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1.0 Introduction

1.1 Purpose of this Project

The Township of Severn has commissioned a Source Protection Implementation Study in response to the approval of the South Georgian Bay Lake Simcoe Source Protection Plan (SPP). The Source Protection Plan and Explanatory Document were approved by the Minister of Environment and Climate Change (MOECC) on January 26, 2015 and took effect on July 1, 2015. As part of the Study, this Background Report is being prepared to summarize the key issues outlined in the Source Protection Plan and to provide guidance on the implementation of the Source Protection Plan in the Township of Severn Official Plan and Zoning By-law. This Study has reviewed the Source Protection Plan document and supporting studies. Funding to conduct this project has been provided through the Source Protection Municipal Implementation Fund (SPMIF).

Source water protection is the protection of water resources that we use for municipal sources of drinking and may include such sources as lakes, rivers and groundwater. In the Township of Severn, municipal drinking water is obtained from three well supplies: the Coldwater Well Supply, the Bass Lake Woodlands Well Supply, and the Severn Estates Well Supply. The Coldwater Well Supply and the Bass Lake Woodlands Supply is located within the Severn Watershed, and the Severn Estates Well Supply is located within the Black-Severn River Watershed. The Warminster Well Supply is located within the Township of Severn, however is located very close to the Township of Oro-Medonte municipal boundary. These wells supply drinking water to the community of Warminster surface water intakes and the Township of Oro-Medonte.

In addition to these well supplies, the Township of Severn also has source water Intake Protection Zones (IPZs). These IPZs affect the part of the Township that lies within the Black-Severn River Watershed. There are a total of three intakes in the Township of Severn: the Sandcastle Source Water Intake, the Washago Source Water Intake, and the West Shore Source Water Intake. The IPZ surrounds each intake location. Additional areas within the Township of Severn are encompassed in the intake zones of the Port Severn Source Water Intake (Township of Georgian Bay) and the Rope Subdivision Source Water Intake (Township of Tay).

It is important to protect both the quality and quantity of drinking water sources and intake zones in order to protect the supply of water for current and future visitors and residents of the Township.

In accordance with Section 40 of the *Clean Water Act*, the Township of Severn is required to amend its Official Plan to conform with the Source Protection Plan and specifically to the significant threats set out in the Source Protection Plan. Similarly, the Township is required to amend its Zoning By-law pursuant to Section 42 of the *Clean Water Act*. In addition, and more importantly, Section 39 of the *Clean Water Act* requires that all decisions under the *Planning Act* and *Condominium Act* made by Council conform with the significant threat policies as set out in the Source Protection Plan the day the Source Protection Plan comes into effect (July 1, 2015).

The purpose of this Report is to summarize the Source Protection Plan and supporting studies and to review industry practices from municipalities who have begun to implement the Source Protection Plan. It is important to note that few municipalities have begun to implement their respective Source Protection Plan and that the review of these practices is limited. The Report will conclude by making recommendations regarding policy areas to be considered through the implementation policies.

This implementation project will produce the following deliverables:

1. A Background Report, which summarizes the relevant Source Protection Plan significant threat policies that should be implemented in the Township of Severn's Official Plan and Zoning By-law. The Report will also review industry practices regarding source water protection;
2. A proposed Official Plan Amendment to implement the Source Protection Plan; and,
3. A proposed Zoning By-law Amendment to implement the Source Protection Plan.

1.2 Source Water Protection Background

Walkerton's drinking water system became contaminated with deadly bacteria in May of 2000. As a result, seven people died and more than 2,300 became ill. The events of Walkerton sparked alarm about the safety of drinking water across the Province of Ontario.

In response to the tragedy in Walkertown, the Government of Ontario established an independent Commission to examine how the water contamination in Walkerton occurred. It was called, the Walkerton Inquiry. The Walkerton Inquiry was prepared in two parts:

Part One of the Walkerton Inquiry concluded that there were site specific issues related to the drinking water system that was the source of the contamination.

Part Two of the Walkerton Inquiry made recommendations to ensure the safety of drinking water for the entire Province. The recommendations of the Report included:

- Source Protection – A watershed-based planning process that guards against the contamination of drinking water.
- Standards and Technology – Effective standards and technology for treating water and for quality monitoring.
- Municipal Water Providers – Water providers (municipalities) to provide a quality management approach to their water systems including an approved operational plan with continuous training for operators.



- Provincial Insight – Ontario’s drinking water is the responsibility of the provincial government and a *Safe Drinking Water Act* should be established.
- Special Cases – Allow variances in regards to regulatory standards across the Province.

In response to the Walkerton Inquiry, the *Clean Water Act, 2006* introduced a new level of protection for Ontario’s drinking water resources that establishes requirements for protecting drinking water resources at-source. The Act established roles and responsibilities for the Province, municipalities, and landowners in protecting drinking water resources for current and future generations. As a result, communities are required to create and carry out a plan to protect sources of their municipal drinking water supplies.

There are a total of 24 Source Protection Regions and subsequent Source Protection Plans in the Province. The Township of Severn is located within the South Georgian Bay Lake Simcoe Source Protection Region. The Source Protection Plan for the Region was approved and took effect on July 1st, 2015. All municipal decisions will have to conform to the Source Protection Plan from that date forward regardless if the Official Plan and Zoning By-law are updated by that date. The Act also requires the Township to update their Official Plan and Zoning By-law by July 1st, 2020 to conform to the approved Source Protection Plan. The Township is taking the proactive step to update these policy documents at the outset in order to ensure that the implementation is better known and available to the public and agencies within its primary land use documents.

A Risk Assessment Report is a component part of this process. A Risk Assessment Report has been completed for the Township. It is used to identify drinking water threats within vulnerable areas including identification of Wellhead Protection Areas (WHPAs) and Intake Protection Zones (IPZs). A WHPA is an area surrounding a well where contaminants are likely to move to eventually reach a well; and IPZs are the area on the water and land surrounding a municipal surface water intake. It is important to note that along with the WHPAs and IPZs a Vulnerability Score has also been assigned to the capture areas. The vulnerability score and its impacts with respect to the Source Protection Plan are discussed later in this Report.

Following the completion of a Risk Assessment Report, a Source Protection Plan is prepared by the Source Protection Committee which contains policies on significant threats. As identified, a Source Protection Plan has been prepared the South Georgian Bay Lake Simcoe Source Protection Region. From a land use perspective, the policies put in place through the Source Protection Plan are to ensure that:

- an activity (or use) never becomes a significant drinking water threat; and,
- If the activity (or use) is being engaged in, the activity (or use) ceases to be a significant drinking water threat.

Table 1 outlines the chronology of events which lead to the Township of Severn initiating the Source Protection Plan Implementation Study.

Table 1: Source Water Protection Chronology of Events

Date	South Georgian Bay Lake Simcoe Source Protection Key Milestones
November, 2006	<i>Clean Water Act, 2006</i> given royal assent
December, 2007	First South Georgian Bay Lake Simcoe Source Protection Committee meeting
June, 2009	Terms of Reference for Source Water Protection approved by MOE
December, 2010	Risk Assessment Report submitted to MOE for approval
October, 2012	Proposed Source Protection Plan and Explanatory Document submitted to MOE
January, 2014	Draft updated Local Area Risk Assessment Report released
April, 2014	Proposed revised Source Protection Plan released for review and public consultation
July, 2014	Source Protection Plan and 2014 Assessment Reports submitted to the Minister of the Environment and Climate Change
January 26, 2015	South Georgian Bay Lake Simcoe Source Protection Plan Approved
July 1, 2015	South Georgian Bay Lake Simcoe Source Protection Plan came into Effect
September, 2016	Township of Severn initiates Source Protection Implementation Study

1.3 Source Water Protection Plan Area

The South Georgian Bay Lake Simcoe Source Protection Region includes portions of southern Muskoka, the County of Simcoe, eastern Dufferin County, northern York and Durham Regions, and portions of the City of Kawartha Lakes. The South Georgian Bay Lake Simcoe Source Protection Region is divided into four sub areas, which are delineated by watershed boundaries. The Township of Severn is located within the Severn Sound and the Black-Severn River Source Protection Areas as shown on Appendix 1. The other two Sub Areas within the South Georgian Bay Lake Simcoe Source Protection Region are the Nottawasaga Valley Source Protection Area and the Lake Simcoe Source Protection Area.

2.0 Source Protection Plan

This Section of the Report will examine the purpose of a Source Protection Plan, as well as vulnerable areas such as Wellhead Protection Areas, Intake Protection Zones, Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers.

2.1 What is a Source Protection Plan

The South Georgian Bay Lake Simcoe Source Protection Plan (SPP) has been developed by the Source Protection Committee based on the requirements of the *Clean Water Act, 2006*.

The objectives of a SPP as established under the *Clean Water Act, 2006* are:

1. To protect existing and future drinking water sources in the protection region; and,
2. To ensure that, for every area identified in the assessment reports as an area where an activity is or would be significant drinking water threat:
 - i. the activity never becomes a significant drinking water threat; or,
 - ii. if the activity is occurring when the Source Protection Plan takes effect, the activity ceases to be a significant drinking water threat.

Source Protection Plans are intended to focus on protecting water before it enters the drinking water treatment system. The process of developing the SPP was intended to be a locally driven, science-based, multi-stakeholder process to protect municipal drinking water sources.

The Source Protection Plan identified four vulnerable areas which include:

1. Wellhead Protection Areas (WHPA)
2. Intake Protection Zones (IPZ)
3. Highly Vulnerable Aquifers (HVA)
4. Significant Groundwater Recharge Areas (SGRA)

The applicable vulnerable areas are summarized in the following subsections.

2.1.1 Wellhead Protection Areas (WHPA)

A wellhead is simply the physical structure of the well above ground. A Wellhead Protection Area (WHPA) is the area around the wellhead where land use activities have the potential to affect the quality or quantity of water that flows into the well. These are areas of high vulnerability where the

greatest care must be taken in the storage, use and handling of materials that could, if mishandled or spilled, pollute or contaminate a municipal well.

2.1.1.1 Water Quality

WHPAs are delineated based on how quickly (time of travel) water travels underground to a well (time of travel). These areas are represented by the letters A, B, C, C1 and D. The time of travel is measured in years. Figure 1 provides an example of how a WHPA functions:

- WHPA-A represents a 100 metre zone around the wellhead.
- WHPA-B represents a time of travel of 2 years for groundwater to reach the wellhead.
- WHPA-C or C1 represents a time of travel of 5 years or 10 for groundwater to reach the wellhead.
- WHPA-D represents a time of travel of 25 years for groundwater to reach the wellhead.
- WHPA-E is a vulnerable area for groundwater well supplies that is under the direct influence or surface water.

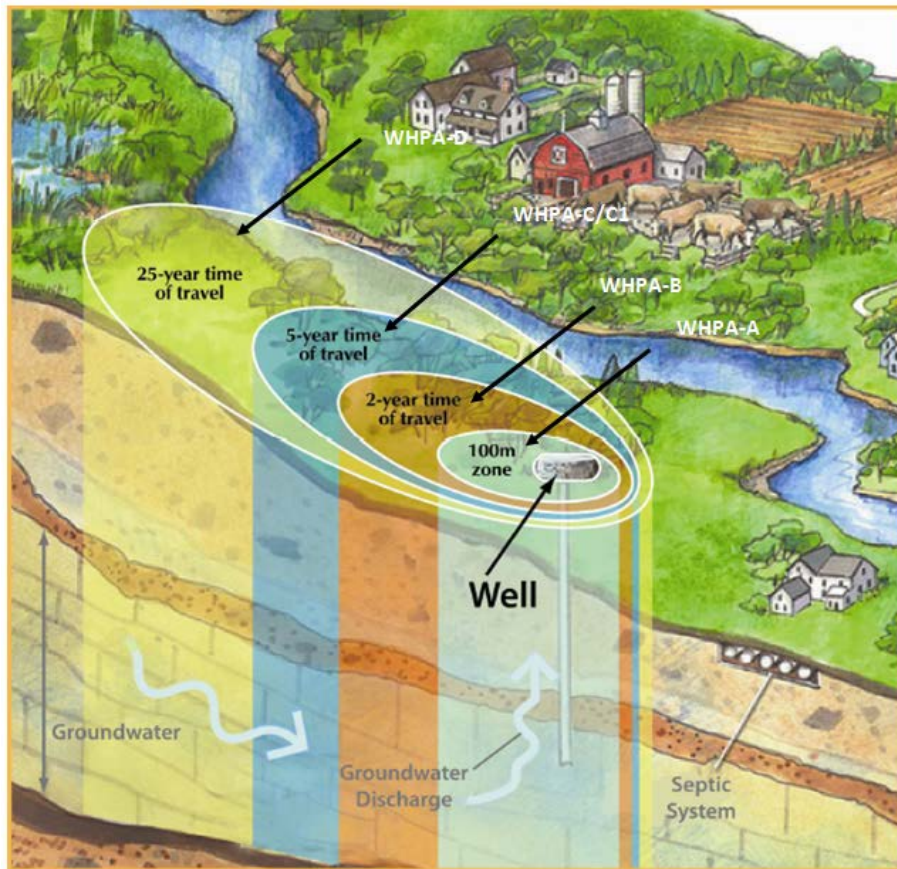
WHPA-A is different from the other geographic notations as the 100 metre “zone” is where the land use activities within this area have the potential to pose the most significant threat to the groundwater source. The municipalities within the Severn Sound and Black-Severn Source Protection Area utilize both the WHPA-C and the WHPA-C1 which represents a time period of 5 years and 10 years respectively for groundwater to reach the wellhead. WHPA-C1 applies where the WHPA was delineated prior to April 30, 2005.

The following factors influence the speed and direction that groundwater travels to the well:

- The rise and fall of the land in the travel zones
- The type of soil surrounding the well
- The type of aquifer
- The amount of water being pumped from the well

WHPA-E is an additional potential vulnerable area for groundwater supplies which are under the direct influence of surface water. WHPA-E is delineated using the same technical rules as an Intake Protection Zone (IPZ) and in accordance with Section 13.6.1.4, no wells in the Township are under the influence of surface water, as a result, no WHPA-E’s are identified.

Figure 1: Conceptual WHPA Cross-section



2.1.1.2 Water Quantity

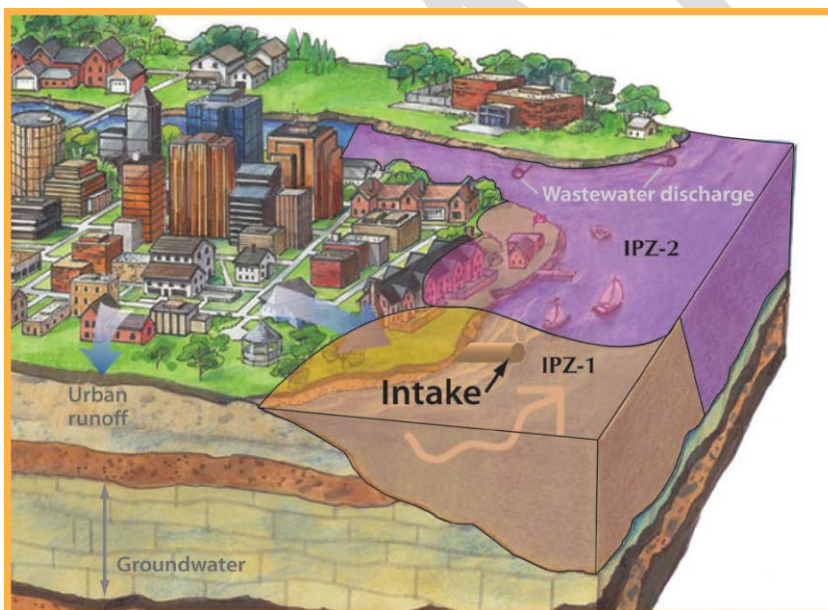
WHPAs Q1 and Q2 are areas that relate to the quantity of water and are delineated based on a cone of influence where new ground water takings could impact the municipal wells ability to meet demand (Q1), or where reduced recharge could impact the ability to meet demand (Q2). There are no WHPAs Q1 and Q2 areas identified in the Township of Severn. A Tier One Report was completed for the Township of Severn, which identified that the demand for water was not in exceedance of a prescribed threshold (available water supply), and as a result there are no Q1 or Q2 areas identified.

2.1.2 Intake Protection Zone (IPZ)

An Intake Protection Zone (IPZ) is an area surrounding a municipal surface water intake both on land and in the water (see Figure 2). The size of the zones is determined by how quickly water flows to the intake (measured in hours). The main purpose IPZs are drawn are for emergency response purposes as surface water travels much faster than groundwater. The Intake Protection Zone is divided into three main categories:

- IPZ-1 is based on length and represents the area encompassed by a one kilometre radius around the intake.
- IPZ-2 is measured by the time water can reach the intake in. For South Georgian Bay Lake Simcoe Source Protection Region, the minimum time of two hours applies to all intakes.
- IPZ-3 identifies activities that are outside of the one kilometre radius and further away than two hours from the intake that could still impact the water quality.

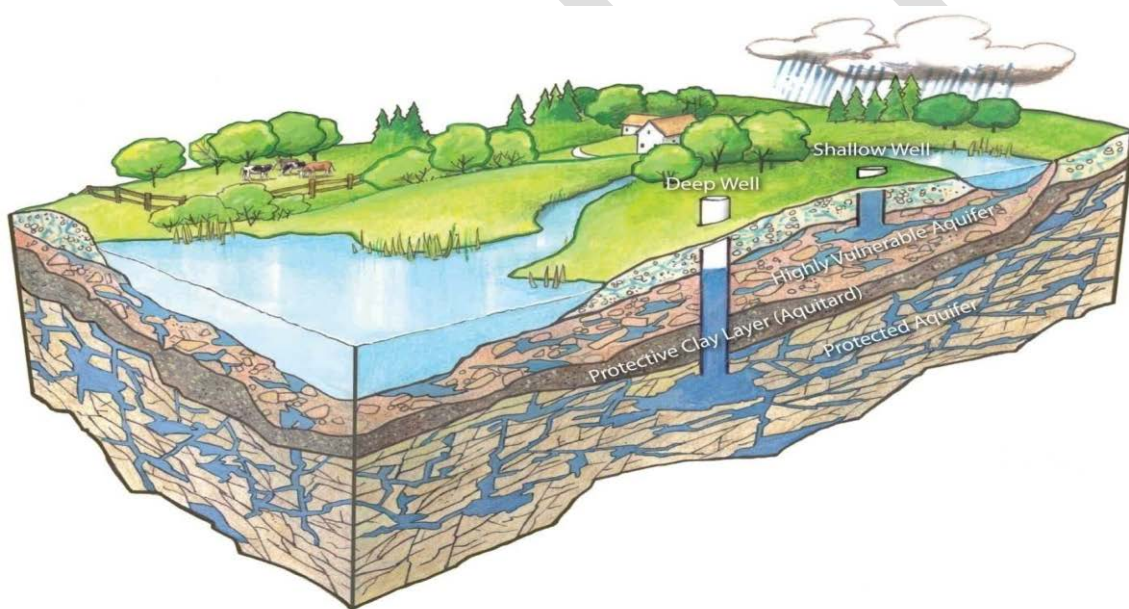
Figure 2: Intake Protection Zone (IPZ)



2.1.3 Highly Vulnerable Aquifers (HVA)

A Highly Vulnerable Aquifer (HVA) is an aquifer used as a water supply for a well where the aquifer is particularly susceptible to contamination due to the proximity of the aquifer to the surface or to the type of materials found in proximity to the aquifer. For example, an area where fractured rock surrounds ground water is considered more vulnerable than an area surrounded by clay as the fractured rock provides transport pathways for contaminants to reach groundwater sources. Figure 3 provides an illustration of an HVA and a protected aquifer. The HVA has fractured rock, sand and gravel above, which could provide a pathway for contaminants to reach the aquifer. The HVA mapping for the Severn Sound and the Black-Severn River watersheds are shown on Appendices 2 and 3.

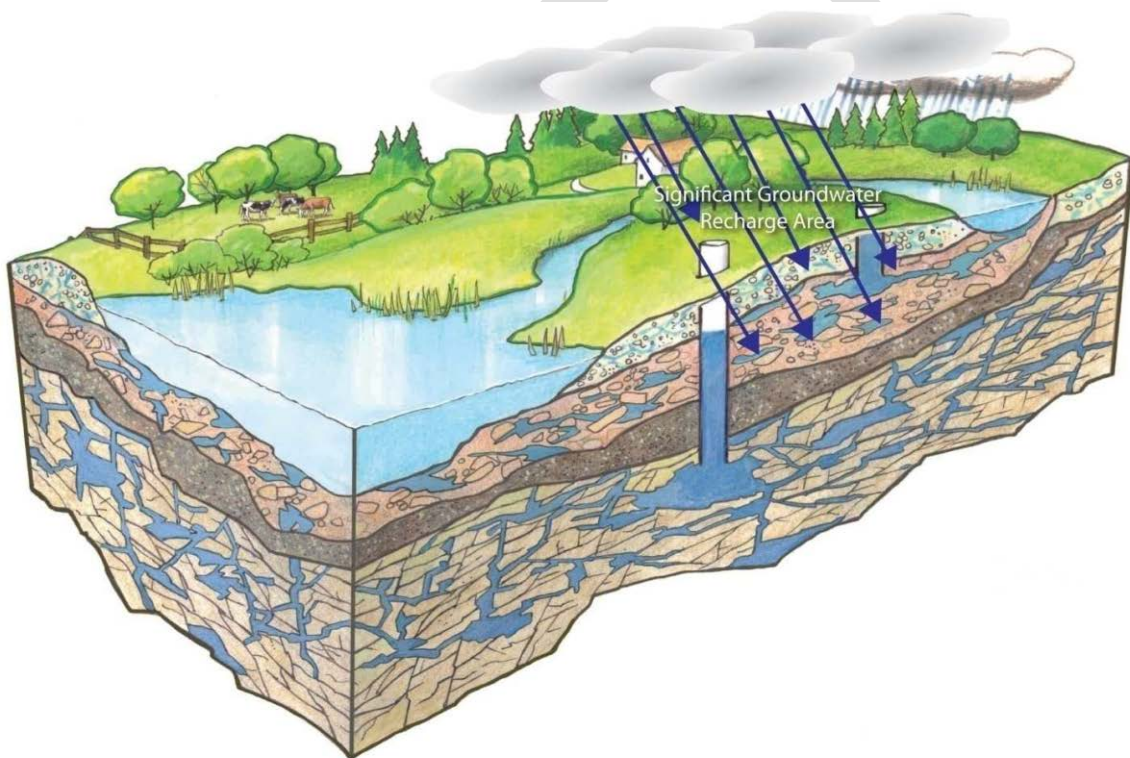
Figure 3: Highly Vulnerable Aquifer (HVA)



2.1.4 Significant Groundwater Recharge Areas (SGRA)

Significant Groundwater Recharge Areas (SGRAs) are areas that are characterized by soils that allow water to easily penetrate into the ground and flow to an aquifer. These are often comprised of sand or gravel. These areas are significant when they assist in maintaining the water level of an aquifer. Figure 4 provides an illustration of a SGRA. In this example, surface water can easily filter through the sand and gravel layer and to recharge the aquifer. The SGRA mapping for the Severn Sound and the Black-Severn River watershed are shown in Appendices 4 and 5.

Figure 4: Significant Groundwater Recharge Area (SGRA)



3.0 Risk Assessment Report

3.1 Purpose of a Risk Assessment Report

The purpose of the Risk Assessment Report is to identify the municipal drinking water systems, establish the levels of vulnerability of those systems, categorize uses and activities that could be significant threats to drinking water, and identify any existing drinking water quality and quantity issues. The Township of Severn Risk Assessment Report is found in Chapter 10 of the Severn Sound Source Protection Area Assessment Report and Chapter 9 of the Black-Severn River Source Protection Area. These Reports identify the number of significant drinking water threats as well as the number of parcels that are subject to various threats.

These Reports were approved by the Ministry of the Environment and are required to be updated periodically as new information becomes available. This Report forms a component part of the implementation of the SPP.

3.2 WHPA Locations in the Township of Severn A, B, C, C1 and D

The Township of Severn operates groundwater-based water supplies in three well supply areas. The well locations for the Township are identified on Appendix 1.

The area around a municipal well where special policy consideration is given is called a Wellhead Protection Area (WHPA). The WHPAs are determined through the Risk Assessment Report and are applied to a total of seven wells located within the three well supply areas. Two additional wells are located within the Township of Severn; however provide drinking water to an area within the Township of Oro-Medonte. The size and location of WHPAs varies based on a number of technical considerations.

The following WHPAs represent the areas that have been identified as being key to protecting the municipal drinking water supply. There are a host of scientific variables that are assessed to determine the vulnerability of a well, and accordingly the size and shape of the WHPAs. Within the WHPAs, groundwater vulnerability has been assessed to provide an indication of the current or future land uses and activities that present the greatest risk to contaminate the water supply.

The classifications of WHPAs, used in the Risk Assessment for the Township of Severn are described in Section 2 of this Report.

3.3 IPZ Locations in the Township of Severn

The Township of Severn operates three surface water intakes within the Black-Severn River Watershed boundary, and two surface water intakes outside of the municipal boundary affect the Township as well. The intake locations are identified on Appendix 1.

The area around a surface water intake identified as an Intake Protection Zone (IPZ) is where special policy consideration is given. These areas are determined through the Risk Assessment Report and are applied to the five intakes that affect the Township surface water. The size and location of IPZs is determined by a number of technical considerations.

The IPZs listed in Section 3.7 represent the areas that have been identified as vulnerable areas to be protected. The size and shape of the zones are based on scientific variables used to assess vulnerability. The IPZ vulnerability has been assessed to provide an indication of the current and future land uses and activities that present the greatest risk to contaminate the surface water intake.

The classifications of IPZs used in the Risk Assessment Report for the Township of Severn are described in Section 2 of this Report.

3.4 Vulnerability Scoring

Within the Township of Severn, vulnerability scores have been assigned. The vulnerability score is used, together with a table of drinking water threats published by the Ministry of the Environment and Climate Change, to determine whether a drinking water threat is one of three categories:

- **Significant:** where the Vulnerability Score is ≥ 8 and there is evidence that the Condition is causing off-site contamination, and/or that the Condition is located on the same property as the supply well or intake zone;
- **Moderate:** (1) where the Vulnerability Score ≥ 6 and < 8 , and there is evidence that the Condition is causing off-site contamination, and/or that the Condition is located on the same property as the supply well or intake zone; or (2) Where the Vulnerability Score is 10, and there is no evidence of off-site contamination; and
- **Low:** Where the Vulnerability Score > 4 and < 6 and there is no evidence of off-site contamination.

Generally, the further away from the actual wellhead or intake, the lower the vulnerability score. Appendices 6 to 8 identify the vulnerability scoring for WHPAs, and Appendices 12 to 14 identify the vulnerability scoring for the IPZs in the Township of Severn.

3.5 High Vulnerability Aquifers and Significant Groundwater Recharge Areas

The Risk Assessment Report delineates High Vulnerability Aquifers (HVAs) and Significant Groundwater Recharge Areas (SGRAs) for the entire Severn Sound and Black-Severn Source Protection Region. A Highly Vulnerable Aquifer is an aquifer on which external sources (including land uses above the aquifer) have or are likely to have a significant adverse effect. A Significant Ground Water Recharge Area is an area characterized by permeable soils, such as sand or gravel which allow the water to seep easily into the ground. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community with drinking water.

In assessing the vulnerability of HVAs and SGRAs, a number of variables are considered, including: surface soil cover, land cover, depth of the aquifer (and thickness of the aquatard), how quickly water can travel through soil, and type of man-made transport pathways present.

3.6 Threats

An assessment of drinking water threats for water systems in the Township was completed as part of the Risk Assessment Report. A drinking water threat is defined as “an activity, or condition that adversely affects, or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water, and includes any activity or condition that is prescribed by the regulations as a drinking water threat.” For instance,

- an activity is one or a series of related processes, natural or anthropogenic, that occurs within a geographical area and may be related to a land use;
- a condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.

The *Clean Water Act, 2006* identifies 21 threats that could be significant when occurring in a vulnerable area, these threats are identified in Table 2.

Table 2: Drinking Water Threats Regulated through the Clean Water Act

Threat ID #	Threat Type
1.	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the <i>Environmental Protection Act</i> . <ul style="list-style-type: none"> a. Untreated septage b. Waste disposal c. Mine tailings
2.	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage. <ul style="list-style-type: none"> a. Stormwater management b. Wastewater treatment plants/sewer systems c. On-site sewage systems d. Industrial effluent
3.	The application of agricultural source material to land.
4.	The storage of agricultural source material.
5.	The management of agricultural source material.
6.	The application of non-agricultural source material to land.
7.	The handling and storage of non-agricultural source material.
8.	The application of commercial fertilizer to land.
9.	The handling and storage of commercial fertilizer.
10.	The application of pesticide to land.
11.	The handling and storage of pesticide.
12.	The application of road salt.
13.	The handling and storage of road salt.
14.	The storage of snow.
15.	The handling and storage of fuel.
16.	The handling and storage of a dense non-aqueous phase liquid (DNAPL).
17.	The handling and storage of an organic solvent.
18.	The management of runoff that contains chemicals used in the de-icing of aircraft.
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.
20.	An activity that reduces the recharge of an aquifer.
21.	The use of land as livestock grazing or pasturing land, an outdoor confinement area, or a farm-animal yard.

Not all of these threats were identified in the Township of Severn Risk Assessment Report.

3.7 Conclusions of Risk Assessment Report

The Risk Assessment Report was prepared for the South Georgian Bay Lake Simcoe Source Water Protection Committee, and members of the Source Protection Committee.

The Report identified the location of significant threats or potential significant threats. Detailed information about the location of each significant threat or potential significant threat is not published in order to protect the privacy of property owners. Where a significant or potential significant threat was encountered in the Risk Assessment Report it was recorded in a series of tables for each WHPA. There are three well supply areas located in the Township of Severn. These well supply areas include the Coldwater Well Supply, the Bass Lake Woodlands Well Supply, and the Severn Estates Well Supply.

In total, there are 118 significant or potentially significant drinking water threats within the Township of Severn's WHPAs. The threats are located on 112 different properties with some properties being associated with more than one threat. Tables 3, 4 and 5 summarize the significant or potential significant drinking water threats by well location.

Table 3: Summary of Threats (Coldwater Well Supply)

Coldwater Well Supply Wells 1, 2 and 3 3 Total Wells		
Threat Type	Number Found	Number of Parcels
Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	11	11
The application of agricultural source material to land	2	2
Application of pesticide to land	6	6
Handling and storage of fuel	3	3
Handling and storage of a dense non-aqueous phase liquid	2	2
Total	24*	18

* 9 verified existing Threats and 15 potential Threats that require further verification

The locations of the WHPAs in the Coldwater Well Supply area are shown on Appendix 9. The Coldwater Well Supply consists of three wells that are located on Part Lots 21 and 22, Concession 11 and 12 within the Township: Well 1, Well 2 and Well 3. These wells supply approximately 1,200 people on 505 lots.

Table 4: Summary of Threats (Bass Lake Woodlands Well Supply)

Bass Lake Woodlands Well Supply Wells 1, 2 and 3 3 Total Wells		
Threat Type	Number Found	Number of Parcels
Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	21	21
Handling or storage of fuel	1	1
Handling and storage of a dense non-aqueous phase liquid	3	3
Total	25*	25

*20 verified existing Threats and 5 potential Threats that require further verification

The locations of the WHPAs in the Bass Lake Woodlands Well Supply area are shown on Appendix 10. The Bass Lake Well Supply consists of three wells that are located on Lot 2, Concession 2 within the Township: Well 1, Well 2 and Well 3. These wells supply approximately 360 people on 120 lots.

Table 5: Summary of Threats (Severn Estates Well Supply)

Severn Estates Well Supply Well 1 1 Total Well		
Threat Type	Number Found	Number of Parcels
Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	68	68
Handling or storage of fuel	1	1
Total	69*	69

*65 verified existing Threats and 4 potential Threats that require further verification

The location of the WHPAs in the Severn Estates Well Supply area is shown on Appendix 11. The Severn Estates Well Supply consists of one well located on Lot 13, Concession 15 within the Township: Well 1. This well supplies approximately 58 people on 23 lots.

Also identified in the Risk Assessment Reports are Intake Protection Zones (IPZs) that are found within the Township of Severn in the Black-Severn River Watershed. There are three IPZs within the watershed, as well as two IPZs that are located outside of the watershed boundary but extend to affect within the boundary. The three IPZs inside the watershed boundary are West Shore, Sandcastle, and Washago; and the two IPZs outside the watershed boundary are Port Severn and Rope Subdivision. Table 6 summarizes the significant or potential significant drinking water threats for the Washago IPZ. The West Shore and Sandcastle IPZs do not have any identified drinking water threats currently. In total, there are 143 significant or potentially significant drinking water threats within the Washago IPZ. The threats are located on 141 different properties with some properties being associated with more than one threat.

The Washago Water Treatment Plant is located on the north shore of Lake Couchiching and the system services the community of Washago and also houses in the Township of Ramara. The plant provides for the screen of raw water, clarification, filtration and disinfection. The filtered water is chlorinated before being sent to a reservoir.

Table 6: Summary of Threats (Washago Intake)

Washago Intake		
Threat Type	Number Found	Number of Parcels
Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	132	132
Handling or storage of fuel	9	9
Handling and storage of a dense non-aqueous phase liquid	2	2
Total	143*	141

*18 verified existing Threats and 125 potential Threats that require further verification

The West Shore Water Treatment Plant is located on the west shore of Lake Couchiching and the system services the community of West Shore and Cumberland Beach. Filtered water flows through a granular activated carbon tank before it is disinfected with ultraviolet light and sodium hypochlorite.

The Sandcastle Estates Water Treatment Plant is located on the north shore of Lake Couchiching and the system services the community of Sandcastle Estates. The plant provides for the screen of raw water, clarification, filtration and disinfection. Water is disinfected with ultraviolet and then chlorinated before going to a reservoir.

It was concluded that there are no drinking water issues associated with the West Shore Water Treatment Plant and the Sandcastle Estates Water Treatment Plant. Areas where activities are or would be potential drinking water threats are shown on Appendices 12 to 14 for the Sandcastle Estates, Washago, and West Shore intakes.

4.0 Tier One Water Budget and Local Area Risk Assessment

4.1 Purpose of a Tier One Report

The purpose of the Tier One Water Budget and Local Area Risk Assessment is to provide a high level screening that shows an understanding of available groundwater and surface water resources on an annual and monthly basis within the subwatershed and provides a standard approach to evaluate the stress on these resources. In the case where demand for water is in exceedance of a prescribed threshold (available water supply) a more detailed analysis in the form of a Tier Two and Tier Three assessment may be required.

Based on the results of the Tier One Assessment, a Tier Two and Tier Three Report were not required for the Township of Severn. On this basis, there were no WHPAs Q1 and Q2 areas identified. It was concluded that no subwatersheds exceed the moderate or significant potential stress in regards to groundwater on an annual basis.

5.0 Policy Development Background

5.1 Developing Policies

In developing policies for Source Protection Plans, there are ten policy tools available with varying levels of restriction. The policy tools are outlined in Table 7.

Table 7: Source Protection Policy Tools

#	Source Protection Tool	Comments
1.	S.57 Prohibition	Activities may be prohibited that pose a significant threat to drinking water sources. Prohibition is meant to be used as a “tool of last resort” for existing threat activities.
2.	S.58 Risk Management Plans	Risk Management Plans are to be negotiated between a risk management official and a land owner; however, a risk management official may impose a Risk Management Plan where an agreement cannot be reached. Risk Management Plans are used to ensure that a threat to drinking water does not become significant.
3.	S.59 Restricted Land Uses	This tool is used in conjunction with a Risk Management Plan or prohibition and is intended to function as a screening tool in order to ensure that activities do not occur within a specified area that have the potential to result in a significant threat .
4.	Prescribed Instruments	A prescribed instrument is a document or permit issued by the Provincial government allowing an activity to take place. An example of a prescribed instrument is an Environmental Compliance Approval.
5.	Land Use Planning Approvals	Land use planning tools issued under the <i>Planning Act</i> and <i>Condominium Act</i> can be used to prohibit land uses. Land use tools such as Official Plans, Zoning By-laws and Site Plan Control Agreements can be used.
6.	Incentives	Incentives can be used to encourage education and reduction in threats. Incentives could include financial incentives or community recognition programs.
7.	Education and Outreach	These tools can be used to educate the public in order to limit the chances of significant drinking water threats being developed in the community.

8.	Other	These could include stewardship programs, specific actions taking by an individual or organization or research activities.
9.	Specify Action	These policies are not legally binding and assign a discretionary obligation to the implementing body to achieve an objective of the Source Water Protection Plan.
10.	Monitoring Policies	Monitoring policies to track the implementation of the threat policies in order to confirm the effectiveness of the Source Protection Plan.

5.1.1 Transition Policies

The following transition provisions are provided to recognize those situations where an application has already been made as of the date the Source Protection Plan comes into effect:

Where a policy in the Source Protection Plan prohibits a "future" threat activity, policies for managing "existing" drinking water threat activities apply in the following circumstances even though those activities will commence after the Source Protection Plan comes into effect:

- 1) A drinking water threat activity that is related to a development proposal where a complete application was made under the *Planning Act* or *Condominium Act* prior to the day the Source Protection Plan comes into effect. Policies for "existing" drinking water threats also apply to any further applications required under the *Planning Act*, *Condominium Act*, or prescribed instruments to implement the development proposal.
- 2) A drinking water threat activity that is related to an application for a Building Permit, which has been submitted in compliance with Division C 1.3.1.3 (5) of the *Ontario Building Code Act* prior to the day the Source Protection Plan comes into effect.
- 3) A drinking water threat activity that is related to an application made for the issuance or amendment of a prescribed instrument prior to the day the Source Protection Plan comes into effect.

5.1.2 Policies for Consideration

Section 16 of the SPP provides the policies through a series of Tables that coincide with the 21 identified threats. A summary of the applicable threats in the Township of Severn with the related policies is provided in the following subsections. Please note that only those policies where the municipality is the implementer are included. In determining if the below threats are significant or not, it is important to note that a combination of the vulnerable area, vulnerability scoring and the circumstance (size of storage area, volume or amount of material being handled/stored) are taken into account. For example, in order for Threat #13 (handling and storage of road salt) to be a significant threat, a quantity greater than 500 tonnes must be stored in a facility exposed to precipitation, runoff, or snowmelt.

5.1.2.1 **Threat #1 - Establishment, Operation or Maintenance of a Waste Disposal Site**

The waste policies of the Source Protection Plan (WAST(b)-5), require that municipalities responsible for waste management consider ways in which additional opportunities for household hazardous waste disposal can be provided to those handling and storing pesticides, organic solvents and DNAPLs, to ensure that they are properly removed from vulnerable areas where the activity is or would be a significant drinking water threat. The County of Simcoe is responsible for most waste management matters; however, the Township's Official Plan should consider appropriate policies for all waste management matters.

5.1.2.2 **Threat #2 - Establishment, Operation or Maintenance of a Sewage Systems and Stormwater Management**

The Source Protection Plan contains policies that apply to on-site sewage systems. Specifically, policy SEWG(c)-3 encourages municipalities to enact By-laws that require mandatory connections to municipal waste water systems in vulnerable areas where an on-site sewage system is a significant drinking water threat. In addition to enacting By-laws, the Township of Severn could also include policies within the Official Plan that recommend any new development in vulnerable areas not serviced with municipal servicing to connect the services when they become available.

Policy SEWG(c)-4 requires that municipalities implement inspection programs for on-site sewage systems that are located in vulnerable areas where they are a significant drinking water threat in accordance with the Ontario Building Code. The Township has an existing program that addresses septic inspection but should consider updating the program to establish policies for septic inspections within WHPAs and IPZs.

The Source Protection Plan also requires stormwater management to be properly managed to protect drinking water sources. Through the development of Official Plan policies and Zoning regulations, the Township could consider establishing siting criteria where stormwater management facilities are proposed in proximity to WHPAs and IPZs.

5.1.2.3 **Threats #3 to #11- Limited Applicability**

Threats #3 through #11 may exist in the Township of Severn and the Zoning By-law can be used to prohibit the development of structures that relate to storage associated with these threats. Application or activities cannot be regulated by a Zoning By-law as these are dealt with through different prescribed instruments. For example, Threat #3 relates to the application of agricultural source material to land which is dealt through the completion of a nutrient management plan. Threats #3 through #11 are:

- 3) Application of Agricultural Source Material to Land
- 4) Storage of Agricultural Source Material
- 5) Management of Agricultural Source Material
- 6) Application of Non-Agricultural Source Material
- 7) Handling and Storage of Non-Agricultural Source Material
- 8) Application of Commercial Fertilizer to Land
- 9) Handling and Storage of Commercial Fertilizer

- 10) Application of Pesticides to Land
- 11) Handling and Storage of Pesticides

Of the threats listed above, only proposed threats associated with a specific use, or a building/structure used to store the materials can be prohibited in a Zoning By-law. The Township may include policies in the Official Plan that encourage best practices in order to protect drinking water for the community. For example, a policy could be added that encourages there to be a nutrient management plan implemented where there may be a significant threat to drinking water.

The proposed uses associated with each threat, or building or structures used to store materials that may cause or be a significant threat to drinking water are only prohibited where they would be a significant threat as determined by the RMO.

5.1.2.4 **Threat #12 and #13- Application of Road Salt and Handling and Storage of Road Salt**

Threat No. 12 deals with circumstances where the application of road salt could be a significant drinking water threat in some instances. Policy No. SALT(app)-1 and SALT(app)-2 provide policies related to the application of road salt. It may be appropriate for the Township of Severn Official Plan to contain policies that provide direction for the application of road salt where it is a significant threat to drinking water. These policies could be added to the Site Plan Control section in the Official Plan and encourage best practices when applying road salt in areas where there may be a significant threat to drinking water.

Threat No. 13 relates to the handling and storage of road salt. Policy No. SALT(h&s)-1 and SALT(h&s)-2 provide policies that require the proper handling and storage of road salt where the activity would be considered a significant threat to drinking water. Road salt storage facilities can be prohibited where there may be a significant threat to drinking water in the Zoning By-law.

5.1.2.5 **Threat #14 – Storage of Snow**

Threat No. 14 applies to the storage of snow. Where snow storage is proposed in an area where it would be a significant drinking water threat, a Risk Management Plan (RMP) is required. The Township planning documents should direct and restrict snow storage that would be a significant threat, to areas that are outside of WHPAs and IPZs and required a RMP where the activity is proposed within a WHPA or IPZ. Policies could be added to the Official Plan that recommend best practices for design to ensure snow is stored in an appropriate manner where there is no significant threat to drinking water.

5.1.2.6 **Threat #15 – Handling and Storage of Fuel**

Threat No. 15 is the handling and storage of fuel. The fuel storage policies of the Source Protection Plan are found as FUEL-1, FUEL-2 and FUEL-3. These policies provide direction for the existing and future handling and storage of fuel. FUEL-2 provides policies that indicate the future handling and storage of fuel is prohibited where the activity would be a significant drinking water threat. The Township of Severn planning documents should contain policies and regulations that prohibit the storage of fuel in areas where it would be considered a significant drinking water threat.

In order for there to be a potential significant drinking water threat present when storing fuel, an amount in exceedance of 250 litres must be stored below or partially below grade in a WHPA; or an amount in exceedance of 2,500 litres where the fuel is stored above the grade. Within an IPZ an amount in exceedance of 2,500 litres of fuel is required to be a significant threat when stored below, partially below or above grade. The RMO reviews the specific circumstances and vulnerability scores associated with an area to make the final determination if the storage of fuel would be considered a significant threat to drinking water. Residential properties within a WHPA or IPZ that store greater than 250 litres of fuel oil below or partially below grade (including a basement) are also categorized as a significant drinking water threat.

5.1.2.7 Threat #16 – Handling and Storage of Dense Non-Aqueous Phase Liquids (DNAPLs)

Threat No. 16 outlines policies that apply to the handling and storage of dense non-aqueous phase liquids (DNAPLs). Dense Non-Aqueous Phase Liquids are more dense than water and do not dissolve in water. The Township's planning documents should restrict land uses that handle and store DNAPLs where such a use would be significant threat to drinking water.

5.1.2.8 Threat #17 – Handling and Storage of an Organic Solvent

Threat No. 17 is the handling and storage of organic solvents. Organic Solvents are chemicals that are used in industrial and commercial activities and some household products that have the ability to contaminate drinking water sources. The Source Protection Plan contains policies for organic solvents and Policy SOLV-2 prohibits the handling and storage of organic solvents where the activity would be a significant drinking water threat. The Township of Severn planning documents should prohibit uses that contain organic solvents where they would be a significant threat to drinking water.

5.1.2.9 Threat #18 – Management of Run-Off that Contains Chemicals Used in the De-icing of Aircraft

Threat No. 18 relates to the threat of chemicals that are used in the de-icing of planes, which is not relevant to the Township of Severn as it does not have an airport facility.

5.1.2.10 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

Threat No. 19 relates to 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. Policy DEMD-3 of the Source Protection Plan identifies that within a Wellhead Protection Area Q1 assigned a significant or moderate risk level where the taking of water from an aquifer without returning the water to the same aquifer is or would be a significant drinking water threat, municipalities responsible for the water shall develop water conservation plans. Policy DEMD-2 requires planning authorities to consider water quantity availability when developing population and employment forecasts. Although there are presently no

Q1 areas identified, the Township of Severn may wish to include a policy to this effect in the Official Plan.

5.1.2.11 **Threat #20 – An Activity that Reduces the Recharge of an Aquifer**

Threat No. 20 relates to an activity that reduces the recharge of an aquifer. The Township may wish to include policies in the Official Plan that require aquifer recharge and quantity threats to be examined when expanding the built up area of the Township of Severn. Although there are presently no Q1 areas identified, the Township of Severn may wish to include a policy to this effect in the Official Plan.

5.1.2.12 **Threat #21 – Use of Land as Livestock Grazing or Pasturing Land, an Outdoor Confinement Area or a Farm-Animal Yard**

It should be noted that existing and future livestock grazing and pasturing is designated for the purposes of Section 57 of the *Clean Water Act*, and is therefore an outdoor confinement area is prohibited where there is a significant threat to drinking water. Policies could be referenced in the Official Plan to encourage the use of nutrient management plans to mitigate against future drinking water threats.

5.2 **Land Use Policies**

Section 17.3 of the Source Protection Plan contains additional land use planning policies. A number of these policies require implementation through the Official Plan and/or Zoning By-law and are summarized in the following subsections.

5.2.1 **No Planning Act Application Possible (Restricted Uses)**

The Restricted Land Use (RLU) policies do not eliminate a land use, but ensure that activity within an area is accessed for potential risk. This is meant to be used as a screening tool when reviewing applications that could lead to a use that would create a significant drinking water threat. Policy RLU-1 functions to prevent individuals from making any *Planning Act* application to establish the following uses where they are or would be a significant drinking water threat:

- 3) Application of agricultural source material to land;
- 4) Handling and storage of agricultural source material;
- 6) Application of non-agricultural source material;
- 7) Handling and storage of non-agricultural source material;
- 8) Application of commercial fertilizer to land;
- 9) Handling and storage of commercial fertilizer;
- 10) Application of pesticide to land;
- 11) Handling and storage of pesticide;
- 12) Application of road salt;
- 13) Handling and storage of road salt;
- 14) Storage of snow;

- 15) Handling and storage of fuel;
- 16) Handling and storage of DNAPLs;
- 17) Handling and storage of organic solvents; and,
- 21) Use of land as livestock grazing, or pasturing land, an outdoor confinement area of farm animal yard.

The Township of Severn may want to consider clear policy language to outline that a *Planning Act* application may not be submitted to permit one of the identified prohibit a use of land where the Risk Management Official has identified the use of land (associated with an activity) to be a significant threat to drinking water.

It is recommended that consideration be given to establishing a process to pre-screen applications to determine if they relate to one of the above threats and require circulation to the RMO. The Township is currently implementing this process by using a Source Protection Plan Pre-application Screening Form. Additional policies may be added to the Official Plan which outlines complete application requirements for applications within vulnerable areas.

5.2.2 Prohibiting Future Uses

Policy LUP-1 requires the Township to amend their Official Plan and Zoning By-law, to prohibit the following future uses in vulnerable areas where the activity is or would be a significant drinking water threat, with the exception of residential uses. As a result the Township must prohibit these uses though the Zoning By-law where they would be a significant threat to drinking water.

- 1) waste disposal sites within the meaning of Part 5 of the Environmental Protection Act;
- 2c) more than 10,000 litres on-site sewage systems for agricultural source material storage facilities;
- 7) non-agricultural source material storage facilities;
- 9) commercial fertilizer storage facilities;
- 11) pesticide storage facilities;
- 13) road salt storage facilities;
- 14) snow storage facilities;
- 15) fuel storage;
- 16) DNAPLs storage;
- 17) organic solvent storage; and,
- 21) outdoor confinement or farm animal yard in WHPA-A/IPZ-1.

5.2.3 Use of Site Plan Control

Policy LUP-2 is required to be implemented by the inclusion of a policy in the Township of Severn's Official Plan. This policy addresses the application of road salt. Policies in the Official Plan could be included regarding the use of road salt in an instance where road salt could constitute a significant threat, and be managed through site plan control to help insure the following steps are used to mitigate the potential threat:

- 1. The extent and location of the impervious surfaces such as parking lots, roadways and sidewalks are minimized;
- 2. Site grading and drainage is designed to reduce pooling; and,
- 3. Run-off is either directed outside of vulnerable areas or to storm sewers.

5.2.4 Other Policies to be Considered

Table 8 contains a summary of other policies as they apply to the Township of Severn that should be addressed as part of this conformity process.

Table 8: Other Policies to be Considered

Policy Reference	Policy Summary
LUP-3	Ensure the design of new stormwater management facilities reduces the risk of contaminating drinking water, and directs the discharge of stormwater outside of vulnerable areas, where the activity would be a significant drinking water threat.
LUP-4	Locate new (private or municipal) sewage system infrastructure, wherever possible, outside of the vulnerable area where it would be a significant drinking water threat.
LUP-5	Include policies to address stormwater pond discharges by requiring master environmental servicing plans (MESPs) as part of a complete application to avoid locating threats associated with development infrastructure in vulnerable areas
LUP-6	In an area where a future small on-site sewage system would be a significant drinking water threat, new development may be permitted only where the lot size for any proposed development that would include a small on-site sewage treatment system is based on the most current version of MOE's guidelines for individual on-site servicing. Lots of record that exist on the effective date of the source protection plan are exempted.
LUP-7	Prohibit new small on-site sewage systems within a WHPA-A (100m radius) area.
LUP-8	In the issue contributing area and outside the WHPA-A, where a future small on-site sewage system would be a significant drinking water threat, new development may be permitted only where the lot size for any proposed development that would include a small on-site sewage treatment system is based on the most current version of MOE's guidelines for individual on-site servicing. Lots of record that exist on the date of approval of the source protection plan are exempted.
LUP-10	Where the future taking of water from an aquifer without returning it to the same aquifer would be a significant drinking water threat, new development or site alteration shall only be permitted where it has been demonstrated that any increase in water demand beyond the allocated demand is sustainable as determined by the MOE in accordance with the Source Protection Plan and Ontario Water Resources Act.
LUP-11	Protect significant groundwater recharge areas from incompatible development or site alteration that may reduce the recharge of an aquifer within WHPA-Q2.
LUP-12	Only permit new major development or site alteration (excluding single detached residential) in a WHPA-Q2 where the activity would be a significant drinking water threat, where it can be demonstrated through the submission of a hydrogeological study that the existing water balance be maintained (i.e. there will be no net reduction in recharge)
LUP-13	Require the use of Best Management Practices such as Low Impact Development to maintain pre-development recharge rates for non-major developments or site alterations in a WHPA-Q2 assigned a moderate risk level, where the activity would be a significant drinking water threat.
LUP-14	Examine municipal water supply servicing constraints when approving settlement area expansions within WHPA-Q2 where an activity is or would be a significant drinking water threat.
LUP-15	Examine municipal water supply servicing constraints when approving settlement area expansions beyond areas assessed in the Tier 3 assessment, within a WHPA-Q2 where an activity that reduces the recharge of an aquifer is or would be a significant drinking water threat. It should be noted that there have been no Q1 or Q2 areas identified in the Township (applicable to LUP-11 to LUP-15) however the Township may still want to consider policies in case these areas are established in the future.

5.3 Issue Contributing Area (ICA) and Transport Pathway Policies

An Issues Contributing Area (ICA) is an area of land where drinking water threats may contribute to a known drinking water issue. For example, if Trichloroethylene (TCE) is determined to be an issue, the area from which the source of the TCE is determined is called the Issues Contributing Area.

Transport Pathways are features or activities occurring at the surface that disturb the surface above the aquifer, or which artificially enhances the flow to an aquifer. The presence of a transport pathway can increase the vulnerability rate of an area.

5.3.1 Coldwater Issue Contributing Area Transport Pathway Policies

Trichloroethylene (TCE) was identified as a Drinking Water Issue for the Coldwater Well Supply. There have been studies undertaken to help address and evaluate options that may be available to the Township to help address this issue. To date the Township has not been successful in determining the source areas of the TCE. However, the work did conclude that the TCE resulted from a historical land use and not from a current land use or activity. The location of the ICA is shown on Appendix 15.

5.4 Education, Incentive, and Monitoring Policies

Section 17.4 of the Source Protection Plan contains a number of education and outreach policies. For example, Policy EDU-10 requires municipalities purchase and install signage that identifies the location of WHPAs in the Township of Severn.

Section 17.5 of the Source Protection Plan contains incentive policies. These policies encourage municipalities to provide incentives for landowners to improve septic systems where they are a significant drinking water threat, and encourage municipalities to consider opportunities to promote the effective storage of snow where it also is a significant drinking water threat.

Section 17.6 of the Source Protection Plan contains monitoring policies. Policy MON-1 requires municipalities to report to the local Source Protection Committee the steps taken to implement significant threat policies and recommendations, where appropriate. The Township of Severn may wish to consider a monitoring policy in the Official Plan.

The Township may wish to consider a general policy supporting the implementation of the Source Protection Plan, encouraging all residents to be mindful of the Township's groundwater and that Council should consider an active education and promotion campaign with respect to source water protection.

5.5 Timing for Updates

The Source Protection Plan also identifies timelines for conformity exercises to be undertaken. Official Plans and Zoning By-laws must be amended to conform with the significant threat policies within five (5) years from the date the Source Protection Plan coming into full force and effect. Prior to this deadline, Official Plans and Zoning By-laws shall be updated to conform with the applicable significant drinking water threat policies in accordance with Section 26 of the *Planning Act*. The Official Plan Review required by Section 26 and the subsequent required Zoning By-law update, establish the timelines for Municipalities update their Official Plans to be consistent with provincial plans and have regard to provincial interests. Funding provided to the Township of Severn to assist in this project is set to expire in March 2017.

6.0 Industry Practices

6.1 Industry Practices

The municipal implementation of Source Water Protection Plans has been limited thus far in Ontario as the Source Water Protection Plans themselves are only recently being approved by the Province. However, some municipalities have progressive Official Plan policies and Zoning By-law regulations in place to address ground water and drinking water threats and to identify vulnerable areas. The following sections provide examples of policies and policy frameworks in place in other jurisdictions. The intent is to review some pre-existing policy frameworks to help determine the range of possibilities and identify what would work best for the Township of Severn.

6.1.1 Official Plan Policy

6.1.1.1 City of Barrie

The City of Barrie Official Plan currently contains policies related to the protection of Wellhead Protection Areas (WHPAs), and utilizes a Schedule overlay to delineation of those areas where drinking water sources are vulnerable. Relevant policies within Section 3.5.2.3.5.1(b) require that:

1. Development or site alteration that involves the storage or manufacturing of pathogens, chemicals or dense aqueous phase liquids are prohibited in vulnerable areas where they would be a significant threat;
2. The expansion, alteration or redevelopment of existing uses in an area where an activity is or would be a significant threat may be permitted if the Risk Management Official (RMO) is satisfied that the threat ceases to be significant;
3. A Threats and Issues Assessment (Water Quality) study is required when it is necessary to determine if a proposed development or use would be a significant threat within a vulnerable area
4. The Zoning By-law shall prohibit or restrict land uses that involve significant threat activities in vulnerable areas.

Further to the above policies, the City's Official Plan also includes policies related to the application and development process within WHPAs. Key concepts include:

1. Any development, site alteration, or *Planning Act* proposal within a vulnerable area must include a Source Water Information Form
2. A Threats and Issues Assessment – Water Quality study is required when it is necessary to determine whether a proposal would be a significant drinking water threat
3. The City will seek opportunities through conditions of planning applications, development plans, community improvement plans, or other means to acquire lands, register easements or apply other methods to control activities within lands identified as WHPA-A.
4. All industrial, commercial, institutional, open space and high density residential areas within vulnerable areas are subject to Site Plan Control.

The Township of Severn may wish to consider incorporating the above concepts into their Official Plan, especially those related to acquiring lands or controlling activities within lands identified as most vulnerable (WHPA-A).

6.1.1.2 **Town of Caledon**

The Town of Caledon protects and manages Wellhead Protection Areas via Official Plan policies that restrict and prohibit uses based on the potential risk of contamination for each use. Demonstration that a proposal will not have a negative impact on the groundwater within a wellhead protection area, and site-specific rezoning is required prior to permitting any of the following uses within such an area:

- Storage Tanks
- Sewage Disposal Systems
- Automobile Service Stations
- Vehicle Repair Shops
- Dry Cleaning or Laundry Plants
- Aggregate Extraction
- Food processing plants
- Cemeteries
- Car washes
- Golf Courses
- Horticultural/Commercial Nurseries
- Open Storage Areas

Such uses, and any other proposed developments which may have an impact on groundwater resources (including new water taking uses) are required to complete hydrogeological investigations prior to approval.

6.1.1.3 **Region of Waterloo**

The Region of Waterloo has implemented Regional Official Plan policies related to both mitigating and prohibiting uses and activities that may be a threat to their drinking water system. The policies developed by the Region of Waterloo, predate the Source Water Protection planning work that is currently underway in the Province. As a result, some of the terminology that is used is not the same as what is proposed through the Source Protection Plans.

There are two areas of policy used by the Region of Waterloo. First are general provisions that seek to mitigate impacts to Source Protection Areas via the requirement for studies. For example, where a *Planning Act* application is made within a Source Water Protection Area, there is a requirement that the applicant demonstrate that the proposed use will not negatively impact the quality and/or quantity of drinking water resources in Source Water Protection Areas.

The second area of policy control which the Region utilizes to implement source water protection is through the prohibiting of certain uses and activities within Wellhead Protection Sensitivity Areas (WPSAs). These areas are classified from 1 to 8, which allows for varying degrees of management relative to the vulnerability of the underlying groundwater to:

- Contamination;
- The importance of the well to the capacity of the municipal drinking water system; and,
- The length of time groundwater within the WPSA will take to reach the supply well.

Once these WPSA's are identified, land uses that may pose a risk to the quantity and/or quality of municipal drinking-water supplies are divided into four categories according to the level of risk. These categories are:

- Category 'A' – Very High Risk Uses;
- Category 'B' – High Risk Uses;
- Category 'C' – Moderate Risk Uses; and,
- Category 'D' – Represents other land uses that involve soil excavation and/or the creation of subsurface facilities, which contribute to the risk to municipal drinking-water supplies by increasing vulnerability.

From these land use categories, policies either restrict uses or require studies prior to the approval of land uses within each category. The Township may wish to consider both approaches.

6.1.1.4 **Region of York**

The Region of York has published a number of implementation tools for local municipalities to consider in the implementation of Source Protection Plan policies within their Official Plans. While the Region's focus is largely on circulating relevant applications to Regional staff for Source Protection Plan assistance, they do provide pertinent information on matters related to transitional policies.

Transition policies are related to those planning applications that are "in process" when the Source Protection Plan is approved. In these cases, the planning application would need to be received and deemed complete prior to the Source Protection Plan approval in order to be considered a transitional application. The transition policies provide relief from the full extent of the Source Protection Plan policies where a prohibition is identified for an associated significant drinking water threat activity. The transition policies treat the threat activity as an "existing threat" (as defined in the Source Protection Plan), rather than a "future threat." The threat activity would then be managed through a Risk Management Plan, rather than prohibited. The Township may wish to also consider transitional policies as part of the Official Plan update.

6.1.1.5 City of Kawartha Lakes

The City of Kawartha Lakes 2012 Official Plan contains policies to address Wellhead Protection Areas. The Plan outlines four different Wellhead Protection Zones, each with varying degrees of permissions or controls on the land uses permitted. Table 9 summarizes the four zones and their related policies.

Table 9: City of Kawartha Lakes Wellhead Protection Policy Summary

Wellhead Protection Zone	Zone Criteria	• Related Policies
1a – Bacterial Contaminant Restriction Zone	Extends from the immediate vicinity of the well to the 50-Day time of travel	<ul style="list-style-type: none"> • The construction of new sanitary sewer systems and installation of new septic systems is not permitted.
1 – Hazardous and Toxic Contaminant Restriction Zone	Extends from the well to the 2-Year time of travel	<ul style="list-style-type: none"> • Uses defined as threats as part of the Source Water Protection Plan are not permitted to establish in this zone • Large residential developments (greater than 20 units) will be required as a condition of draft plan approval to install shallow monitors and to monitor groundwater quality for a period of no less than five years
2 – Contaminant Constraint Zone	Extends from the 2 year to the 10 year time of travel	<ul style="list-style-type: none"> • Certain land uses can be permitted with Best Management Practices. • As a condition of zoning approval, certain land uses could be required to monitor shallow groundwater quality on a regular basis.
3 – Contaminant Control Zone	Beyond the 10 Year Time of Travel	<ul style="list-style-type: none"> • Certain land uses will be permitted but will require Best Management Practices to be implemented for groundwater protection.

The above policies found within the City of Kawartha Lakes Official Plan illustrate the hierarchy of policy provisions within WHPAs. In general, the further the property is located from a well, the less restrictive the policy becomes. Kawartha Lakes Official Plan policy also allows for the updating of Wellhead mapping without the need for an amendment to the Plan, if studies are undertaken to refine the Wellhead Protection Zones. The Township of Severn will need to consider whether it is appropriate to require an OPA if changes are proposed to the limits of the WHPA mapping to address changes that may occur in the future to these areas.

6.1.1.6 County of Wellington

Section 4.9.5 of the County of Wellington Official Plan contains policies related to WHPAs, the intent of which is to prohibit high risk activities from establishing within WHPAs, and to “ensure that permitted uses can be established within an acceptable level of risk to groundwater quality and quantity.” To do this, the Plan establishes three protection areas (ranked 1 to 3, with 1 being the most vulnerable), and applies restrictions to uses based on the level of risk activity associated with each use, probable chemical usage and the ability to apply Best Management Practices (BMPs) to reduce risks. These categories are broadly shown in Table 10.

Table 10: County of Wellington Land Use Risk Categories

Category	Uses Included
A	<ul style="list-style-type: none"> • Outdoor bulk storage of road salt • Bulk storage of chemicals or hazardous substances • Bulk storage of tires • Lagoons for sewage treatment • Sanitary landfill sites • Manufacturing of large volumes of chemicals, resins, paints, varnish, printing inks, adhesives, plastics and reinforced fibreglass plastic.
B	<ul style="list-style-type: none"> • Manufacturing and dyeing of textiles • Manufacturing of agricultural, commercial and industrial machinery • Asphalt batching • Paving and roofing contractor yards • Facilities that use chemicals, resin, paints, varnish, printing inks, adhesives, plastics and reinforced fibreglass plastic, snow dumping
C	<ul style="list-style-type: none"> • Automated manufacturing of soft drinks • Distilleries, breweries • Automated production of baked goods, dairy, canned goods, frozen foods, processed food and meat • Glass and glass products manufacturing • Machinery equipment rental outlets

These land use categories in Table 8 are based on the descriptions of risk as found in Table 11.

Table 11: County of Wellington Land Use Risk Descriptions

Description	Land Use Risk Categories		
	High (Category A)	Medium (Category B)	Moderate (Category C)
<ul style="list-style-type: none"> Generates and handles large volumes of potentially hazardous liquid or soluble chemicals and/or; 	Yes	No	No
<ul style="list-style-type: none"> Generates and handles moderate volumes of potentially hazardous liquid or soluble chemicals and/or; 	No	Yes	No
<ul style="list-style-type: none"> Handles small volumes, if any, of potentially hazardous liquid or soluble chemicals and/or; 	No	No	Yes
<ul style="list-style-type: none"> Have effective engineering measures to manage chemical usage (or retroactively engineer systems) and/or; 	No	Yes	Yes
<ul style="list-style-type: none"> Can effectively implement hazard prevention measures and/or; 	No	Yes	Yes
<ul style="list-style-type: none"> Can reasonably be relocated and/or; 	No	Possible	Yes
<ul style="list-style-type: none"> Potential to increase vulnerability to the aquifer because of the removal by excavation and/or drilling surficial (soil) materials. 	No	No	Yes

Official Plan policies related to preventing the contamination of WHPAs are tied back to the land use risk categories, shown in Table 12, which shows the levels of land use category restriction for each WHPA.

Table 12: County of Wellington Wellhead Protection Provisions

Wellhead Protection Areas (WHPA)	Land Use Risk Category for Industrial and Commercial Uses		
	Category A Uses	Category B Uses	Category C Uses
WHPA 1	Prohibited	Prohibited	Prohibited
WHPA 2	Prohibited	Level I Assessment	Level II Assessment
WHPA 3	Prohibited	Level II Assessment	Level III Assessment

The level of assessment prescribed for each category and WHPA relates to the level of study required as shown in Table 13.

Table 13: County of Wellington Wellhead Protection Study Requirements

Study Requirements	Level of Assessment		
	Level I	Level II	Level III
A hydrogeological investigation complete with piezometer nests and a comprehensive evaluation of site hydrogeology	Yes	No	No
Confirm vulnerability of aquifer on-site from: <ul style="list-style-type: none"> • Site specific drilling program to the municipal aquifer, and any increase to aquifer vulnerability resulting from excavation, foundations or any other development activities; • Site specific bore hole drilling to the shallow aquifer, develop site specific water levels and water quality data and complete a review of local conditions from public records including water well records; • Review of available well records and geotechnical reports from adjacent wells to assess the potential risk to the municipal aquifer; 	Yes	No	No
Characterize subsurface hydrogeological conditions (rate and direction of groundwater flow, water quality and budget);	Yes	No	No
Consists of an extension of geotechnical investigations normally required for building design;	No	Yes	No

Study Requirements	Level of Assessment		
	Level I	Level II	Level III
Disclosure report of risk activities including chemical uses, quantities, types, storage, handling, disposal, etc., and classification (Category B or C) of each activity;	Yes	Yes	Yes
Complete an assessment of potential risks to local aquifers;	Yes	Yes	Yes
Disclosure report of the management programs associated with the use of chemicals at the site, including risk management / reduction measures, management (emergency response plans), employee awareness training, best management practices (BMPs) and monitoring programs.	Yes	Yes	Yes

6.1.1.7 Town of Midland

The Town of Midland Official Plan was approved in 2002 and consolidated in 2014. The Town of Midland has recently implemented and adopted Source Protection policies within their Official Plan at the local level. These policies are currently at the County of Simcoe for approval. Section 7.3 of the Town of Midland Official Plan contains policies related to Groundwater Resources. This section contains subsections regarding Groundwater Source Protection; WHPAs; Highly Vulnerable Aquifers. The policies indicate that uses and activities will conform to the Source Protection Plan and studies will be required to be undertaken prior to development occurring in WHPA's, Aquifer Recharge Areas or Significant Groundwater Recharge Areas. The work undertaken as part of the Source Protection Plan, Risk Assessment Report and Tier Three Report generally reflect the studies required to be completed by the Official Plan.

6.1.2 Zoning Provisions

As Source Water Protection Plans are a new concept in land use planning in Ontario, the implementation of protection provisions within municipal planning documents, especially Zoning By-laws, has been extremely limited. However, there are some examples of municipalities that have implemented limited groundwater protection provisions through zoning. These provisions provide some examples of how the Township of Severn could approach the zoning of WHPAs and significant threats.

6.1.2.1 Town of Caledon

The Town of Caledon Zoning By-law 2006-50 contains limited provisions related to Wellhead Protection Areas. The By-law primarily:

- restricts numerous uses within Wellhead Protection Areas; and,
- Provisions related to existing uses that are prohibited within WHPAs, which specify that the use may continue in accordance with the use provisions of the underlying existing zoning.

6.1.2.2 Township of Centre Wellington

Section 4.41 of the Township of Centre Wellington Zoning By-law #2009-045 contains WHPA provisions, which apply to those uses that are both prohibited and restricted within a hierarchy of WHPAs (WHPAs classification from 1 to 3 derived from the County of Wellington Official Plan, based on sensitivity to contamination). An overlay schedule is used to delineate each WHPA. Table 14 summarizes these provisions as they relate to each WHPA:

Table 14: Summary of Centre Wellington Zoning Provisions related to Wellhead Protection

WHPAs	Provision Type	Uses
1, 2 and 3	Prohibited Uses	Uses prohibited: <ul style="list-style-type: none"> • outdoor bulk storage of road salt • bulk storage of chemicals, hazardous substances or tires • lagoons for sewage treatment & sanitary landfill sites • manufacturing of large volumes of various chemicals and other toxic materials
1	Prohibited Uses	Uses prohibited: <ul style="list-style-type: none"> • manufacturing and dyeing of textiles • manufacturing of agricultural, commercial and industrial machinery • asphalt batching, paving and roofing contractors yards • facilities that use certain chemicals and other toxic materials. machinery,
1, 2 and 3	Restricted Uses	Risk assessment or hydrogeological assessment is required prior to permitting: <ul style="list-style-type: none"> • automated manufacturing of various foods and drinks • glass and glass products manufacturing • machinery equipment rental outlets.
2 and 3	Restricted Uses	Risk assessment or hydrogeological assessment is required prior to permitting: <ul style="list-style-type: none"> • manufacturing and dyeing of textiles • manufacturing of agricultural, commercial and industrial machinery • asphalt batching, paving and roofing contractor yards • facilities that use chemicals and other toxic materials.

The Township of Centre Wellington Zoning By-law also contains provisions for existing uses within WHPAs. In this regard, the By-law states that while uses otherwise prohibited within WHPAs will be permitted to continue if they legally existed in the Area prior to the passing of the By-law, they will not be permitted to expand unless:

- a) a risk assessment or hydrogeological assessment is prepared; and,
- b) the provisions and regulations of the underlying zoning are complied with.

6.1.2.3 Township of Zorra

The Township of Zorra has provisions within Section 5.12 of Zoning By-law 35-99 related to the protection of Groundwater Recharge Areas. Through these provisions (and associated mapping of such recharge areas on their Zoning schedules), the Township uses a two-tiered approach to protect such areas. First, permitted uses are outlined as those uses that existed as of the date of the passing of the By-law. Furthermore, all uses permitted within the underlying zone are also permitted, with the exception of a list of uses that are deemed a threat to groundwater resources. Some of these uses include:

- A landfill site;
- An asphalt or concrete batching plant;
- An industrial or commercial use involving the storage or processing of chemical and/or petroleum products, except a farm;
- An automobile service station; and,
- A fuel storage tank or supply yard.

The above restricted uses, when permitted in an underlying zone, require a Disclosure Report and/or Contingency Report prior to issuing a building permit, and also require the proponent to enter into a Site Plan Control agreement. The requirement for these studies is similar to the allowance for Risk Management Plans in the *Clean Water Act*, which could be an implementing concept utilized in the Township of Severn's Zoning By-law.

7.0 Recommendations

The *Clean Water Act* requires municipalities to implement Source Protection Plans to protect existing and future municipal drinking water supplies. Source Protection safeguards public health by protecting drinking water supplies and is a preventative approach that is a more cost effective means of protecting drinking water than water treatment alone. Once water sources are contaminated, treatment can become much more expensive, challenging or even impossible.

This Background Report summarizes the basics of Source Water Protection, the implementation requirements of the South Georgian Bay Lake Simcoe Protection Plan, which is applicable to the Township of Severn, and industry practices within Official Plans and Zoning By-laws that are being employed around the Province.

Based on the information contained in this Report, it is recommended that the implementing policies and regulations for the Township of Severn focus on managing and restricting land uses, particularly those that are identified as threats within the Township.