Chapter 14: Town of New Tecumseth

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14.1 Introduction

This chapter contains information on three drinking water systems for the Town of New Tecumseth. Various consultants have completed the work presented, which has also been reviewed by South Georgian Bay-Lake Simcoe Source Water Protection staff and members of the Technical Work Group or the Source Protection Committee~~Various consultants have completed the work presented, all of which was reviewed by South Georgian Bay-Lake Simcoe Source Water Protection staff and members of the Technical Work Group~~. In this chapter, each of the groundwater systems and surface water systems is discussed separately for easier readability.

Each municipal system section begins with an introduction of the characteristics of the drinking water system. This includes an overview of the location, number of people served, and source of the water supply. The sections following the system introductions are comprised of a Vulnerability Assessment and Issues and Threats evaluation of the system. The Vulnerability assessment includes the delineation of the Vulnerable Area(s) (Wellhead Protection Area), and the assignment of Vulnerability Score for the delineated area. An Uncertainty Rating is also provided for the Vulnerable Area delineation and the Vulnerability Assessment as per Technical Rules 13-15 (Part I.4 – Uncertainty Analysis – Water Quality (MOE, 2008a)) to express the level of confidence in the results based on the information that was available for the study.

The Issues evaluation is intended to identify chemical parameters or pathogens in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future. Any Issues identified for the systems will be listed in this section, along with a map illustrating the Issues Contributing Area if an Issue is known. The Threats evaluation identifies potential Significant Drinking Water Threats within the delineated Vulnerable Areas. This process includes creating lists for Drinking Water Threats for Activities and Conditions, generating maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats, and a final enumeration of Significant Drinking Water Threats.

For more information, readers are encouraged to read Chapter 5: Methods Overview as well as, the responsible consultant reports and memos (found in Appendix MO and N) for a more in depth description of the methods used, as well as the Glossary for any unfamiliar terms.

14.2 Drinking Water Systems

The Town of New Tecumseth, located in the southern portion of Simcoe County, operates three (3) groundwater based water supplies in two communities and does not have any surface water based supplies. As shown Figure 14-1 all of the groundwater supplies are within the South Georgian Bay-Lake Simcoe (SGBLS) Source Protection Region (SPR).

Municipal Groundwater Supplies in the Town of New Tecumseth within the Nottawasaga Valley Source Protection Area (SPA) included in this report:

- Alliston Water Works- Alliston Wells (Drinking Water Information System Number 220001174) with 6 wells screened in the A2, A3 and A4 confined overburden/bedrock aquifers
- Alliston Water Works- Hillcreast Well (Drinking Water Information System Number 220006874) with 1 well screened in the A4 confined bedrock aquifer
- Tottenham Water Works (Drinking Water Information System Number 220001085) with 4 wells screened in the A3 and A4 confined overburden aquifers

A pipeline has been constructed from the Raymond A. Barker Water Treatment Plant in the Town of Collingwood to reach sections of the Town of New Tecumseth, such as Alliston and Beeton, and now serves as the main source of water. The Alliston Water Works serve as a supplemental water source as required. There are plans for the pipeline to extend the Community of Tottenham by 2014. The groundwater wells are planned to be used less and less as more of the surface water from the Town of Collingwood will be used, but the well system would be sufficient to supply the Town of New Tecumseth by itself if there is the need for it. The assessment of Drinking Water Threats to the Raymond A. Barker Water Treatment Plant in the Town of Collingwood is provided in Chapter 11 of this Assessment Report.

In addition to the groundwater systems within New Tecumseth, a number of vulnerable areas from surrounding municipalities extend into the Town (Table 14-1). This includes WHPAs from the Palgrave (Peel) and Cookstown (Innisfil) Well supplies– see Chapter 7 and 13 of this Assessment Report, as well as WHPA for the Schomberg Well Supply – see the Lake Simcoe and Couchiching-Black River Assessment Report (Part 1, Chapter 13) for more information. Also, the Hillcrest and Alliston water supplies have been found to extend out of New Tecumseth and into the Township of Adjala-Tosorontio (Table 14-1).

Table 0-1: WHPA that cross into and out of the Town of New Tecumseth in the SGBLS SPR.

Local Municipality that WHPA extends into	Municipality where wellhead is located	Name of Water Supply	Source Protection Region and Source Protection Authority (SPA)	Location where entire Assessment can be obtained
Town of New Tecumseth	Regional Municipality of Peel	Palgrave	SGBLS SPR and Nottawasaga Valley SPA	This report (Chapter 7)
Town of New Tecumseth	Town of Innisfil	Cookstown	SGBLS SPR and Nottawasaga Valley SPA	This report (Chapter 13)
Town of New Tecumseth	Regional Municipality of York	Schomberg	SGBLS SPR and Lakes Simcoe and Couchiching / Black River SPA	Lake Simcoe and Couchiching-Black River Assessment Report (Part 1, Chapter 13)
Township of Adjala-Tosorontio	Town of New Tecumseth	Alliston Water Works	SGBLS SPR and Nottawasaga Valley SPA	This Chapter

14.3 Alliston Water Works (Alliston & Hillcrest Water Supplies)

The Alliston Water Works is located in the northwest corner of the Town of New Tecumseth in the Community of Alliston. The Hillcrest Well Supply is included within the Alliston Water Works as it provides water to the Community of Alliston and operates under the same Permit to Take Water. The Alliston Water Works currently consists of seven water supply wells: Well 1, Well 4, Well 5, Well 6, Well 7, Well 8 and the Hillcrest Well. The well locations are shown on Figure 14a-1. The 8,600 residents (2001 data) of the Community of Alliston now rely primarily on surface water supplied from the Raymond A. Barker Water Treatment Plant in the Town of Collingwood for its water supply. The water is obtained from Georgian Bay and treated prior to distribution by pipeline. The municipal well system is now used to supplement for peak demands and as a back-up as required.

Well 1 and the Hillcrest Well are located in the northwest part of the community. Well 8 is located on the east side of the Community of Alliston, just off Highway 89. Well 5 is located adjacent to the Honda plant on the 14th Line, whereas Well 4 and Well 6 are located south of the community on County Road 10. Well 7 is located west of Wells 4 and 6, on 8th Avenue.

Well 1 was drilled in 1951. Wells 4, 5 and 6 were drilled around 1986. Well 7 was drilled in 1993, Well 8 was drilled in 1996 and the Hillcrest Well was drilled in 1958.

According to the Permit to Take Water (PTTW) # 8607-62VKNL for this system which expires on August 30 2014, the rated capacity for the maximum flow rate is 1,642 m^3/day for Well 1; 2,938 m^3/day each for Wells 4, 5 and 6; 4,964 m^3/day for Well 7; 1,964 m^3/day for Well 8 and 821 m^3/day for the Hillcrest Well.

Well 1 was constructed to a total depth of 80.16 meters below ground level (mbgl) and has a 203 mm diameter Layne #6 louvered stainless steel well screen that extends from 73.4 to 79.4 mbgl. Following construction the well had a static level of 12.37 mbgl. Well 4 was constructed to a total depth of 74.9 m. The well is a single wall gravel pack design with 10.7 m of Layne #6 stainless steel louvered screen, with a diameter of 610 mm. The screen is 250 mm diameter and was installed with a back-off coupling and a lead packer. The top of the 250 mm diameter extension pipe is 55.3 mbgl. Following construction the static level was 2.6 m above ground level. In 1998, static levels were 27 mbgl and the wells no longer recover to flowing conditions.

Well 5 is a 254 x 508 mm diameter gravel wall well with 20-slot stainless steel wire wound screen extending from 67.22 to 78.27 mbgl. The original static level was 14.2 mbgl. Well 6 was constructed to a total depth of 71.6 m and is a double wall 305 x 610 mm diameter gravel pack design with 7.6 m of Johnson 20-slot stainless steel wire wound screen. The outer casing has a

diameter of 610 mm. Following construction the static level was 17.5 mbgl. Well 7 is a 304 x 610 mm diameter gravel pack well that is 51.2 m deep with 4 m of 40-slot pipe size stainless steel wire wound screen. The well had an original static level of 0.48 m above ground level. Well 8 is a double wall 508 x 254 mm diameter gravel pack design with 6.3 m of Johnson 15 to 25-slot stainless steel wire wound screen. The outer casing has a diameter of 508 mm. Following construction, the static level was 10.2 mbgl. The Hillcrest Well is a 152 mm diameter well that is constructed in the limestone-bedrock at a depth of 95.7 m. The original static level is reported to be 18.3 mbgl.

A stratified multi-aquifer system, consisting of interbedded layers of sand and silt/clay till material are observed beneath the Community of Alliston area. The sand aquifer materials are relatively continuous throughout the Community of Alliston area, except in areas of bedrock highs, or thick till deposits. The overburden ranges between 50 and 100 m thick, thins toward the Niagara Escarpment to the west, and is underlain by shale and limestone bedrock. There are three aquifers present. The upper aquifer is discontinuous and unconfined. The two lower aquifers, are confined by overlying aquitards and are the source of water for the Alliston Water Works. The Hillcrest Well is drilled into a confined limestone bedrock aquifer.

The screen interval for Well 1, Well 4, Well 5, Well 6, Well 7, Well 8 and the Hillcrest Well has been assigned to the A4, A4, A4, A3, A2, A3 and A4 Aquifers, respectively, in the draft regional hydrostratigraphic model prepared by Golder and Aquaresource (2009). The Groundwater Vulnerability rating will be determined for the observed most vulnerable of the A2, A3 and A4 Aquifers.

Information presented for the Alliston Water Works section of this Chapter is based on Genivar 2010a report.

14.3.1 Groundwater Vulnerability Assessment

The Wellhead Protection Area (WHPA) is the primary Vulnerable Area delineated to ensure the protection of the municipal water supply wells. The Groundwater Vulnerability has been assessed to provide an indication, within the WHPA, which current (or future) Threats at the surface present the greatest risk to contaminate the water supply. The Vulnerability Analysis considers the WHPA and the Groundwater Vulnerability, as well as the potential for the vulnerability to be increased by man-made (anthropogenic) structures, through Transport Pathways, by developing a “Vulnerability Score” within the WHPA. Conversion of Vulnerability categories (High, Medium and Low) to Vulnerability Scores (10, 8, 6, 4 and 2) results in a new map for each WHPA that expresses the relative degree to which a Threat could affect the

drinking water supply. A higher value Vulnerability Score will always be assigned to the immediate vicinity of the well and to any areas that are shown to be vulnerable.

The Groundwater Vulnerability for the Alliston Water Works has been delineated following the process recommended in the Technical Rules. The areas determined to contribute groundwater to the wells within 25 years were delineated as WHPA. The Groundwater Vulnerability within the WHPA was assessed and included consideration for the effects of man-made structures that may increase the Vulnerability. The WHPA and the Vulnerability were considered together as per the Technical Rules to determine a Vulnerability Score for the Alliston WHPA. Details of the methods for the Vulnerability Analysis are provided in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO).

14.3.1.1 Wellhead Protection Area (WHPA) Delineation

The WHPA for the Alliston Water Works were delineated in 2005 by Golder using a 3-dimensional analytical groundwater flow model. An updated survey of well locations was commissioned by SGBLS in 2009 to provide improved accuracy for delineation of the WHPA. Golder (2010g) provided updated WHPA for the Alliston Water Works based on the revised locations. The updated well locations and the WHPA are shown in Figure 14a-1. WHPA delineation and adjustment details are documented in Genivar, 2010a.

WHPA-A has been added to include the 100 m radius from each municipal well. The Golder (2005) study delineated time-of-travel zones (TOT) for 50 days, 2 years, 10 years and 25 years. The 10 year TOT zone was used as WHPA-C1 for the determination of Vulnerability Scores.

The WHPA for the Alliston Water Works reflects groundwater flow mostly from west to east, consistent with the regional surface water drainage pattern. There is more of a south to north component to groundwater flow to Wells 4 and 6. The groundwater flow patterns are reasonable based on available data describing topography and regional drainage.

14.3.1.2 Groundwater Vulnerability

The Alliston Water Works draw water from a series of confined overburden aquifer layers (regional aquifer systems A2, A3 and A4). The Groundwater Vulnerability for the municipal overburden and bedrock aquifers in the area was determined using the regional Aquifer Vulnerability Index (AVI methods outlined in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO). The regional Groundwater Vulnerability is illustrated in Technical Memorandum B1 – Regional Groundwater Vulnerability Mapping.

The Groundwater Vulnerability within the WHPA of the municipal wells in the Alliston Water Works is shown in Figure 14a-2. The Groundwater Vulnerability for the municipal water supply aquifer within the WHPA is considered to be Low, except for a small area of Medium Vulnerability near the western extent of WHPA-D to the west of Well 7.

14.3.1.3 Transport Pathway Increase

Technical Memorandum A3 (Appendix MO) documents the consideration of Transport Pathways to increase the Vulnerability Rating as per the Technical Rules. The Vulnerability Rating can be increased from Medium to High, Low to Medium, or from Low to High in accordance with the potential for artificial Transport Pathways to increase the observed vulnerability.

Private wells, and particularly wells that either do not contain seals that will prevent water from moving down around the outside of the well pipe, and wells that are no longer used and/or that have not been sealed present the greatest potential for increasing the rated Vulnerability. The available data from the Provincial Water Well Information System (WWIS) database was screened to identify wells that penetrate to the water supply aquifers and have potential to increase the Vulnerability of the natural stratigraphic profile. There is potential that other wells may exist that are not included in the database, particularly in areas now serviced by municipal water that formerly obtained water supply from private wells.

Several wells in the available databases were identified to be potential Transport Pathways within the Alliston WHPA. Two (2) are located within the WHPA for Wells 4 and 6, one (1) is located within the WHPA for Well 5, and six (6) are located within the WHPA for Well 1 and the Hillcrest Well. All of the identified potential Transport Pathways are located within areas of Low Vulnerability. The Vulnerability Rating of the 30 m radius around each well has been increased from Low to Medium. Mapping of the transport pathways and increased vulnerability were presented in the technical study completed by GENIVAR (2010). Ultimately the locations of transport pathways and increased vulnerability are reflected in the maps of Vulnerability Scores (See Section 14.3.1.5).

14.3.1.4 WHPA-E ~~/ WHPA-F~~

None of the wells in this study have been identified as Groundwater Under the Direct Influence of surface water (GUDI), therefore delineation of a WHPA-E was not required. ~~Since a WHPA-E was not required for any of the wells, the delineation of a WHPA-F was also not required.~~

14.3.1.5 Vulnerability Score

The WHPA zones for the Alliston Water Works, as shown in Figure 14a-1, the Groundwater Vulnerability, as shown in Figure 14a-2, and the increased Vulnerability discussed in Section 14.3.1.3, were used to assign a Vulnerability Score by using the matrix from Table 5.3 (Chapter 5: Methods Overview, Section 5.2.4). Figure 14a-3 illustrates the Vulnerability Scores for the Alliston WHPA Figure 14a-3 will be used to assess Drinking Water Threats in Section 14.3.3. The Transport Pathways are illustrated as circles with 30 m radius in the WHPA.

14.3.1.6 Uncertainty Rating

The Technical Rules require that an Uncertainty Rating of either High or Low be assigned with each Vulnerable Area as outlined in Technical Rules 13-15 (Part I.4 – Uncertainty Analysis – Water Quality (MOE, 2008a)). A component of the Uncertainty Rating is to be provided for the WHPA delineation by the technical peer review consultant. A second component of the Uncertainty Rating is to be provided in association with the Vulnerability Assessment.

The uncertainty delineation of the Alliston Water Works WHPAs was determined by peer reviewers from Dillon Consulting using a standard scoring matrix (Table 1, Appendix MO). The Uncertainty Rating assigned for the Alliston Water Works WHPAs is High. The full results of the WHPA delineation Peer Review process, for Alliston Water Works is available in Appendix N and discussed in Chapter 5 (Methods Overview).

The assessment of the uncertainty for the Vulnerability Assessment considers the type, quantity and quality of available data, the methods used to determine the Groundwater Vulnerability, and the nature of the groundwater flow system.

The Uncertainty Rating assigned for the Vulnerability Assessment Component for the Alliston WHPA is High. The Vulnerability Rating for the Alliston Water Works has been determined using decisions and assumptions that would err on the conservative side (higher Vulnerability Scores). In this case, the High Uncertainty Rating reflects that additional data to describe the continuity, thickness and types of soils within the delineated WHPA could potentially be used to improve the understanding of local hydrostratigraphy and to increase the confidence in the Vulnerability Analysis. For further information, refer to Technical Memorandum A1 (Appendix MO).

14.3.2 Drinking Water Issues Evaluation

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future. To be considered a Drinking Water Issue, a parameter needs to be

at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water or if there is a trend of increasing concentrations of the parameter and a continuation of that trend that would result in the deterioration of the quality of the water as a source of drinking water (Technical Rule 114.(1)(a-b)). However, a parameter may not be considered an Issue in cases where it is naturally occurring or effective treatment is in place.

Available data describing raw water quality and treated water quality for the Alliston Water Works have been reviewed to identify Drinking Water Issues that are considered likely to result in a deterioration of the quality of water for use as a source of drinking water. Details of the Drinking Water Issues Evaluation for the Town of New Tecumseth Groundwater systems are provided in Technical Memorandum J1 – Drinking Water Issues Evaluation – New Tecumseth (Appendix N).

No Drinking Water Issues were identified for the Alliston Water Works.

Parameters whose concentrations occasionally exceed Aesthetic/Operational guidelines under the Ontario Drinking Water Quality Standards (ODWQS) include hardness, iron, aluminum and organic nitrogen. These parameters are likely naturally-occurring.

Sodium concentrations have exceeded the guideline of 20 mg/L used by the Medical Officer of Health for sodium restricted diets but are not projected to exceed the ODWQS objective of 200 mg/L within 50 years.

The organic parameter 2,4,6-trichlorophenol was detected in trace concentrations on only one occasion at Alliston Well 1.

Coliforms have been detected in the raw water under conditions that are rare and not consistent. Treatment consisting of adequate filtration and disinfection is in place and maintained in accordance with Provincial standards set under the Safe Drinking Water Act. As this treatment is effective and detections are rare, the coliform bacteria are not considered to be Drinking Water Issues.

14.3.3 Drinking Water Threats Evaluation

An assessment of Drinking Water Threats for the Alliston Water Works was completed in accordance with the detailed methodology presented in Technical Memo – A5 (Appendix MO). 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.” 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 particular land use, whereas a Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities. Therefore, it is not only presently existing Threats that must be regulated, but future ones as well.

The Drinking Water Threats Assessment for the Alliston Water Works builds on the information from the Vulnerability Analysis and Issues Evaluation and includes preparation of:

- a list of Drinking Water Threats for Activities
- a list of Drinking Water Threats for Conditions
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Activities
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Conditions
- an enumeration of Drinking Water Threats

14.3.3.1 List of Drinking Water Threats – Activities

The list of Prescribed Drinking Water Threats considered in the assessment for the Alliston Water Works is provided in Chapter 5, section 5.5.1.

No additional Drinking Water Threats were identified for consideration. No local circumstances for prescribed Threats were identified.

14.3.3.2 List of Drinking Water Threats – Conditions

Methods used to assess Conditions are described in Technical Memorandum A5 (Appendix MO). The following information sources were consulted to identify existing Conditions that could affect the Alliston Water Works:

- files provided by the Ministry of the Environment, Conservation and Parks local offices pertaining to licenses, and records of spills in the area of the delineated WHPA
- records available from the Ministry of the Environment, Conservation and Parks website containing registry of Brownfield Sites
- records from available technical studies and previous contaminant source inventories that identified situations that may qualify as conditions

- interviews of Town of New Tecumseth staff to identify potential conditions within the identified WHPA for the drinking water supply

No confirmed Conditions have been identified for the Alliston Water Works. No potential Conditions have been identified for consideration at this time.

14.3.3.3 Identifying Areas of Significant/Moderate/Low Threats – Activities

The areas where Activities are or would be Drinking Water Threats are illustrated on a series of maps based on the Vulnerability Scores and Vulnerable Area delineations. The maps combined with the ~~table of drinking water~~Technical Rules threat circumstances can be used to correlate activities that are or would be Drinking Water Threats. ~~include references to a series of tables prepared by MOE to correlate activities that are or would be Drinking Water Threats with the Vulnerability Scores.~~ The circumstances~~tables~~ can be found at ~~the~~ https://threats.swpip.ca/~~https://swpip.ca/~~. ~~Source Water Protection Information PortalSource Water Protection Information Portal.~~

14.3.3.3.1 Pathogen Parameters

The ~~MECP table of Drinking Water Threats~~Technical Rules can be used in conjunction with the Vulnerability Scores ~~Key Table on Figure 14a-4 can be used in conjunction with the Vulnerability Scores~~ to identify the areas where activities associated with pathogen Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Alliston Water Works (Figure 14a-4). Activities that are or would be Significant Drinking Water Threats for pathogens can be observed within the areas where the Vulnerability Score is 10. Pathogens can also only be a Significant, Moderate or Low Threat within WHPA-A and WHPA-B.

14.3.3.3.2 Chemical Parameters

The ~~MECP table of Drinking Water Threats~~Technical Rules ~~Key Table on Figure 14a-5~~ can be used in conjunction with the Vulnerability Scores to identify the areas where activities associated with chemical Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Alliston Water Works (Figure 14a-5).~~,~~ Activities that are or would be Significant Drinking Water Threats for chemicals can be observed within areas where the Vulnerability Score is equal to or greater than 8.

14.3.3.3.3 DNAPL Chemical Parameters

Figure 14a-6 illustrates the area of the 5-year time-of-travel zone (WHPA-C) and areas with a Vulnerability Score of 6, where activities associated with DNAPL parameters are considered to

be a Significant Drinking Water Threat for the Alliston Water Works. The ~~MECP table of Drinking Water Threats~~ Technical Rules~~Key Table on Figure 14a-6~~ can be used to can be used to identify the circumstances in which these Activities associated with DNAPL threats would be Significant Drinking Water Threats.

14.3.3.4 Identifying Areas of Significant/Moderate/Low Threats – Conditions

Further to Section 14.3.3.2, no Conditions have been confirmed within the WHPA for the Alliston Water Works.

A Condition would be a threat to municipal drinking water in the following situations:

- **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
- **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
    2. where the Vulnerability Score is 10, and there is no evidence of off-site contamination
- **Low**: where the Vulnerability Score ≥ 8 and < 10 and there is no evidence of off-site contamination

Figure 14a-3 illustrates the Vulnerability Score map for Alliston Water Works that can be used to determine where a Condition is or would be a Significant, Moderate or Low Threat to Drinking Water.

14.3.3.5 Enumerating Drinking Water Threats

The number of Significant Drinking Water Threats for the Alliston Water Works has been determined using the methodology outlined in Technical Memorandum A5 (Appendix MO) and refined using the methodology outlined in Chapter 5 (Section 5.5.6.4) of this Assessment Report. There are no Significant Threats associated with Conditions or Drinking Water Issues.

Table 14-2 to Table 14-6 document the enumeration of existing and potential activities that are considered to be Significant Drinking Water Threats within the WHPA for the Alliston Water Works. Table 14-2 presents the enumeration for the WHPA for Wells 4 and 6, Table 14-3 presents the enumeration for Well 5, Table 14-4 presents the enumeration for Well 7, Table

14-5 presents the enumeration for Well 8 and Table 14-6 presents the enumeration for Well 1 and the Hillcrest Well. Activities that are considered to be potential Significant Drinking Water Threats were identified within areas where the Vulnerability Score is 10 and for parcels within WHPA B & C that are identified as potentially having a threat related to DNAPLs.

For the WHPA around Wells 4 and 6, twelve (12) activities that are considered to be potential Significant Drinking Water Threats were identified in association with four (4) land parcels. The identified significant Threats are related to private on-site sewage systems (2), the application of agricultural source material to land (4), the application of pesticide to land (4), and the handling and storage of fuel (2).

For the WHPA around Well 5, nine (9) activities that are considered to be potential Significant Drinking Water Threats were identified in association with three (3) land parcels. One (1) potential Significant Threat was identified in association with a stormwater sewer outfall within WHPA-A. One (1) of the parcels was identified as having Significant Threats related to a private sewage disposal system, potential for below grade storage of fuel for heating purposes, application of agricultural source material and pesticide to land, as well as for the handling/storage of fertilizer and pesticide. Two (2) parcels were identified with the potential for handling/storage of DNAPL within WHPA-C.

For the WHPA around Well 7, eleven (11) activities that are considered to be potential Significant Drinking Water Threats were identified in association with two (2) land parcels. The identified Significant Threats are related to a private on-site sewage system (1), the application of agricultural source material to land (1), storage of agricultural source material (2), the application of commercial fertilizer to land (2), the application of pesticide to land (2), the handling and storage of fuel (1), and the use of land as livestock grazing or pasturing land, an outdoor confinement area, or a farm-animal yard.

For the WHPA around Well 8, sixteen (16) activities that are considered to be potential Significant Drinking Water Threats were identified in association with thirteen (13) land parcels. Eleven (11) parcels were identified for use of private sewage disposal systems, three (3) parcels were identified for the handling/storage of fuel, and two (2) parcels were identified for the potential handling/storage of DNAPLs.

For the WHPA around Well 1 and the Hillcrest Well, four (4) activities that are considered to be potential Significant Drinking Water Threats were identified in association with four (4) land parcels. One (1) Threat and parcel was included to represent the municipal sanitary sewage system and connections within the areas where the vulnerability score is 10. One Threat and parcel was included to represent the potential storage of fuel for home heating purposes within

the areas where the vulnerability score is 10. Two (2) parcels were identified for potential handling and storage of DNAPLs.

Table 0-2: Number of Significant Drinking Water Threats for Alliston Water Works - Wells 4 and 6, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	2~~0~~
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	2
3	The application of agricultural source material to land	4
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	1~~4~~
11	The handling and storage of pesticide	0
12	The application of road salt	1~~0~~
13	The handling and storage of road salt	1~~0~~
14	The storage of snow	1~~0~~

Threat Number	Threat	Significant Threat Counts Number of Threats
15	The handling and storage of fuel	2
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	**18~~2~~*** significant threats (on **8** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. * 12 potential Threats that require further investigation

Table 0-3: Number of Significant Drinking Water Threats for the Alliston Water Works - Well 5, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	2
3	The application of agricultural source material to land	1
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	1
10	The application of pesticide to land	1
11	The handling and storage of pesticide	1
12	The application of road salt	1~~0~~
13	The handling and storage of road salt	1~~0~~

Threat Number	Threat	Significant Threat Counts Number of Threats
14	The storage of snow	1~~0~~
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	2
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	1~~2~~9* significant threats (on **4** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. * 9 potential Threats that require further investigation

Table 0-4: Number of Significant Drinking Water Threats for the Alliston Water Works - Well 7, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	1
3	The application of agricultural source material to land	1
4	The storage of agricultural source material to land	2
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	2
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	2
11	The handling and storage of pesticide	0
12	The application of road salt	1~~0~~
13	The handling and storage of road salt	1~~0~~

Threat Number	Threat	Significant Threat Counts Number of Threats
14	The storage of snow	10
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	2
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	**14*** significant threats (on **3** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. *3 verified existing Threats and 8 potential Threats that require further investigation

Table 0-5: Number of Significant Drinking Water Threats for the Alliston Water Works - Well 8, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	11
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	7~~0~~
13	The handling and storage of road salt	7~~0~~

Threat Number	Threat	Significant Threat Counts Number of Threats
14	The storage of snow	7~~0~~
15	The handling and storage of fuel	3
16	The handling and storage of dense non-aqueous phase liquid	2
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	37~~16~~* significant threats (on **20** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. *9 verified existing Threats and 7 potential Threats that require further investigation

Table 0-6: Number of Significant Drinking Water Threats for the Alliston Water Works - Well 1 and Hillcrest Well, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	1
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0

Threat Number	Threat	Significant Threat Counts Number of Threats
14	The storage of snow	0
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	2
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	**4*** significant threats (on **4** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. *1 verified existing Threats and 3 potential Threats that require further investigation

~~14.3.3.4.1~~14.3.3.5.1 Managed Lands

Technical Rule 16(9) ~~(August 2009)~~ requires the Assessment Report to include maps showing the location of Managed Lands and the percentage of Managed Lands within a Vulnerable Area, including WHPA-A, -B, -C, -D, and -E. This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~Part XII of~~ the Technical Rules ~~(December 2021). the Table of Drinking Water Threats.~~

Managed Lands were identified and the Managed Lands proportions were determined for the WHPA of the Alliston Water Works as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.3.3.5). The Managed Lands are used in the identification of threat activities associated with the application of Agricultural Source Material, Non-Agricultural Source Material and commercial fertilizer

Figure 14a-7 illustrates the location and proportion of Managed Lands within the delineated WHPA zones for the Alliston Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.

~~14.3.3.4.2~~14.3.3.5.2 Livestock Density

Technical Rule 16(10) ~~(August 2009)~~ requires the Assessment Report to include maps showing the livestock density within WHPA-A, -B, -C, -D, and -E. This mapping is not required where the vulnerability scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~the Table of Drinking Water Threats. Part XII of~~ the Technical Rules ~~(December 2021).~~

The Livestock Density was determined for the delineated WHPA zones of the Alliston Water Works as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.3.3.5). Nutrient units per farm are in the identification of Threat activities associated with the storage of Agricultural Source Material, and the grazing and/or confinement of livestock.

Figure 14a-8 illustrates the distribution of Livestock Density within the delineated WHPA zones for the Alliston Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D. The Livestock Density figure reflects the distribution of Agricultural Managed Lands as determined in accordance with Technical Memorandum A5 (Appendix MO).

~~14.3.3.4.3~~14.3.3.5.3 Impervious Surfaces

Technical Rule 16(11) ~~(August 2009)~~ requires the Assessment Report to include maps showing the percentage of surface area where road salt could be applied to Impervious Surfaces within WHPA-A, -B, -C, -D, and -E. This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~the Table of Drinking Water Threats.~~ ~~Part XII of~~ the Technical Rules ~~(December 2021)~~.

The proportion of Impervious Surfaces within the delineated WHPA zones for the Alliston Water Works was determined in accordance with the methodology in Technical Memorandum A5 (Appendix MO). Methodology in Technical Memorandum A5.1 (Appendix MO) was used in 2023 to update the proportion of Impervious Surfaces within the delineated WHPA zones using the 2021 Technical Rules. The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.3.3.5). The Impervious Surfaces are used in the identification of threat activities associated with the application of winter de-icing agents (salt).

Figure 14a-9 illustrates the distribution of Impervious Surfaces within the delineated WHPA zones for the Alliston Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.

14.4 Tottenham Well Supply

The Tottenham Water Works is located in the southwest part of the Town of New Tecumseth in the Community of Tottenham. The Tottenham Water Works currently consists of four water supply wells: Well 4, Well 5, Well 6 and Well 7. Wells 4 and 5 are located centrally within the community on Walkhem Drive. Wells 6 and 7 are located to the immediate west of the Community of Tottenham adjacent to the community Sports Park. The wells serve the Community of Tottenham which services a population of roughly 4,800 based on 2001 data. Tottenham Wells 4, 5, 6 and 7 were drilled in 1970, 1977, 1996 and 1997, respectively.

According to the Permit to Take Water (PTTW) # 2535-5ZYLJF issued on July 7, 2004 and which expires on January 15 2014, the rated capacity for the maximum flow rate is 1,633 m^3/day each for Wells 4 and 5; 1,728 m^3/day for Well 6 and 1,669 m^3/day for Well 7.

Well 4 was constructed as a 381 mm diameter well that is 88.4 m deep and has 16.8 m of telescoping 25-slot stainless steel well screen. The well had an original static level of 7.9 mbgl. Well 5 was constructed as a 304 mm diameter well that is 88.9 m deep and has 13.2 m of telescoping 30, 60 and 80-slot stainless steel well screen. The well had an original static level of 7.9 mbgl. Wells 6 is a naturally developed, 152 mm diameter well that is 88.4 m deep and is fitted with 3.05 m of 25-slot stainless steel screen. The well had an original static level of 15.71 mbgl. Well 7 is a naturally developed, 254 mm diameter well that is 88.2 m deep and is fitted with 10.7 m of 14 and 18-slot stainless steel screen. The well had an original static level of 17.01 mbgl.

The Tottenham wells are drilled into confined overburden aquifers. The aquifer system beneath the Community of Tottenham is a stratified multi-aquifer system, consisting of interbedded layers of sand/gravel and silt/clay till. The sand and gravel aquifer materials are relatively continuous beneath the Community of Tottenham area, except in areas of bedrock highs, or thick till deposits. The overburden ranges from less than five m thick to over 100 m thick, and is observed to thin toward the Niagara Escarpment to the southwest. The overburden sequence is underlain by shale and limestone bedrock. The multi-aquifer system consists of three aquifers. The upper aquifer is discontinuous and unconfined. The two lower aquifers are confined by overlying aquitards and are the source of water for the municipal wells.

The screen interval for Well 4, Well 5, Well 6 and Well 7 has been assigned to the A3, A3, A4 and A4 Aquifers, respectively, in the draft regional hydrostratigraphic model prepared by Golder and Aquaresource (2009). The Groundwater Vulnerability rating will be determined for the A3 and A4 Aquifers.

Information presented for the Tottenham section of this Chapter is based on Genivar 2010a report.

14.4.1 Groundwater Vulnerability Assessment

The Wellhead Protection Area (WHPA) is the primary Vulnerable Area delineated to ensure the protection of the municipal water supply wells. The Groundwater Vulnerability has been assessed to provide an indication, within the WHPA, which current (or future) Threats at the surface present the greatest risk to contaminate the water supply. The Vulnerability Analysis considers the WHPA and the Groundwater Vulnerability, as well as the potential for the vulnerability to be increased by man-made (anthropogenic) structures, through Transport Pathways, by developing a "Vulnerability Score" within the WHPA. Conversion of Vulnerability categories (High, Medium and Low) to Vulnerability Scores (10, 8, 6, 4 and 2) results in a new map for each WHPA that expresses the relative degree to which a Threat could affect the drinking water supply. A higher value Vulnerability Score will always be assigned to the immediate vicinity of the well and to any areas that are shown to be vulnerable.

The Groundwater Vulnerability for the Tottenham Water Works has been delineated following the process recommended in the Technical Rules (MOE, 2008a). The areas that determined to contribute groundwater to the wells within 25 years were delineated as WHPA. The Groundwater Vulnerability within the WHPA was assessed and included consideration for the effects of man-made structures that may increase the vulnerability. The WHPA and the Vulnerability were considered together as per the Technical Rules to determine a Vulnerability Score for the Tottenham WHPA. Details of the methods for the Vulnerability Analysis are provided in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO).

14.4.1.1 Wellhead Protection Area (WHPA) Delineation

The WHPA for the Tottenham Water Works were delineated in 2005 by Golder using a 3-dimensional analytical groundwater flow model. An updated survey of well locations was commissioned by SGBLS in 2009 to provide improved accuracy for delineation of the WHPA. Golder (2010g) provided updated WHPA for the Tottenham Water Works based on the revised locations. The updated well locations and the WHPA are shown in Figure 14b-1. WHPA delineation and adjustment details are documented in Genivar, 2010a.

WHPA-A has been added to include the 100 m radius from each municipal well. The Golder (2005) study delineated time-of-travel zones (TOT) for 50 days, 2 years, 10 years and 25 years. The 10 year TOT zone was used as WHPA-C1 for the determination of Vulnerability Scores.

The WHPA for the Tottenham Water Works reflect groundwater flow from south to north. This is reasonable based on available data describing regional groundwater flow and drainage patterns.

14.4.1.2 Groundwater Vulnerability

The Tottenham Water Works draw water from confined overburden and overburden aquifer layers (regional aquifer systems A3 and A4). The Groundwater Vulnerability for the municipal overburden aquifers in the area was determined using the regional Aquifer Vulnerability Index (AVI methods outlined in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO). The regional Groundwater Vulnerability is illustrated in Technical Memorandum B1 – Regional Groundwater Vulnerability Mapping.

The Groundwater Vulnerability within the WHPA of the municipal wells in the Tottenham Water Works is shown in Figure 14b-2. The Groundwater Vulnerability for the municipal water supply aquifer within the WHPA is considered to be Low.

14.4.1.3 Transport Pathway Increase

Technical Memorandum A3 (Appendix MO) documents the consideration of Transport Pathways to increase the Vulnerability Rating as per the Technical Rules. The Vulnerability Rating can be increased from Medium to High, Low to Medium, or from Low to High in accordance with the potential for artificial Transport Pathways to increase the observed vulnerability.

Private wells, and particularly wells that either do not contain seals that will prevent water from moving down around the outside of the well pipe, and wells that are no longer used and/or that have not been sealed present the greatest potential for increasing the rated Vulnerability. The available data from the Provincial Water Well Information System (WWIS) database was screened to identify wells that penetrate to the water supply aquifers and have potential to increase the Vulnerability of the natural stratigraphic profile. There is potential that other wells may exist that are not included in the database, particularly in areas now serviced by municipal water that formerly obtained water supply from private wells.

Three wells were identified to be potential Transport Pathways within the Tottenham WHPA. All of the identified potential Transport Pathways are located within areas of Low Vulnerability. The Vulnerability Rating of the 30 m radius around each well has been increased from Low to Medium. Mapping of the transport pathways and increased vulnerability were presented in the technical study completed by GENIVAR (2010). Ultimately the locations of transport pathways

and increased vulnerability are reflected in the maps of Vulnerability Scores (See Section 14.4.1.5).

14.4.1.4 WHPA-E ~~/ WHPA-F~~

None of the wells in this study have been identified as Groundwater Under the Direct Influence of surface water (GUDI), therefore delineation of a WHPA-E was not required. ~~Since a WHPA-E was not required for any of the wells, the delineation of a WHPA-F was also not required.~~

14.4.1.5 Vulnerability Score

The WHPA zones for the Tottenham Water Works, as shown in Figure 14b-1, the Groundwater Vulnerability, as shown in Figure 14b-2, and the increased Vulnerability discussed in Section 14.4.1.3, were used to assign a Vulnerability Score by using the matrix from Table 5.3 (Chapter 5: Methods Overview, Section 5.2.4). Figure 14b-3 illustrates the Vulnerability Scores for the Tottenham WHPA. Figure 14b-3 will be used to assess Drinking Water Threats in Section 14.4.3. The Transport Pathways are illustrated as circles with 30 m radius in the WHPA.

14.4.1.6 Uncertainty Rating

The Technical Rules require that an Uncertainty Rating of either High or Low be assigned with each Vulnerable Area as outlined in Technical Rules 13-15 (Part I.4 – Uncertainty Analysis – Water Quality (MOE, 2008a)). A component of the Uncertainty Rating is to be provided for the WHPA delineation by the technical peer review consultant. A second component of the Uncertainty Rating is to be provided in association with the Vulnerability Assessment.

The uncertainty delineation of the Tottenham Water Works WHPAs was determined by peer reviewers from Dillon Consulting using a standard scoring matrix (Table 1, Appendix MO). The Uncertainty Rating assigned for the Tottenham Water Works WHPAs is High. The full results of the WHPA delineation Peer Review process, for Tottenham Water Works is available in Appendix N and discussed in Chapter 5 (Methods Overview).

The assessment of the uncertainty for the Vulnerability Assessment considers the type, quantity and quality of available data, the methods used to determine the Groundwater Vulnerability, and the nature of the groundwater flow system.

The Uncertainty Rating assigned for the Vulnerability Assessment Component for the Tottenham WHPA is High. The Vulnerability Rating for the Tottenham Water Works has been determined using decisions and assumptions that would err on the conservative side (higher Vulnerability Scores). In this case, the High Uncertainty Rating reflects that additional data to describe the continuity, thickness and types of soils within the delineated WHPA could

potentially be used to improve the understanding of local hydrostratigraphy and to increase the confidence in the Vulnerability Analysis. For further information, refer to Technical Memorandum A1 (Appendix MO).

14.4.2 Drinking Water Issues Evaluation

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future. To be considered a Drinking Water Issue, a parameter needs to be at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water or if there is a trend of increasing concentrations of the parameter and a continuation of that trend that would result in the deterioration of the quality of the water as a source of drinking water (Technical Rule 114.(1)(a-b)). However, a parameter may not be considered an Issue in cases where it is naturally occurring or effective treatment is in place.

Available data describing raw water quality and treated water quality for the Tottenham Water Works have been reviewed to identify Drinking Water Issues that are considered likely to result in a deterioration of the quality of water for use as a source of drinking water. Details of the Drinking Water Issues Evaluation for the Town of New Tecumseth water supplies are provided in Technical Memorandum J1 – Drinking Water Issues Evaluation – New Tecumseth (Appendix N).

No Drinking Water Issues were identified for the Tottenham Water Works.

Parameters whose concentrations occasionally exceed Aesthetic/Operational guidelines under the Ontario Drinking Water Quality Standards (ODWQS) include hardness, iron and organic nitrogen. These parameters are likely naturally-occurring.

Sodium concentrations have exceeded the guideline of 20 mg/L used by the Medical Officer of Health for sodium restricted diets but are not projected to exceed the ODWQS objective of 200 mg/L within 50 years.

Trihalomethanes are present in trace concentrations in the treated water as by-products of disinfection by chlorination. Trihalomethane concentrations are typically well below ODWQS values and do not display increasing trends.

Coliforms were detected in the raw water under conditions that are not considered to be consistent. Treatment consisting of adequate filtration and disinfection is in place and maintained in accordance with Provincial standards set under the Safe Drinking Water Act. As

this treatment is effective and detections are rare, the coliform bacteria are not considered to be Drinking Water Issues.

14.4.3 Drinking Water Threats Evaluation

An assessment of Drinking Water Threats for the Tottenham Water Works was completed in accordance with the detailed methodology presented in Technical Memo – A5 (Appendix MO). 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." 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 particular land use, whereas a Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities. Therefore, it is not only presently existing Threats that must be regulated, but future ones as well.

The Drinking Water Threats Assessment for the Tottenham Water Works builds on the information from the Vulnerability Analysis and Issues Evaluation and includes preparation of:

- a list of Drinking Water Threats for Activities
- a list of Drinking Water Threats for Conditions
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Activities
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Conditions
- an enumeration of Drinking Water Threats

14.4.3.1 List of Drinking Water Threats – Activities

The list of Prescribed Drinking Water Threats considered in the assessment for the Tottenham Water Works is provided in Chapter 5, section 5.5.1.

No additional Drinking Water Threats were identified for consideration. No local circumstances for prescribed Threats were identified.

14.4.3.2 List of Drinking Water Threats – Conditions

Methods used to assess Conditions are described in Technical Memorandum A5 (Appendix MO). The following information sources were consulted to identify existing Conditions that could affect the Tottenham Water Works:

- files provided by the Ministry of the Environment, Conservation and Parks local offices pertaining to licenses, and records of spills in the area of the delineated WHPA
- records available from the Ministry of the Environment, Conservation and Parks website containing registry of Brownfield Sites
- records from available technical studies and previous contaminant source inventories that identified situations that may qualify as conditions
- interviews of Town of New Tecumseth staff to identify potential conditions within the identified WHPA for the drinking water supply

No confirmed Conditions have been identified for the Tottenham Water Works. No potential Conditions have been identified for consideration at this time.

14.4.3.3 Identifying Areas of Significant/Moderate/Low Threats – Activities

The areas where Activities are or would be Drinking Water Threats are illustrated on a series of maps based on the Vulnerability Scores and Vulnerable Area delineations. The maps combined with the ~~table of Drinking Water Threat~~Technical Rules threat circumstances can be used to correlate activities that are or would be Drinking Water Threats and the Vulnerability Scores. ~~include references to a series of tables prepared by MOE to correlate activities that are or would be Drinking Water Threats with the Vulnerability Scores.~~ The circumstances~~tables~~ can be found at ~~the~~ https://swpip.ca/. ~~Government of Ontario's Drinking Water Threats and Circumstances.~~

14.4.3.3.1 Pathogen Parameters

The ~~MECP table of Drinking Water Threats~~Technical Rules can be used in conjunction with the Vulnerability Scores ~~Key Table on Figure 14b-4 can be used in conjunction with the Vulnerability Scores~~ to identify the areas where activities associated with pathogen Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Tottenham Water Works (Figure 14b-4). Activities that are or would be Significant Drinking Water Threats for pathogens can be observed within the areas where the Vulnerability Score is 10. Pathogens can also only be a Significant, Moderate or Low Threat within WHPA-A and WHPA-B.

14.4.3.3.2 Chemical Parameters

The ~~MECP table of Drinking Water Threats~~Technical Rules can be used in conjunction with the Vulnerability Scores ~~Key Table on Figure 14b-5 can be used in conjunction with the Vulnerability Scores~~ to identify the areas where activities associated with chemical Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Tottenham Water Works (Figure 14b-5).~~,~~ Activities that are or would be Significant Drinking Water Threats for chemicals can be observed within areas where the Vulnerability Score is equal to or greater than 8.

14.4.3.3.3 DNAPL Chemical Parameters

Figure 14b-6 illustrates the area of the 5-year time-of-travel zone (WHPA-C) and areas with a Vulnerability Score of 6, where activities associated with DNAPL parameters are considered to be a Significant Drinking Water Threat for the Tottenham Water Works. The M~~ECP table of Drinking Water Threats~~Technical Rules can be used ~~Key Table on Figure 14b-6 can be used to can be used~~ to identify the circumstances in which these Activities associated with DNAPL threats would be Significant Drinking Water Threats.

14.4.3.4 Identifying Areas of Significant/Moderate/Low Threats – Conditions

Further to Section 14.4.3.2, no Conditions have been confirmed within the WHPA for the Tottenham Water Works.

A Condition or potential Condition that has not been identified would potentially be a Significant, Moderate, or Low Threat to Drinking Water based on the combination of Hazard Rating and Vulnerability Rating as described in Section 5.5.5 (Chapter 5: Methods Overview) and Technical Memorandum A5 (Appendix MO). The Hazard Rating is dependent on whether there is evidence the Condition is causing off-site contamination, and whether the Condition is located on the same property as the supply well.

A Condition would be a threat to municipal drinking water in the following situations:

- **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
- **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

2. where the Vulnerability Score is 10, and there is no evidence of off-site contamination

- **Low**: where the Vulnerability Score ≥ 8 and < 10 and there is no evidence of off-site contamination

Figure 14b-3 illustrates the Vulnerability Score map for Tottenham Water Works that can be used to determine where a Condition is or would be a Significant, Moderate or Low Threat to Drinking Water.

14.4.3.5 Enumerating Drinking Water Threats

The number of Significant Drinking Water Threats for the Tottenham Water Works has been determined using the methodology outlined in Technical Memorandum A5 (Appendix MO) and refined using the methodology outlined in Chapter 5 (Section 5.5.6.4) of this Assessment Report. There are no Significant Threats associated with Conditions or Drinking Water Issues.

Table 14-7 documents the enumeration of existing and potential activities that are considered to be Significant Drinking Water Threats within the WHPA for the Tottenham Water Works. Potential Significant Drinking Water Threats were identified within areas where the Vulnerability Score is 10 and for parcels within WHPA B & C that are identified as potentially having a threat related to DNAPL.

Thirteen (13) activities that are considered to be potential Significant Drinking Water Threats were identified in association with eleven (11) land parcels. One (1) parcel was identified with a potential Threat related to a private on-site sewage system. One (1) parcel was identified for potential handling and storage of fuel. Additionally, one (1) threat activity and parcel has been assigned to represent the municipal sanitary sewer system within WHPA-A and one (1) threat activity and parcel has been assigned to address the potential handling/storage of fuel for residential heating purposes within areas where the vulnerability score is 10. One (1) parcel was identified as having significant threats related to the application of agricultural source material and pesticide to land. Seven (7) parcels were identified as having activities with potential for handling/storage of DNAPL within WHPA-B and WHPA-C1.

The municipal sanitary sewage treatment facility, including the lagoons, is observed to lie within WHPA-B and WHPA-C. This facility was classified as a moderate threat to the drinking water source by the methods outlined in Appendix A5. An independent review of the water quality data for the municipal wells was conducted and no evidence was observed of water quality impacts that would be considered to have originated from the sewage treatment facility.

Table 0-7: Number of Significant Drinking Water Threats for the Tottenham Drinking Water Supply, Enumeration of Significant Threats (Wellhead Protected Area)

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	2
3	The application of agricultural source material to land	1
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	2~~1~~
11	The handling and storage of pesticide	2~~0~~
12	The application of road salt	0
13	The handling and storage of road salt	0

Threat Number	Threat	Significant Threat Counts Number of Threats
14	The storage of snow	0
15	The handling and storage of fuel	2
16	The handling and storage of dense non-aqueous phase liquid	7
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	**17~~3~~*** significant threats (on **13** properties)

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Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel
2. *5 verified existing Threats and 9 potential Threats that require further investigation

~~14.4.3.4.1~~14.4.3.5.1 Managed Lands

Technical Rule 16(9) ~~(August 2009)~~ requires the Assessment Report to include maps showing the location of Managed Lands and the percentage of Managed Lands within a Vulnerable Area, including WHPA-A, -B, -C, -D, and –E . This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~Part XII of~~ the Technical Rules ~~(December 2021). the Table of Drinking Water Threats.~~

Managed Lands were identified and the Managed Lands proportions were determined for the WHPA of the Tottenham Water Works as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.4.3.5). The Managed Lands are used in the identification of threat activities associated with the application of Agricultural Source Material, Non-Agricultural Source Material and commercial fertilizer.

Figure 14b-7 illustrates the location and proportion of Managed Lands within the delineated WHPA zones for the Tottenham Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.

~~14.4.3.4.2~~14.4.3.5.2 Livestock Density

Technical Rule 16(10) ~~(August 2009)~~ requires the Assessment Report to include maps showing the livestock density within WHPA-A, -B, -C, -D, and –E. This mapping is not required where the vulnerability scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~Part XII of~~ the Technical Rules ~~(December 2021). the Table of Drinking Water Threats.~~

The Livestock Density was determined for the delineated WHPA zones of the Tottenham Water Works as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.4.3.5). Nutrient units per farm are in the identification of Threat activities associated with the storage of Agricultural Source Material, and the grazing and/or confinement of livestock.

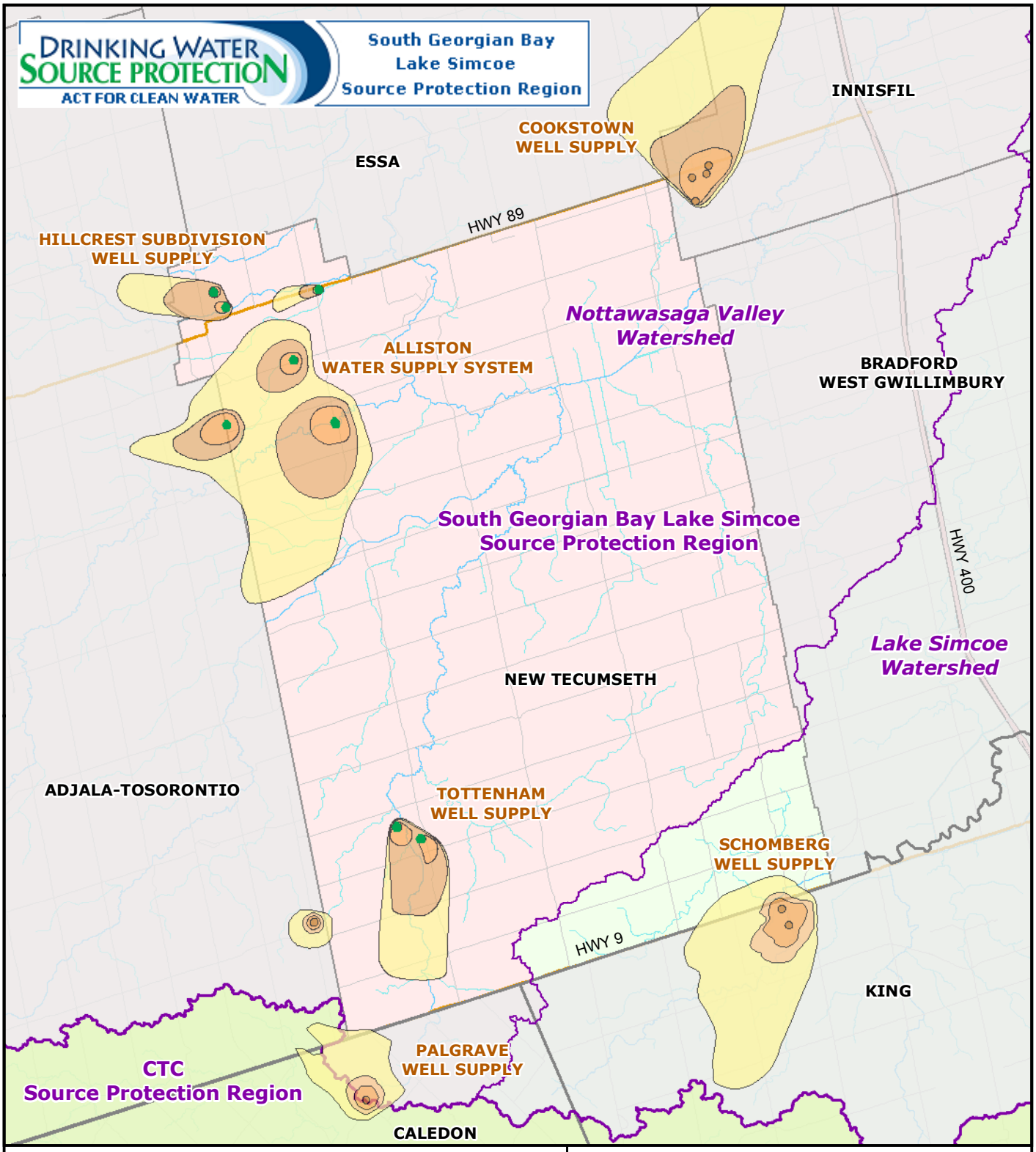
Figure 14b-8 illustrates the distribution of Livestock Density within the delineated WHPA zones for the Tottenham Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D. The Livestock Density figure reflects the distribution of Agricultural Managed Lands as determined in accordance with Technical Memorandum A5 (Appendix MO).

~~14.4.3.4.3~~14.4.3.5.3 Impervious Surfaces

Technical Rule 16(11) ~~(August 2009)~~ requires the Assessment Report to include maps showing the percentage of surface area where road salt could be applied to Impervious Surfaces within WHPA-A, -B, -C, -D, and –E . This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in ~~Part XII of~~ the Technical Rules ~~(December 2021).~~ ~~the Table of Drinking Water Threats.~~

The proportion of Impervious Surfaces within the delineated WHPA zones for the Tottenham Water Works was determined in accordance with the methodology in Technical Memorandum A5 (Appendix MO). Methodology in Technical Memorandum A5.1 (Appendix MO) was used in 2023 to update the proportion of Impervious Surfaces within the delineated WHPA zones using the 2021 Technical Rules. The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 14.4.3.5). The Impervious Surfaces are used in the identification of threat activities associated with the application of winter de-icing agents (salt).

Figure 14b-9 illustrates the distribution of Impervious Surfaces within the delineated WHPA zones for the Tottenham Water Works where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.



- Municipal Supply Well in Town of New Tecumseth
- WHPA-A (100m)
- WHPA-B (2 years time of travel)
- WHPA-C (5 years time of travel)
- WHPA-C1 (10 years time of travel)
- WHPA-D (25 years time of travel)
- SWP Watershed Region
- SWP Watershed Area
- Municipality Boundary

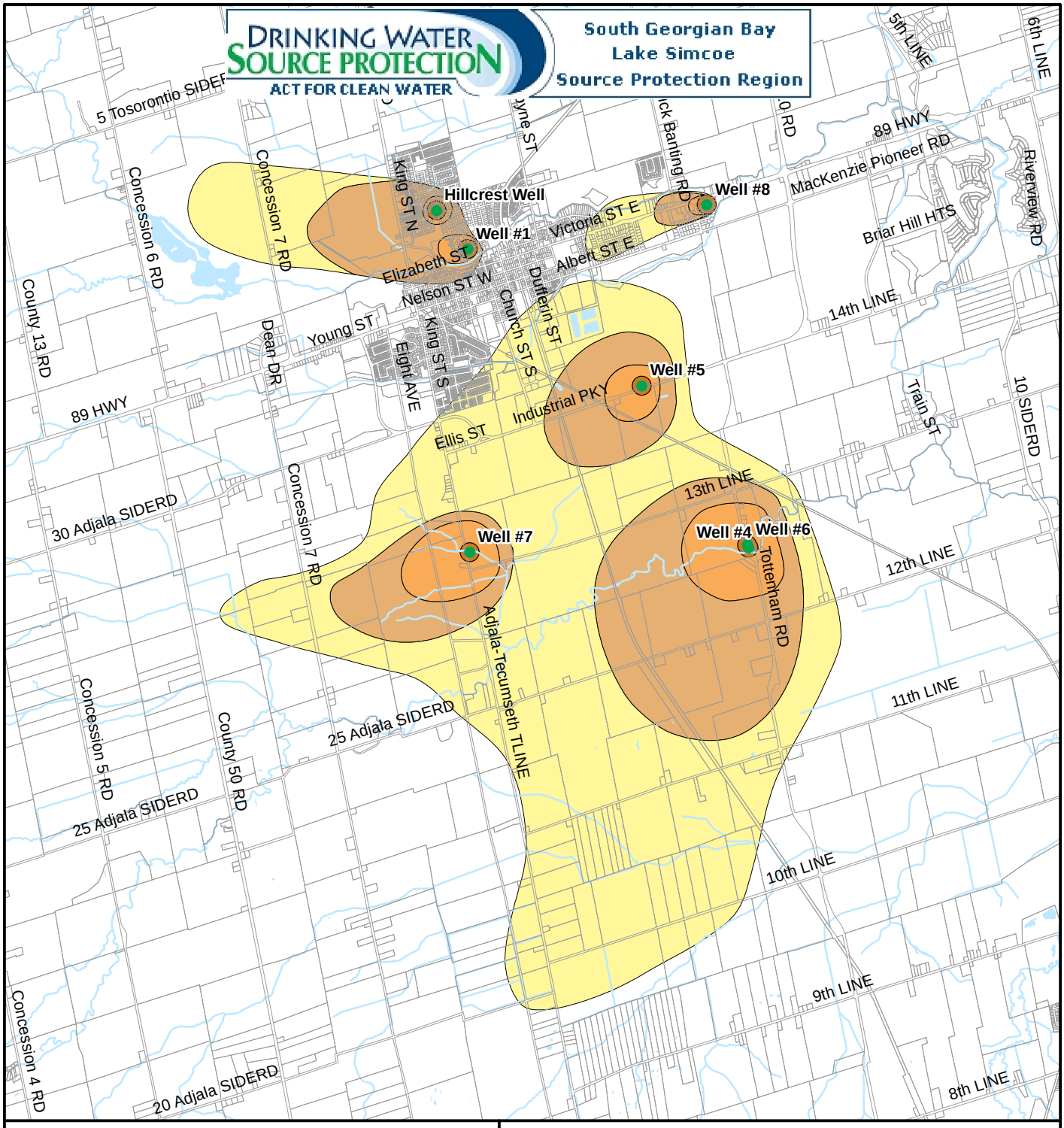
Drinking Water System Vulnerable Areas in Town of New Tecumseth

Created by: LSRCA
Date: 2011-04-01

Scale: 1:150,000
0 2 4km
UTM Zone 17N, NAD83

Ontario

Figure 14-1



Legend

- MUNICIPAL WELL LOCATION
- WHPA-A: 100 m RADIUS
- WHPA-B: 2-YEAR TIME-OF-TRAVEL
- WHPA-C1: 10-YEAR TIME-OF-TRAVEL
- WHPA-D: 25-YEAR TIME-OF-TRAVEL

N W E S

500 250 0 500 Metres

WELLHEAD PROTECTION AREAS - ALLISTON, NEW TECUMSETH

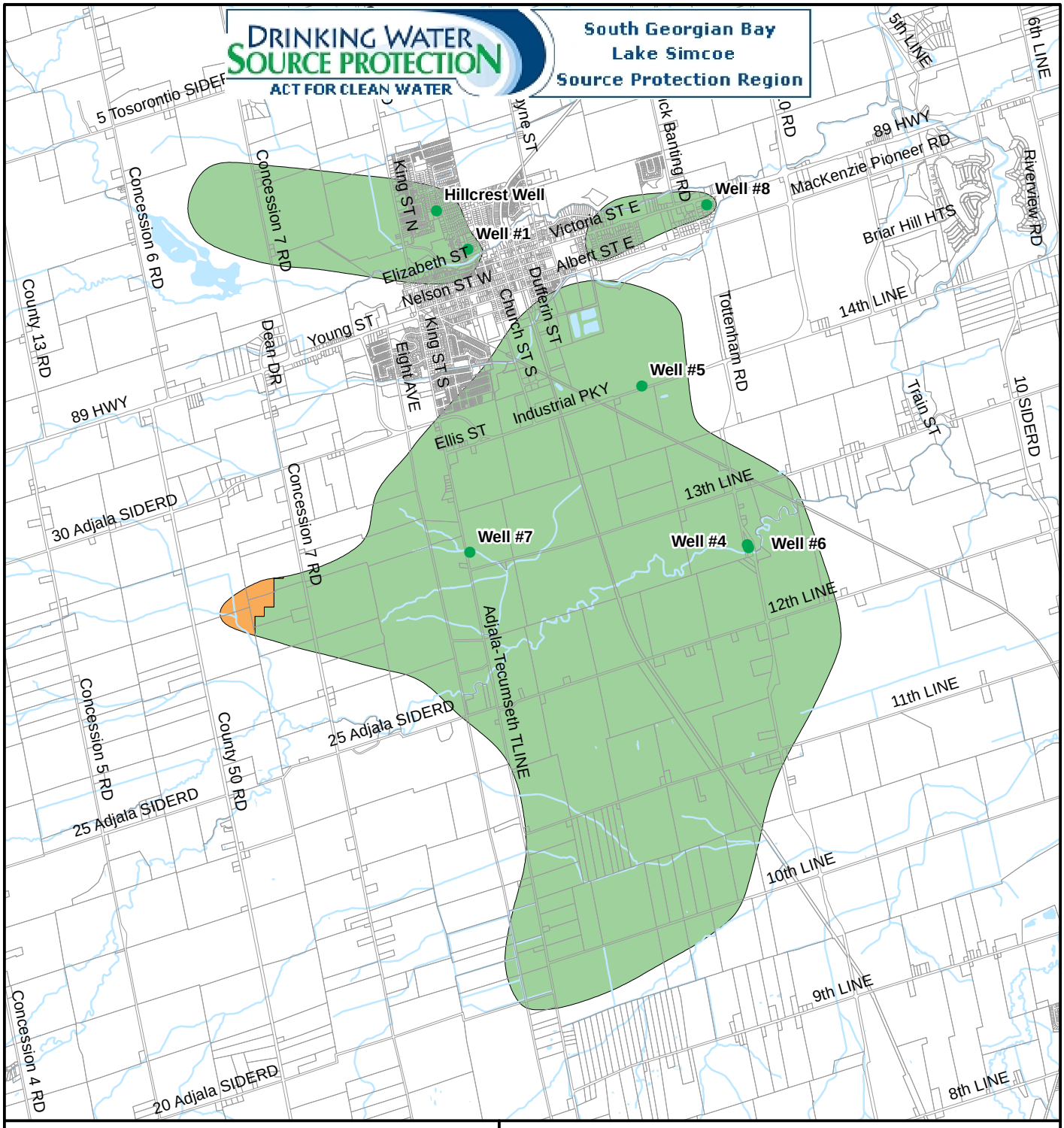
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-1

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE **14a-1**



LEGEND

- MUNICIPAL WELL LOCATION

AQUIFER VULNERABILITY INDEX

- HIGH
- MEDIUM
- LOW

N W E S

500 250 0 500 Metres

GROUNDWATER VULNERABILITY - ALLISTON

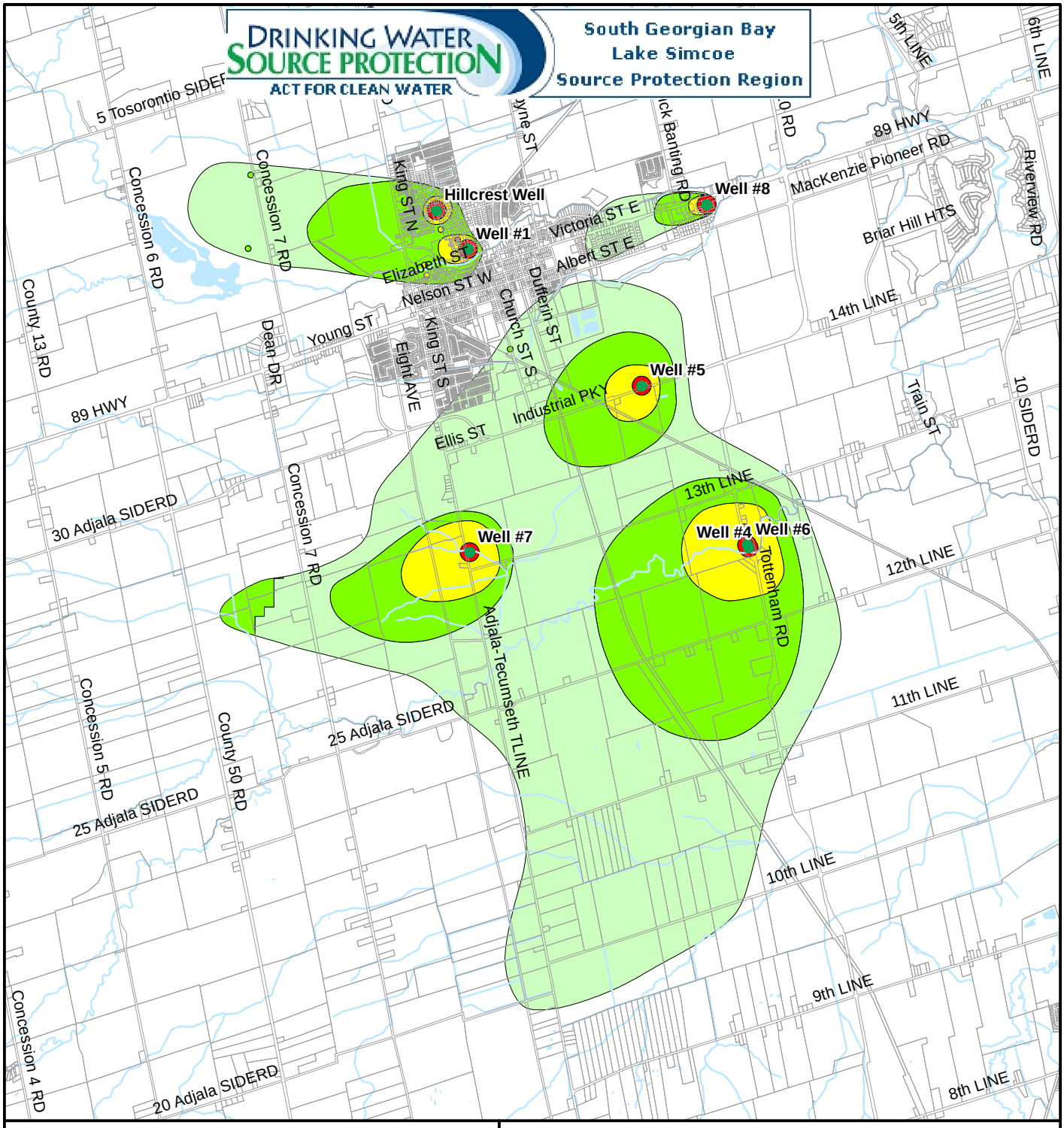
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-2

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE 14a-2



LEGEND

MUNICIPAL WELL LOCATION

VULNERABILITY SCORING

- 10
- 8
- 6
- 4
- 2

N
W E
S

500 250 0 500 Metres

VULNERABILITY SCORES - ALLISTON

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-5

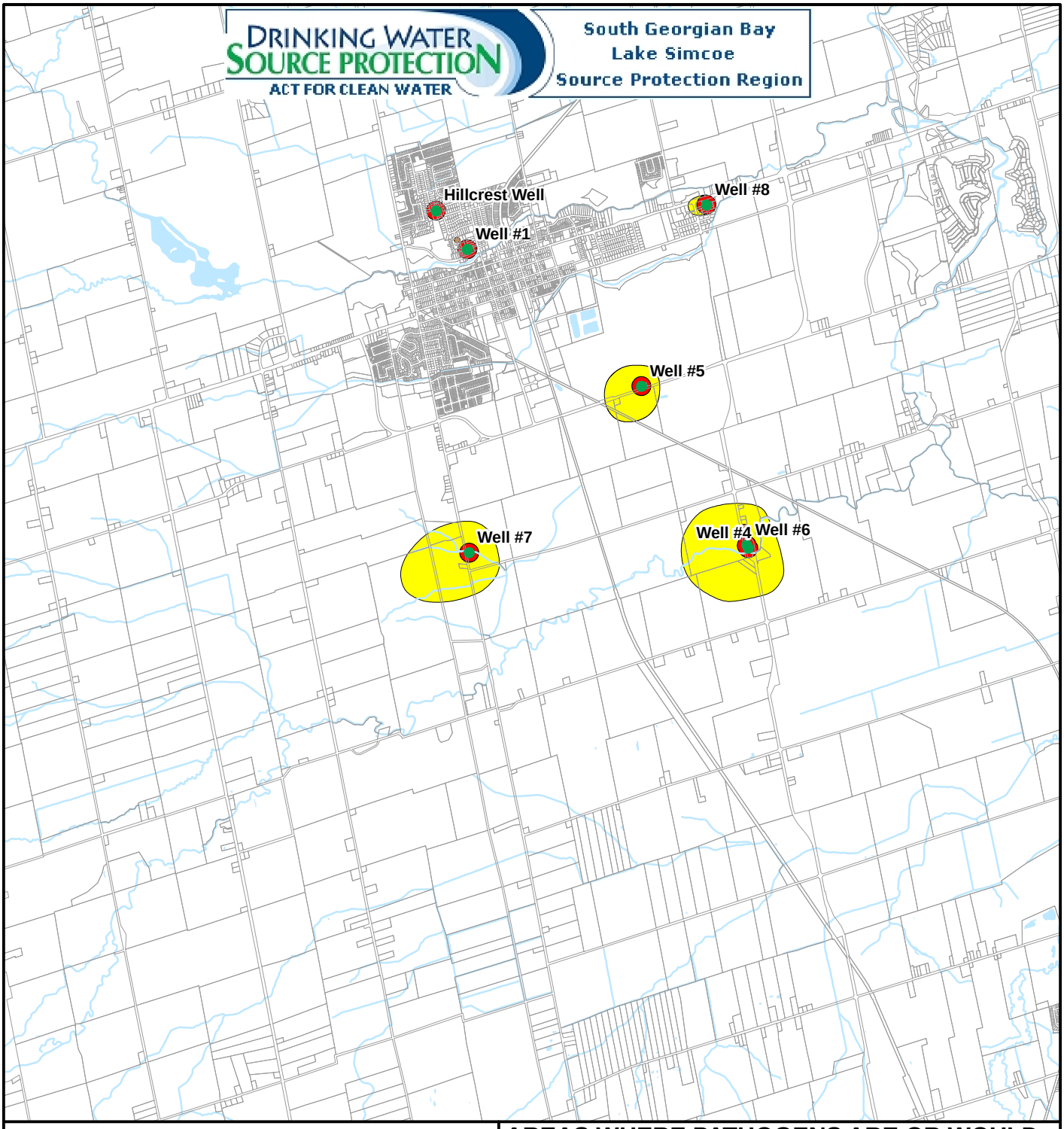
This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE 14a-3

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

South Georgian Bay
Lake Simcoe
Source Protection Region



LEGEND

- MUNICIPAL WELL LOCATION

VULNERABILITY SCORING

- 10
- 8
- 6

N
W E
S

500 250 0 500 Metres

AREAS WHERE PATHOGENS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - ALLISTON

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

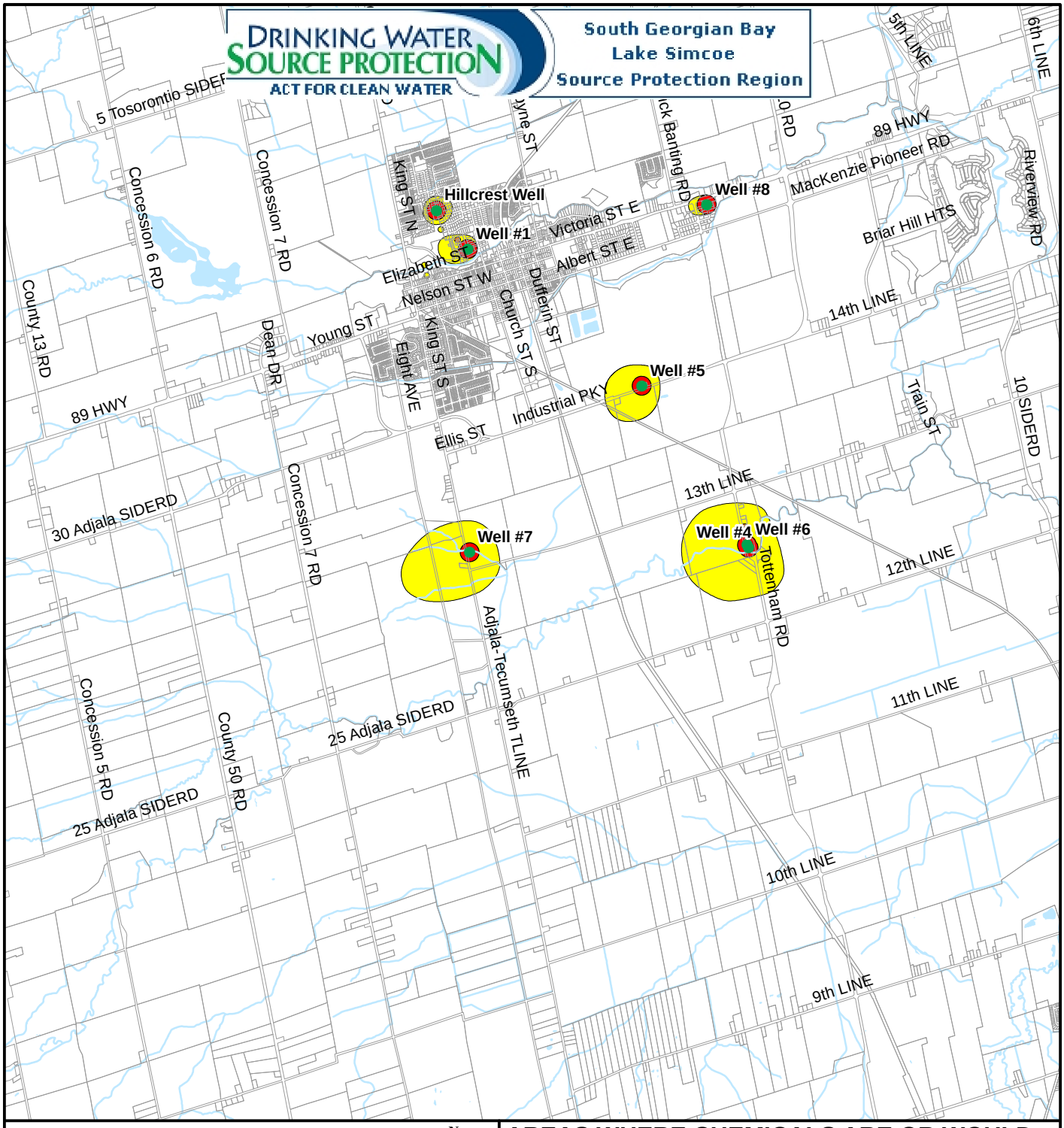
This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-6

GENIVAR

Ontario

FIGURE
14a-4



AREAS WHERE CHEMICALS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - ALLISTON

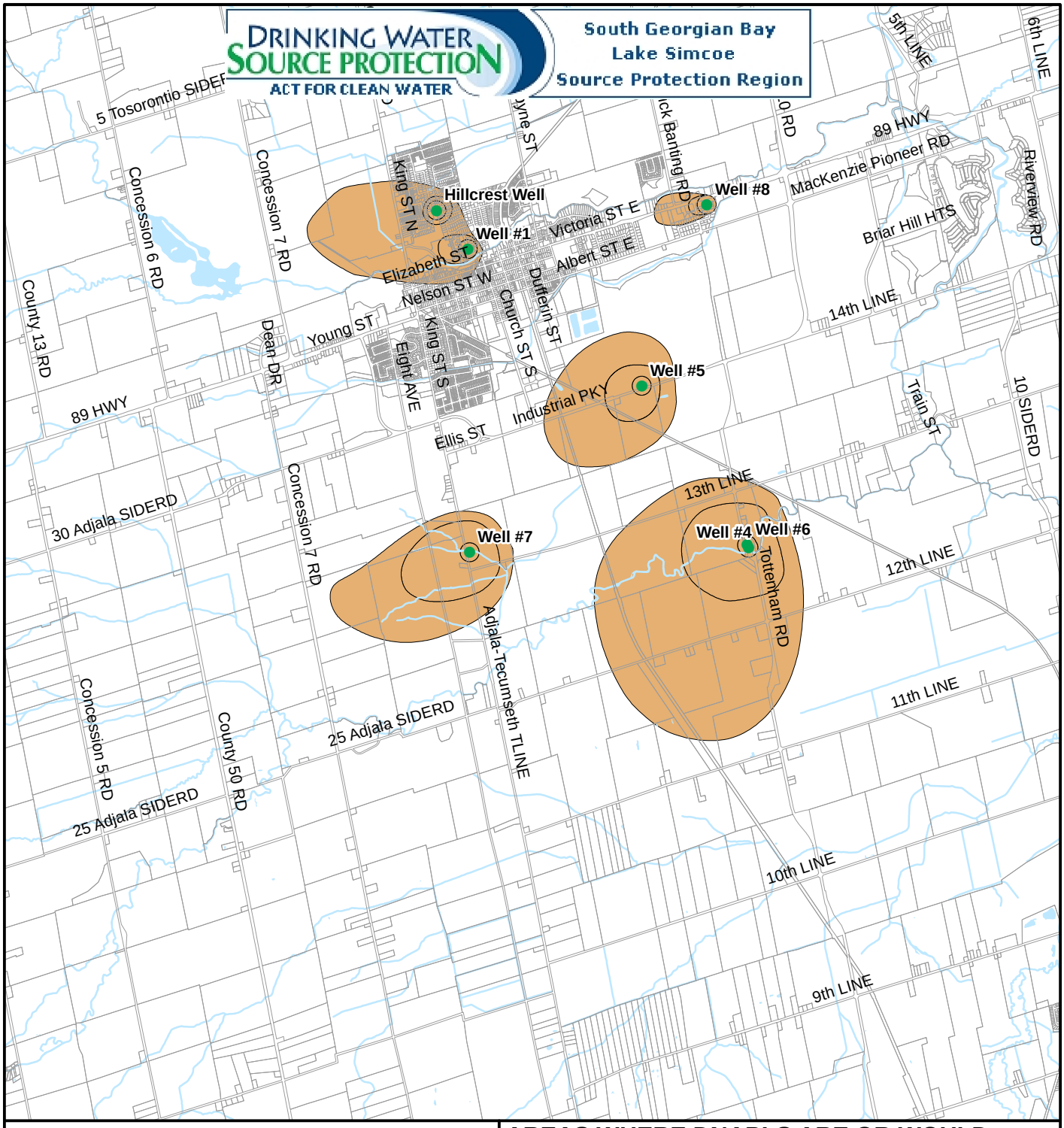
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-7

GENIVAR Ontario

FIGURE **14a-5**



LEGEND

- MUNICIPAL WELL LOCATION
- WHPA-C1: 10-YEAR TIME-OF-TRAVEL

AREAS WHERE DNAPLS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - ALLISTON

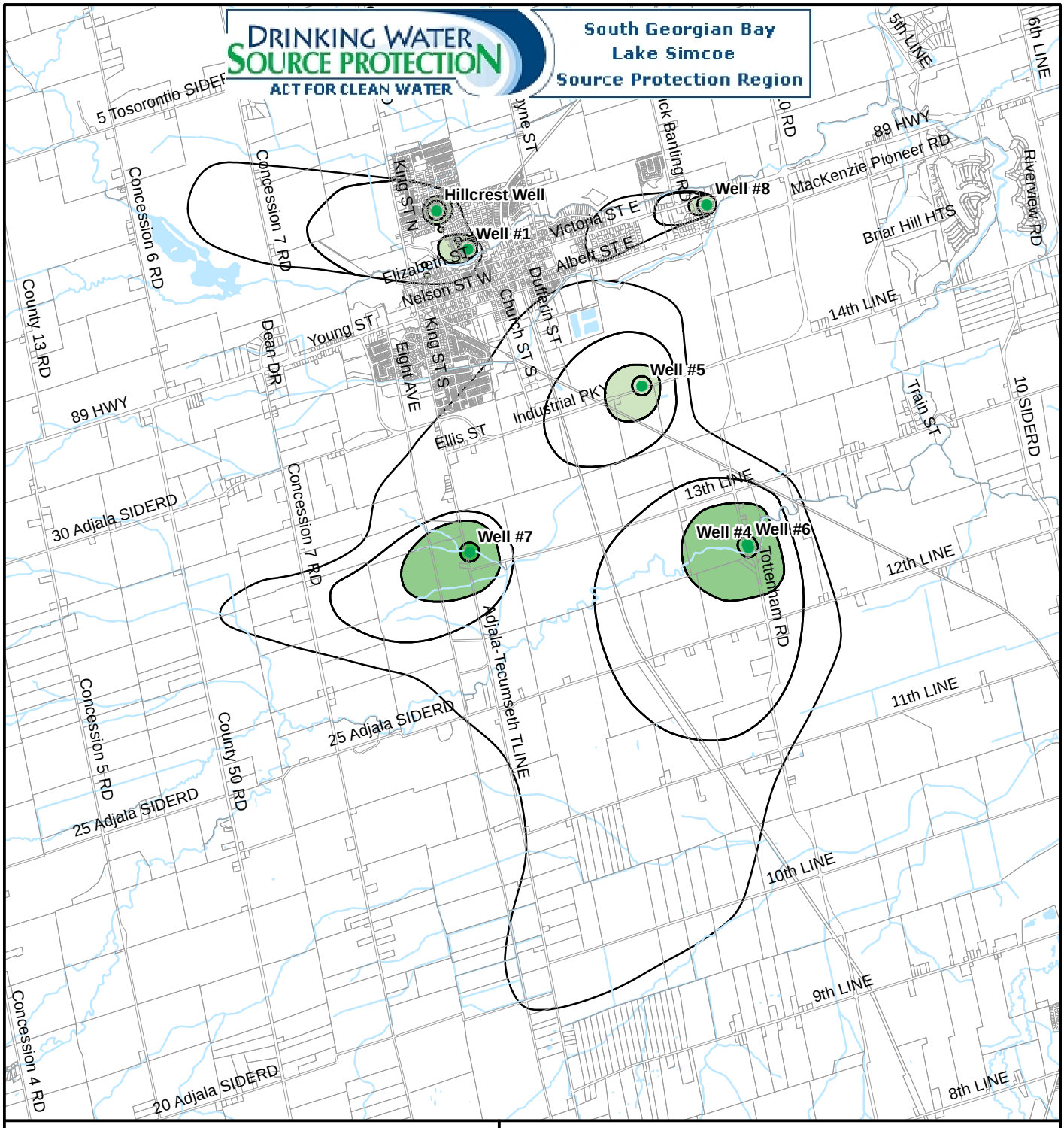
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-8

GENIVAR Ontario

FIGURE **14a-6**



MANAGED LANDS - ALLISTON

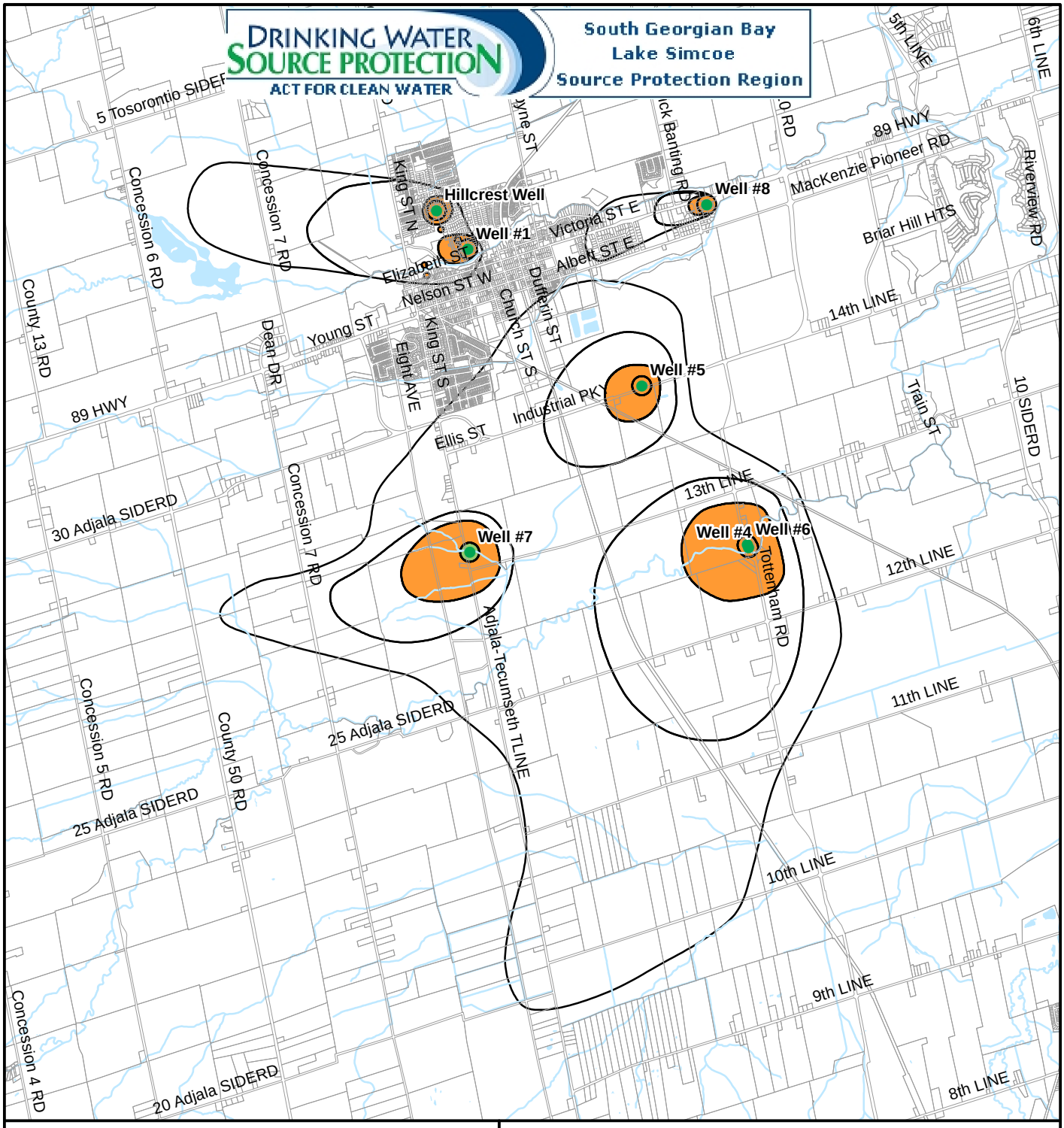
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

The Managed Land proportion is illustrated for the parts of WHPA A-D where the vulnerability score is greater than 6.

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-9

GENIVAR Ontario

FIGURE 14a-7



Legend

- MUNICIPAL WELL LOCATION
- LIVESTOCK DENSITY (<0.5 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (0.5-1.0 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (>1.0 NUTRIENT UNITS/ACRE)

N W E S

500 250 0 500 Metres

LIVESTOCK DENSITY - ALLISTON

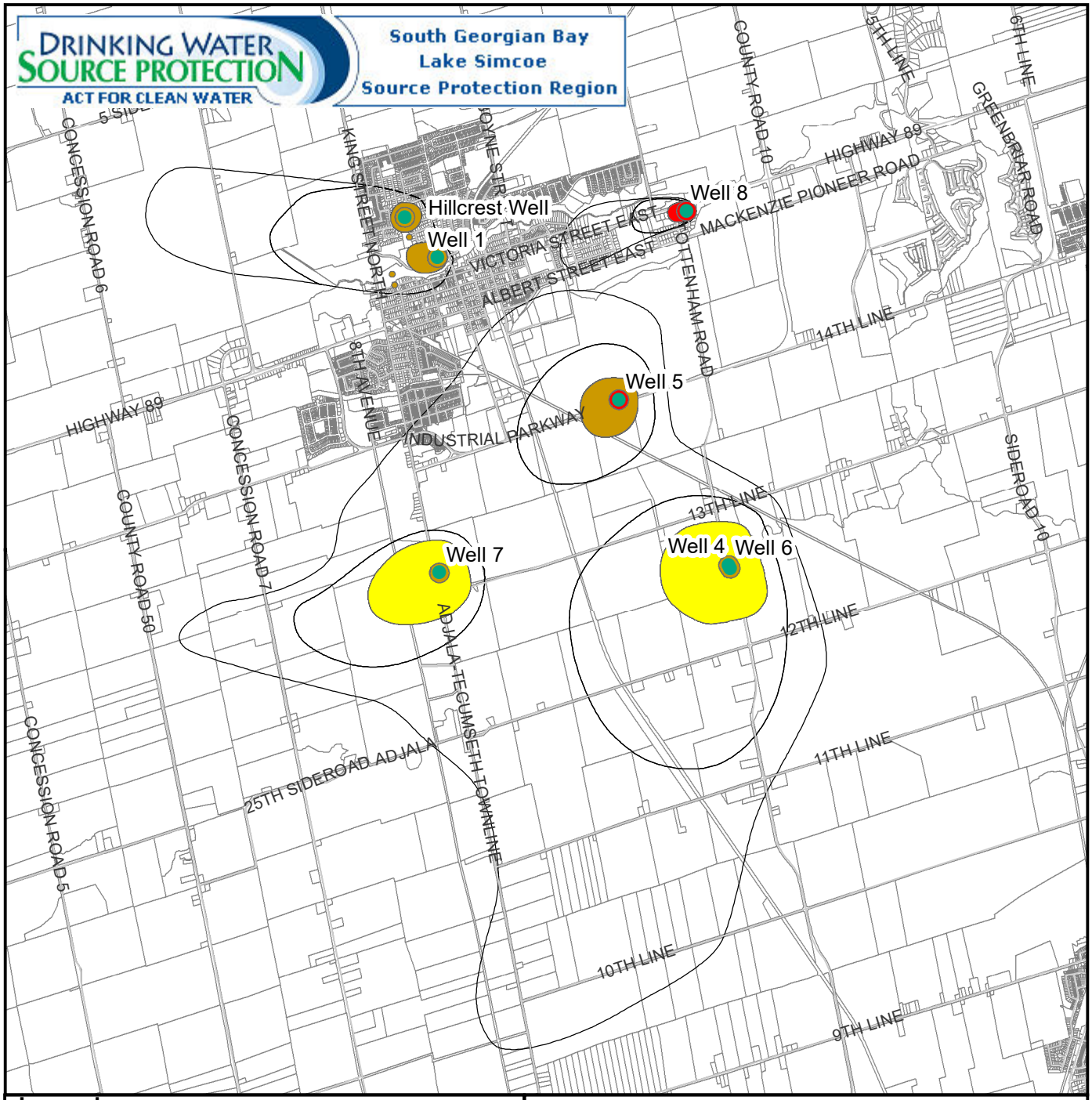
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

The Livestock Density proportion is illustrated for the parts of WHPA A-D where the vulnerability score is greater than 6.

DATE: JULY 2010	SCALE: 1:60000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.1-10

GENIVAR Ontario

FIGURE 14a-8



Legend

- Municipal Well Location
- <1%
- =1 - <6%
- =6 - <8%
- =8 - <30%
- =>30%

N W E S

800 400 0 800 Meters

The Impervious Surfaces proportion is illustrated where the vulnerability score is greater than 6.

This map was produced for the South Georgian Bay Lake Simcoe Protection Region for the purpose of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

IMPERVIOUS SURFACES - ALLISTON

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2025-09

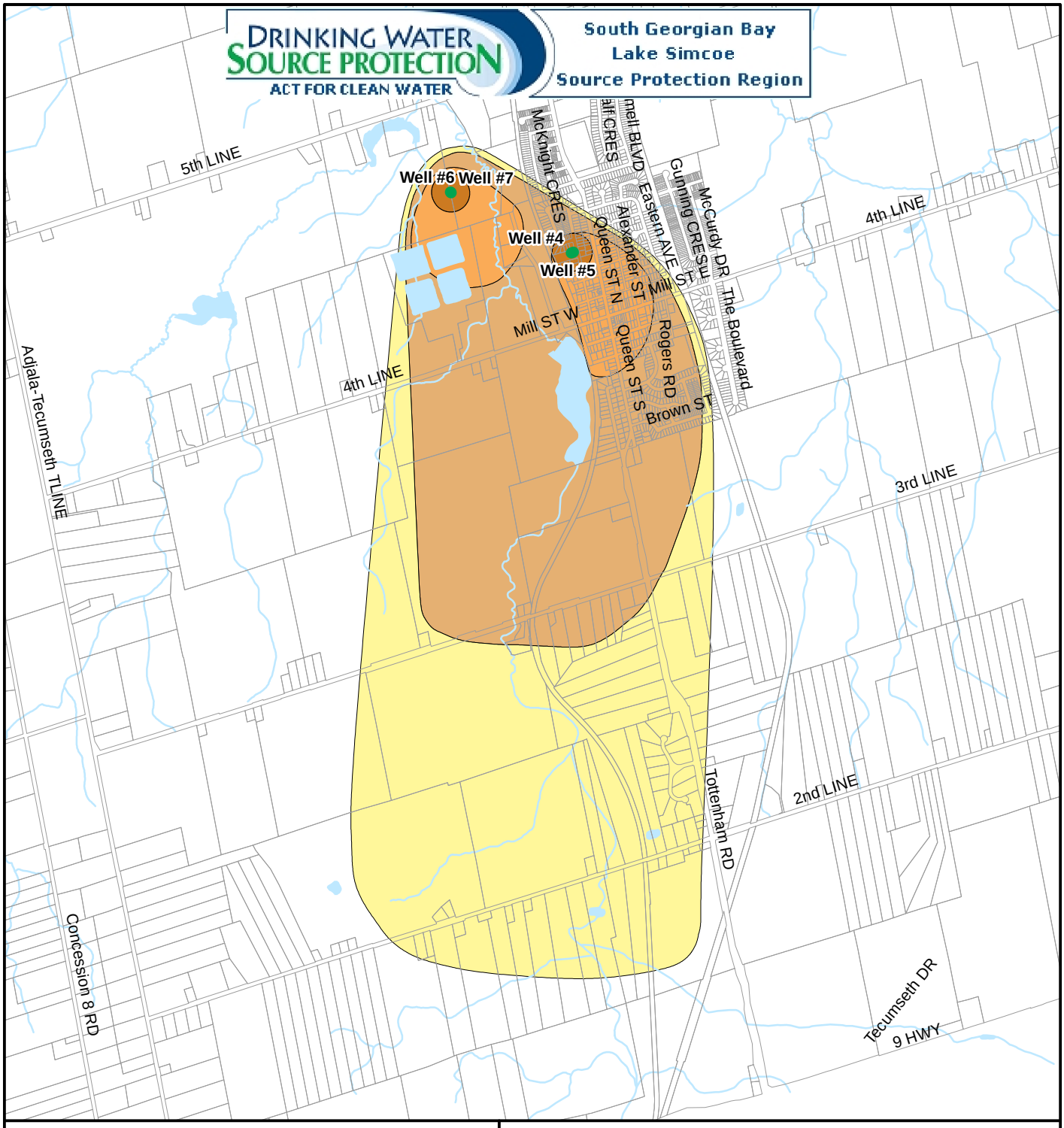
Scale: 1:60,000

UTM Zone 17N, NAD83

Nottawasaga Valley Conservation Authority

Ontario

Figure 14a-9



Legend

- MUNICIPAL WELL LOCATION
- WHPA-A: 100 m RADIUS
- WHPA-B: 2-YEAR TIME-OF-TRAVEL
- WHPA-C1: 10-YEAR TIME-OF-TRAVEL
- WHPA-D: 25-YEAR TIME-OF-TRAVEL

N W E S

300 150 0 300 Metres

WELLHEAD PROTECTION AREAS - TOTTENHAM, NEW TECUMSETH

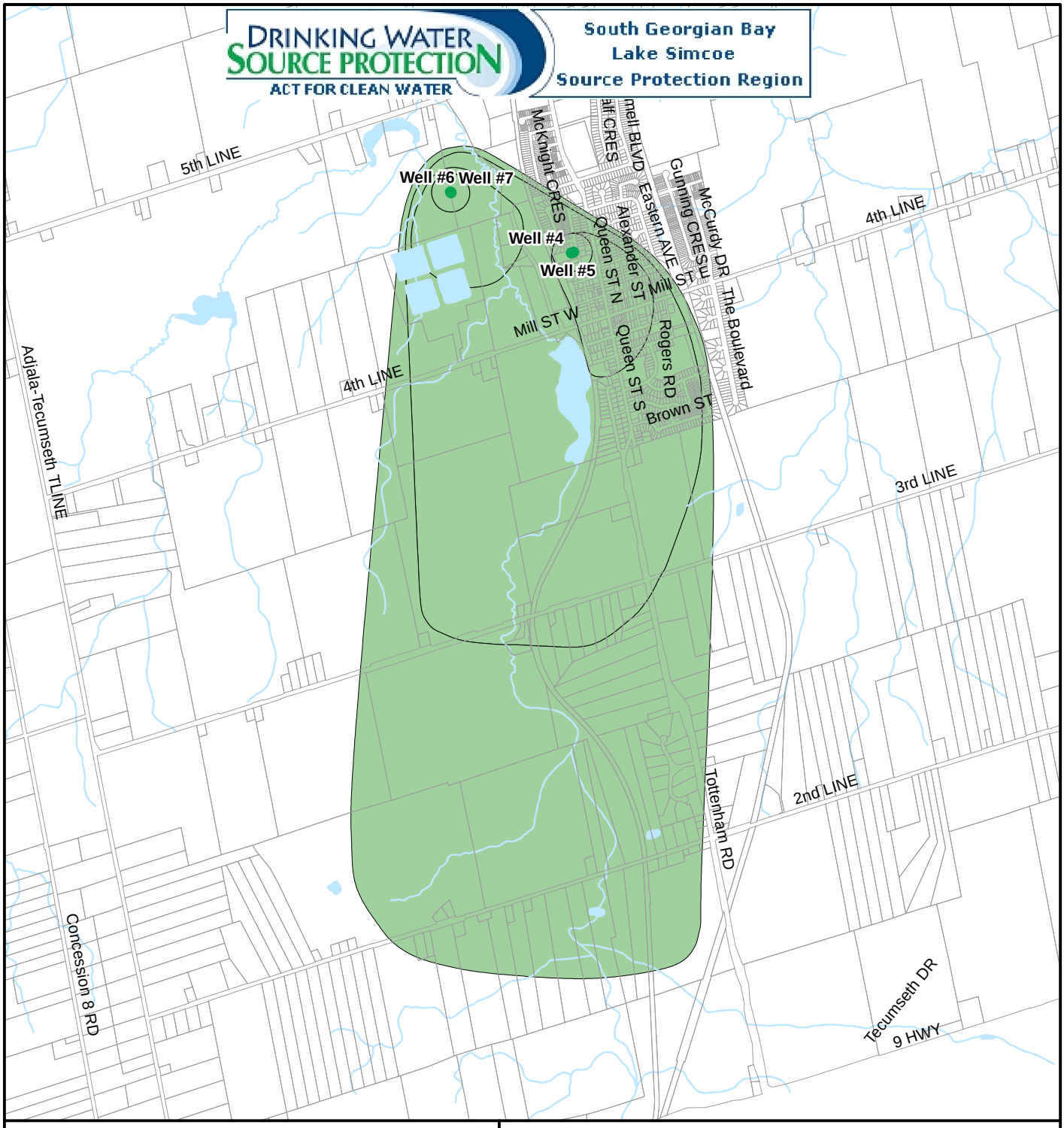
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-1

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE **14b-1**



LEGEND

- MUNICIPAL WELL LOCATION

AQUIFER VULNERABILITY INDEX

- HIGH
- MEDIUM
- LOW

N W E S

300 150 0 300 Metres

GROUNDWATER VULNERABILITY - TOTTENHAM

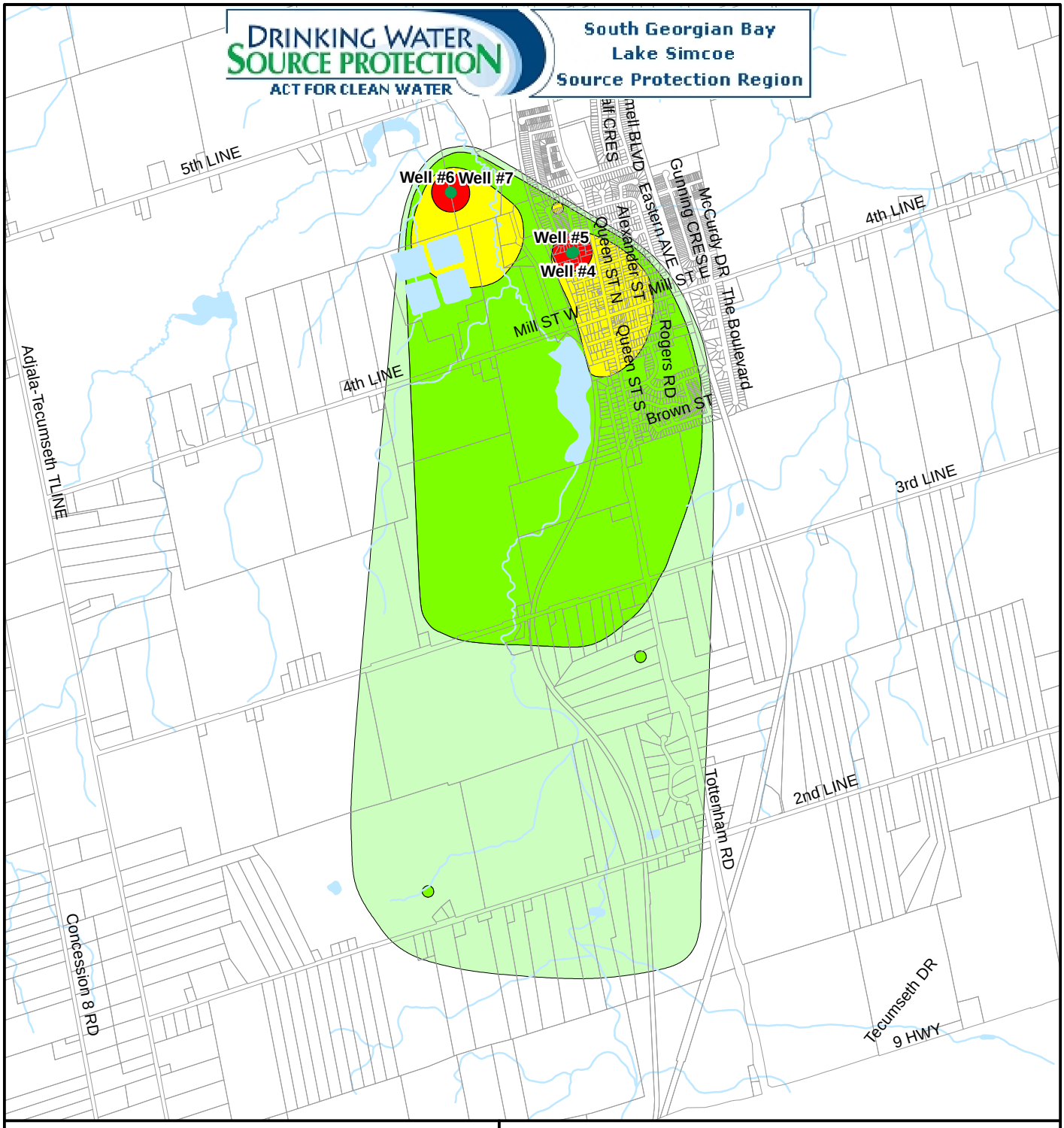
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-2

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE **14b-2**



LEGEND

- MUNICIPAL WELL LOCATION

VULNERABILITY SCORING

- 10
- 8
- 6
- 4
- 2

N W E S

300 150 0 300 Metres

VULNERABILITY SCORES - TOTTENHAM

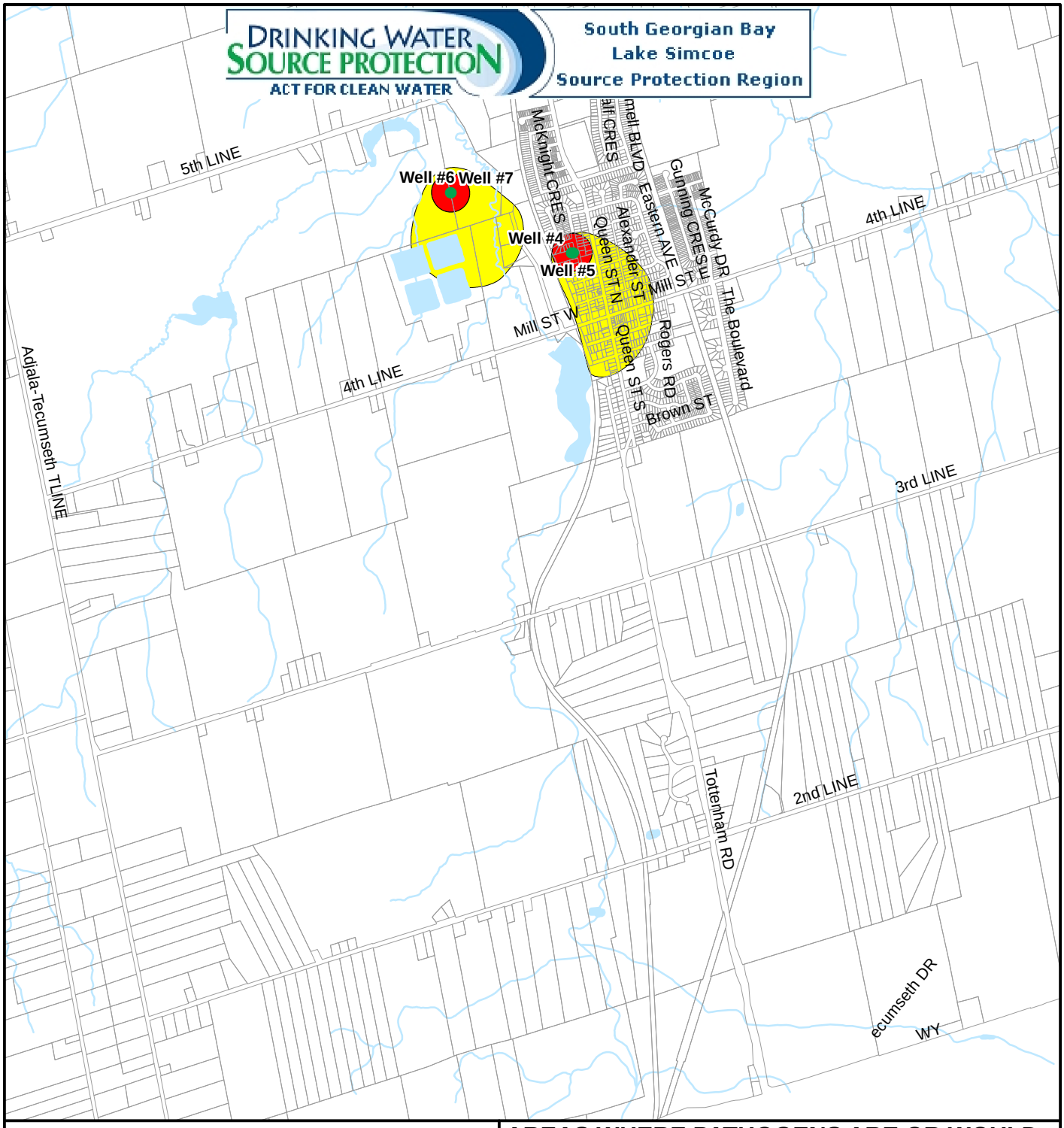
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-5

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

GENIVAR Ontario

FIGURE 14b-3



LEGEND

- MUNICIPAL WELL LOCATION

VULNERABILITY SCORING

- 10
- 8
- 6

N W E S

300 150 0 300 Metres

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

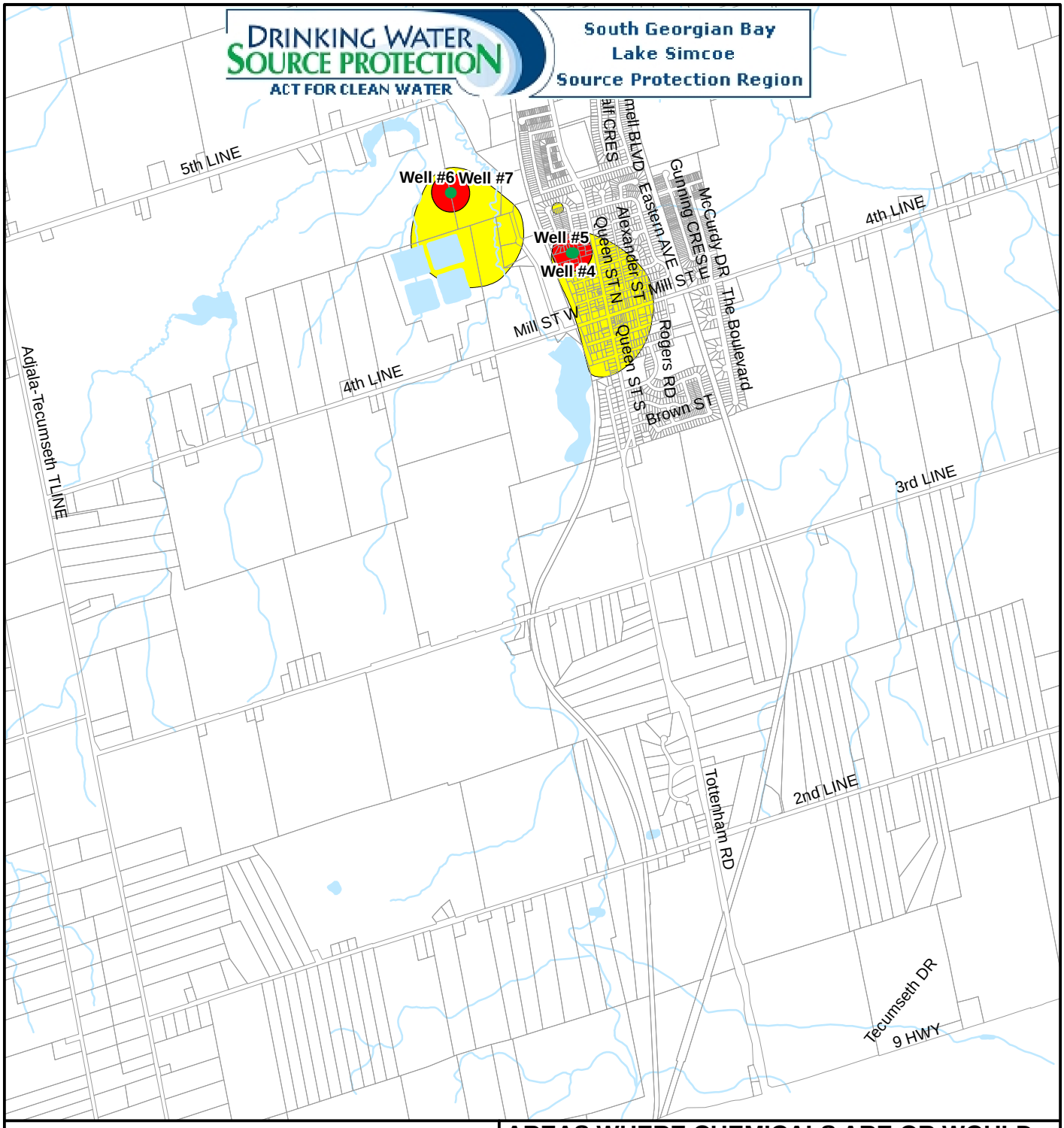
AREAS WHERE PATHOGENS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - TOTTENHAM

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-6

GENIVAR Ontario

FIGURE **14b-4**



LEGEND

- MUNICIPAL WELL LOCATION

VULNERABILITY SCORING

- 10
- 8
- 6

N W E S

300 150 0 300 Metres

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

This map was produced for the South Georgian Bay Lake Simcoe Source Protection Region for the purposes of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

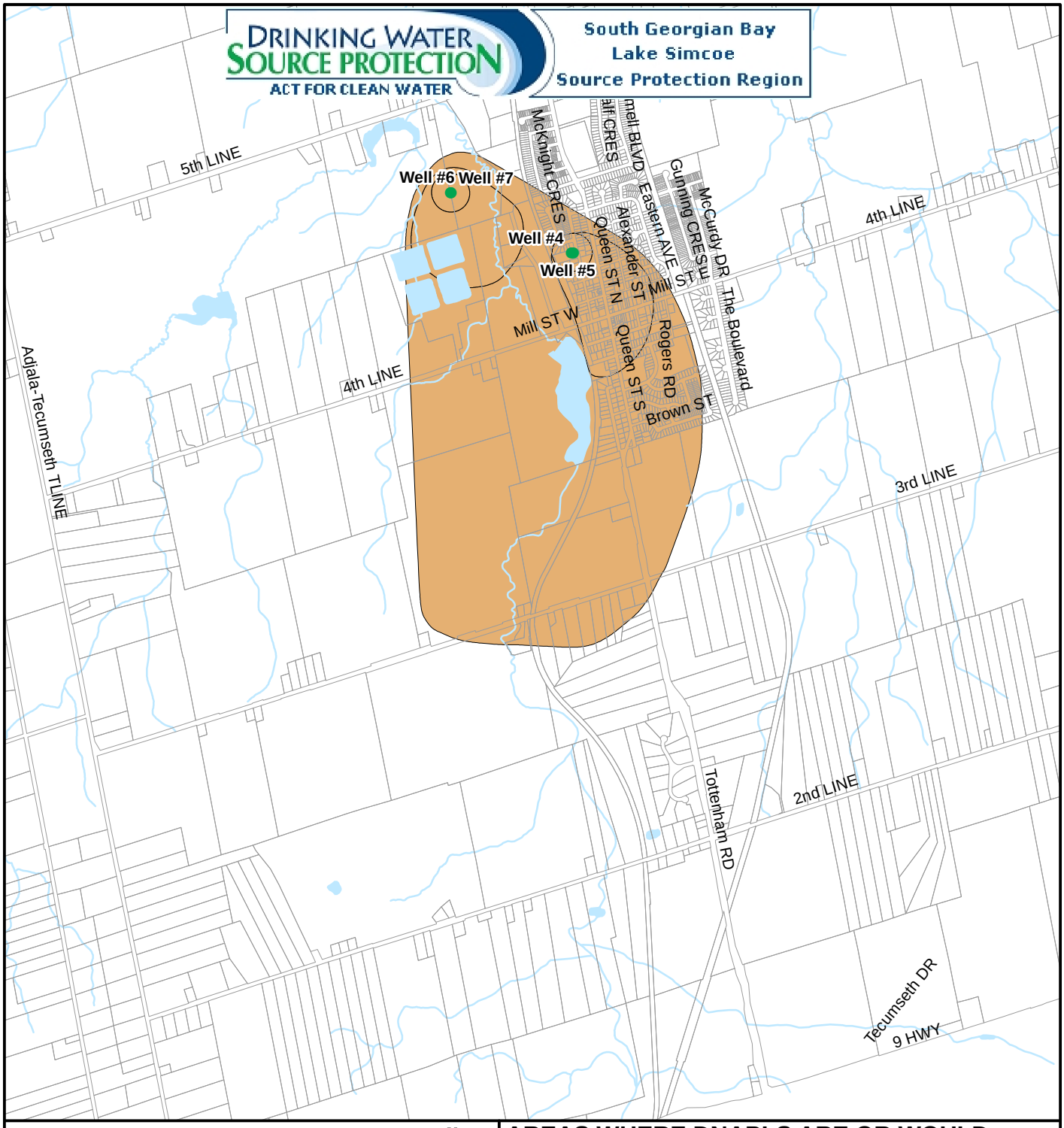
AREAS WHERE CHEMICALS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - TOTTENHAM

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-7

GENIVAR Ontario

FIGURE **14b-5**



LEGEND

- MUNICIPAL WELL LOCATION
- WHPA-C1: 10-YEAR TIME-OF-TRAVEL

N W E S

300 150 0 300 Metres

AREAS WHERE DNAPLS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS - TOTTENHAM

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules. The key table is intended to correlate the vulnerability score with circumstances that are significant, moderate, or low threats in the Table of Drinking Water Threats. The table shows the number of circumstances and references the table designation in the Provincial Tables of Circumstances for each threat category.

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-8

GENIVAR Ontario

FIGURE **14b-6**

Legend

- MUNICIPAL WELL LOCATION
- MANAGED LANDS (<40%)
- MANAGED LANDS (40-80%)
- MANAGED LANDS (>80%)

N W E S

300 150 0 300 Metres

MANAGED LANDS - TOTTENHAM

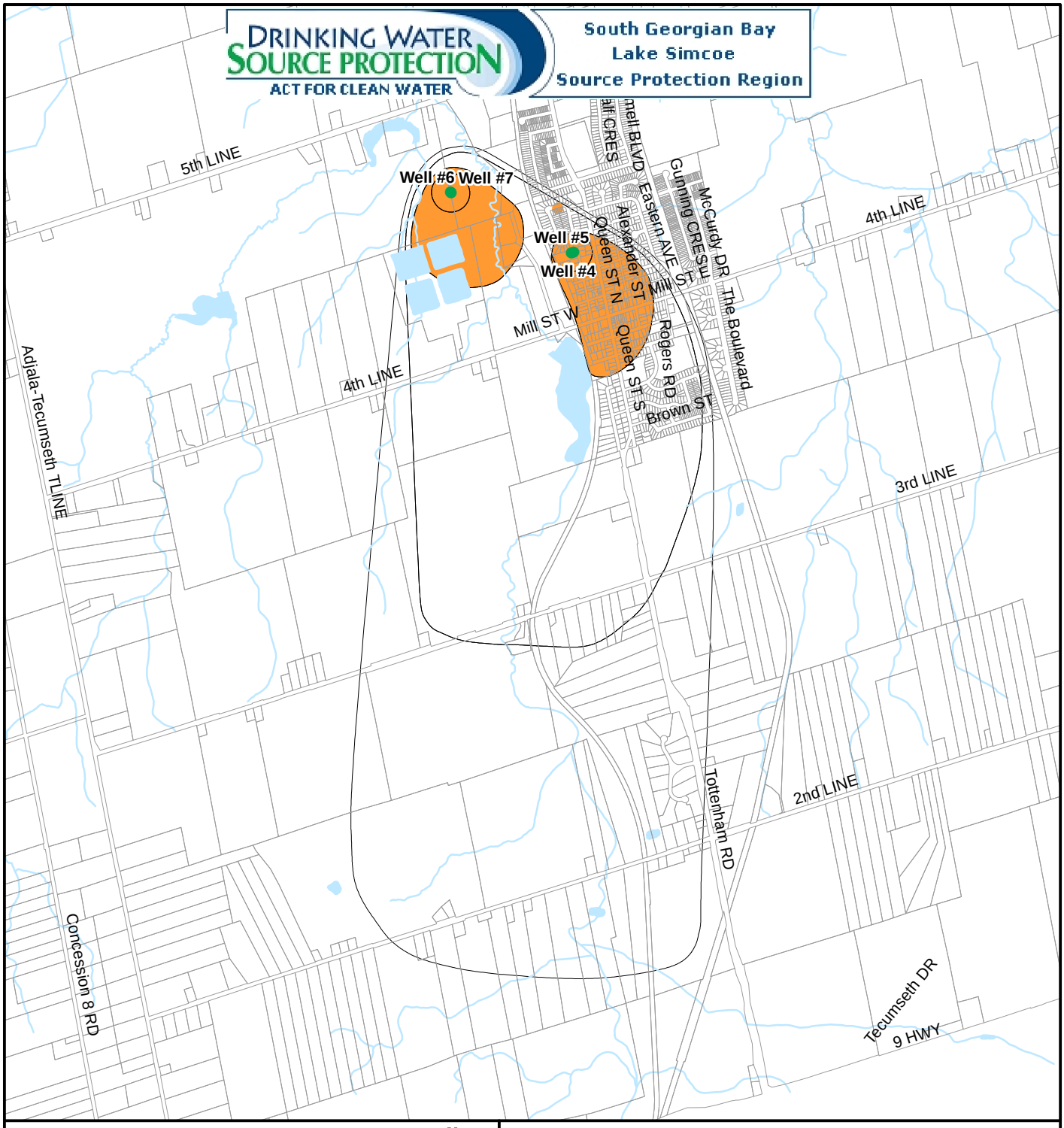
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

The Managed Land proportion is illustrated for the parts of WHPA A-D where the vulnerability score is greater than 6.

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-9

GENIVAR Ontario

FIGURE **14b-7**



Legend

- MUNICIPAL WELL LOCATION
- LIVESTOCK DENSITY (<0.5 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (0.5-1.0 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (>1.0 NUTRIENT UNITS/ACRE)

N W E S

300 150 0 300 Metres

LIVESTOCK DENSITY - TOTTENHAM

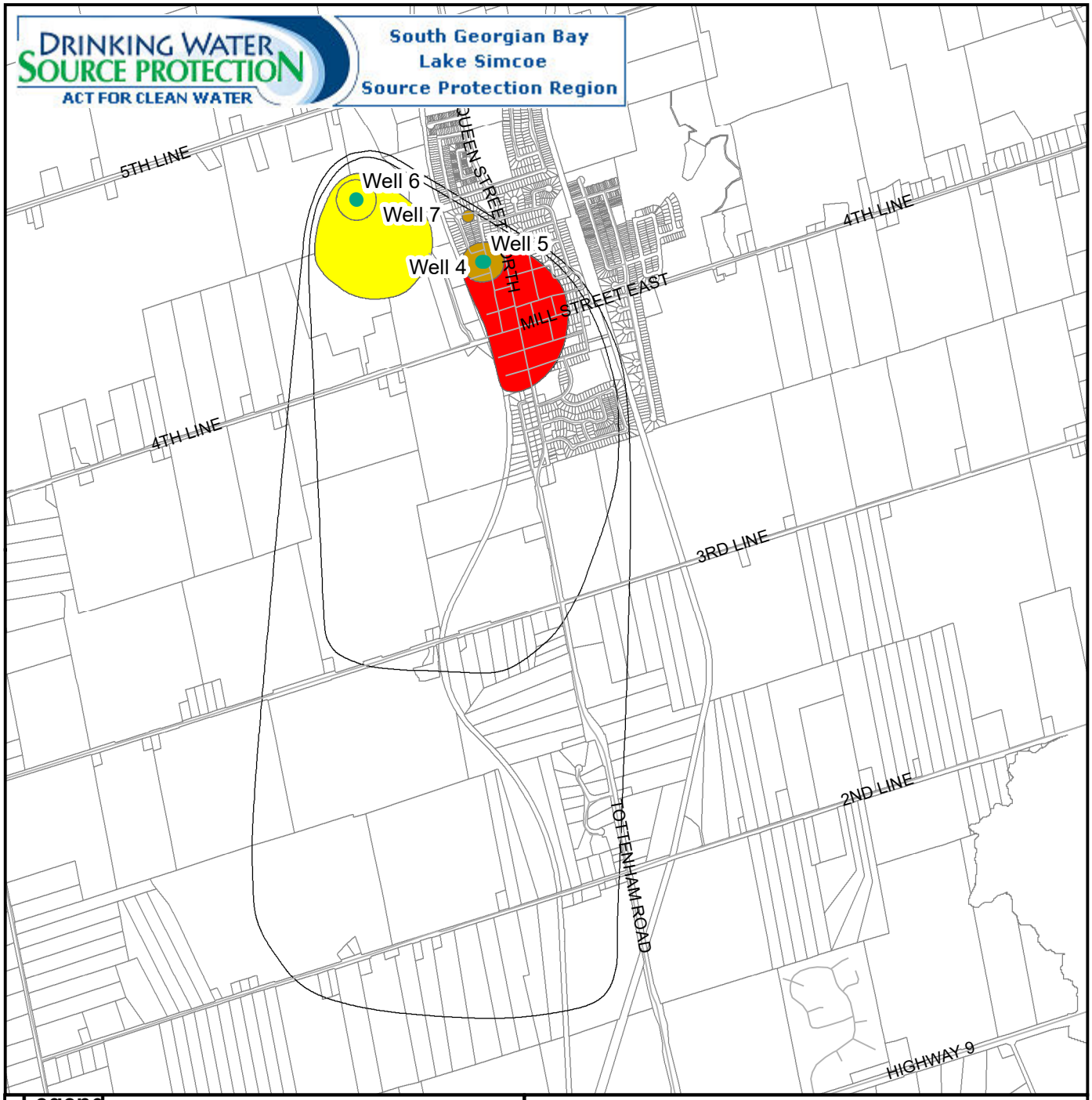
ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

The Livestock Density proportion is illustrated for the parts of WHPA A-D where the vulnerability score is greater than 6.

DATE: JULY 2010	SCALE: 1:30000
PROJECT: 0-071948.05	FILE. NO.:0-07194805F11.2-10

GENIVAR Ontario

FIGURE **14b-8**



Legend

- Municipal Well Location
- <1%
- =1 - <6%
- =6 - <8%
- =8 - <30%
- =>30%

N W E S

400 200 0 400 Meters

The Impervious Surfaces proportion is illustrated where the vulnerability score is greater than 6.

This map was produced for the South Georgian Bay Lake Simcoe Protection Region for the purpose of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

IMPERVIOUS SURFACES- TOTTENTHAM

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2025-09

Scale: 1:30,000

UTM Zone 17N, NAD83

Nottawasaga Valley Conservation Authority

Ontario

Figure 14b-9