

8. Source Water Protection

Waterloo Region is unique in Ontario in that it is the largest urban municipality to rely almost exclusively on groundwater supplies for its drinking-water. Approximately three quarters of all the region's drinking-water comes from the over one hundred municipal wells, many of which tap into rich aquifers sustained by the Waterloo Moraine. The remaining quarter of the region's drinking-water is drawn from the Grand River. Protecting these valuable water resources from contamination and from land uses that could hinder groundwater recharge is essential to maintaining human health, economic prosperity and a high quality of life in the region.

The *Province* has recently emphasized the importance of protecting the *municipal drinking-water supply system* by way of land use planning decisions, through changes to the Provincial Policy Statement. The importance of protecting the *municipal drinking-water supply system* is also underscored by the enactment of the Safe Drinking Water Act and the Clean Water Act. The Region's role in implementing Provincial policy, places an obligation on the Region to make land use planning decisions consistent with the Provincial Policy Statement's direction to protect the quality and quantity of drinking-water resources in the region, and to limit *development* and *site alteration* that could adversely affect drinking-water supplies drawn from both the Grand River and groundwater resources. Waterloo Region's continued long-term reliance on groundwater resources necessitates a high priority be placed on protecting this valuable resource through land use management.

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This Chapter contains policies for the protection and conservation of the Region's drinking-water resources. These policies form an important component of the Region's Water Resource Protection Strategy, and play a critical role in the Region's multi-barrier approach to providing safe drinking-water. By safeguarding drinking-water at the source, this Plan seeks to prevent unnecessary environmental, economic, social and health costs associated with the loss and/or clean up of drinking-water resources due to contamination or over use. This proactive approach will help ensure that the region's municipal drinking-water supply remains clean and plentiful to support current and future generations.

The policies in this Chapter will be carried out by managing land use activities within designated Source Water Protection Areas. These *vulnerable* areas are located throughout the region, including residential neighbourhoods, *employment areas*, rural settlements, agricultural areas, mineral aggregate resource areas and in areas where future urban development may occur. The Source Water Protection Areas designated in this Plan include: Wellhead Protection Sensitivity Areas; wells that obtain their water from Groundwater Under the Direct Influence of surface water (GUDI wells); Surface Water Intake Protection Zones; and Regional Recharge Areas.

In addition to managing land uses to prevent contamination from *hazardous chemicals and/or substances* and disease causing organisms, this Chapter contains policies to

help reduce the impact of de-icing salts on the *municipal drinking-water supply system*. The policies in this Chapter promote the balance between the use of de-icing salts and the need to mitigate impacts through best management practices. Significant reductions in the need for de-icing salt application to sidewalks, parking lots and roads can be achieved through sound management practices and innovative road and property designs.

Overall Goal – Protect, maintain and, wherever feasible, enhance surface water and groundwater resources to ensure that a *municipal drinking-water supply system* continues to provide a sufficient quantity and quality of drinking-water.

Objectives:

- 8.1 Protect existing and future sources of drinking-water from incompatible land uses.
- 8.2 Maintain and, wherever feasible, enhance the quantity and quality of water infiltration and recharge to groundwater aquifers.
- 8.3 Minimize the potential for contamination, including potential contamination from de-icing salts, on sources of municipal drinking-water.
- 8.4 Promote informed stewardship of Source Water Protection Areas in collaboration with the *Province*, Area Municipalities and Grand River Conservation Authority.

8.A Source Water Protection Areas

Source Water Protection Areas are identified in this Plan to protect the current and future *municipal drinking-water supply system*. These protection areas are significant in that they contribute water, or are in close proximity, to municipal drinking-water supply wells and surface water intakes that are *vulnerable* to contamination and or depletion from incompatible land uses. Source Water Protection Areas consist of: Wellhead Protection Sensitivity Areas; High Microbial Risk Management Zones; Surface Water Intake Protection Zones; and Regional Recharge Areas.

General Policies

- 8.A.1 Source Water Protection Areas are designated as shown on Maps 6a through 6g.
- 8.A.2 Area Municipalities will designate Source Water Protection Areas and establish associated policies within their official plans to ensure that *development applications* are in conformity with the policies in this Plan.

- 8.A.3 The Region, in consultation with the Province and other stakeholders, will prepare and update a Regional Implementation Guideline for Source Water Protection Studies to inform and implement the policies in this Plan in accordance with the provisions of Policies 10.B.9 through 10.B.14.
- 8.A.4 Where the policies in this Chapter require one or more studies to be submitted in support of a *development application*, such studies will be completed in accordance with the Regional Implementation Guideline for Source Water Protection Studies to the satisfaction of the Region. The studies requested will vary based on the location of the *development application* relative to the sensitivity of the Source Water Protection Area and its proximity to a municipal drinking-water supply well or surface water intake. Studies submitted by the owner/applicant will demonstrate that the proposed use will not negatively impact the quantity and/or quality of drinking-water resources in Source Water Protection Areas for the *development application* to receive approval.
- 8.A.5 *Development applications* within all Source Water Protection Area designations will comply with the following:
- (a) employment uses that would direct infiltration of stormwater run-off without pre-treatment through the use of drywells or artificial/enhanced recharge will not be permitted; and
 - (b) employment uses that would require new water taking for industrial/commercial purposes and/or for irrigation purposes, except for water taking associated with *mineral aggregate operations* will not be permitted.
- 8.A.6 New water taking will not be permitted for any new or expanding uses within the Urban Area and Township Urban Area designations.
- 8.A.7 New water taking in quantities greater than 50,000 litres per day may be permitted outside of the Urban Area, Township Urban Area and Source Water Protection Area designations through a site specific amendment to the applicable zoning by-law, provided that the application is substantiated by further study in accordance with Policy 8.A.4.

Source Water Protection Land Use Categories

The quantity and quality of drinking-water is affected by land uses found within Source Water Protection Areas. Not all land uses pose the same level of risk to drinking-water; therefore, this Plan identifies four categories of land uses based on their associated level of risk.

- 8.A.8 For the purposes of implementing the policies in this Chapter, land uses that may pose a risk to the quantity and/or quality of municipal drinking-water

supplies are divided into the following four categories according to the level of risk:

- (a) Category 'A' (Very High Risk Uses);
- (b) Category 'B' (High Risk Uses);
- (c) Category 'C' (Moderate Risk Uses); and
- (d) Category 'D' (represents *preferential pathways*, or other land uses that involve soil excavation and/or the creation of subsurface facilities, that contribute to the risk to municipal drinking-water supplies by increasing *vulnerability*).

8.A.9 Land uses typically associated with each of the land use categories identified in Policy 8.A.8 include, but are not limited to, the uses listed in Schedule 'B' to this Plan.

Time of Travel Capture Zones

This Plan makes reference to two and ten year *time of travel* capture zones surrounding each municipal drinking-water supply well. These capture zones reflect the length of time groundwater within the zone will take to reach the municipal drinking-water supply well. The size and shape of the capture zones is influenced by many factors including the well pumping rate, the topography of the land, the nature of the subsurface materials, and the rate and direction of groundwater flow.

Wellhead Protection Areas

This Plan designates Wellhead Protection Areas around each municipal drinking-water supply well. Wellhead Protection Areas are the total area of land which contributes water to a municipal drinking-water supply well. Within each Wellhead Protection Area, one or more Wellhead Protection Sensitivity Areas (WPSA) may be delineated. The purpose of these designations is to prevent land uses involving *hazardous chemicals and/or substances*, disease causing organisms and land uses that increase the *vulnerability* of groundwater from becoming water quantity and/or quality risks to municipal drinking-water supply wells.

8.A.10 Wellhead Protection Sensitivity Areas (WPSA) are classified from 1 to 8. This classification allows for varying degrees of management relative to the *vulnerability* of the underlying groundwater to contamination, the importance of the well to the capacity of the *municipal drinking-water supply systems*, as well as the length of time groundwater within the WPSA will take to reach the municipal drinking-water supply well. WPSAs are designated as shown on Maps 6a through 6e and are described below:

- (a) WPSA 1 - delineates areas within a 100 meter radius of each municipal drinking-water supply well. It represents the highest sensitivity area with respect to the potential movement of disease causing organisms and groundwater infiltration. This area requires the most restrictive management, including the consideration of land purchase or establishment of conservation easements, given its close proximity to the drinking-water supply wells;
- (b) WPSA 2 - delineates high sensitivity areas found within the two year *time of travel* to a municipal drinking-water supply well;
- (c) WPSA 3 - delineates high sensitivity areas found outside of the two year, but within the ten year *time of travel* to a municipal drinking-water supply well;
- (d) WPSA 4 - delineates medium sensitivity areas found within the two year *time of travel* to a municipal drinking-water supply well;
- (e) WPSA 5 - delineates medium sensitivity areas found outside of the two year, but within the ten year *time of travel* to a municipal drinking-water supply well;
- (f) WPSA 6 - delineates low sensitivity areas found within the two year *time of travel* to a municipal drinking-water supply well;
- (g) WPSA 7 - delineates low sensitivity areas found outside of the two year, but within the ten year *time of travel* to a municipal drinking-water supply well; and
- (h) WPSA 8 - delineates the area outside of the ten year *time of travel* to the limit of the total land area contributing water to a municipal drinking-water supply well.

8.A.11 Within the WPSA 1 designation:

- (a) Category 'A', 'B', 'C' and 'D' uses will not be permitted;
- (b) new individual wastewater treatment systems, private wells, pipelines sewers, stormwater management ponds (or other ponds) and the direct infiltration of stormwater run-off without pre-treatment will not be permitted; and
- (c) new impermeable surfaces of any kind will be restricted or minimized to the greatest extent feasible.

8.A.12 *Development applications* within the WPSA 2 designation will comply with the following:

- (a) Category 'A' uses, *geothermal wells*, *mineral aggregate operations* and *wayside pits and quarries* will not be permitted;
- (b) Category 'B' and 'C' uses and underground parking garages will not be permitted outside of the Built-Up Area as shown on Maps 3a to 3e;
- (c) Category 'B' and 'C' uses and underground parking garages already permitted by existing Area Municipal official plans may be permitted within the Built-Up Area subject to further study in accordance with Policy 8.A.4; and
- (d) individual wastewater treatment systems, private wells, pipelines, sewers, stormwater management ponds (or other ponds) and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

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8.A.13 *Development applications* within the WPSA 3 designation will comply with the following:

- (a) Category 'A' uses will not be permitted;
- (b) Category 'B' and 'C' uses will not be permitted outside of the Built-Up Area;
- (c) Category 'B' and 'C' uses already permitted by existing Area Municipal official plans may be permitted within the Built-Up Area subject to further study in accordance with Policy 8.A.4; and
- (d) Category 'D' uses, individual wastewater treatment systems, private wells, pipelines, sewers, stormwater management ponds (or other ponds), and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

8.A.14 *Development applications* within the WPSA 4 designation will comply with the following:

- (a) Category 'A' uses, *geothermal wells*, *mineral aggregate operations* and *wayside pits and quarries* will not be permitted;
- (b) Category 'B' and 'C' uses will not be permitted outside of the Built-Up Area;

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- (c) Category 'B' and 'C' uses already permitted by existing Area Municipal official plans may be permitted within the Built-Up Area subject to further study in accordance with Policy 8.A.4; and
 - (d) underground parking garages, individual wastewater treatment systems, private wells, pipelines, sewers, stormwater management ponds (or other ponds) and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.
- 8.A.15 *Development applications* within the WPSA 5 designation will comply with the following:
- (a) Category 'A' uses will not be permitted;
 - (b) Category 'B' and 'C' uses will not be permitted outside of the Built-Up Area;
 - (c) Category 'B' and 'C' uses already permitted by existing Area Municipal official plans may be permitted subject to further study within the Built-Up Area in accordance with Policy 8.A.4; and
 - (d) Category 'D' uses and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.
- 8.A.16 *Development applications* within the WPSA 6 designation will comply with the following:
- (a) Category 'A' uses, *geothermal wells*, *mineral aggregate operations* and *wayside pits and quarries* will not be permitted;
 - (b) Category 'B' and 'C' uses will not be permitted outside of the Built-Up Area;
 - (c) Category 'B' and 'C' uses may be permitted within the Built-Up Area subject to further study in accordance with Policy 8.A.4; and
 - (d) underground parking garages and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.
- 8.A.17 *Development applications* within the WPSA 7 designation will comply with the following:
- (a) Category 'A' uses will not be permitted;

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- (b) Category 'B' and 'C' uses will not be permitted outside of the Built-Up Area;
- (c) Category 'B' and 'C' uses already permitted by existing Area Municipal official plans may be permitted within the Built-Up Area subject to further study in accordance with Policy 8.A.4; and
- (d) Category 'D' uses and plans of subdivision or vacant land condominiums may be permitted subject to further study in accordance with Policy 8.A.4.

8.A.18 *Development applications* within the WPSA 8 designation will comply with the following:

- (a) Category 'A' uses will not be permitted; and
- (b) *geothermal wells, mineral aggregate operations and wayside pits and quarries* may be permitted subject to further study in accordance with Policy 8.A.4.

GUDI Wells and High Microbial Risk Management Zones

This Plan designates municipal drinking-water supply wells supplied by Groundwater Under the Direct Influence of Surface Water (GUDI) as shown on Maps 6a, 6b and 6c. These GUDI wells are classified separately under the Safe Drinking Water Act in that they require a higher level of protection and treatment than other municipal drinking-water supply wells. GUDI wells draw groundwater that is directly connected to, and dependant upon, surface water in locations where contaminants in the surface water may not be filtered adequately by the overlying soil or subsurface before entering the well. Areas of high microbial risk have been delineated immediately surrounding GUDI wells to minimize the risk of contamination to these drinking-water supply wells.

8.A.19 High Microbial Risk Management Zones surrounding each GUDI well are designated as shown on Map 6f. These zones identify areas where the underlying groundwater is the most vulnerable to disease causing organisms. In addition to the policies in this Chapter that apply to any Wellhead Protection Sensitivity Areas, *development applications* proposing individual wastewater treatment systems and/or private wells will not be permitted within High Microbial Risk Management Zones.

Surface Water Intake Protection Zones

A portion of the Region's drinking-water supply comes from surface water through a municipal intake located in the Grand River. Similar to Wellhead Protection Areas, Surface Water Intake Protection Zones represent geographic areas (land and water) that contribute water to the surface water intake of the Region's *municipal drinking-water supply system*. Surface Water Intake Protection Zones are delineated to protect

the quality and quantity of the surface water entering the intake, mainly by protecting the surface water upstream of the intake from hazardous spills.

- 8.A.20 Surface Water Intake Protection Zones 1 and 2 are designated as shown on Map 6g. Surface Water Intake Protection Zone 1 delineates an area of land within a 200 metre radius upstream of the municipal intake, while Surface Water Intake Protection Zone 2 delineates the area of land over which a hazardous spill could reach a municipal surface water intake within a two hour travel time.
- 8.A.21 Within Surface Water Intake Protection Zone 1, *development applications* proposing Category 'A', 'B', 'C' and 'D' uses, individual wastewater treatment systems, private wells, pipelines, sewers and stormwater management ponds (or other ponds) will not be permitted.
- 8.A.22 Within Surface Water Intake Protection Zone 2, *development applications* will comply with the following:
- (a) Category 'A' uses will not be permitted; and
 - (b) Category 'B', 'C' and 'D' uses and stormwater management ponds (or other ponds) may be permitted subject to further study in accordance with Policy 8.A.4.

Regional Recharge Areas (Source Water Protection)

Regional Recharge Areas play a crucial role in providing clean water to the Region's *municipal drinking-water supply system*. This designation identifies portions of the Waterloo Moraine where considerable deposits of sand and gravel found in the ground allow for the natural infiltration of large quantities of rainfall, snowmelt, and in some cases, seepage from creeks and streams into a series of deep and shallow aquifers. The deep aquifers are a significant source of the Region's existing and future municipal drinking-water supply, and the protection of these aquifers is vital to the region's health and economic prosperity.

- 8.A.23 Regional Recharge Areas are designated as shown on Maps 4 and 6g. This designation identifies areas that will be protected from land use practices, *hazardous chemicals and/or substances* that could negatively impact the quality and quantity of water within and available to the aquifers that contribute to the *Region's municipal drinking-water supply system*.

Within the Southwest Kitchener Policy Area designated on Maps 7 and 7a, the final extent of the Regional Recharge Area has yet to be determined. Studies completed to date have demonstrated that the portions of lands within the Southwest Kitchener Policy Area also contained within the study area boundary of the Blair Creek Functional Drainage Study are not Regional

Recharge Area and therefore will not be subject to the Regional Recharge Area designation. However, the exact boundary of the Regional Recharge Area designation within the Cedar Creek Subwatershed has yet to be finalized. The final extent of the Regional Recharge Area within the Cedar Creek Subwatershed will be determined through the next *municipal comprehensive review* process to be undertaken not later than 2019. The final location of the Regional Recharge Area as it applies to the Southwest Kitchener Policy Area will be implemented by future amendment to this Plan. The current Regional Recharge Area designation adjacent to the Southwest Kitchener Policy Area as shown on Map 7a will be considered as the minimum extent of the designation for the purposes of this future review process.

- 8.A.24 *Development applications* proposed within Regional Recharge Areas will be regulated in accordance with the policies in Section 6.B, and Policies 7.B.23, 7.B.24 and 7.B.25.

8.B De-icing Salts

The use of de-icing salts is an important component of Regional and Area Municipal efforts to keep transportation corridors open and safe during icy and snowy conditions. However, the impact of de-icing salts on the quality of municipal drinking-water supplies has become a concern. This Plan includes policies that encourage a more balanced approach to the use of de-icing salts through sound salt management practices and strategic urban design as methods to reduce the need for de-icing salt application to sidewalks, parking lots and roads.

- 8.B.1 Applications for a new plan of subdivision, or vacant land condominium, will only be approved where the owner/applicant has submitted a Salt Impact Assessment in accordance with the Regional Salt Impact Assessment Protocol Implementation Guideline to the satisfaction of the Region. This assessment is required to address the potential impacts of de-icing salts of the *development* on the Region's municipal drinking-water supply wells and to recommend ways to minimize such impacts.
- 8.B.2 Prior to the approval of any modifications to existing draft approved plans of subdivision, or vacant land condominiums, the Region may require the owner/applicant to submit a Salt Impact Assessment in accordance with Policy 8.B.1, where the scope of the modification would necessitate such an assessment.
- 8.B.3 The Region may require the owner/applicant to submit and implement Salt Management Plans in accordance with the Regional Salt Management Planning Implementation Guideline to the satisfaction of the Region for the following types of *development applications*:

- (a) plans of subdivision and zoning by-laws proposing new employment land uses and multiple unit residential *development*;
- (b) plans of condominium for new development;
- (c) plans of condominium in previously constructed buildings; or
- (d) consent to create a lot for a multi-unit residential or employment land use.

8.C Stewardship

- 8.C.1 The Region, in collaboration with the *Province*, Grand River Conservation Area, and Area Municipalities, will provide advice to land owners to promote good stewardship practices for lands and water within Source Water Protection Areas.
- 8.C.2 The Region will encourage the design of drainage systems and lot grading in new plans of subdivision to include consideration for cold weather stormwater flows and winter maintenance, and will promote and may require the strategic design of new road networks to reduce the need for road salt application.
- 8.C.3 The Region may consider the use of alternative protection measures within highly *vulnerable* Source Water Protection Areas, including but not limited to, the establishment of a Land Trust for acquiring, holding and managing Source Water Protection Areas, and/or entering into conservation easements, agreements, and development of stakeholder partnership programs to encourage changes in land use or land management practices.