

Information Report



To	City Council
Service Area	Infrastructure, Development and Enterprise Services
Date	Monday, February 24, 2020
Subject	Framework for Assessing Geothermal Energy Implementation
Report Number	IDE-2020-31

Purpose of Report

This report provides background and information on the policy framework for evaluation of geothermal system proposals in the City of Guelph.

Key Findings

Geothermal systems use water from below the ground to heat and cool buildings. The water is accessed through a series of bore holes in either a closed or open loop system. Guelph relies on a groundwater based system for the City’s drinking water and source protection areas have been identified near wells and intakes that are vulnerable to contamination and or depletion. Siting a geothermal system within a source protection area can potentially put a municipal drinking water well at risk from the transport pathways that are generated from the geothermal boreholes. As such, an evaluation framework for geothermal systems in the City has been developed in accordance with the “protecting existing and future drinking water supplies” objectives of the Clean Water Act, 2006. The resultant policy has been developed to be transparent to proponents pursuing the implementation of such systems and provides a staged approach to assessing the feasibility of geothermal earth energy systems on a case-by-case basis.

Financial Implications

Financial needs for the administration of the City’s Source Water Protection Program are funded from the Council approved 2020 Water Services Non-Tax Capital Budget – Groundwater Protection WT0009.

Background

Geothermal systems use water from below the ground to heat and cool buildings. Although geothermal systems are attractive from a green energy perspective, the drilling of boreholes and construction of infrastructure required for such systems can cause concern with the fractured bedrock geological setting of the City of Guelph (City) water supply aquifer. Therefore, geothermal system proposals must be proactively assessed and managed to address any potential impacts to the quality and/or quantity of the City’s drinking water sources.

Through the Provincial Policy Statement, Safe Drinking Water Act and the Clean Water Act, the Province of Ontario has emphasized the importance of protecting municipal drinking-water supply systems by way of land use planning decisions.

Furthermore, the City's role in implementing Provincial policy places an obligation on the City to make land use planning decisions consistent with the Provincial Policy Statement's direction to protect the water quality and quantity of drinking water resources in the City, and to limit development and site alteration that could adversely affect drinking-water supplies.

Under the Clean Water Act, Source Protection Regions and Areas (SPRs and SPAs) have been established on a watershed basis to manage and protect the current and future municipal drinking-water supply systems that are present within the watershed. Source protection areas are important in that they contribute water to municipal drinking-water supply systems (wells and intakes) that are vulnerable to contamination and or depletion. Within each SPA, Wellhead Protection Areas (WHPAs) are delineated under the Clean Water Act around each municipal drinking-water supply well, representing the total area of land which contributes water to the municipal drinking-water supply well. The purpose of these designations is to identify the vulnerable areas associated with the municipal water supplies and in conjunction with the Approved Source Protection Plan policies, manage all prescribed activities so that water quantity and/or quality risks to municipal drinking-water supply wells are mitigated.

These policies are particularly important in the City of Guelph as it is one of the largest communities to be reliant almost solely on groundwater for its current and future drinking water needs. Further, the City overlies a fractured bedrock aquifer, which is more vulnerable to contamination than other settings such as lake based drinking water systems.

Siting a geothermal system within a WHPA can potentially put a municipal drinking water well at risk from the transport pathways that are generated from the geothermal boreholes. Locating such infrastructure outside of any WHPA is the safest approach, however, in consideration of the City's several wellfields and associated WHPAs, finding such areas can be a challenge in the City, where approximately 97% of the City exists within a vulnerable area as defined by the Clean Water Act 2006. To that end, managing such risks in the City requires a level of special due diligence to ensure requirements of Clean Water Act are met when considering our communities' green energy interests.

The geothermal systems policy for local developments in the City has been developed in accordance with the "protecting existing and future drinking water supplies" objectives of the Clean Water Act, 2006. The resultant policy has been developed to be transparent to proponents pursuing the implementation of such systems and provides a staged approach to assessing the feasibility of geothermal earth energy systems on a case-by-case basis.

Policy Administration Process

Under the Clean Water Act, 2006 and in accordance with the Approved Grand River Source Protection Plan (2019) and the Lake Erie Region Transport Pathway Guidance document (2016), proponents are required to complete a Section 59 Policy Applicability Review form (S 59 PAR) for development applications and building permits in the City. If a geothermal system is being proposed, the proponent will indicate the intent for a geothermal system installation through the S 59 PAR form and Source Water Protection staff will then review this application in accordance with the City's Geothermal Evaluation Procedure.

In managing potential risks to the City's municipal water supply well, an application for the geothermal system will not be approved should the proposed location be subject to any of the following conditions below:

- WHPA-A (wellhead protection area 1-year time of travel zone);
- WHPA-B (wellhead protection area 2-year time of travel zone) with a Vulnerability Score of 8 or higher;
- 1 km proximity to municipal drinking water supply well and within WHPA-B

For reference, a map of the City's Wellhead Protection Areas and associated vulnerability scores are included as Attachment A to this report.

If not subject to these constraints, Source Water Protection program staff will review the information provided by the proponent and may request further information of the proponent to support technical evaluation of the proposal. Such requests will be determined on a case-by-case basis and may include the need for fieldwork such as confirmation testing, site-specific monitoring, pilot programming and reporting, to be completed at the proponent's sole expense.

Following the submission of subsequent information, Source Water Protection Program staff will finalize technical review and issue a final written decision to the proponent as follows:

- Prohibited (including reasons)
- Approved
- Tentative approval with conditions (such the need for future groundwater monitoring and reporting requirements)

If the geothermal system application is approved, Source Water Protection staff will complete the Lake Erie Region Transport Pathway Notice Template, in accordance with Section 27(3) and (4) of O. Reg. 287/07 made under the Clean Water Act, 2006 and submit the form to the Source Protection Authority.

Financial Implications

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Consultations

Departmental consultation completed in support of this policy framework include:

- Facilities and Energy Management;
- Engineering and Transportation Services;
- Planning and Building Services;
- Legal, Realty and Court Services; and
- Finance Services – Teisha Colley-Balgrave

Strategic Plan Alignment

The policy is aligned with the Strategic Plan Priorities of Sustaining our Future as its implementation will directly lead to protecting Guelph's groundwater—the drinking water supply for residents and businesses. This policy approach also aligns with Working Together for Our Future by sustaining core services.

Attachments

Attachment 1 - City of Guelph Wellhead Protection Areas and Vulnerability Scores

Departmental Approval

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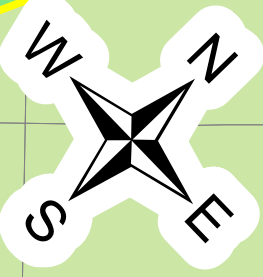
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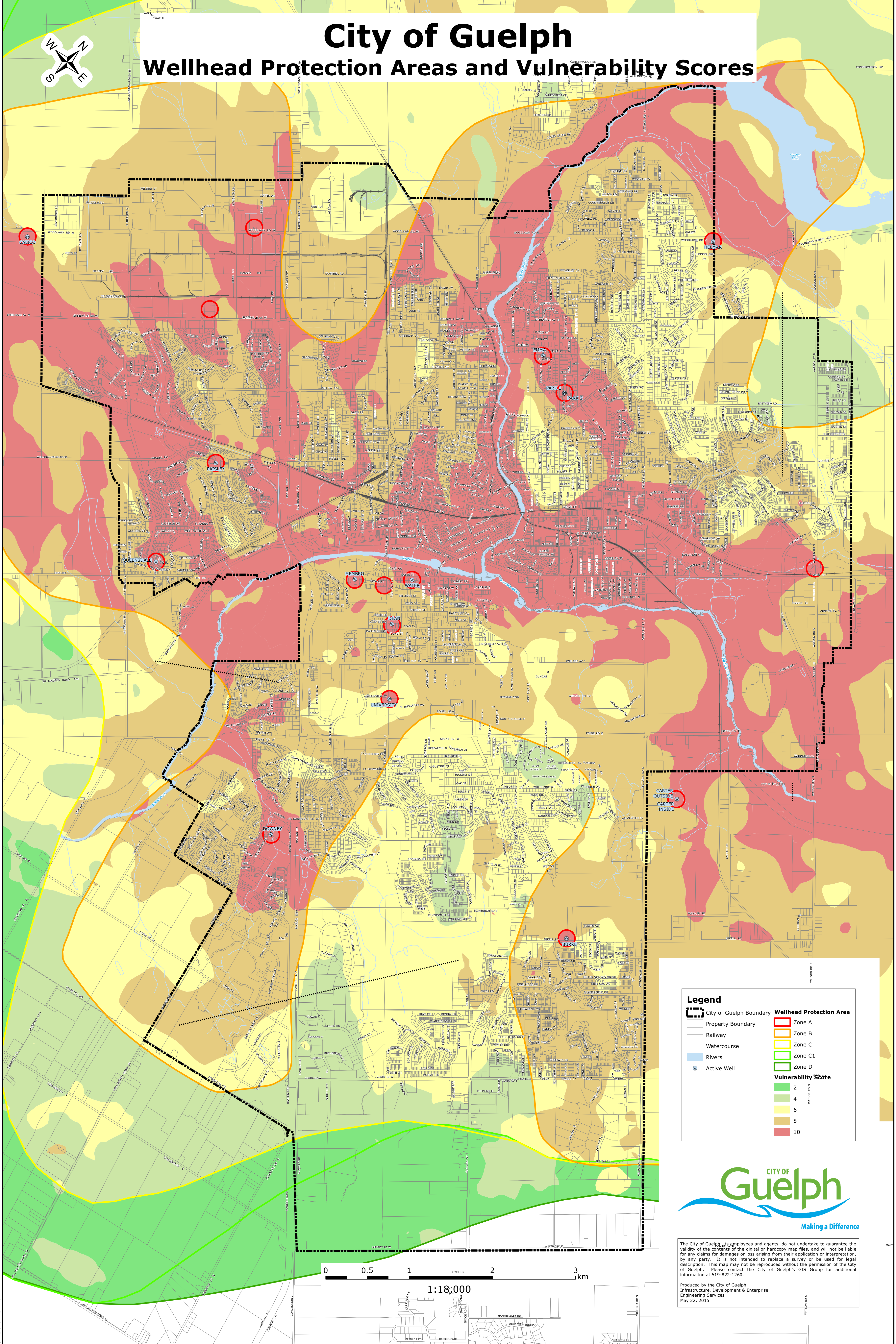
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City of Guelph

Wellhead Protection Areas and Vulnerability Scores



Legend

- City of Guelph Boundary
- Property Boundary
- Railway
- Watercourse
- Rivers
- Active Well

Wellhead Protection Area

- Zone A
- Zone B
- Zone C
- Zone C1
- Zone D

Vulnerability Score

- 2
- 4
- 6
- 8
- 10



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