Landowners shall ensure their hired consulting, engineering and drilling companies are proficient in the installation, maintenance and decommissioning of monitoring wells and knowledgeable in the application of Provincial regulations and this City standard.

Decommissioning of groundwater pumping wells shall be completed in accordance with Provincial regulations and guidance.

2. DEFINITIONS

- a. **Abandoned well:** a well that is no longer used or functioning.
- b. **Abandonment barrier:** material placed into a well during decommissioning to prevent the vertical movement of water and/or liquids within the well. Abandonment barrier shall be:
 - A slurry consisting of clean water, Portland cement and bentonite; or
 - Bentonite chips or pellets.
- c. **Aquifer:** any geological formation from which groundwater can be withdrawn in usable quantities to suit a given need.
- d. **Decommissioned well:** a well that has been sealed to prevent the vertical movement of water within it.
- e. **Decommissioning plan:** a document signed and stamped by an engineer or geoscientist licensed to practice in Saskatchewan that proposes monitoring well decommissioning methods and a date of completion.
- f. **Decommissioning report:** a document signed and stamped by engineer or geoscientist licensed to practice in Saskatchewan that describes actual methods used to decommission a well following decommissioning work.
- g. **Flowing Well:** a well from which the water flows from without pumping due to natural or artificially supplied underground pressure.
- h. **Groundwater:** water beneath the surface of land (as defined in *The Ground Water Regulations*).

- i. **Landowner or owner:** registered owner of the land.
- j. **Monitoring well:** a well used for measuring, testing, or sampling groundwater.
- k. **Right of Way:** a public street, road, sidewalk, walkway, lane or other place designed and intended for use or used by the general public for the passage of vehicles or pedestrians, but does not include a parking lot, whether privately or publicly owned.
- l. **Well:** an opening made by drilling into the ground for the purpose of obtaining groundwater or scientific data on groundwater, whether water is obtained or not (as defined in *The Water Security Agency Act*).

3. POLICY

3.1 Installation

- a) Installation method is to be determined by the qualified engineer, geoscientist or consultant that installs the well.
- b) Installation method should be determined in consideration of depth of well, strata and/or aquifer it is installed into, surrounding strata that could be impacted by well, potential current and future contaminants that could impact the well and/or underlying strata.
- c) Determination of installation location and method should consider longevity of well and end use of the land the well is installed upon.
- d) Monitoring wells proposed to be functional for longer than 1 year shall have a locked protective casing installed.
- e) Monitoring wells proposed to be functional for less than 1 year but installed in locations that are easily accessed by the public or at risk from damage by construction or agricultural equipment should have a locked protective casing installed.

3.2 Maintenance

- a) Monitoring wells shall be inspected periodically to ensure well is still functioning as intended. Monitoring wells can and should be decommissioned in advance of the submitted decommissioning date if the well is damaged or becomes non-operational.

3.3 Decommissioning Plan

- a) Upon the installation of a monitoring well on public land, for City purposes or large-scale developments a record of the monitoring well installation and decommissioning plan shall be submitted to the City at geo@saskatoon.ca within 30 days.

- b) The record of monitoring well installation shall include the following:
 - UTM co-ordinates to NAD 83 (Zone 13)
 - Elevation of ground surface and top of protective casing if obtained from well installer
 - Base and top of screen
 - Strata screen is installed into
- c) The decommissioning plan shall include the following:
 - Date of planned decommissioning
 - Planned decommissioning method
- d) The decommissioning plan shall be signed and stamped by an engineer or geoscientist licenced to practice in Saskatchewan.

3.4 Decommissioning Method

- a) Decommissioning method is to be determined by the qualified engineer, geoscientist or consultant that installs the well.
- b) Decommissioning method should be determined in consideration of depth of well, strata and/or aquifer it is installed into, surrounding strata that could be impacted by well, potential current and future contaminants that could impact the well and/or underlying strata.
- c) Determination of decommissioning method should consider end use of the land the well is installed upon.
- d) Decommissioning method may involve removal of well casing and screen or decommission well with casing and screen intact. The consultant or engineer installing the well should determine which is most appropriate for the well and the potential risks to the underlying strata and/or aquifers.
- e) If the screen is within an aquifer or water producing zone, clean sand or pea gravel must be placed from the bottom of the well to the top of the aquifer or water producing zone.
- f) Abandonment barrier material must be placed continuously from the bottom of the well or top of sand/pea gravel within water producing zone, upward to approximately 0.3 m (1 ft.) below the ground surface.
- g) The well and well opening, including any excavation around the well, should be sealed to the ground surface by placing 0.2 m of bentonite in the form of chips, pellets, granules or powder and covered with soil or

material similar to the material adjacent to the well opening to ground surface.

- h) Abandonment of flowing wells, commercially-manufactured drilling mud that does not impair water quality may be used to assist with drilling or placement of an abandonment barrier. Drilling mud may not be used as an abandonment barrier.

3.5 Decommissioning Report

- a) A decommissioning report shall be submitted to the City at geo@saskatoon.ca within 30 days of well decommissioning.
- b) The report shall detail:
 - well location and identifying number;
 - decommissioning date;
 - decommissioning method.
- c) The decommissioning report shall be signed and stamped by an engineer or geoscientist licenced to practice in Saskatchewan.

3.6 Monitoring Well Database

- a) The City will maintain a database of functioning monitoring wells installed by the City and on public land through the *License and Encroachment Agreement for Installation of Boreholes/Monitoring Wells* permitting process.
- b) The database will be updated upon receipt of new monitoring well installations and will be reviewed annually to ensure monitoring wells have been decommissioned in accordance with the submitted decommissioning plan.
- c) Project managers shall consult the database as part of their project planning process to determine if a monitoring well exists within their project extents. Project managers shall work with the Geotechnical Engineering Specialist to determine if the monitoring well requires protecting or decommissioning as part of the project work.

4. RESPONSIBILITIES

4.1 City of Saskatoon Geotechnical Engineering Specialist

- a) Assisting in the administration of this standard and recommending updates to this standard;

- b) Maintaining, and developing where necessary, an active monitoring well inventory and database of the city;
- c) Developing and maintaining the standard;
- d) Ensuring compliance with the standard and obtaining monitoring well installation records and decommissioning reports.

4.2 City Project Manager

- a) Submit monitoring well installation records, maintenance plan and decommissioning plan to City at geo@saskatoon.ca;
- b) Ensure monitoring wells are maintained and decommissioned in accordance with the accepted decommissioning plan;
- c) Submit decommissioning report to the City at geo@saskatoon.ca once wells have been decommissioned.

4.3 Non City Project Manager (when installing on public property)

- a) Obtain approved *License and Encroachment Agreement for Installation of Boreholes/Monitoring Wells*.
- b) Retain geotechnical engineer licensed to practice in Saskatchewan to complete design of monitoring well installations, provide maintenance recommendations, estimate decommissioning dates and supply proposed decommissioning methods;
- c) Submit monitoring well installation records, maintenance plan and decommissioning plan to City at geo@saskatoon.ca;
- d) Ensure monitoring wells are maintained and decommissioned in accordance with the accepted decommissioning plan;
- e) Submit decommissioning report to the City at geo@saskatoon.ca once wells have been decommissioned.

4.4 Landowner

- a) Retain geotechnical engineer licensed to practice in Saskatchewan to complete design of monitoring well installations, provide maintenance

recommendations, estimate decommissioning dates and supply proposed decommissioning methods;

- b) Submit monitoring well installation records, maintenance plan and decommissioning plan to City at geo@saskatoon.ca;
- c) Ensure monitoring wells are maintained and decommissioned in accordance with the accepted decommissioning plan;
- d) Submit decommissioning report to the City at geo@saskatoon.ca once wells have been decommissioned.