DRINKING WATER
SOURCE PROTECTION
Our Actions Matter

Lake Erie Source Protection Region

Guelph-Guelph/Eramosa Water Quantity Policy Development Study

Discussion Paper

Drinking Water Threats:

An activity that takes water from an aquifer or surface water body without returning the water taken to the same aquifer or surface water body; and

An activity that reduces the recharge of an aquifer

June 21, 2018

Executive Summary

As part of the development of the Source Protection Plan, the Lake Erie Source Protection Region has prepared a discussion paper addressing policy development for the two drinking water quantity threats identified by the Ministry of the Environment and Climate Change (MOECC) in Regulation 287/07 under the Ontario Clean Water Act, 2006. This discussion paper provides a summary of the Guelph-Guelph/Eramosa Tier 3 Water Budget and Local Area Risk Assessment, a description of drinking water threats identified for groundwater and surface water sources in the Guelph-Guelph/Eramosa water quantity Wellhead Protection Area (WHPA-Q) and water quantity Intake Protection Zone (IPZ-Q), reviews existing legislation, policies and programs to be considered for policy development, outlines and reviews policy tool options available, and provides a discussion on future policy options that could be used to protect water quantity sources in the WHPA-Q and IPZ-Q, and outlines the next steps. Input from municipalities, stakeholders and experts was sought and considered during the review of policy tools.

Guelph-Guelph/Eramosa Tier Water Budget and Local Area Risk Assessment Summary

The Tier 2 Water Budget study completed for the Grand River watershed in 2009 identified the Upper Speed Assessment Area as having a moderate potential for groundwater stress. Since the municipal drinking water systems for the City of Guelph and Guelph/Eramosa Township take groundwater from the Upper Speed Assessment area, a Tier 3 Water Budget and Local Area Risk Assessment was triggered for these drinking water systems.

As part of the Tier 3 Assessment, complex surface water and groundwater computer models were developed to help evaluate the sustainability of the municipal water supplies in the City of Guelph (City) and Guelph/Eramosa Township (GET). The models were also used to complete a risk assessment to determine the sustainability of the system under a number of scenarios.

Results of the Tier 3 Assessment assigned a significant risk level to the City of Guelph's and GET's Hamilton Drive water quantity vulnerable areas (WHPA-Q and IPZ-Q) that triggering the need for a Risk Management Measures Evaluation Process (RMMEP) and water quantity policy development. GET's Rockwood WHPA-Q were assigned a low risk level and no additional work is required.

Description of the Drinking Water Threats

Prescribed Drinking Water Threat #19: an activity that takes water from an aquifer or surface water body without returning the water taken to the same aquifer or surface water body.

Threat 19 occurs when water is taken and not returned and is no longer available for other users of the same water source. This is called consumptive use. The taking of water from an aquifer or surface water body used as a municipal drinking water source (without returning it to the same source) could result in a depletion of available supply that could impair the long-term sustainability of a drinking water system. Unlike water quality threats, where the threat level is a product of the vulnerability score and the hazard score (of the activity), water quantity threats are a function of exposure and tolerance. Consumptive use is or would be a significant drinking water threat in WHPA-Qs and IPZ-Qs that are assigned a significant risk level.

Prescribed Drinking Water Threat #20: an activity that reduces the recharge of an aquifer.

Threat 20 occurs when an activity reduces recharge of the water table. Examples of activities that could reduce the infiltration of water into the ground include paving of parking lots, construction of buildings and the pumping of water out of the ground (i.e., sump pumps) where the water is diverted to a discharge location (i.e., storm sewer or surface water) rather than allowing the water to recharge the water table. A reduction in recharge could result in a reduction of available supply that may impair the long-term sustainability of a drinking water system. Recharge reduction is or would be a significant drinking water threat in WHPA-Qs and IPZ-Qs that are assigned a significant risk level.

A review of the significant drinking water threats identified in the Guelph-Guelph/Eramosa Tier 3 Water Budget and Local Area Risk Assessment indicates that a number of drinking water threat activities related to consumptive use and recharge reduction are located/present in water quantity vulnerable areas in the City of Guelph, Guelph/Eramosa Township (County of Wellington), Township of Puslinch (County of Wellington) and the Town of Erin (County of Wellington) within the Grand River Source Protection Area.

Existing Legislation, Policies and Other Programs

Existing legislation, policies and other programs, used for current management associated with consumptive use and recharge reduction, are summarized in **Section 4** and **Appendix B** of the discussion paper and include:

- Federal legislation

- Provincial legislation
- Municipal policies, strategies, plans and programs
- Other programs

Examples:

The *Ontario Water Resources Act, 1990* protects the sustainability of the Province of Ontario's water resources. The Act, among other things, requires those taking greater than 50,000 litres per day to obtain a Permit to Take Water (PTTW). There are exceptions for residential use, livestock watering, frost protection and firefighting (less than 379,000 litres per day). No permit can be issued for more than ten years. The purpose of the PTTW program is to ensure the conservation, protection and wise use and management of provincial waters.

The City of Guelph has a Water Efficiency Strategy that was updated in 2016. The Strategy includes a number of plans, initiatives and other programs that work together to reduce water demand on a daily basis to ensure more water is available for future use and the source water remains sustainable.

Wellington County's Official Plan pertains to Water Resources and includes policies on watershed planning, surface and groundwater protection, source water protection and specific policies on the protection of the Paris and Galt Moraine.

The Township of Puslinch initiated a municipal servicing feasibility study in 2017 for municipal servicing (water and wastewater) within the Guelph-Guelph/Eramosa Tier 3 study area. Guelph/Eramosa Township has established and employed water conservation measures, including water use restrictions and a toilet rebate program for Rockwood residents.

Policy Toolbox and Options

The objective of the Source Protection Plan is to protect existing and future drinking water sources. Within the Grand River Source Protection Area, the plan must ensure that for every area identified in the assessment report as an area where an activity is or would be a significant threat, the activity never becomes a significant threat, or the activity ceases to be a significant drinking water threat. Policy tools are provided by the Province through the CWA to achieve these objectives, and they include:

- Part IV Prohibition
- Part IV Regulation (Risk Management Plan)
- Part IV Restricted Land Uses
- Prescribed Instruments
- Land Use Planning

- Other: Stewardship, Pilot Programs, and Research
- Other: Specify Action

The policy options presented in the table below could be used to address significant drinking water quantity threats with respect to consumptive use and recharge reduction activities, respectively.

Table 1: Policy options for consumptive use and recharge reduction activities

Policy Tool	Intent
Part IV Tool: Prohibition	• Prohibit recharge reduction or consumptive water taking in an area where prohibition us justified due to the excessive risk to drinking water supplies
Part IV Tool: Regulation (Risk Management Plans)	• Require that a Risk Management Plan be developed to ensure that consumptive takings are managed and pre-development recharge is maintained
Part IV Tool: Restricted Land Uses	• The policy would be used in conjunction with either Part IV: Prohibition or Part IV: Risk Management Plans to act as a screening tool for development applications (planning or building) that may trigger a Part IV policy
Prescribed Instruments	• The policy would direct the Province to review and/or include conditions in a Permit To Take Water or Environmental Compliance Approval to ensure that the municipal drinking water supply is sustainable.
Land Use Planning	• The policy would manage new development by restricting specific uses through official plans and zoning by-laws which result in excessive risk to the aquifer due to consumptive use or recharge reduction, or including specific criteria as part of development approvals to minimize the impact of consumptive use or maintain or improve recharge of the aquifer
Education, Outreach/Incentive Programs	• The policy would continue and/or expand water conservation or water recharge education initiatives and develop new water quantity outreach materials to be shared across the region for both residents and businesses
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• The policy would continue and/or expand risk reduction projects (e.g., water conservation, protection of recharge areas) implemented through stewardship programs; • Promote Best Management Practices, e.g., water conservation, downspout disconnect encouraged through Land Use Planning approvals, use of best

	management practices for municipal infrastructure and facilities; Promote pilot programs to assist in implementing water conservation programs for private business; • Allow for the consideration of alternative water supplies (i.e., water reuse) to assist in creating a resilient water supply system; and • Develop municipal water saving programs
Other: Specify Actions	• The policy would establish specific action(s) to help manage consumptive use and recharge reduction activities, such as: ○ MOECC to use Tier 3 model for PTTW decisions ○ Municipality encouraged to locate additional water supplies ○ When implementing the new growth targets as set out within the Provincial Places to Grow Plan, municipal growth forecasts to consider incorporating Tier 3 information ○ Update or develop municipal water conservations plans and water management plans to support sustainable use ○ Update or develop water management plans to maximize aquifer recharge ○ Require maintenance of storm water management infrastructure

Policy Tool Review

The Project Team, with input from the Implementing Municipalities Group (IMG) and Community Liaison Group (CLG) reviewed potential strengths, opportunities, weaknesses and challenges of policy tools available to the Lake Erie Region Source Protection Committee (SPC) to address existing and future water quantity threats in the Guelph-Guelph/Eramosa WHPA-Q and IPZ-Q. **Table 2** provides a high-level summary of that review.

Table 2: Policy tool review summary for consumptive use and recharge reduction activities

Policy Tool	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Part IV Tool: Prohibition	• Can be very effective by completely removing and preventing the threat • Potential to delineate smaller zones in a	• Impact to the property owner could be high • Difficult to justify if used broadly across a vulnerable area

	vulnerable area where prohibition could be justified	
Part IV Tool: Regulation (Risk Management Plans)	• Can be property/activity specific making it flexible • Consumptive use - could be applied to takings where PTTW does not apply • Recharge reduction – ability to include monitoring program and measure implementation success	• Potentially high level of resources required to administer and enforce • Consumptive use - Implementation and legal challenges (e.g. appeal to ERT) if application of RMP is not applied consistently and/or locally justified.
Part IV Tool: Restricted Land Uses	• Can manage an activity without restricting an entire land use and able to provide exemptions • Can link tool to Planning Act process and integrate into municipal development review process	• Only applies to existing land use when activity is changing or expanding • Consumptive use - activity may not always be flagged through a development application • Recharge reduction – land uses named in the policy must match the names that appear in local official plans or zoning bylaws
Prescribed Instruments (PTTW)	• Science-based, pre-cautionary, transparent and peer-reviewed • Existing, relatively well understood regulatory framework • Broad powers to collect new data through monitoring conditions and require studies • Consumptive use - adaptive management: ability to require review of existing PIs within a certain timeframe; and maximum 10-year PTTW period	• Financial implications for property owners from new requirements • Consumptive use - need for improved monitoring • Consumptive use - all permits are treated the same regardless of how the water is used • Consumptive use - may not be seen as equitable as single tool as not all consumptive water takings are captured
Land Use Planning	• Can be tailored to specific areas with specific restrictions • Consumptive use - water taking can be considered a land use and can be regulated through land use	• Addresses future threats only • Appeals to the Local Planning Appeal Tribunal (LPAT) could result in this body that is not familiar with water issues making uninformed rulings that cannot be overturned

	planning • Recharge reduction - land use plans could be updated using update recharge information on a regular basis	• Consumptive use - land use planning tools untested as a means to address water takings • Recharge reduction – unclear where land use would apply to recharge
Education, Outreach/Incentive Programs	• Increases landowner awareness and community engagement • Recharge reduction – can encourage effective Best Management Practices	• Public understanding of water quantity is poor • Time and cost to implement program could be high • Recharge reduction – increased recharge in all areas may not be appropriate and justified
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• Reduction in financial burden for the applicant • Fills data gaps • Consumptive use - can motivate changes in behaviour with little cost to municipality compared to cost of producing water and maintaining or expanding infrastructure	• May not be sufficient to address threats on its own • Continuous funding required • Effectiveness relies on property owner participation • Difficult to ensure compliance
Other: Specify Actions	• Tool is flexible • Can require specific action and provides options for local situations • Consumptive use - could increase engagement from non-municipal water takers	• Implementation cost could be high and coordination could be challenging if multiple parties involved

Promising Policy Tools

Through the review of possible policy tools and approaches to address consumptive water taking and recharge reduction activities, certain policy tools have been identified as promising, meriting further discussion to achieve the objectives of the Source Protection Plan.

The promising policy tools described below are not an exhaustive list and do not limit the Project Team from selecting other tools to develop policies throughout the remainder of the policy development process.

Threat 19: Consumptive Water Use

Addressing consumptive water takings that are identified as a significant drinking water threat could be achieved through the use of Prescribed Instruments, specifically the PTTW program. Where a PTTW already exists, policies may be developed to direct the Province to review, and amend or revoke existing permits using the Tier 3 model results or the model itself, and require that additional terms and conditions are added to ensure that the municipality's existing and future water supply is sustainable. New or increased takings subject to the PTTW process could also include similar terms and conditions.

Where consumptive water takings may not be able to be adequately addressed by Prescribed Instruments (e.g., takings within the WHPA-Q that are exempt from the PTTW process), the Part IV tools (i.e., Prohibition, Risk Management Plans, together with Restricted Use) may be an option to meet the source protection plan objectives.

A prohibition tool would only be considered after all other feasible management options have been assessed as being insufficient in protecting the municipalities' drinking water supply.

Municipal land use planning policies could be considered a tool to address consumptive water use activities. However, land use planning tools are untested as a means to address water takings. Consumptive water use and availability could be considered by the Province when allocating growth through provincial planning tools such as the Growth Plan.

Additional policies addressing water consumption could also be addressed through policy within Official Plans, e.g., specific restrictions in certain areas of the municipality or by the type of development and/or water taking. The need for additional restrictiveness of the land use policies may vary depending on existing municipal land use policies and the geographic setting of the vulnerable areas.

Policies could also be written for municipalities to incorporate the long-term sustainability of the municipal water supply into their decisions about water services when approving growth and development. This could be achieved by requiring an approved PTTW where the MOECC has determined that the proposed taking does not become a significant drinking water quantity threat.

The specify action tool could also be valuable in addressing existing and future consumptive use activities through the development of locally-specific policies. For example, policies could focus on:

- ensuring that municipal water management plans and/or water conservation plans are developed or updated;

- developing joint water resource management systems to provide collaboration and cooperation between the province, Source Protection Authority and municipalities to manage local water resources to protect drinking water sources;
- that Tier 3 information is used in making informed decisions and that Tier 3 models are provincially funded and maintained on an ongoing basis; and
- ensuring that existing and future municipal water demands are met before allocating water to other users in the WHPA-Q and IPZ-Q. This would mean shifting to a "priority of use" concept instead of the current "first in time, first in right" approach.

Threat 20: Recharge Reduction

Perhaps the most effective tools to address recharge reduction threats are municipal land use planning policies and implementation of best management practices as part of updated municipal practices and development approval requirements. Policies could be developed to require the local planning authority to manage new developments by including criteria for approval that ensure the proposed activity does not become a significant drinking water threat. The restrictiveness of the policies may vary depending on existing municipal land use policies and the geographic setting of the vulnerable area.

Recharge reduction activities could also be addressed through Prescribed Instrument policies, specifically Environmental Compliance Approvals (ECA) such as sewage works projects being used for low-impact development, stormwater ponds, etc.

Softer tools such as education and outreach and incentive programs can be used to promote source protection policies in general and focus on promoting BMPs, as well as low impact development (LID) in specific areas where feasible. Outreach programs could target specific sectors in the vulnerable area.

Next Steps

Lake Erie Source Protection Region is committed to a collaborative process working with municipalities and stakeholders during policy development. After completion of the discussion paper and release by the Lake Erie Region Source Protection Committee, policy approaches will be drafted by the Guelph-Guelph/Eramosa Water Quantity Policy Development Study Project Team with feedback and support from the Implementing Municipalities Group (IMG) and Community Liaison Group (CLG). Municipalities will be able to identify policy options that best suit their needs based on specific circumstances and resources available. The drafting of water quantity policies is expected to occur in the fall 2018.

Draft policy options will then be developed by the Project Team with support from the IMG and CLG and presented to the SPC. The SPC has the decision making authority regarding the policies to be included in the Source Protection Plan, and with direction from the SPC, Lake Erie Region staff will incorporate the water quantity policies into an updated Grand River Source Protection Plan.

Formal public consultation is a mandatory component prior to the updated plan being submitted to the MOECC for review and approval and is expected to occur in the spring 2019. Municipalities affected by the plan updates will be asked to endorse the plan amendments prior to formal public consultation.

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Appendices

1. Introduction

The Source Protection Program under the Province's *Clean Water Act, 2006* (CWA) was developed to protect the water quality and quantity of existing and proposed municipal drinking water systems across the Province. To date, the water quality components of the Grand River Source Protection Plan have been approved and in place since July 1, 2016. The water quantity components for the Grand River Source Protection Plan are still underway, and water budget studies are a major piece of technical work in the process.

The Tier 2 Water Budget study completed for the Grand River Watershed in 2009 identified the Upper Speed Assessment Area as having a moderate potential for groundwater stress. Since the municipal drinking water systems for the City of Guelph and Guelph/Eramosa Township take groundwater from the Upper Speed Assessment area, a Tier 3 Water Budget and Local Area Risk Assessment was triggered. Results of the Tier 3 Assessment assigned a significant risk level to the City of Guelph's and Guelph/Eramosa Township's Hamilton Drive water quantity vulnerable areas triggering the need for a Risk Management Measures Evaluation Process (RMMEP) and water quantity policy development.

The Lake Erie Source Protection Region has prepared a discussion paper as part of the update of the Grand River Source Protection Plan to address water quantity policy development in the City of Guelph and Guelph/Eramosa Township water quantity vulnerable area. Consumptive water takings and reduction in recharge are the two drinking water quantity threats identified by the Ministry of the Environment and Climate Change (MOECC) in Regulation 287/07 under the *Ontario Clean Water Act (CWA), 2006*.

The aim of this discussion paper is to aid policy makers by providing background information on drinking water quantity threats and an assessment of the policy tools and approaches that are available. This discussion paper provides a summary of the Guelph-Guelph/Eramosa Tier 3 Water Budget and Local Area Risk Assessment and results, a description of drinking water threats identified for groundwater and surface water sources in the Guelph-Guelph/Eramosa water quantity Wellhead Protection Area (WHPA-Q) and water quantity Intake Protection Zone (IPZ-Q), reviews existing legislation, policies and programs to be considered for policy development, outlines and evaluates policy tool options available, and provides a discussion on future policy options that could be used to protect water quantity sources in the WHPA-Q and IPZ-Q, and outlines the next steps. Input from municipalities, stakeholders and experts was sought and considered during the review of policy tools.

This discussion paper will form a basis for developing the water quantity policies, and the Lake Erie Region Source Protection Committee, working with municipal partners, stakeholders, and with significant public consultation, will prepare an update to the Grand River Source Protection Plan that will include water quantity technical work and water quantity policies.

2. Guelph-Guelph/Eramosa Tier 3 Water Budget and Local Area Risk Assessment Summary

Tier 3 Water Budget

A Tier 3 Water Budget is a detailed scientific technical study aimed at assessing the water quantity risk to current and future municipal drinking water sources under a variety of scenarios, such as future increased municipal water needs due to growth and a sustained drought. The water budget study uses a computer model to simulate groundwater and surface water flow to evaluate how water levels will change within the municipal wells under the various scenarios. The development of the water budget models will use all available data to understand the groundwater flow system from recharge to discharge areas, and quantify the volume of water flowing through the area. Quantity-related Wellhead Protection Areas and Intake Protection Zones are delineated to identify the subsurface and surface areas where the municipal wells and intakes are sensitive to water takings and reductions to infiltrations of precipitation caused by land use changes.

The Guelph-Guelph/Eramosa Tier 3 Assessment was completed following the Province's Technical Rules, which were applied across southern Ontario. The model findings were verified by observed water monitoring results. Flexibility in the Rules allowed the team of experts to achieve a better match between the model and observed water monitoring results. A review team of local technical experts and academics appointed by the Province have accepted the results before it was presented to the Lake Erie Region Source Protection Committee (SPC) on April 6, 2017. The Ontario Ministry of the Environment and Climate Change (MOECC) has also endorsed the results of the Tier 3 Assessment.

As part of the Tier 3 Assessment, complex surface water and groundwater computer models were developed to help evaluate the sustainability of the municipal water supplies in the City of Guelph (City) and Guelph/Eramosa Township. The models incorporated the best available information about local geology, groundwater and surface water resources, precipitation and infiltration and water withdrawals. The models developed a water budget for municipal water supplies that quantified the additions (e.g., precipitation infiltrating into the ground, runoff to streams and rivers, flow within and between the aquifers) and withdrawals (e.g., surface water and groundwater

flowing out of the study area, water taking by municipalities and other takers and groundwater contributions to rivers). The groundwater and surface water systems are in balance when the water additions and withdrawals are approximately equal.

Risk Assessment

In addition to the water budget calculations, the models were also used to determine an area where the municipal drinking water systems could be affected by other existing, new or expanded water takings, referred to as a water quantity wellhead protection area (WHPA-Q). The WHPA-Q for the City's wells is a circular area with a diameter of approximately 20 km around the City and extending into the adjacent Townships (**Appendix A, Figure 1**). Similarly, the WHPA-Q for the Guelph/Eramosa Township wells for the Rockwood area are circular in shape around the wells but much smaller in size due to lower pumping rates. The surface water Intake Protection Zone for water quantity (IPZ-Q) is the upstream catchment area that contributes water to the City's surface water intake on the Eramosa River (**Appendix A, Figure 2**).

The final task of the Tier 3 Assessment was to assign a risk level to the groundwater and surface water quantity vulnerable areas. According to the Rules, the risk level may be "low", "moderate" or "significant" depending on whether the municipal water supply is predicted to be able to meet the water needs of its customers under the modelled risk scenarios. The Rules guiding the Tier 3 Assessment followed a conservative approach to ensure the cumulative effects of water takings across the vulnerable area are included in the assessment. As a result, the highest risk level triggered in at least one well is assigned to the entire vulnerable area. For example, if the scenario for current and future municipal needs produced a "low" risk, but the added stress of a prolonged drought produced a "significant" risk level, the vulnerable area would be assigned a "significant" risk level. If this significant risk level was found for one well, the significant risk level was also assigned to the entire water quantity vulnerable area.

Risk Assessment Results

The Tier 3 Assessment scenarios predicted that the City's and Guelph/Eramosa Township's municipal wells can meet current needs. However, the assessment predicted that the City's Queensdale municipal well would be unable to meet future needs under normal climate conditions and during prolonged drought. All of the City's other wells and Guelph/Eramosa Township's wells are expected to be able to meet future needs under all scenarios, but there is a high level of uncertainty with the results for the City's Arkell Well 1. As a result of these assessments, and since the City's drinking water system is dependent on the contribution of water from the Eramosa River intake, the City's WHPA-Q and IPZ-Q are assigned a significant risk level.

The findings of the Tier 3 Assessment are supported by the historical operating experience in the City where many of the wells reliably provided water over prolonged periods of time. The City primarily draws water from the deep bedrock aquifer which is protected in most areas by a protective layer. The protective layer isolates the deep bedrock aquifer from short-term changes in climate (e.g., a dry summer with little rainfall) and it takes a prolonged drought, as Ontario experienced in the early 1960s, for declines in water levels to be observed in City's wells. While all the City municipal wells, except the Queensdale Well, are expected to meet the City's future needs, water levels at some of the City's other wells (Arkell Well 1, Arkell Well 8, Arkell Well 14, Arkell Well 15, Burke Well, Carter Well and Emma Well) and Guelph Eramosa Township's Bernardi Well 3 have water levels in the wells that are close to the pump intake and may be more susceptible to drought conditions. With the addition of new Arkell Spring Ground wells, the City's water supplies have the capacity to meet the 2031 estimated water needs; however, there is little redundancy in the water supply system.

Since the Tier 3 Assessment identified areas where the municipal systems may be affected by water takings (WHPA-Q or IPZ-Q), all water takings that could potentially impact the municipal systems were identified. For water quantity vulnerable areas with a significant risk level, all existing and new water takings located within the area that draw water from the municipal aquifers or Eramosa River or activities that reduce groundwater recharge are classified as Significant Drinking Water Quantity Threats (significant threats). The City and Guelph/Eramosa Township municipal wells are significant threats as are other permitted water takings in the WHPA-Q and the IPZ-Q. The significant threats for the WHPA-Q and IPZ-Q are shown in **Appendix A, Figures 3 and 4**, respectively.

3. Description of the Drinking Water Quantity Threats

Definitions

Prescribed Drinking Water Threat #19

Prescribed drinking water threat Number 19 listed in Regulation 287/07 under the *Clean Water Act, 2006* (CWA) is, "an activity that takes water from an aquifer or surface water body without returning the water taken to the same aquifer or surface water body". For this drinking water threat, an aquifer is defined as an underground saturated permeable geological layer that is capable of holding water in sufficient quantities to serve as a source of groundwater supply.

Threat 19 occurs when water is taken and not returned and is no longer available for other users of the same water source. This is called consumptive use. The taking of water from an aquifer or surface water body used as a municipal drinking water source

(without returning it to the same source) could result in a depletion of available supply that could impair the long-term sustainability of a drinking water system.

Unlike water quality threats, where the threat level is a product of the vulnerability score and the hazard score (of the activity), water quantity threats are a function of exposure and tolerance. Consumptive water taking is or would be a significant drinking water threat in WHPA-Qs and IPZ-Qs that are assigned a significant risk level.

Prescribed Drinking Water Threat #20

Prescribed drinking water threat Number 20 listed in Regulation 287/07 under the CWA is, “an activity that reduces the recharge of an aquifer."

Threat 20 occurs when an activity reduces recharge of the water table. Examples of activities that could reduce the infiltration of water into the ground include paving of parking lots, construction of buildings and the pumping of water out of the ground (i.e., sump pumps) where the water is diverted to a discharge location (i.e., storm sewer or surface water) rather than allowing the water to recharge the water table. A reduction in recharge could result in a reduction of available supply that may impair the long-term sustainability of a drinking water system.

Recharge reduction is or would be a significant drinking water threat in WHPA-Qs and IPZ-Qs that are assigned a significant risk level.

Identifying Consumptive Use and Recharge Reduction as Significant Drinking Water Threats

Below is a modification of Table 5 from the Updated CWA Technical Rules which describes the circumstances surrounding how and where consumptive use (**Table 1**) and recharge reduction (**Table 2**) activities are considered Significant Drinking Water Threats.

Table 1: Circumstances in which consumptive use is considered a Significant Drinking Water Threat

Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
An activity that takes water from an	1	1. An existing taking, an increase to an existing taking or a new taking.	IPZ-Q where the water is or would be taken if the area

Table 1: Circumstances in which consumptive use is considered a Significant Drinking Water Threat			
Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.		2. The water is or would be taken from within an IPZ-Q.	relates to one or more surface water intakes and the local area was assessed to have a risk level of significant in accordance with Part IX.
	2	1. An existing taking, an increase to an existing taking or a new taking.	WHPA-Q1 where the water is or would be taken if the area relates to one or more wells and the local area was assessed to have a risk level of significant in accordance with Part IX.
		2. The water is or would be taken from within a WHPA-Q1	
	3	1. An existing taking, an increase to an existing taking or a new taking.	IPZ-Q where the water is or would be taken if the area relates to one or more surface water intakes and the local area was assessed to have a risk level of moderate in accordance with Part IX.
		2. Section 34 of the *Ontario Water Resources Act* requires a permit to take water in respect of the increase or new taking.	
		3. The water is or would be taken from within an IPZ-Q.	
		4. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the increase to the existing taking or the new taking	

Table 1: Circumstances in which consumptive use is considered a Significant Drinking Water Threat			
Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
		were factored into the risk level assessment.	
	4	1. An increase to an existing taking or a new taking.	WHPA-Q1 where the water is or would be taken if the area relates to one or more wells and the local area was assessed to have a risk level of moderate in accordance with Part IX.
		2. The water is or would be taken from within a WHPA-Q1.	
		3. Section 34 of the *Ontario Water Resources Act* requires a permit to take water in respect of the increase or new taking.	
		4. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the increase to the existing taking or the new taking were factored into the risk level assessment.	
Reference: Ministry of the Environment and Climate Change, Technical Rules under the Clean Water Act, 2017.			

Table 2: Circumstances in which recharge reduction is considered a Significant Drinking Water Threat			
Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
An activity that reduced	5	1. An existing activity, a modified activity or a new activity.	IPZ-Q where the water is or would

Table 2: Circumstances in which recharge reduction is considered a Significant Drinking Water Threat

Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
recharge to an aquifer.		2. The activity is or would be wholly or partly located within an IPZ-Q.	be taken if the area relates to one or more surface water intakes and the local area was assessed to have a risk level of significant in accordance with Part IX.
	6	1. An existing activity, a modified activity or a new activity.	WHPA-Q2 where the water is or would be taken if the area relates to one or more wells and the local area was assessed to have a risk level of significant in accordance with Part IX.
		2. The activity is or would be wholly or partly located within a WHPA-Q2.	
	7	1. A modified activity or a new activity.	IPZ-Q where the water is or would be taken if the area relates to one or more surface water intakes and the local area was assessed to have a risk level of moderate in accordance with Part IX.
		2. The activity is or would be wholly or partly located within an IPZ-Q.	
		3. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the modified activity were factored into the risk level assessment.	
	8	1. A modified activity or a new	WHPA-Q2 where

Table 2: Circumstances in which recharge reduction is considered a Significant Drinking Water Threat

Column 1	Reference #	Circumstances	Column 3
Activity (Drinking Water Threat)	Column 2		Areas where Activity is a Significant Drinking Water Threat
		activity.	the water is or would be taken if the area relates to one or more wells and the local area was assessed to have a risk level of moderate in accordance with Part IX.
		2. The activity is or would be wholly or partly located within a WHPA-Q2.	
		3. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the modified activity were factored into the risk level assessment.	
Reference: Ministry of the Environment and Climate Change, Technical Rules under the Clean Water Act, 2017.			

Drinking Water Quantity Threats Identified in Guelph-Guelph/Eramosa

A review of the significant drinking water threats identified in the Guelph-Guelph/ Eramosa Tier 3 Water Budget and Local Area Risk Assessment indicates that a number of drinking water threat activities related to consumptive use (i.e., Permit to Take Water activities) (**Table 3**) and recharge reduction (**Table 4**) are located/present in water quantity vulnerable areas in the City of Guelph, Guelph/ Eramosa Township (County of Wellington), Township of Puslinch (County of Wellington) and the Town of Erin (County of Wellington) within the Grand River Source Protection Area. Significant threat activities related to consumptive use include municipal, non-municipal permitted and non-municipal non-permitted takings. Non-municipal non-permitted takings may include numerous domestic wells in WHPA-Q. The Tier 3 study, while it considers all water takings, is primarily focused on larger permitted takings. The locations of identified water quantity threats (PTTW) in the Guelph-Guelph/ Eramosa WHPA-Q and IPZ-Q are presented in **Appendix A**.

Table 3: Summary of significant drinking water threats (PTTW) identified in the Guelph-Guelph/ Eramosa Tier 3 WHPA-Q and IPZ-Q related to an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body

Municipality	Number of Significant Threats*	
	WHPA-Q	IPZ-Q
City of Guelph	47	-
County of Wellington – Puslinch	41**	7***
County of Wellington – Guelph/Eramosa	12	6****
County of Wellington - Erin	-	10

* Does not include threats that are non-municipal non-permitted water takings, e.g., domestic wells of which there are an estimated 5,100 (Guelph-Guelph/Eramosa Threats Management Strategy, May 2018)

- ** This includes the City of Guelph's Eramosa River Intake
- *** This includes the 6 Arkell wells
- **** This includes the 3 Rockwood wells

Table 4: Presence of significant drinking water threats identified in the Guelph-Guelph/Eramosa Tier 3 WHPA-Q and IPZ-Q related to an activity that reduces the recharge of an aquifer

Municipality	Recharge Reduction Threats Present
City of Guelph	Yes
County of Wellington - Puslinch	Yes
County of Wellington – Guelph/Eramosa	Yes
County of Wellington - Erin	Yes

4. Existing Legislation, Policies and Other Programs

A brief summary of the existing legislation, policies, and other programs with respect to consumptive use and recharge reduction as drinking water threats are presented in **Appendix B.**

5. Policy Toolbox

The objective of the Source Protection Plan is to protect existing and future drinking water sources. Within the Grand River Source Protection Area, the plan must ensure that for every area identified in the assessment report as an area where an activity is or

would be a significant threat, the activity never becomes a significant threat, or the activity ceases to be a significant drinking water threat. Policy tools are provided by the MOECC through the CWA to achieve these objectives. A general summary of these policy tools is provided in **Table 5**.

Table 5: Summary of Policy Tools (Government of Ontario, 2006)

Policy Tool	General Example
Part IV Tool: Prohibition	Prohibit the activity using Section 57 of the *Clean Water Act, 2006*. This tool is considered the strongest tool available in the "policy toolbox" for reducing risk associated with significant drinking water threats. When source protection committees consider it as a tool to address activities that already exist on the landscape, they only do so after considering all other feasible options.
Part IV Tool: Regulation (Risk Management Plans)	Regulation of the activity using a Risk Management Plan under Section 58 of the *Clean Water Act, 2006* (i.e., the activity can only occur if an approved plan is in place to manage the risk to the raw water supply from that activity). Risk Management Plans are site specific, locally negotiated plans developed between the municipal official and the person engaged in the threat activity after the Source Protection Plan has been approved.
Part IV Tool: Restricted Land Uses	Using Section 59 under the *Clean Water Act, 2006*, some development applications under the *Planning Act* or the *Building Code Act* related to activities that would be a significant drinking water threat would be subject to certain conditions. It acts as a "pause"/ screening tool/ early warning system by providing municipalities with an administrative procedure to avoid inadvertently approving applications/ building permits for activities that would conflict with Part IV policies. This tool must be used in conjunction with either Part IV: Prohibition or Part IV: Risk Management Plans.
Prescribed Instruments	A tool issued by provincial ministries using government regulations to manage an activity, e.g., Permit To Take Water (PTTW).
Land Use Planning	Policies that affect land use planning decisions under the *Planning Act* and *Condominium Act*. In some cases it may be appropriate to manage or restrict the threat through local land use planning policies, documents and processes (Official Plans, zoning by-laws and site plan controls).
Education, Outreach/Incentive Programs	Used to inform and/ or elicit positive responses from residents and businesses. Education and outreach can be used to inform the identified residents/ owners of the significant threat activity

	associated with their property. Incentives are used to encourage an action by means of support, usually financial.
Other: Stewardship programs, Best Management Practices, Pilot Programs and Research	Stewardship programs partner the landowner and the regulating authority which usually provides financial assistance to mitigate risks. Best Management Practices are methods or techniques found to be the most effective and practical means of achieving an objective while making the optimum use of the resources available. Pilot Programs are implemented to determine best practices. Research is the process of gathering information for the purpose of initiating, modifying or terminating a particular project.
Other: Specify Actions	Specify the actions to be taken to implement the source protection plan or to achieve the plan's objectives (i.e., includes policies that rely upon other municipal authorities such as the *Municipal Act*).

6. Policy Options

The aim of this discussion paper is to aid policy makers by providing background information on drinking water quantity threats and an assessment of the policy tools and approaches that are available. This assessment is to provide guidance on which tools may or may not apply to address existing and future drinking water threats within the Guelph-Guelph/Eramosa WHPA-Q and IPZ-Q.

The main consideration for policy development is to prevent, reduce or manage risks from consumptive use activities and recharge reduction activities. The policy options presented in **Table 6** and **Table 7** could be used to address significant drinking water quantity threats with respect to consumptive use and recharge reduction activities, respectively. These policy options were compiled by reviewing other source protection region source protection plan water quantity policies, government resources, (e.g., provincial acts and regulations).

Prohibition of an existing activity (under the CWA, Part IV, Section 57) is viewed as the strongest tool available in the "policy toolbox" for reducing risk associated with significant drinking water threats. When source protection committees consider prohibition as a tool to address activities that already exist on the landscape, they only do so after considering all other feasible options.

Examples of approved water quantity policies can be found in the: Grand River Source Protection Plan, Townships of Amaranth and East-Garafraxa, section 4-10; the CTC Source Protection Plan, section 10.13; and the South Georgian Bay Lake Simcoe Source Protection Plan, section 16.19.

Table 6: Policy options for an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body

Policy Tool	Intent
Part IV Tool: Prohibition	• The policy would prohibit consumptive use in an area where prohibition is justified due to the excessive risk to drinking water supplies.
Part IV Tool: Regulation (Risk Management Plans)	• The policy would require that a Risk Management Plan be developed for consumptive use.
Part IV Tool: Restricted Land Uses	• The policy would be used in conjunction with either Part IV: Prohibition or Part IV: Risk Management Plans to act as a screening tool for development applications (planning or building) that may trigger a Part IV policy.
Prescribed Instruments	• The policy would direct the Province to review and/or include conditions in a Permit To Take Water to ensure that the municipal drinking water supply is sustainable.
Land Use Planning	• The policy would manage new development by restricting specific uses through official plans and zoning by-laws which require consumptive use or including specific criteria as part of development approvals to minimize the impact of uses that require consumptive use
Education, Outreach/Incentive Programs	• The policy would continue and/or expand water conservation outreach and develop new outreach materials to be shared across the region for both residents and businesses
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• The policy would continue and/or expand risk reduction projects (e.g., water conservation) implemented through stewardship programs; • Promote Best Management Practices, e.g., water conservation mandated as part of the Land Use Planning approvals, use of best management practices for municipal infrastructure and facilities; Promote pilot programs to assist in implementing water conservation programs for private business; • Allow for the consideration of alternative water supplies (i.e., water reuse) to assist in creating a resilient water supply system; and • Develop municipal water saving programs

Other: Specify Actions	• The policy would establish specific action(s) to help manage consumptive use, such as: ○ Province supports and funds ongoing maintenance of Tier 3 models ○ MOECC to use Tier 3 model for PTTW decisions ○ Municipality encouraged to locate additional water supplies ○ Municipality encouraged to diversify water profile through the implementation of direct potable reuse and non-potable resource opportunities ○ When implementing the new growth targets as set out within the Provincial Places to Grow Plan, municipal growth forecasts to consider incorporating Tier 3 information ○ Update or develop municipal water conservations plans and water management plans to support sustainable use

Table 7: Policy Options for an activity that reduces the recharge of an aquifer

Policy Tool	Intent
Part IV Tool: Prohibition	• The policy would prohibit development that reduces recharge of an aquifer in an area where prohibition is justified due to the excessive risk to drinking water supplies
Part IV Tool: Regulation (Risk Management Plans)	• The policy would require that a Risk Management Plan be created for developments to ensure that pre-development recharge is maintained
Part IV Tool: Restricted Land Uses	• The policy would be used in conjunction with either Part IV: Prohibition or Part IV: Risk Management Plans to act as a screening tool for development applications (planning or building) that may trigger a Part IV policy
Prescribed Instruments	• The policy would direct the Province to review and/or include conditions in Environmental Compliance Approval (ECA), e.g., for storm water infiltration projects to ensure that the municipal drinking water supply is sustainable
Land Use Planning	• The policy would manage new development by restricting specific uses through official plans and zoning by-laws which result in excessive risk to the aquifer due to reduction in recharge or including specific criteria as part of development approvals to maintain or improve recharge of the aquifer
Education, Outreach/Incentive	• The policy would continue and/or expand water recharge education initiatives and develop new

Programs	outreach materials to be shared across the region for both residents and business
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• The policy would continue or expand risk reduction projects (e.g., protection of recharge areas) implemented through stewardship programs • Promote Best Management Practices (e.g., downspout disconnect) encouraged through Land Use Planning approvals
Other: Specify Actions	• The policy would establish specific action(s) to help manage recharge reduction activities, such as: ○ Provincial/municipal growth forecasts incorporate Tier 3 information ○ Update or develop water management plans to maximize aquifer recharge ○ Province/SPA/municipalities to develop joint water resource management system to support the municipalities in developing mutually beneficial solutions to address water quantity constraints in the WHPA-Q ○ Require maintenance of stormwater management infrastructure ○ Province/municipalities to develop Low Impact Development guidelines that attempt to balance recharge opportunities with water quality risks

7. Policy Tool Review

The Project Team, with input from the Implementing Municipalities Group (IMG) and Community Liaison Group (CLG), completed a review of all the policy tools available to the Lake Erie Region Source Protection Committee (SPC) to address water quantity threats in the Guelph-Guelph/Eramosa WHPA-Q and IPZ-Q. This review, presented in Appendix C, provides details of the potential strengths and opportunities as well as potential weaknesses and challenges of the available policy tools for addressing both existing and future drinking water threats. Table 8 and Table 9 are high-level summaries of the policy tool review tables presented in Appendix C.

Table 8: Policy tool review summary for an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body

Policy Tool	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Part IV Tool: Prohibition	• Can be very effective by completely removing the threat	• Impact to the water taker could be high • Difficult to justify if used

	• Potential to delineate smaller zones in a vulnerable area where prohibition could be justified	broadly across a vulnerable area and/or if Tier 3 indicates capacity for increased takings
Part IV Tool: Regulation (Risk Management Plans)	• Can be property/activity specific making it flexible • Could be applied to takings where PTTW does not apply	• Potentially high level of resources required to administer and enforce • Implementation and legal challenges (e.g. appeal to ERT) if application of RMP is not applied consistently and/or locally justified.
Part IV Tool: Restricted Land Uses	• Can manage an activity without restricting an entire land use and able to provide exemptions (e.g. residential) • Can link tool to Planning Act process and integrate into municipal development review process	• Only applies to existing land use when activity is changing or expanding • Activity may not always be flagged through a development application
Prescribed Instruments (PTTW)	• Science-based, pre-cautionary, transparent and peer-reviewed • Existing, relatively well understood regulatory framework • Broad powers to collect information and require studies • Ability to assess cumulative effects, use alongside with prioritization of use, and implement water charges • Adaptive management: ability to require review of existing PIs within a certain timeframe; and maximum 10-year PTTW period	• May not be seen as equitable as single tool as not all consumptive water takings are captured • Financial implications for property owners from new requirements • If used too frequently or harshly can be appealed to ERT and high level decision may not be appropriate for local community • Need for improved monitoring • All permits are treated the same regardless of how the water is used • Lack of control regarding how MOECC implements the instrument
Land Use Planning	• Established municipal tool; Planning Act processes are in place • Water taking can be considered a land use and	• Addresses future threats only • Appeals to the LPAT could result in this body that is not familiar with water issues making uninformed rulings

	can be regulated through land use planning • Can be tailored to specific areas with specific restrictions	that cannot be overturned • Insufficient enforcement powers • Policies may be interpreted differently across municipalities, e.g., water taking requirements for dry industrial vs wet industrial zoning • Use of land use planning tools untested to address water takings
Education, Outreach/Incentive Programs	• Increases landowner awareness and community engagement • Can be effectively applied by using in combination with other tools	• Public understanding of water quantity is poor • Time and cost to implement program could be high • No guarantee the threat will be managed
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• Reduction in financial burden for the applicant • Opportunity to reach residents/businesses where water conservation programs are not currently implemented or at capacity • Can motivate changes in behaviour with little cost to municipality compared to cost of producing water and maintaining or expanding infrastructure	• May not be sufficient to address threats on its own • Continuous funding required • Effectiveness relies on property owner participation • Costs for pilot projects may outweigh benefits • Difficult to ensure compliance
Other: Specify Actions	• Tool is flexible • Can require specific action and provides options for local situations • Could increase engagement from non-municipal water takers	• Implementation cost could be high and coordination could be challenging if multiple parties involved

Table 9: Policy tool review summary for an activity that reduces the recharge of an aquifer

Policy Tool	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Part IV Tool: Prohibition	• Can be very effective by completely removing the threat • Potential to delineate smaller zones in a vulnerable area where prohibition could be justified	• Impact to the property owner could be high • Difficult to implement retroactively under existing conditions • Difficult to justify if used broadly across a vulnerable area
Part IV Tool: Regulation (Risk Management Plans)	• Can be property/activity specific making it flexible • Ability to include monitoring program and measure implementation success • Can be used for multi-residential properties	• Potentially high level of resources required to administer and enforce • Monitoring required to ensure actions sustained over the long term, i.e., operation and maintenance of green infrastructure
Part IV Tool: Restricted Land Uses	• Can manage an activity without restricting an entire land use, i.e. able to provide exemptions • Could be useful for areas identified through the planning process, e.g., greenfield • Can link tool to Planning Act process and integrate into municipal development review process	• Only applies to existing land use when activity is changing or expanding • Land uses named in the policy must match the names that appear in local official plans or zoning bylaws
Prescribed Instruments (ECA)	• Science-based, pre-cautionary, transparent and peer-reviewed • Potential to collect new data though monitoring conditions	• Staff resources for administration and enforcement may be high • Financial implications for property owners from new requirements may be high
Land Use Planning	• Can be tailored to specific areas with specific restrictions • Could strengthen pre/post development water balance	• Addresses future threats only • Appeals to the LPAT could result in this body that is not familiar with water issues making uninformed rulings

	• Land use plans could be updated using update recharge information on a regular basis	that cannot be overturned • Push for growth areas does not currently consider recharge needs • Unclear where land use would apply to recharge
Education, Outreach/Incentive Programs	• Increases landowner awareness and community engagement • Can encourage effective Best Management Practices • Retrofits could reverse, i.e. increase recharge in built up areas	• Time and cost to implement program could be high • Adding retrofits more difficult after development • Increased recharge in all areas may not be appropriate and justified
Other: Stewardship programs, Best Management Practices (BMPs), Pilot Programs and Research	• Reduction in financial burden for the applicant • Could prove useful and effective when combined with other tools • Fills data gaps • Can support other tools	• May not be sufficient to address threats on its own • Continuous funding required • Effectives relies on voluntary participation; costs may outweigh benefits • Difficult to ensure compliance
Other: Specify Actions	• Tool is flexible • Can require specific action and provides options for local situations	• Implementation cost could be high and coordination could be challenging if multiple parties involved

8. Promising Policy Tools

In developing this Discussion Paper and through the review of possible policy tools and approaches to address consumptive water taking and recharge reduction activities, certain policy tools have been identified as promising, meriting further discussion to achieve the objectives of the Source Protection Plan.

The objectives, for reference, are that a) any proposed water taking or recharge reduction activity never becomes a significant threat, and b) any existing activity ceases to be a significant drinking water threat.

The promising policy tools described below are not an exhaustive list and do not limit the Project Team from selecting other tools to develop policies. Other tools also have potential applicability and tools may be used in combination to complement each other. All policy tools will be considered by the Project Team throughout the policy development process.

Threat 19: Consumptive Water Use

Addressing consumptive use water takings that are identified as a significant drinking water threat could be achieved through the use of Prescribed Instruments, specifically the PTTW program. Where a PTTW already exists, policies may be developed to direct the Province to review, and amend or revoke existing permits and require that additional terms and conditions are added to ensure that the municipality's existing and future water supply is sustainable. New or increased takings subject to the PTTW process could also include similar terms and conditions. The MOECC could use the Tier 3 model results or the model itself to make PTTW decisions and adaptively manage permits as the model is updated and permits and permit applications are reviewed or assessed for approval. In some areas it may be appropriate to not issue new PTTWs so as to not create a new significant drinking water threat or revoke an existing PTTW to reduce the number of threats. This may be possible in areas with municipal water servicing.

The MOECC already has authority to not approve, amend, or revoke PTTW. However, using the PTTW as a prohibition tool would only be considered after all other feasible management options have been assessed as being insufficient in protecting the municipalities' drinking water supply. The Ministry could consider a phased approach for some takings with the requirement for appropriate monitoring and information-sharing to assess impacts before the permit is fully approved.

Where consumptive water takings may not be able to be adequately addressed by Prescribed Instruments (e.g., takings that are exempt from the PTTW process), the Part IV tools (i.e., Prohibition, Risk Management Plans, together with Restricted Use) may be an option to meet the source protection plan objectives. The Part IV tools may be applicable in an area around existing or planned municipal wells or in areas where municipal water supply systems are available or elsewhere in the WHPA-Q where activities are exempted from the Prescribed Instrument.

Municipal land use planning policies could be considered a tool to address consumptive water use activities. However, land use planning tools are untested as a means to address water takings. Consumptive water use and availability could be considered by the Province when allocating growth through provincial planning tools such as the Growth Plan, particularly where municipal comprehensive reviews and expansion of urban boundaries may be required as a result of growth forecasts and targets set out by the Province. In the implementation of the Growth Plan population and employment targets, municipalities could consider the Tier 3 information as a component of the Official Plan update process.

Additional policies addressing water consumption could also be addressed through policy within Official Plans, e.g., specific restrictions in certain areas of the municipality or by the type of development and/or water taking. The need for additional

restrictiveness of the land use policies may vary depending on existing municipal land use policies and the geographic setting of the vulnerable areas. For example, the policy may include a list of the types of hydrological or hydrogeological studies required as part of a complete application for development proposals. Municipalities could establish Official Plan policies to provide direction as to which circumstances for development applications that required high water use would be considered. Policies could also provide direction on the types of land uses that are not permitted within the community due to consumptive water use concerns. Municipalities may also include policies requiring all new development to be directed to settlement areas on full municipal services to help manage water consumptive use and consistency with municipal water supply master plans, if applicable.

Policies could also be written for municipalities to incorporate the long term sustainability of the municipal water supply into their decisions about water services when approving growth and development. This could be achieved by requiring an approved PTTW where the MOECC has determined that the proposed taking does not become a significant drinking water quantity threat.

The specify action tool could also be valuable in addressing existing and future consumptive use activities through the development of locally-specific policies. For example, policies could focus on:

- ensuring that municipal water management plans and/or water conservation plans are developed or updated;
- developing joint water resource management systems to provide collaboration and cooperation between the province, Source Protection Authority and municipalities to manage local water resources to protect drinking water sources;
- that Tier 3 information is used in making informed decisions and that Tier 3 models are provincially funded and maintained on an ongoing basis; and
- ensuring that existing and future municipal water demands are met before allocating water to other users in the WHPA-Q and IPZ-Q. This would mean shifting to a “priority of use” concept instead of the current “first in time, first in right” approach.

Threat 20: Recharge Reduction

Perhaps the most effective tools to address recharge reduction threats are municipal land use planning policies and implementation of best management practices as part of updated municipal practices and development approval requirements. Policies could be developed to require the local planning authority to manage new developments by including criteria for approval that ensure the proposed activity does not become a significant drinking water threat. The restrictiveness of the policies may vary depending on existing municipal land use policies and the geographic setting of the vulnerable area. For example, policies could be specific by directing municipalities to require new

development for lands to implement best management practices (BMPs) to maintain predevelopment recharge.

Recharge reduction activities could also be addressed through Prescribed Instrument policies, specifically Environmental Compliance Approvals (ECA) such as sewage works projects being used for low-impact development, storm water ponds, etc.

Softer tools such as education and outreach and incentive programs can be used to promote source protection policies in general and focus on promoting BMPs, as well as low impact development (LID) in specific areas where feasible. Outreach programs could target specific sectors in the vulnerable area.

Policy Legal Effect

As defined in the CWA, the Source Protection Plan policies will have to identify who will be responsible for implementation. The legal effect describes whether there is an obligation for the responsible party to implement the policy. The Legal Effect Policy Matrix as presented in Appendix D outlines the obligations of provincial, municipal, local board, source protection authority or other body to implement a policy using a specific tool. For example, for the “softer” tools (i.e., education and outreach) a policy could direct a municipality to comply with the policy where a Provincial Ministry would only have to adhere to the policy.

9. Next Steps

Lake Erie Source Protection Region is committed to a collaborative process working with municipalities and stakeholders during water quantity policy development. After completion of the discussion paper and release by the Lake Erie Region Source Protection Committee (anticipated in June 2018), policy approaches will be drafted by the Guelph-Guelph/Eramosa Water Quantity Policy Development Study Project Team with feedback and support from the Implementing Municipalities Group (IMG) and Community Liaison Group (CLG). Municipalities will be able to identify policy options that best suit their needs based on specific circumstances and resources available. The drafting of water quantity policies is expected to occur in the fall 2018.

Draft policy options developed by the Project Team with support from the IMG and CLG are expected to be presented to the Lake Erie Source Protection Committee (SPC) in the fall 2018. The SPC has the decision making authority regarding the policies to be included in the Source Protection Plan, and with direction from the SPC, Lake Erie Region staff will incorporate the water quantity policies into an updated Grand River Source Protection Plan. Formal public consultation is a mandatory component prior to the updated plan being submitted to the MOECC for review and approval and is

expected to occur in the spring 2019. Municipalities affected by the plan updates will be asked to endorse the plan amendments prior to formal public consultation.

Appendix A

Guelph-Guelph/ Eramosa WHPA-Q and IPZ-Q

Location of Identified Water Quantity Threat

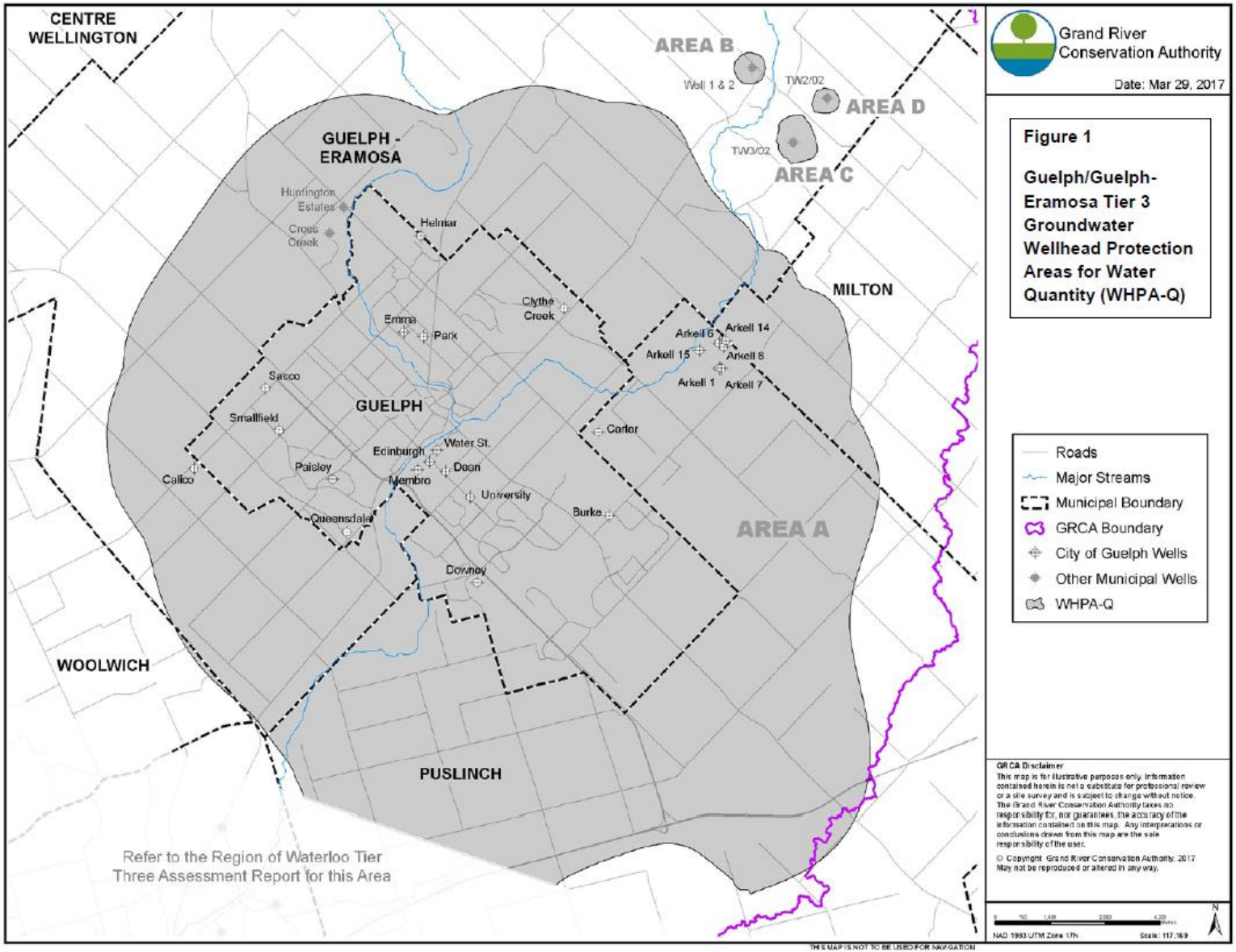

Figure 1: Guelph-Guelph/ Eramosa Tier 3 Wellhead Protection Area A Water Quantity (WHPA-Q)

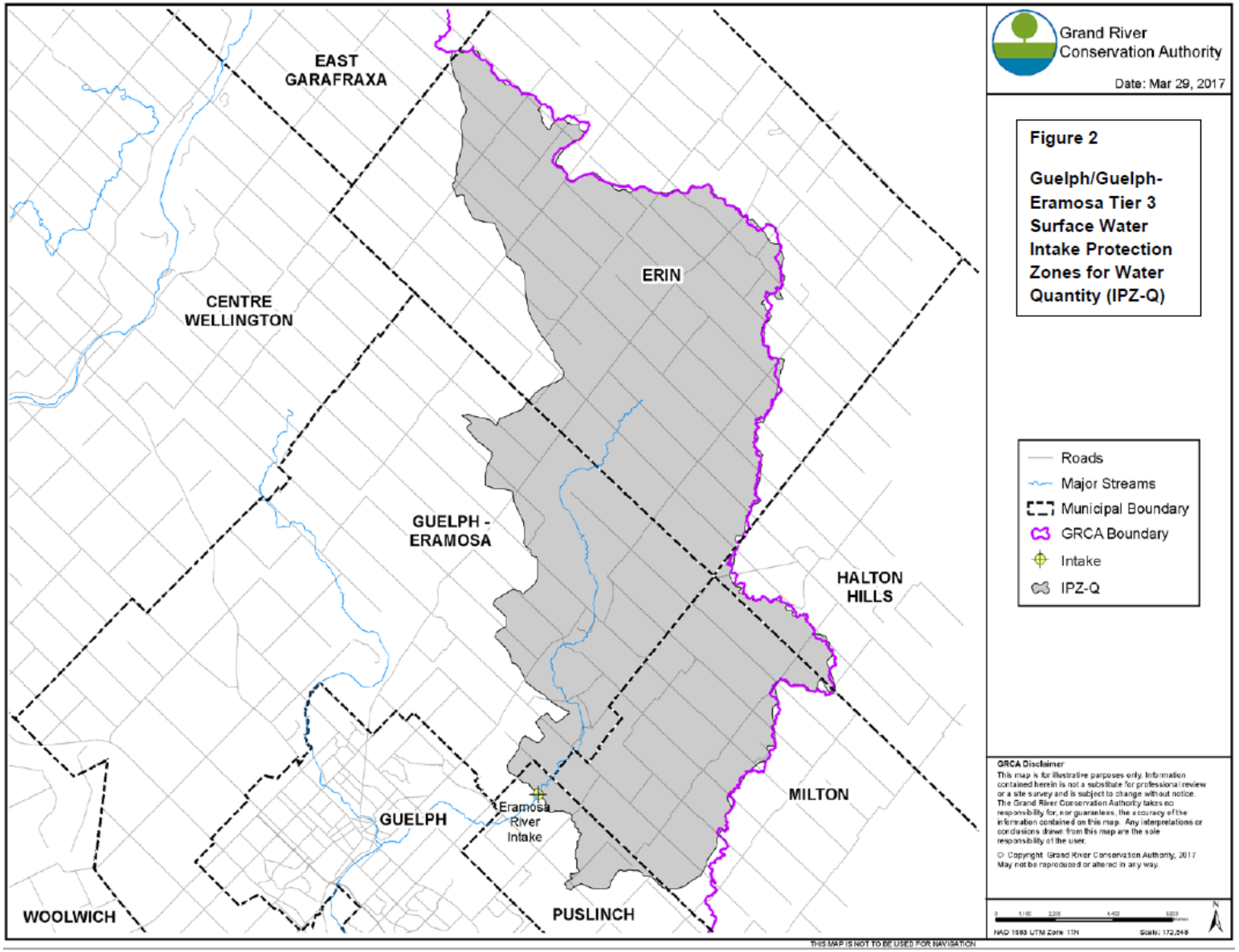

Figure 2: Guelph-Guelph/ Eramosa Tier 3 Intake Protection Zone Water Quantity (IPZ-Q)

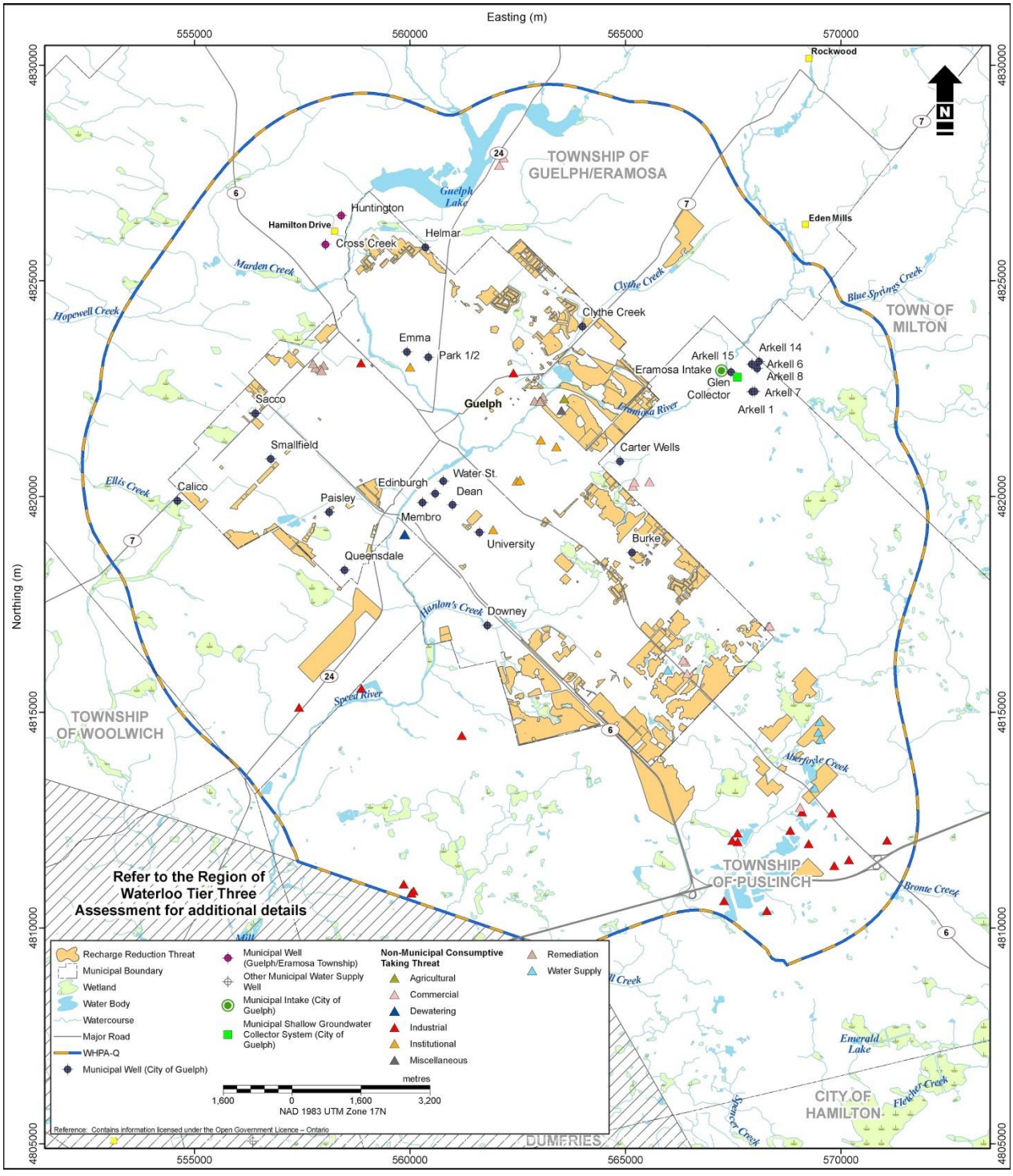

Figure 3: Guelph-Guelph/ Eramosa Tier 3 Wellhead Protection Area A Water Quantity (WHPA-Q) Threats

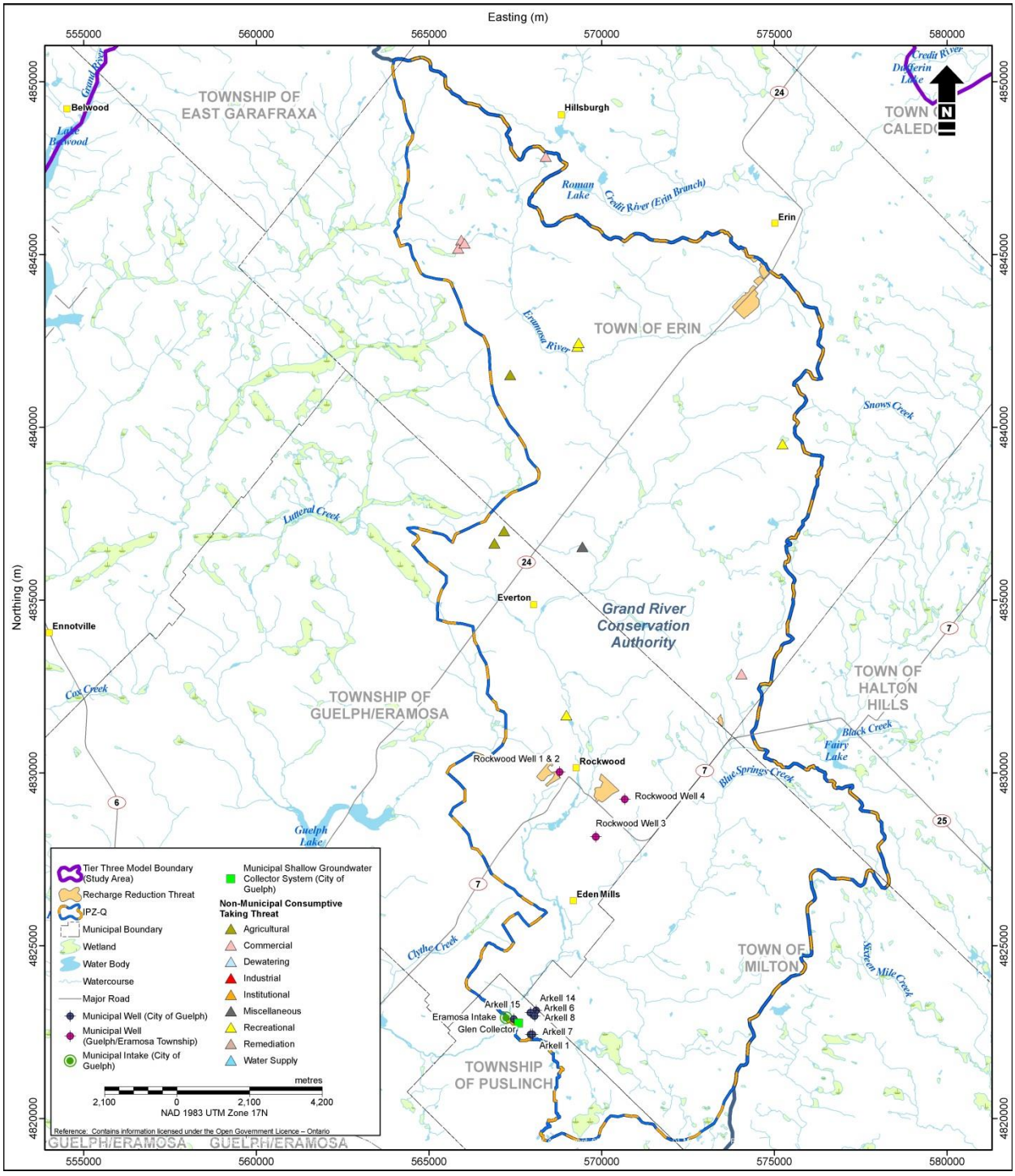

Figure 4: Guelph-Guelph/ Eramosa Tier 3 Intake Protection Zone Water Quantity (IPZ-Q) Threats

Appendix B

Existing Legislation, Policies and Other Programs

The following legislation, policies and programs are in place to address consumptive water taking activities and recharge reduction.

Federal

This section has been included to provide context for water management in Canada. Water management in Canada is a joint responsibility of indigenous peoples, federal and provincial governments, municipalities, conservation authorities, and all water users. Aboriginal rights and treaty rights, including certain customs and practices, became constitutionally protected in 1982; and these rights may take priority over all other uses. Canada's approach to water law varies significantly from province to province, but has a basis in English common law. The *Constitution Act, 1867* (& *Constitution Act, 1982*) lays out the split in responsibilities with respect to water resources between the federal and provincial governments.

Great Lakes Water Quality Agreement (GLWQA)
The GLWQA includes annexes on groundwater and climate change that speak to increasing understanding of groundwater resources, and coordinating with water quantity management actions taken by the International Joint Commission (IJC).

Canadian Environmental Assessment Act
This Act focuses on potential adverse environmental effects that are within federal jurisdiction.

Federal Water Policy (1987)
The policy encourages the management and use of freshwater in a wise, efficient, and equitable manner consistent with the social, economic, and environmental needs of present and future generations.

International Boundary Water Treaty Act and International River Improvement Act
The federal government is responsible for waters that have inter-provincial or international boundary considerations. Two main federal acts regulate use of waters along the Canada-United States (US) border: the International Boundary Waters Treaty Act and the International River Improvement Act. Within Canada, a number of inter-jurisdictional water boards have been established to focus on specific water issues that have implications for more than one province or territory.

Fisheries Act
This Act is the principal federal statute conserving and protecting Canadian fisheries resources.

Species at Risk Act
This Act works on protecting and saving indigenous Canadian species and distinct populations from becoming extirpated or extinct.

Navigation Protection Act
This Act prohibits the dewatering of any navigable water.

Provincial

Ontario Water Resources Act, 1990
To protect the sustainability of the Province of Ontario's water resources, the Ontario Water Resources Act requires those taking greater than 50,000 litres per day to obtain a Permit to Take Water (PTTW) with exceptions for residential use, livestock watering, frost protection and firefighting (less than 379,000 litres per day). No permit can be issued for more than ten years.

The purpose of the Permit to Take Water (PTTW) program is to ensure the conservation, protection and wise use and management of the waters of the province. The chief considerations in the review of PTTW applications are the potential for impacts to other users and the natural and built environment. There are currently 23 municipal residential PTTWs in the Guelph-Guelph/Eramosa Tier 3 WHPA-Q .

Clean Water Act, 2006
The *Clean Water Act, 2006* enables the protection of existing and future sources of municipal drinking water through source protection plans, which contain policies to address activities identified as threats to municipal drinking water sources. The Act identifies two threats to water quantity: an activity that reduces the recharge of an aquifer, and an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body. Under this Act, PTTWs are provincial prescribed instruments that can be used to manage activities that take water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body. There is no provincial instrument prescribed under this Act that is available to be used in source protection plan policies to address recharge reduction.

Additionally, where a Wellhead Protection Area (WHPA)-Q has been assigned a significant water quantity risk level, the Risk Management Measures Catalogue can be used as part of a RMMEP to help select and evaluate preferred measures to manage water quantity threats and inform the policy development process. A variety of tools are available under the Act to address water taking and recharge reduction, including Part IV tools, prescribed instruments (water taking only), land use planning, incentives, and education and outreach (see section 4).

Planning Act, 1990

Requires that the Minister of Municipal Affairs, Ontario Municipal Board and other planning bodies across Ontario have regard to various matters of provincial interest, including but not limited to the protection of ecological systems, conservation and management of natural resources, and the efficient use and conservation of energy and water. The Act provides for and supports the control of land use and development throughout Ontario. The Provincial Policy Statement, 2014 (PPS), which is issued under section 3 of the Planning Act, applies province-wide. Its policies set out the government's land use vision for how land and resources are managed, and all decisions affecting land use planning matters "shall be consistent with" the PPS. The PPS requires wise use and management of resources, including water.

The Act requires that planning authorities (e.g. municipalities) ensure the long-term protection of natural heritage and water resource systems, as well as the conservation and management of natural resources, and the efficient use and conservation of energy and water. Under the Provincial Policy Statement (PPS), planning authorities are required to protect, improve or restore the quality and quantity of water and designated hydrologic functions or features; plan efficient and sustainable water use; and use water conservation practices. Municipalities use the PPS to develop their official plans and to guide and inform decisions on other planning matters. Using the Planning Act, municipalities control planning and development through a variety of tools

Places to Grow Act, 2005

Growth Plan for the Greater Golden Horseshoe, 2017

Mandates population and employment forecasts which must be conformed to as part of the next municipal comprehensive review process. The Places to Grown plan is about accommodating forecasted growth in complete communities. The Plan contains specific targets (e.g., greenfield densities, residential intensification, affordable housing) for growth and implementing policies to ensure that the growth forecasts and complete community objectives are achieved. In Wellington County, approved local allocations of the County forecast that is contained in the Places to Grow plan is included in the County Official Plan (OP). As the growth forecasts are mandated by the Province and must be conformed with, the decision to not accommodate growth to manage the risk associated with this threat is not an option. The Plan contains specific policies regarding planning for new and expanded infrastructure, including municipal water systems. These water system-related policies provide direction for the protection, conservation, enhancement and restoration of quality and quantity of water within a watershed. Specific water resources policies relate directly to recharge in Significant Groundwater Recharge Areas (SGRA) and Highly Vulnerable Areas (HVA) in the Assessment Reports to which planning decisions must conform and which have been in effect since July 1, 2017. A Natural Heritage System has been issued under the Places to Grow

plan for which there are policy directions that indirectly relate to protection of cold water streams that are also the subject of the Tier 3 Assessment work. The Places to Grow plan also includes climate change policies.

Municipal Act, 2001

Provides municipalities with broad powers to provide “any service or thing that the municipality considers necessary or desirable for the public” and they have broad powers to pass by-laws concerning the “economic, social and environmental well-being of the municipality” and the “health, safety and well-being of persons” as long as they do not frustrate provincial acts and regulations. Municipalities have powers to regulate tree cutting and site alteration which can affect the control of recharge, they can also use offer programs that encourage or incentivize recharge. The City of Guelph regulates tree cutting and site alteration through the development approval process and through related supporting by-laws.

Building Code Act, 1992

Objectives of the Building Code include limiting the probability that the design or construction of buildings, or supporting infrastructure will cause a resource to be exposed to unacceptable risk of depletion. A number of changes regarding water conservation/reuse where made in 2014 that promote water efficiency.

Ontario Environmental Assessment Act, 1990

Provides for the protection, conservation and wise management of the environment, generally requiring an environmental assessment of any major public or designated private undertaking. Common and/or important issues identified in Environmental Assessments related to water projects include fish and fish habitat, water levels and flows, and competing or complementary interests of nearby land owners, water-resource users and water-related natural resource users.

The Act also establishes a “Class Environmental Assessment” process for planning certain municipal projects. For water projects, the purpose of the municipal class environmental assessment is to ensure that projects will be "undertaken to address problems affecting the operation and efficiency of existing water systems, to accommodate future growth of communities, or to address water source contamination problems". Relating to source water protection, once an Environmental Assessment is complete for a planned municipal water supply source, the well/intake is defined as a “planned source” under the *Clean Water Act, 2006*; meaning it must be included in the Assessment Report and Source Protection Plans.

Ontario Low Water Response (OLWR)

This program is a mitigation strategy, intended to reduce the effects of low water or drought periods. Under OLWR, watershed-based water response teams (WRT)

coordinate local activities, with these teams consisting of local water users and local and provincial water managers.

Environmental Protection Act, 1990
This Act is the primary pollution control legislation in Ontario. Under Part II.2 of the Act – Water Taking Regulation (O. Reg. 63/16) under the Environmental Protection Act, a registration process has been established for certain lower risk water takings through the Environmental Activity and Sector Registry (EASR). These include takings for construction site dewatering or road construction purposes.

Water Opportunities and Water Conservation Act, 2010
The Lieutenant Governor in Council may, by regulation, require public agencies to prepare water conservation plans. These plans will allow the Minister of the Environment and Climate Change to require municipalities to develop water conservation plans. Further the Minister can establish performance indicators and targets for municipal water, wastewater and stormwater services and operations.

Conservation Authorities Act, 1990
Allows the formation of Conservation Authorities by municipalities, in order to protect and manage natural resources, other than gas, oil, coal and minerals, on a watershed scale. The Act enables conservation authorities to regulate activities that may interfere with a watercourse or wetland, and regulate development in areas prone to water-related hazards (floodplains, shorelines) for impacts to the control of flooding, erosion, dynamic beaches, pollution or conservation of land.

Endangered Species Act, 2007
Works to protect and save species at risk and their habitat in Ontario. Consumptive water taking and recharge reduction activities that damage or destroy such habitat may be prohibited under this Act.

Public Lands Act, 1990
Authorizes the Ministry of Natural Resources and Forestry to acquire land for their purposes while also guiding disposition of Crown land resources via a permitting process (e.g., peat, vegetation removal, etc.).

Conservation Land Act, 1990
Authorizes private land owners to grant easements or enter into a covenant with one or more conservation bodies for the protection of water quality and quantity, including protection of drinking water sources and for watershed protection and management.

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
OMAFRA supports programs for the agricultural sector that assist in maintaining potable water supplies, supporting the use of efficient irrigation and drainage methods.

OMAFRA also works with Agriculture and Agri-Food Canada on the Environmental Farm Plan (EFP) program, which is delivered by the Ontario Soil and Crop Association.

Environmental Bill of Rights, 1993 and Environmental Registry
Serves to notify the public of important environmental decisions and to solicit public comment. Through the EBR, the public has the right to request reviews of inadequate laws, regulations, policies or instruments as well as to comment on proposed legislation and regulations.

Provincial Water Quality Objectives, 1994
The Ontario Ministry of Environment and Energy issued the Provincial Water Quality Objectives in 1994, which gives direction on the management of the province's water resources. The inter-relationship of and between surface and ground water quality and quantity is to be recognized in water management decision making processes. The guidelines speak to water quantity management principles including: avoiding interference between users, water conservation, and protection of significant infiltration areas.

Lakes and Rivers Improvement Act, 1990
Regulates the public and private use of Ontario's lakes and rivers, and the land under them, including for the construction, repair and use of dams. It empowers the Ministry of Natural Resources (MNRF) to regulate the construction and operation of water works, and requires that new water works be approved.

Drainage Act, 1990
Allows for the construction of drains to serve as a communal drainage system for an area of landowners.

Tile Drainage Act and Tile Drainage Installation Act, 1990
Both acts enable improvement of agricultural land productivity via drainage systems. While drainage may allow for increased surface recharge, it can also lessen the amount of water available for taking, through drainage of surface and groundwater.

Great Lakes Strategy, 2012
Lays out a vision for drinkable, swimmable and fishable Great Lakes.

Great Lakes Protection Act, 2015
Reflects the goals and principles of the Strategy. The Act supports: economic opportunities and innovation through environmentally sustainable use of natural resources; and allows public bodies to target actions on priority issues and problem areas through the Great Lakes Guardian Community Fund.

Assessment Act, 1990

The Assessment Act sets out eligibility criteria for lands that can receive property tax exemptions under the Conservation Land Tax Incentive Program (CLTIP) and the Managed Forest Tax Incentive Program (MFTIP). Under the CLTIP, provincially significant conservation lands, such as wetlands and community conservation lands, are eligible for property tax relief.

Municipal

At the local level, municipalities and local bodies such as conservation authorities also have discrete water management responsibilities, many which have been mandated or delegated to them by the province, such as through the Municipal Act, Planning Act, regional planning initiatives, *Clean Water Act, 2006*, *Building Code Act*, and *Conservation Authorities Act.* Other initiatives and programs undertaken at local levels can include: integrated watershed management, watershed planning, local drought contingency projects and planning, and stewardship and education/outreach initiatives.

City of Guelph

Water Efficiency Strategy Update, 2016

Includes a number of programs, initiatives and strategies, that work together to help protect the City's water supply by reducing water demand on a daily basis to ensure that water is available for future use and meet the targets of the 2014 Water Supply Master Plan. From 2006 to 2014, the City's water efficiency programs have reduced demands by about 6.6 million litres per day with about 42 percent of this savings (2.8 million litres per day) attributable to the City's water loss reduction program.

Water Supply Master Plan, Updated in 2014

The Water Supply Master Plan aims to ensure the long-term water supply capacity to allow for growth within the City of Guelph. The Plan evaluated water needs associated with community growth over a 25-year planning period and identified a series of preferred water supply projects to meet the City's future community water supply requirements. Through this detailed Master Plan, water capacity reclaimed through water conservation and efficiency was identified as the most cost–effective and immediate source of available water supply. While the City's overall water demands will continue to increase because of the growing population, per capita demands are projected to decline on an annual basis due to effective water conservation programming and changes to the building code.

Water and Wastewater Servicing Master Plan, 2008

The Plan identifies preferred servicing strategies and related system improvements for water distribution/ storage and wastewater conveyance and identifies the need for the

development of a water distribution hydraulic model to assist water loss management. The Plan assesses each system to enhance reliability, efficiency and capability to service existing and new city residents. Additional recommendations included a study of a large scale wastewater reuse initiative. The 2009 Wastewater Treatment Master Plan identified water conservation initiatives as a key component of the master plan and as a non-expansion, source control alternative.

Stormwater Management Master Plan

To satisfy the first phases of an Environmental Assessment and to create a framework for the future development, the City of Guelph has prepared a Master Plan for stormwater management. The Stormwater Management Master Plan is a long-term plan for the safe and effective management of stormwater runoff from existing urban areas, while improving the ecosystem health and ecological sustainability of the Eramosa and Speed Rivers and their tributaries. The Plan's overall objective is to integrate flood control and stormwater drainage with opportunities to improve and protect groundwater and surface water quality and the natural environment. Three key areas are addressed in the plan. These include management of stormwater runoff as it related to aquifer recharge, low impact development to increase the efficient use of outdoor water and water sensitive urban design to minimize impacts to water quality.

Urban Forest Management Plan, 2012

Ensures a healthy urban forest which cleans air, conserves energy, decreases water use, increases property values and makes Guelph's neighbourhoods more beautiful and enjoyable.

Official Plan

Establishes a statement of goals, objectives and policies for growth and development for the next 20 years. The Official Plan is focused on sustainability and establishes policies that have a positive effect on the social, economic, cultural and natural environment of the city. It includes policies for the protection of water resources including the City's drinking water sources, as well as, surface water and groundwater features.

The City of Guelph has current Official Plan policies recognizing the entire City as a recharge area. For newly developing communities, a secondary plan process is undertaken by the City, as is currently underway for the Clair Maltby Area. This secondary plan process includes an assessment of infrastructure including stormwater to inform the policies for development within the area.

Natural Heritage Action Plan

Looking at potential opportunities for review and update of existing subwatershed plans. As part of development approvals, the City requires pre to post water balance on site as

the minimum stormwater management criteria unless subwatershed studies provided alternative targets. For any development applications which are proximate or within the Natural Heritage System, an environmental impact study is required. “Sensitive ground water features” identified to date include those areas to support recharge/discharge as identified through subwatershed studies relating to streams and wetlands or significant landform as set out within the Natural Heritage System.

Outside Water Use Program

The Outside Water Use Program (OWUP) was created in 2002 in response to the Ontario Low Water Response Plan. The OWUP program objectives are to conserve Guelph’s groundwater supply and protect against the impact of drought during the hot, dry summer months. The Program has three levels that affect residential outside water use. These levels are triggered by dry weather and local watershed conditions, and range from every other day lawn watering (level blue and yellow) to banning of lawn watering during drought conditions (level red) along with other water uses. A large education and outreach component of this program is the Healthy Landscapes Program. This program provides a method in which the City can communicate with water customers about their outdoor water use while showing them how to improve their landscaping to ensure it is water efficient and suitable for the City’s climate and soil conditions. This includes the promotion of trees to assist with the urban tree cover, the planting of non-invasive plants and best irrigation practices. Further, the program forges relationships with the community and local businesses.

Water Conservation Program

The City has undertaken and implementation an extensive water conservation program as outlined in the Water Efficiency Strategy. The program has achieved a benefit of approximately $2.70 for each dollar they spent on their water efficiency programming between 2006 and 2014. While the potential to save money by deferring or downsizing infrastructure expansion projects is often one of the primary drivers for communities to implement water efficiency programs, there are also many other co-benefits to municipalities such as reducing operational costs (i.e., energy costs) and greenhouse gas emissions.

The City’s water conservation program is also considered in the MOECC’s application review process for a new or renewed PTTW. Not maintaining a robust conservation program could jeopardize the City of Guelph’s ability to obtain new water supplies. Furthermore, if the PTTW is approved, the City of Guelph conservation programs become a regulatory requirement of the PTTW upon issuance. Any revisions to current conservation programs will need to be incorporated in renewals to PTTWs in ensure ongoing compliance.

Incentive Programs

The City of Guelph offers a number of incentive programs for residential, multi-residential, industrial, commercial and institutional sectors as outlined in the Water Efficiency Strategy. Examples of incentive programs include: the Royal Flush Rebate Program, Water Efficient Landscaping Incentives, Multi-residential Audit Program and Sub-metering programs, Industrial, Commercial, and Institutional Capacity Buyback Program and, the Water Loss Management Program. Additionally, the City of Guelph have developed a credit program for industrial, commercial, institutional (ICI) and multi-residential properties of six units or more where land owners who reduce stormwater runoff on private property can obtain a credit towards the stormwater service fee they are required to pay as outlined in the Stormwater Master Plan.

Municipal Facility Upgrades Program

The City will continue to make water saving upgrades in City buildings and conduct pilot and research projects within municipal facilities (e.g., rainwater harvesting and wastewater reuse). Funding and program details are provided in the Water Efficiency Strategy.

Water Loss Management Program

The Program's goal is to achieve and maintain distribution system leakage at the lowest economically viable level. The City utilizes District Metered Areas and a leak detection program (sounding and correlation of water mains) where possible to manage system leakage. The City will continue its current leak detection and sounding programs and it has commissioned an additional 20 district metered areas between the years of 2016-2018, bringing the total number to 27.

Public Outreach/Education Programs

The City provides public education programs/activities to support and facilitate a number of program initiatives as outlined in the Water Efficiency Strategy. These include the Mobile Water Engagement Application which allows users to track their water consumption data, school presentations, and the Outdoor Water Use Program which ensures community members are aware of the summer outdoor water use by-law and how they can reduce their outdoor water use.

Research

There are a number of ongoing and planned studies the City is engaged in related to water management and conservation. A few examples of these studies include: Distribution System Pressure Management, Water Conservation and Rebound Effects, Water Softener Pilot, Automated Meter Reading and, Municipal Upgrades Best Practices.

Wellington County

Official Plan

Section 4.9 of the Wellington County Official Plan pertains to Water Resources and includes policies on watershed planning, surface and groundwater protection, source water protection and specific policies on the protection of the Paris and Galt Moraine. The Wellington County Official Plan has been amended to conform with all five Source Protection Plans in the County. The County Official Plan serves as the local Official Plan for the Townships of Guelph/Eramosa and Puslinch. The Paris and Galt Moraine is protected through Policy Area policies in Section 4.9.7 and shown on Schedules B-2, 3 and 7.

Township of Puslinch

Municipal Servicing Feasibility Study

In 2017, the Township of Puslinch initiated a feasibility study for municipal servicing (water and wastewater) within the GGET Tier 3 study area. More information can be found at www.puslinch.ca as the study is ongoing.

Puslinch Groundwater Monitoring Network

The Township has been measuring sixteen groundwater monitoring wells for quality and quantity since 1994. These wells provide ambient groundwater conditions unassociated with development within the Township. The groundwater monitoring network includes overburden wells completed in the Paris Moraine, Galt Moraine and the Aberfoyle Outwash deposits. The network also includes wells drilled into the Guelph and Gasport bedrock aquifers. The results of the monitoring can be found at www.hardenv.com\mill_creek.html.

The monitoring program provides the Township of Puslinch with quarterly groundwater levels and annual groundwater quality and is used to evaluate impacts from major water takings in the Township including that from the City of Cambridge and the City of Guelph.

Guelph/Eramosa Township

Water Conservation

The Township of Guelph/Eramosa municipal water system has a water supply that relies heavily upon the use of groundwater. As a result, the Township has established outside water use restrictions to balance demand with the available water supply. Restrictions are in place for residents using the Municipal Water Supply. The Township also operates a toilet rebate program for Rockwood residents that upgrade their toilets to approved high efficiency (3.0L and 4.8L) and dual flush (3/4.8L or 3/6L) models.

Other Programs

Integrated Watershed Management (IWM)

Establishes a process of managing human activities and natural resources in an area defined by watershed boundaries. It is an evolving and continuous process through which decisions are made for the sustainable use, development, restoration and protection of ecosystem features, functions and linkages. While yet to be formally adopted in Ontario, it is firmly established in the initiatives of conservation authorities and within the limited scope of drinking water source protection planning.

Appendix C

Policy Tool Review Tables

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Part IV: Prohibition	Prohibit consumptive water takings	• Removes threat completely • Very effective • Potential to delineate smaller zones within vulnerable areas where prohibition may be justified • Prohibit and move existing takings to the municipal system where municipal water services are available	• Difficult to justify when used broadly across vulnerable areas • Province may not support prohibition for existing takings • Restricts all water takings • Impact to water taker high	• Combine with Part IV Restricted Land Use • Consider where municipal water services are available • Potential to delineate smaller zones within vulnerable areas where prohibition may be justified • Consider using other vulnerable area boundaries or screening tool (e.g., SGRA) to delineate smaller zones	• Difficulty justifying prohibition when Tier 3 results indicate capacity for increased takings • Public acceptance for WHPA-Q-wide prohibition may be low • The science is well-founded and precautionary but there is some uncertainty incorporated into the assessment
Part IV: Risk Management Plans (RMP)	Require a RMP that manages consumptive water takings	• Could apply to water takings where there is a PTTW exemption • Property specific and flexible	• Potentially high level of resources required for administration and enforcement • Potential for public	• Combine with Part IV Restricted Land Use • Could apply to water takings where there is a	• If too broadly applied may impair economic development • Potentially high level of resources

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		• Addresses specific activity • Opportunity to apply municipal water conservation programs through RMPs	or stakeholder opposition as there are current exemptions to PTTW • Implementation and legal challenges (e.g., appeals to Environmental Review Tribunal (ERT) if application of RMP is not consistent and/or locally justified.	PTTW exemption • Could be applied to smaller takings, i.e. below PTTW threshold • Terms and conditions in RMP could ensure monitoring data is submitted to municipalities or to confirm water taking is below exemption threshold	required for administration and enforcement
Part IV: Restricted Land Use	Used in conjunction with either Part IV: Prohibition or Part IV: Risk Management Plans to act as a screening	• Allows for an activity to be managed without restricting an entire land use • Would be useful process tool to link to Planning Act process if the decision is made	• Applies to existing land use only when the activity is changing or expanding • Activity may not be flagged through a building permit or other development application	• Able to provide exemptions to specific land use (e.g., residential) • Integration with existing municipal development review process • Would be useful process tool to link	• Must be combined with Part IV RMP • Land uses named in the policy must match the names that appear in local official plans or zoning bylaws

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
	tool for development applications (planning or building) that may trigger a Part IV policy.	to use either prohibition or RMP as a tool		to Planning Act process if the decision is made to use either prohibition or RMP as a tool	
Prescribed Instruments	Regulate a permitted consumptive water taking through a prescribed instrument (Permit To Take Water - PTTW).	• Science-based, pre-cautionary, transparent and involves peer reviewed process • Broad powers to collect information and to require studies • Relatively well understood compared to other tools • Opportunity to strengthen Ontario Low Water Response through PI, especially for private permits	• Not all consumptive water takings are captured under the Ontario Water Resource Act; i.e. not equitable, if not used in conjunction with other policy tools • Financial impact to property owners from new requirements • Lack of control regarding how the MOECC implements the instrument • If PIs are used too	• Opportunity to assess cumulative effects if a Tier 3 model is available • Maximum 10-year PTTW period allows for adaptive management • Can limit water takings (volume) to ensure too much water is not being taken. • Potential to use this tool along with prioritization of use • Potential to use this tool to implement water	• Creates new SDWT which then needs to be managed • Staff resources for administration and enforcement • Financial impact to property owners from new requirements • Cumulative effects are currently not considered and are difficult to assess • If used incorrectly, the opportunities listed may become weaknesses • Permitted future

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		• Many water takings are already managed through PTTW (uses existing legislation) • Ability to set timelines in plan policies for reviews of existing PTTW (e.g., adaptive management) • Potential for new data collection and assessments through improved monitoring requirements. • Ability to "roll back" takings if permitted rates are not being used • Ability to not renew or cancel permits	often and/or too harshly to prevent water takings, challenges to PIs will be taken to the Environmental Review Tribunal (ERT) and high-level ERT decisions may not be appropriate for local communities • Lack of clear scientific direction on water quantity limits and impacts often makes ERT arbitration decisions and restrictions to be seen as subjective • May be ineffective without other supportive changes (e.g. assessments of cumulative impacts, the	charges	takings risk further depletion of the resource and unsustainable implications

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
			creation of new monitoring standards) • Lack of clear data as to how much water is available and existing water takings may be over-allocated • Need for improved clarity and consistency regarding expectations and outcomes of permitting process • Need for improved monitoring – there is no central database • All permits are treated the same regardless of how the water is used, i.e. if some of it is returned to the		

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
			watershed or if it all leaves the watershed		
Land Use Planning	Regulate new development through land use planning processes and documents by establishing conditions that must be met	• Does not apply to existing threats		• Established municipal tool; Planning Act processes are in place • Policies can be tailored to specific areas with specific restrictions • Water taking can be considered a land use and can therefore be regulated through land use planning (e.g., through Official Plans) • The new Growth Plan includes efforts to ensure there is adequate water supply available for	• Addresses future threats only • Use of Land use planning tools untested to address water takings • Insufficient enforcement powers • There is a lack of guidance for how to ensure growth areas reflect water supply service capacity • Attempts to regulate water taking through land use planning could result in challenges at the LPAT. This is a body that is not familiar with water issues, and may

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
				• populations • Opportunity for municipalities to provide their intention for the long-term	make uninformed rulings that cannot be overturned • Policies may be interpreted differently across municipalities, e.g., water taking requirements for dry industrial vs wet industrial zoning
Education and Outreach (E&O)	Continue and/or expand water conservation outreach and develop new outreach materials to be shared across the region for both residents and business	• Provides information and options to landowners (opportunity to increase awareness in the industrial sector) • Learn from best practices within Ontario by sharing more research, communications plans, programs, strategies and	• Communications about water quantity are generally poor • People do not understand the complex water process, e.g., conveying messaging about drought response • Time and cost for program could be high • No guarantee that	• Same as existing	• Same as existing

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		campaigns • Can be combined with other tools • Achieved high water use awareness in City of Guelph • Opportunity for large users to improve engagement with the community • Can reduce cost of the water supply by reducing water use through effective programming	threat will be reduced without the development of targets and metrics • Need more discussion around the use of technical language and what it means, e.g., "threat" and "risk" • Need for increased E&O at the residential level • Requires stakeholder by- in		
Incentives/Stewardship Programs	Provide incentives, grants or tax incentives for consumptive water use reduction actions	• Reduces financial burden to applicant • BMPs are effective • Opportunity to reach industry, condominiums, and multi-	• May not be sufficient to effectively address significant threats on its own • Requires continuous funding • Effectiveness relies	• Same as existing	• Same as existing

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		residential properties as these programs are not often implemented or at capacity, and can produce large return on investment • Municipal water reduction program working well • Find and share good examples of incentive and stewardship programs in Ontario jurisdictions that can be replicated (e.g., Guelph Energy Efficiency Retrofit Strategy (GEERS), a greywater financing model)	in voluntary participation • Ensuring compliance with municipal water saving programs • Some incentive and stewardship programs have started to see diminishing returns • Need to ensure fairness in implementing charges, and avoid perceptions of providing advantages to industry through incentives • Difficult to incentivize industry and connect with industry		

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		• Can motivate water conservation behaviours at little cost to the municipality when compared to the cost of producing water, completion of new infrastructure programs and maintaining or expanding infrastructure			
Pilot Programs/Research	Example: Complete studies to determine existing impacts and/or future BMPs	• Fill data gaps • Target specific areas • Pilot different technologies in most sensitive areas • Pilot programs to focus on long-term outcomes • Improve well and energy	• Costs may outweigh the benefits • Difficult to achieve public buy-in • Challenge to find participants • Limited impact	• Same as existing	• Same as existing

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		optimization • Opportunity for industry to partner with and help municipalities			
Specify Actions	Establish specific action(s) to help manage water takings	• Tool is flexible with opportunity to engage stakeholders in implementation of the policy • Ability to require or encourage specific action that helps reduce risks, e.g., maintenance of Tier 3 models, consider water servicing in growth forecasts, prioritizing consumptive water use or improving low-water response consistency	• Potential implementation cost may be high • Coordination may be difficult between all parties involved due to overlapping jurisdictions at municipal, provincial, Conservation Authority level • Not enough teeth to ensure compliance	• Could work with other regulating bodies (e.g., MOECC) with existing expertise to identify proper actions • Expand education and outreach initiatives through these actions • Opportunity for more engagement from non-municipal water takers	• Potential implementation cost may be high • Coordination may be difficult between all parties involved due to overlapping jurisdictions at municipal, provincial, Conservation Authority level • Not enough teeth to ensure compliance

Threat 19: An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		across the watershed • Opportunity to affect change within broader water management framework • Provides options for local situations (i.e. water management at a regional or local level)			

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Part IV: Prohibition	Prohibit recharge reduction activities	• Potentially removes threat completely • Potentially effective	• Restricts all activities that reduce recharge • Difficult to implement retroactively under existing conditions • Impact to property owner potentially very high	• Could be very effective in completely removing the threat • Potential to delineate smaller zones within vulnerable areas where prohibition may be justified • Could be used in concert with the other Part IV tools • Consider as a valuable tool when development is not able to meet a recharge value target/threshold • Consider using RMP to maintain water quantity when a certain threshold is met through the development	• Cumulative impact of recharge reduction may justify prohibition in some areas, while in other areas it may be difficult to justify because reduction in recharge threats are not contributing significantly to significant risk level • The science is well-founded and precautionary but there is some uncertainty incorporated into the assessment

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
				application. This should include requirements for monitoring. If threshold is not met, then prohibit.	
Part IV: Risk Management Plans (RMP)	Require a RMP that implements measures to restore or maintain pre-development recharge	• Property specific and flexible • Ability to include monitoring program and measure implementation success • Potential opportunity to impose RMP (though this is a challenge as threat inspection is required), especially on land that is zoned but not developed. This could be implemented through a	• Ownership and collection of monitoring data (e.g. condominium board or residential development) falls to municipality • Implementation may be ineffective; need to monitor and ensure actions are sustained over the long term (e.g., operation and maintenance of green infrastructure such as infiltration gallery) • Recharge is not monitored • Significant resource	• Proactive tool • Ability to require water balance for subdivision (individual lot level) • Can occur through land use • Can occur on multi-residential properties • Can help ensure ongoing performance beyond initial planning approval • Could implement RMP for gravel pit approval then require monitoring (by Risk	• Staff resources to implement may be high, e.g., to complete follow-ups, addressing challenges related to non-conformity • Cost of program delivery may be high

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		stormwater management model.	and time effort	Management Official, RMO) of pit for set times • Must demonstrate to the RMO that the RMP and site plan are being adhered to	
Part IV: Restricted Land Use	Designate land uses where recharge reduction could occur and where RMP or prohibition would be required.	• Allows for an activity to be managed without eliminating an entire land use • Alerts all jurisdictions involved that permissions are needed for modifications to development • May be useful for areas identified through the planning process (e.g. greenfield areas)	• Applies to land use only when the activity is changing or expanding	• Able to provide exemptions to specific land use (e.g., residential) • Integration with existing municipal development review process • May allow development that does not pose a significant drinking water threat to be established in a designated area	• Must be combined with Part IV Prohibition or RMP • Land uses named in the policy must match the names that appear in local official plans or zoning bylaws
Prescribed	Regulate	• Science-based,	• Staff resources for	• Same as existing	• Same as existing

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
Instruments	recharge reduction activities through a Prescribed Instrument (Environmental Compliance Approval – ECA)	pre-cautionary, transparent and involves peer reviewed process • Potential for new data collection and assessments through improved monitoring requirements.	administration and enforcement may be high • Financial impact to property owners from new requirements may be high		
Land Use Planning	Regulate new development through land use planning processes and documents by establishing conditions that must be met	• Does not apply to existing threats		• Municipalities already have the Planning Act in place • Policies can be tailored to specific areas with specific restrictions • Strengthen pre/post development water balance • Include water balance assessment requirements for	• Addresses future threats only • Appeals to the LPAT could result in this body that is not familiar with water issues making uninformed rulings that cannot be overturned • Push for growth areas does not consider water quantity recharge needs • Unclear where land

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
				development applications • Bylaws for stormwater management, for the maintenance of Low Impact Development (LID) systems • Provincial Policy Statement supports protecting water quality and quantity • Environmental Impact Statement can be used to require multi-year monitoring period (through municipalities) for site plan approval • Require developers to use the Tier 3 model to validate recharge	use could apply to recharge • Unclear what would be regulated on industrial sites, and how site planning would address drainage

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
				and increase protection of recharge areas • Update and improve land use plans to require subwatershed plans on a cyclical basis (not only when triggered by development)	
Education and Outreach	Continue and/or expand outreach initiatives about maintaining recharge and develop new outreach materials to be shared across the region for both residents and business	• Provides information and options to landowners (increases awareness) • Can encourage best management practices • Can be combined with other tools • Retrofits could reverse, i.e. increase recharge in built up areas	• Self-motivated program • Time and cost for program could be high • Typically requires long-term and extensive investment to be successful • Retrofits to increase recharge more difficult after development built • Increased recharge in built up areas	• Education programs can be effective and can be used in combination and to support other tools	• Typically requires long-term and extensive investment to be successful

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
			may not be appropriate (e.g. road salt impacts) • No enforcement		
Incentives/Stewardship Programs	Provides grants or tax incentives for actions to maintain or increase pre-development recharge	• Reduces financial burden to applicant • Could prove useful and effective when combined with other tools • Strengthen incentives to further water quantity protection objectives (e.g. stormwater credits)	• May not be sufficient to effectively address significant threats on its own • Requires continuous funding • Effectiveness relies in voluntary participation • May be perceived as rewarding those with poor management practices	• Same as existing	• Same as existing
Pilot Programs/Research	Example: Complete studies to determine existing impacts and/or future BMPs	• Fill data gaps • Target specific areas • Partner with local researchers • Should be used in conjunction with a stewardship/incent	• Costs may outweigh the benefits • Challenge to find participants	• Same as existing	• Same as existing

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		ive program • Can work well and support other tools			
Specify Actions	Establish specific action(s) to help manage recharge reduction activities	• Tool is flexible • Ability to require or encourage specific action that helps reduce risks • Opportunity to affect change within broader water management framework • Provides options for local situations • Can be linked with other policy tools including RMPs • Could work with other regulating bodies (e.g., MOECC) with existing expertise to identify proper actions • Ability to require	• Cost to municipality may be high • Coordination may be difficult between all parties involved • Unclear how to obligate municipalities to follow best management practices • Create new specify actions: provide municipalities with best management practices for water quantity sustainability, but provide more detailed and specific guidance for how to implement those best practices in	• Same as existing	• Same as existing

Threat 20: An activity that reduces the recharge of an aquifer					
		Existing Threats		Future Threats	
Tool	Tool Description	Potential Strength/ Opportunity	Potential Weaknesses/ Challenge	Potential Strength/ Opportunity	Potential Weakness/ Challenge
		maintenance of Stormwater management infrastructure	communities		

Appendix D

Legal Effect Policy Matrix

Appendix D: Legal Effect Policy Matrix			
Responsible Party:	Provincial	Municipality, Local Board or Source Protection Authority	Other Bodies
SIGNIFICANT THREAT POLICIES- ACTIVITIES			
Part IV Tools (1)	Comply	Comply	Comply
Prescribed Instruments	Must Conform	N/A	N/A
Land Use Planning Approaches	Comply	Must Conform	
Education and Outreach/ Incentive Programs	Strategic Action	Comply	Strategic Action
Other (2)			
MONITORING POLICIES			
All Policy Tools	Comply	Comply	Comply

(1) Part IV Tools include Section 57 Prohibition, Section 58 Risk Management Plans and Section 59 Restricted Land Uses

(2) Other approaches authorized by the regulation include: specify the action to be taken to implement the source protection plan or to achieve the plan's objectives; establish stewardship programs; specify and promote best management practices; establish pilot programs; and govern research.