DRINKING WATER SOURCE PROTECTION

ACT FOR CLEAN WATER

Thames-Sydenham and Region Source Protection Committee

St. Clair Region Source Protection Area

Assessment Report

Appendices

Approved

September 16, 2015

St. Clair Conservation

Lower Thames Conservation

UPPER THAMES RIVER CONSERVATION AUTHORITY

Ontario

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Appendices

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Appendix 2 – Section Summaries

This section is no longer part of the Assessment Report. Section Summaries will be updated to reflect the updates to the Assessment Report and will be available on the web site.

Appendix 3 – System Summaries

This section is no longer part of the Assessment Report. System Summaries will be updated to include policy summaries and will be available on the web site.

Appendix 4 – Assessment Report Consultation

Assessment Report Consultation Plan
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DRINKING WATER SOURCE PROTECTION
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Thames-Sydenham and Region
Source Protection Region

Assessment Report Consultation Plan

May 13, 2011

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1 Background

The Clean Water Act requires the completion of Assessment Reports which will contain the science on which the Source Protection Plan will be based. These reports will identify vulnerable areas, assess the vulnerability of those areas, identify water quality issues related to the water sources and assess the risks to the water systems. General Regulation 287/07 under the Clean Water Act requires consultation on the Assessment Report.

Work on the components of the Assessment Report (AR) is being undertaken by various leads through partnerships involving system operating authority and CA staff. The following table summarizes the various projects and the systems included in those projects. It is generally anticipated that the work on the systems within a project will be completed together and this will determine when the work from a system can begin the peer review and consultation processes. Peer review involves the review of the work for technical completeness and whether it meets provincial rules and guidance. It is generally accepted that only the vulnerability assessment requires peer review due to the highly technical nature of this work. Upon completion of the peer review, stakeholder consultation on the delineation and vulnerability assessment of the vulnerable areas can be initiated. When the other components of the Assessment Report are complete consultation on those parts can be initiated. The regulations also require that the specific consultation be undertaken on the draft and proposed Assessment Reports.

Table 1 - Assessment Report technical studies

Groundwater		Surface Water	
Projects	**Systems**	**Projects**	**Systems**
Perth	Stratford St Marys West Perth - Mitchell Perth East - Shakespeare (& Milverton)* Perth South - St Pauls, Sebringville*	Essex Chatham Kent	Wallaceburg Wheatley South Chatham Kent/Chatham
London-Middlesex	City of London - Fanshawe, Hyde Park Thames Centre - Thorndale, Dorchester Kilworth Heights Subdivision, Melrose, Mount Brydges Birr	West Elgin	West Elgin
Oxford	Woodstock, Innerkip Ingersoll, Beachville-Loweville Mount Elgin* Embro, Lakeside* Thamesford Tavistock, Hickson-King*	Southern Lake Huron	LAWSS* Petrolia*
Chatham-Kent	Ridgetown Highgate		
GUDI Studies	St. Marys Oxford (Thamesford, Woodstock) City of London (Fanshawe) Thames Centre (Dorchester) Middlesex Centre (Kilworth Heights Subdivision) Chatham-Kent (Highgate)	IPZ-3 Studies	LAWSS, Petrolia Wallaceburg, Wheatley, Erie Beach West Elgin Lake St. Clair intakes (Essex Region SPA)

Municipalities identified with an asterisk (*) include vulnerable areas from water systems in neighbouring municipalities
Note: Milverton is outside of the TSR SP Region but included in the technical study

The Assessment Reports are to be submitted to the MOE one year from the approval of the Terms of Reference (April 20, 2010). MOE has accepted that it is unlikely that all work on the Assessment Report will be completed by the due date in the larger and more complex regions. They have therefore accepted that some components of the Assessment Report will be identified as data gaps at the time of submission of the first Assessment Report. There is an expectation that work would continue on those gaps in parallel with work on the Source Protection Plans. The remaining aspects would be expected to be submitted sufficiently in advance of the due date of the Source Protection Plan to allow for the approval of that work prior to the completion of the Source Protection Plan. Those aspects of the Assessment Report which we expect cannot be completed prior to the submission of the Assessment Report are identified in Phase 4 in the following table.

Due to the size and complexity of the AR it is not adequate to await its completion prior to initiation of consultation. Instead, a phased approach to consultation is proposed and described in the consultation plan. This Consultation Plan outlines the planned consultation on the Assessment Report in the Thames-Sydenham and Region.

2 Purpose

This consultation plan is intended to:

- Describe the consultation on the vulnerability assessment work including vulnerability zones (the lines on the map); Issues and Threats; Risk Assessment; and Tier 1 Water Budget.
- Meet the requirements of the Clean Water Act and related regulations and rules.
- Allow adequate opportunity for stakeholder input into the technical work comprising the Assessment Report.
- Increase the local community awareness of the Source Protection Planning process

3 Consultation Overview

In order to allow for adequate stakeholder engagement in the development of the Assessment Report a phased approach to consultation is planned. These phases allow multiple opportunities for stakeholders to be involved in the consultation process. The phases will allow multiple times and locations to be involved. The phases align with the availability of technical reports. The phases are also intended to target local information at the local communities. The 4 phases of consultation are described in the following table

Table 2 - Consultation phases

Phase	Description	Anticipated consultation
1. Vulnerability Assessment (Draft)	• WHPA –A, B, C, D delineations • IPZ -1, 2 delineations • Vulnerability scores • List of activities which would be threats with a given vulnerability score	• Dependent on completion of work by consultants • Dependent on completion of peer review including possible revisions as a result of peer review comments • Local targets (systems or groups of nearby systems) • Municipal information packages
2. Issues and Threats (Final Draft)	• Vulnerable areas from previous consultation • HVA, SGRA • IPZ-3 (preliminary)	• Local targets • Municipal consultation

	• Issues • Conditions • Significant Risks (preliminary)	
3. Assessment Report	• Proposed draft containing all aspects of the Assessment Report except for those identified in Phase 4 below.	• Regional open houses/public meeting • Internet posting and notices • Municipal and First Nations consultation required
4. After submission of the first Assessment Report	• Tier 3 Water Budget – SGRA Vulnerability Assessment • Significant Risks - Refinements based on site-specific Risk Assessment • IPZ-3 vulnerability assessment • GUDI based WHPAs (WHPA E and F) • Prior to completion of SP Plan	• Consultation on the additional components • Consultation on the proposed AR – required regional open houses/ public meeting • Municipal and First Nations consultation required

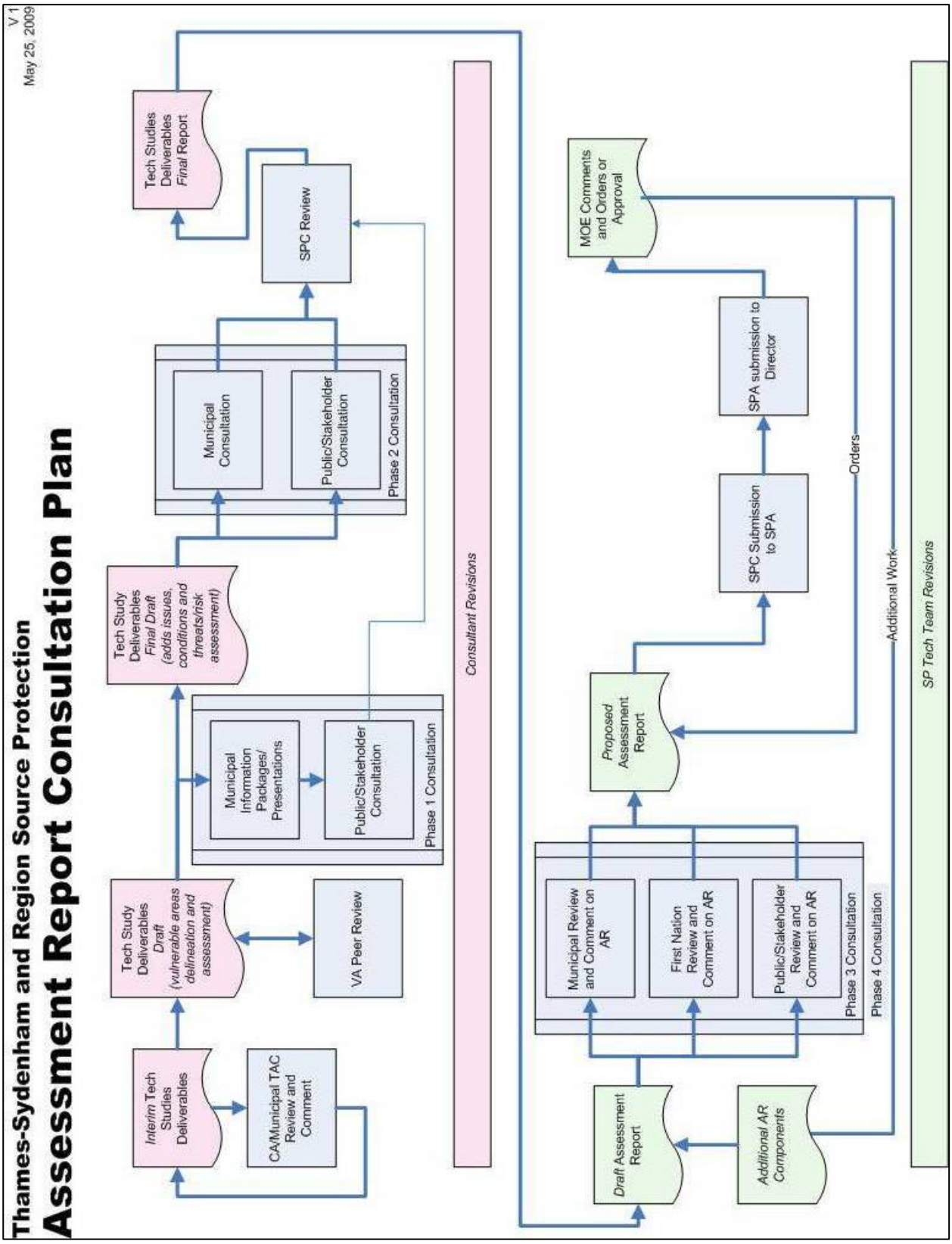

Figure 1 - Consultation plan overview

4 Target Audiences

4.1 Municipalities which do not include lands within vulnerable areas

While these municipalities are not directly impacted by some aspects of the Source Protection planning process, it is important to maintain a flow of information to ensure they understand the process and the scope of the impacts in the region. Information will be made available to these municipalities on a regular basis. The focus on the municipalities outside of vulnerable areas will be on the process and work ahead.

4.2 Municipalities which include jurisdiction within vulnerable areas

These municipalities need to be kept current and engaged with the Source Protection planning process. Their participation will include all four phases of the consultation process. Significant effort will be focused on engaging those communities containing Wellhead Protection Areas (WHPA) and Intake Protection Zones which are likely to be the focus of many of the policies of the Source Protection Plans.

4.3 Land-owners within vulnerable areas

These landowners may or may not be impacted by the Source Protection planning process. They will be included in all four phases of consultation. The early phases of the consultation are intended to allow these landowners to determine how closely they should remain involved in the Source Protection planning process.

4.4 Landowners that are or could be a significant risk

At this point, these landowners have not been identified. They will be included in consultation in Phase 1 as they are within the vulnerable areas. Specific efforts will be made to directly engage them in Phase 2 and 3 of the consultation. The regulation requires that landowners who are known to be involved in an activity which poses a significant risk to a municipal drinking water source be contacted as part of the consultation on the Assessment Report.

4.5 First Nations

At this point, no First Nation Systems are part of the Source Protection Plan. Efforts will continue to involve First Nations in initiating technical studies. Once a system is identified, formal consultation on the vulnerability assessment will commence. Until this time, First Nation Communities will be kept informed of the Source Protection planning process.

4.6 General Public

The general public outside of vulnerable zones will be kept informed about the Source Protection planning process. It is important that all landowners have an opportunity to understand the process and to determine that, in fact, their properties lie outside of a vulnerable zone and therefore, are not directly impacted by this process.

5 Approaches to Consultation

5.1 Phase 1

Phase 1 involved consultation on the identification of vulnerable areas and a general overview of threats and issues. The key messages communicated included details regarding the planning process to date, local vulnerable areas and scores, the science behind the vulnerability mapping and the next steps.

5.1.1 Municipalities which do not include lands within a vulnerable area

- distribution of updates and other printed material
- invitations to public meetings held throughout the region

5.1.2 Municipalities which include jurisdiction within a vulnerable area

- letter and package of information to municipality which includes maps of vulnerable areas
- meeting with municipal staff/council as required

5.1.3 Land-owners within a vulnerable area

- A series of public meetings were held as outlined in Appendix B. The meetings were held from 3:00 – 7:00 as an open house format. A 10-minute presentation will be available throughout the meeting as required.

5.1.4 First Nations (not within a vulnerable area)

- general distribution of tabloid
- public meetings

5.1.5 General Public

- invitation through newspapers for public meeting
- media articles
- general distribution of tabloid
- response to requests for information/presentations

5.2 Phase 2

Phase 2 Consultation involved the results of issues evaluation, threats assessment and the Tier 1 Water Budget. The key messages communicated included details regarding the planning process to date, how threats are determined, the science behind the threats assessment and the next steps.

5.2.1 Municipalities which do not include a vulnerable area

- distribution of updates and other printed material
- invitations to public meetings held throughout the region

5.2.2 Municipalities which include jurisdiction within a vulnerable area

- letter and package of information to municipality which includes maps of vulnerable areas
- meeting with municipal staff/council as required

5.2.3 Land-owners within a vulnerable area:

- A series of public meetings were held as outlined in Appendix B. The meetings were held from 3:00 – 7:00 as an open house format. A 10-minute presentation will be available throughout the meeting as required.

5.2.4 Landowners that are or could be a significant risk

- direct mail followed with kitchen table meetings with any landowner who is a significant risk, when information becomes available

5.2.5 First Nations not a vulnerable area

- general distribution of tabloid
- public meetings

5.2.6 General Public

- invitation through newspapers for public meeting
- media articles
- general distribution of tabloid
- response to requests for information/presentations

5.3 Phase 3

Phase 3 involved the formal consultation for the proposed Assessment Reports and included public meetings held throughout the region, as shown in Appendix B. These sessions were timed to satisfy the requirements of the regulation. Dates were set based on the previous consultation phases and completion of technical studies. The key messages communicated include details regarding the process for establishing the

Assessment Report and the consultation that has taken place to date. Additional local consultation was undertaken as required.

5.4 Phase 4

Phase 4 involves consultation on updates to the Assessment Report. In addition to regulatory requirements, additional consultation will take place subject to direction by the Source Protection Committee.

5.5 Use of Web site

The web site www.sourcewaterprotection.on.ca will be used extensively for the purpose of extending the consultation beyond the public meetings. A description of the process, vulnerability maps and scores, materials used in the consultation as well as the draft assessment report will be available on-line. The web site will describe options for submitting comments as well as the ability to provide comments on-line. Comments collected through the consultation will be posted on the web site as well as forming part of the submission to the MOE with the proposed Assessment Report.

5.6 Distribution of Report and Other Materials

The web site will include access to interactive mapping products through a geoportal. It will also include the availability of documents. The web site will be promoted as the primary method of accessing the documents and mapping products. CDs will also be made available to those who request them. Printed copies of the reports will be made available for review at CA offices and at the public meetings. Various summary products will be available for the public at the public meetings.

6 Appendices

Appendix B – SCRSPA Assessment Report Consultation Schedule

Note: When included as part of the Assessment Report for a Source Protection Area only the appropriate schedule is included

Appendix B – SCRSPA Assessment Report Consultation Schedule

St. Clair Region Source Protection Area Phase 1 and Phase 2 Consultation Schedule

No.	PHASE 1 Meeting Date	PHASE 2 Meeting Date	Meeting Location	IPZ/WHPA	Methods of Notification
1	Aug. 6, 2009 3:00 – 7:00	Nov. 5, 2009 3:00 – 7:00	Huron Oaks Golf Club, 2587 Lakeshore Rd. Bright's Grove	Lambton Area Water Supply System (IPZ)	direct mail ad in paper website
				Petrolia (IPZ)	direct mail ad in paper website
2	Feb. 24 and Feb. 25, 2010 3:00 – 7:00	Feb. 24 and Feb. 25, 2010 3:00 – 7:00	Oaks Inn, 80 McNaughton Avenue, Wallaceburg	Wallaceburg (IPZ)	hand delivered ad in paper website

St. Clair Region Source Protection Area Phase 3 Consultation Schedule

No.	PHASE 3 Meeting Date	Meeting Location	IPZ/WHPA	Methods of Notification
1	April 13, 2010 3:00 – 7:00	Wallaceburg Municipal Office, 786 Dufferin, Wallaceburg	Wallaceburg	direct mail (for significant threats) ad in paper website
2	April 15, 2010 3:00 – 7:00	Huron Oaks Recreation Centre 2587 Lakeshore, Brights Grove	LAWSS Petrolia	direct mail (for significant threats) ad in paper website
3.	April 20, 2010 3:00 – 7:00	St. Clair Region Conservation Authority 205 Mill Pond Cr., Strathroy	HVAs/SGRAs	ad in paper website

St. Clair Source Protection Area Phase 4 Consultation Schedule

1.	June 9, 2011 3:00 – 7:00	Huron Oaks Recreation Centre 2587 Lakeshore, Brights Grove	LAWSS Petrolia	ad in paper website
2.	June 13, 2011 3:00 – 7:00	Wallaceburg Municipal Office, 786 Dufferin, Wallaceburg	Wallaceburg	ad in paper website

Summary of Consultation and Comments

Open House - Consultation Phase 1: Vulnerability Assessment,
August 6, 2009, Bright's Grove, 3 p.m. - 7 p.m.

Commenter	No.	Comment	Response
Resident	1	I have a complaint about the garbage that is being dumped in the creek on Brigden Rd. Garbage: i.e. tires, fridges, stoves, construction materials and almost all kinds of garbage. I have complained to our Alderman at different times, but nothing has ever been done to stop this dumping nor has it ever been cleaned up. This Creek drains directly into Lake Huron and I feel it is a major risk of contaminating of our water. Also the City of Sarnia sprays chemicals along creek.	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	2	How do you control effuent from livestock, farm buildings or rookeries where many birds roost? Barnyards etc. Why are the large farms east of Obrien and south of Errol Rd. not in the 6.3 vulner zone? Two large farms there use large amounts of fertilizer & pesticides and definitely drain into the 6.3 zone. Road Salt?? How do you stop it form entering the water system? Dilution??	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	3	(1) Leachate from the landfill goes to lake through Clark Drain (pumped to Clark Drain) which discharges into Perch Creek. No Environmental Assessment was done. LEachate Sample water - very high pH, COD (Sample from the K & E Landfill, Sarnia) (2) Green/Clean Harbor on 10th Line (clay soil)- EP Act governs it, for hazardous waste?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	4	At present and in the past there has been a major flow of beach sand travelling west to go down the St. Clair River. This sand is gone for ever. I suggest strongly that a pier, a groyne, or an old ship be placed just east of the S.Y.C. This would be a collector for millions of yards of sand for use in posterity. For the water system there would be much less sand going by the intake. This proposal would serve both purposes very well.	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	5	(1) Possibility of moving intake more than one mile into lake (2) Sewage discharge from Bright's Grove Sewage Lagoon due to heavy rains or faulty equipment. (3) 100 year rain cycles have increased to the point where it happens more than once per yea or more than three times in 10 years. I have personally experienced this type of events at work maintaining the environmental analyzers which monitor THC -BTX's in water bring return to the St. Clair River. (4) How to limit boat traffic over the intake for the WTP (water treatment plant)	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	6	Interested in a grant program that will help with capping a residential well.	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	7	Old septic systems west end of IPZ2 in Bright's Grove	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	8	Homes in protection zone are a mixture of septic and municipal sewer service. The committee should consider suggesting that municipalities give priority to converting septic to sewers for properties in the IPZ. Once the IPZ is finalized consider advising all persons residing in the zone that they are in the zone and ensuring that the communiation is repeated whenever property is sold (similar to airport zoning)	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	9	Poor water from Perch Creek- need to enforce dumping laws	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	10	Lessee Drain on the south side of Hislop Line drains across Mandaumin Rd. to Cow creek. No hydraulic connection from south side of Hislop to Lakeshore Rd., east of the road, east of Mandaumin. Landowners available for call or site visit. Also note that Cul Drain used to drain Wawawash Lake in 1930s, and was dug by hand. Also note the presence of septic tanks along the shoreline west of the intake in Petrolia IPZ-2. As well, the LAWSS storm sewershed at the east end should be reviewed with the city as development may have altered the pattern.	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	11	Cow Creek on the IPZ map is Perch Creek, it has been Perch Creek for 100 years before Sarnia took over.	A verbal repsonse at the open house; presented to Source Protection Committee and noted

Open House - Petrolia Treatment Plant and Lambton Area Water Supply System IPZs Vulnerability Assessment, Thursday, Nov 5, 2009

Commenter	No.	Comment	Response
Resident	1	I'm a residential property owner and how does this affect me?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	2	Will I have to make changes to my septic system?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	3	How does this address water quality in my creek behind my house?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	4	Are boating activities considered a threat?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	5	Who will pay to make changes mandated by SWP assessments of threats on my land	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	6	What happens if they shut down an intake…do we run out of water?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	7	Why is the IPZ-2 delineation so jagged rather than a smooth line?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	8	Are low risk threats a concern for SWP planning?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	9	What is considered a moderate or significant risk?	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	10	Why is LAWSS intake not extended to US side of the border and is the US conducting similar studies?	A verbal repsonse at the open house; presented to Source Protection Committee and noted

Open House - Wallaceburg IPZ Vulnerability Assessment, Wednesday February 24 and Thursday February 25, 2010

Commenter	No.	Comment	Response
Resident	1	General comment living in community for 30 plus years I have seen a significant improvement in the health of the Sydenham.	A verbal repsonse at the open house; presented to Source Protection Committee and noted
Resident	2	Wallaceburg in the past has has spills int McDonald tap drain as recnet as September 2009. Turned water black for a mile. Potential for contaminated sediments? Sarnia MOE came in and took tests.	A verbal repsonse at the open house; presented to Source Protection Committee and noted

Comments on St Clair Region Draft Proposed Assessment Report Comment Period 1
(March 19, 2010 to April 30, 2010)

Commenter	No.	Comment	Response
Water Treatment Plant Operator (Brights Grove WTP)	1	Noted capacity of Petrolia WTP as 12,000 m3/day contrary to Municipal System Summary of 10,985m3/day	Confirmed rated capacity according to C of A dated Dec 2006 as 12,000m3/d AR changed accordingly.
	2	Indicated that Maximum Water Taking is 15,586 m3/day	This is the maximum permitted daily taking under PTTW which has not been included in the municipal summary.
	3	Indicated that depth of intake was 3.4m as compared to 5.4m noted in report. Should report total depth of water and depth to top of intake crib.	Confirmed depth to intake at 3.4m with plant operator based on IGLD 1985 176.0m. AR (System summary and Section 4) changed accordingly.
	4	Indicated that Maximum Annual Pumping rate is 5,688,890m3/year. Possible confusion over definition of Maximum Annual meaning total allowable draw for the year as per PTTW verses highest years draw for a period of record (in this case 5 years)	Confirmed that actual maximum annual pumping rate is equivalent to the year with the highest total draw for the period of record. Calculated figure in AR is correct. (5 years POR). AR will be updated to clarify value reported.
	5	Operator indicated annual was 1,775,273 m3 which is the total of all months in 2009.	Confirmed average annual pumping rate is equivalent to actual yearly total rate averaged for all years in period of record. Calculated figure in AR is correct, no change required. (5 years POR)
	6	Intake distance to shore noted as 365m not 430m indicated in consultants report. (430m is distance to plant)	Distance from shore to intake should be changed to 365m in AR (system summary & section 4 (table 4.2). No impact on intake location or IPZ deliniation or vulnerability assessment.
	7	Population serviced should be 9,937. Municipal Summary indicates approx. 9,700	Discussion with Petrolia staff suggested approximate population should be 10,000. Will update AR
Proofreader	8	AR Section 4 - Various text and sentence structure edits as noted by proofreader	Editorial changes on pages: 13,14,21,22,24,25,27,29,34
	9	AR Section 7 - Various text and sentence structure edits as noted by proofreader	Editorial changes on pages: 10,12,17,21,22,24,27
	10	AR Section 8 - Various text and sentence structure edits as noted by proofreader	Editorial changes on pages: 9,12,16,17,
	11	AR Section 9 - Various text and sentence structure edits as noted by proofreader	Editorial changes on page: 11
Source Protection Committee	12	Section Summary 3 - clarify permitted water taking from Great Lakes and connecting channels was not included as a supply in Water Budget calculations description. Confirm comment in Main Report Section 3 also.	Email from Mark dated April 27, 2010 indicates that water taken from the Great Lakes and connecting channels **is not** included as a demand. Text provided to clarify process. Revisions required to pages 3-7 and 3-12 and Section Summary 3 of AR
Resident	13	New pipeline along Hwy 40 to Dufferine Ave. should be connected to Wallaceburg since existing intake pumps are vulnarable to contamination due to reverse flow conditions in the Chenal Ecarte.	Beyond the scope of the AR - no change to AR.
Resident	14	We need education for all property owners relating to septic tanks, fertilizer usage and encourage good farming practices. Even though AR does not identify any issues we can still do better through education, outreach and other tools.	Comment for consideration during development of SP plan. No change to AR
General Manager - LAWSS	15	LAWSS is very interested in continuing to be involved in this process	No change to AR
Resident	16	I noticed that for the Wallaceburg area there are no maps or fact sheets for either Phase 1 or 2.	Not a comment on AR. Link has been corrected on website.

	17	Is the possibility of spills or contamination of our drinking water source from the Sarnia area considered within your mandate?	Will be considered under IPZ 3 delineation communicated by email from Brian McDougall April 15, 2010
	18	Ensure municipalities in draft assessment report (AR) are consistent with Terms of Reference	Changes noted and will be formatted in AR to meet Terms of Reference
	19	Data gaps do not seem to meet the direction provided in the Director's memo of October 2009. Some appear to be limitations of data in arriving at conclusions	Province would like to see difference between data gaps and data limitations however the reader may not recognize the distinction between the two. AR should acknowledge that not all data gaps will be able to be filled in the current or future AR. Amended AR should consider prioritizing gap filling.
	20	**Format of the draft AR -** The current structure for data gaps may be confusing for the public. Data gaps are documented three different ways throughout the document; at the end of each chapter, within the text and in section 9. If map reference numbers are changed (see note below) ensure that Table of Contents is accurate.	Suggestion for consideration - No comments from the the public regarding confusion - data gaps are well identified - no change to AR
	21	The legend in map 1-3 shows green representing source protection area boundaries. The actual map has purple representing the boundaries	Legend will be updated to be consistent with map.
	22	Ensure map reference numbers match up, i.e. Map 4-8 should be map 4-7.	Text in paragraph 1 on page 4-26 needs to be clarified regarding reference to maps
	23	Reference is made to the maps in appendix 5 on the website, these maps are not on the website	Website link has been updated
	24	The federal lands map/figure on pg 2-16 does not meet Technical Rule 12.	This map will be changed according to Technical rule 12.
	25	A few sections of the report contain language that should be considered for re-wording or deleted. For example:On pg 1-17, "This due date has no consideration of the complexity or quantity of work related to the submission of the ARs…	Text changes will be made to clarify language
	26	Page 2-24/Table 2-10: This table shows all drinking water systems that serve the St. Clair region. But the last two intake systems (Chatham and West Erie) are located in another Source protection Region, i.e. the Lower Thames region. Clarification is required.	Clarify text and Table 2-10 footnotes
	27	Page 4-7/Sec. 4.2.3: Please re-word "from the crib" to "from the entry point where raw water enters a system" to be consistent with the Rules.	Text will be updated to reflect Rules
	28	Page 4-5: The Wallaceburg intake is classified as a Type B intake in the report but would be a Type C system based on the technical rules. The Ministry has agreed that the system should be classed as a Type B system. To ensure this is adequately documented in the AR, the province is sending a formal letter confirming the classification as type B as per technical rule 55.1. This letter will need to be included in your final report.	Previous discussions with MOE supported the Type B classification. Flexibility in IPZ 3 may be possible through 15.1
	29	For completeness, the draft AR should provide rationale as to why this intake is classified as a Type B even though it is not located *in* a connecting channel. Reverse flow in the Chenal Ecarte channel is not a rationale for classifying the intake as a type B. Reverse flow can occur in any water course regardless the type of intake. Also, the draft AR should provide rationale for extending the IPZ 1 to 1000 metres at the downstream of the intake.	Additional information regarding increased velocities during reverse flow will be outlined to justify the extension of the IPZ 1 downstream. AR will be edited accordingly.
	30	The setback for IPZ-1 and IPZ-2 for the Wallaceburg intake on land should be 120m or the Regulation Limit, whichever is greater. The delineation of IPZ-1 and IPZ-2 covers the following: The left side of the zones is located on First Nations land where no Regulation Limit is available. Also, no drainage pattern is known in this area. The 120m setback was considered instead of using the RL. Data and information are being collected to estimate the drainage pattern for this area and the Data Gap section shows that clearly. It is acceptable to use the 120m setback.	Rationale for the current zone delineation on St. Anne Island is accepted with the understanding that further information is required. No change to AR.
	31	The right side of the IPZ-1 and IPZ-2 is an area where setback of 120m or RL applies. The RL for this area is huge and covers a big portion of land. Since the rules require delineating the biggest setback of 120m or the RL, the RL should be used. The AR shows clearly that a drainage pattern on land for delineation should be used instead of the RL. Technically, this assumption makes sense and to use this approach, Rule 15.1 should be applied because it departs from using the RL to instead use the drainage pattern based on professional judgments	Correspondence dated April 23, 2010 from SCRCA to MOE outlines a request to exercise Rule 15.1 to delineate the zones as portrayed in the AR. AR will be revised to reflect request has been made.
Ministry of the Environment	32	Page 4-8: The IPZ 1 for the Lambton Area Water Supply System was extended to include a sewer area that discharges in a marina using Technical Rule 64. Technical Rule 64 allows modifying the IPZ 1 on the water portion only and not on the land or sewer-system. The inclusion of the sewer system should be done through the delineation of the IPZ 2 based on the time of travel. Please revise.	RV Anderson, consultant on the LAWSS study has been made aware of the issue and is revising IPZ 1 and IPZ 2 as requested.
	33	IPZ 2 Page 4-11: 2nd paragraph: Scenarios chosen for modelling IPZ 2. The AR is silent on why those scenarios were chosen. Please provide the details.	Changes to text outlining scenarios will be made in 4.2.4.1
	34	Page 4-17: IPZ 2 score for Petrolia was higher than IPZ 2 score for Wallaceburg even though the percentage of land for Wallaceburg is lower than for Petrolia (this is just an example). Rationale behind scores is required as per rule 92	Comment is unclear since Petrolia IPZ 2 = 6.3 and Wallaceburg IPZ 2 = 7.2. Will clarify with commenter as to concern.
	35	Reasonable consideration on the weight of the evaluation factors was not provided in the draft AR (technical rule 92).	Discussion with the Stantec and R.V. Anderson is ongoing regarding this comment. All evaluation factors have been given equal weight based on professional judgement. AR will be amended to clarify.

	36	Page 4-19: More explanation is needed in the uncertainty section to explain why the level of uncertainty was assigned to low. Does this level of uncertainty apply to all intakes and all protection zones? Please clarify.	Details are provided in Appendix 13. AR to be edited to reflect that the uncertainty does apply to all protection zones.
	37	Transport Pathways have not been identified or documented in the report. Whether or not they have been considered should be documented in the AR.	No adjustment to groundwater vulnerability (HVA,SGRA only) due to transport pathways was undertaken. AR to be edited accordingly.
	38	Uncertainty has not been identified or documented for the groundwater analyses and should be included in the AR.	Uncertainty to be added to AR from technical report.
	39	Significant Groundwater Recharge Area (SGRA) map is included; however, there is no explanation of which methodology was used to create the map. *One* method needs to be chosen and the implementation of this method must be documented. In the text page3-17; Section 3.5 An explanation of the two rules that can be used is provided, but it does not clearly say which is being used for the map. For example, ""In most cases, Technical Rule 44(1) provides more conservative criteria for SGRA declaration than does Technical Rule 44(2)." It should be clear which Technical Rule is being used.	Review ongoing with Mark Helston. Results to follow
	40	It would be beneficial to include the Tier 1 Stress Assessment as an Appendix once the peer review is completed.	Comment noted for consideration
	41	It is suggested that Section 3.3 *Phases of Water Budget Work* move closer to the top of chapter 3 to make it flow better.	Impact on AR report formatting would be significant. No change to AR.
	42	Table 6-2 on page 6-7 Notes section, it would help to elaborate as to when a threat could be significant (i.e. issues approach or events based approach	Text is noted immediately below Table 6-2. No change to AR.
	43	Section 7.1.1 Page 7-8 3rd paragraph, first sentence…road salt is not a pathogen threat	It was not intended to imply that road salt was a pathogen, rather to outline that Pathogen threats need to be considered. Examples outlined in paragraph 3, page 7-8 did not provide clarity and will be removed.
	44	Section 7.1.1 Page 7-9 second paragraph second sentence term 'wellhead protection area' (WHPA) is used and should be removed as there are no WHPAs in the SPA.	Noted and text to be updated
	45	Section 7.2.2 Table 7-5 on page 7-17 The wording is confusing. The text references a table that gives the number of significant drinking water threats, but then goes on to say there are no significant drinking water threats. It would help to just indicate that the table shows that there are no significant drinking water threats.	Paragraph 7.2.2 re-written to clarify.
	46	Page 7-18 refers to Appendix 10 for detailed lists of low, moderate or significant threats and the circumstances under which they occur. In Appendix 10 page 2 there is a reference to the provincial tables. They refer to 73 tables. There now are 76 tables	Will update text on page 7-18 to indicate 76 tables
	47	Appendix 10 p. 11 Section 5.8 needs updating as Technical Rule 130 has been amended. The AR should be updated to reflect this change	Rule 130 refers to IPZ 3 work which is beyond the scope of local guidance and is identified as work which is yet to be done. No revision to AR required.
	48	Section 7.2.1. There are maps indicating impervious surfaces, managed lands and livestock density in the region (see Maps 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7), but the identification of the threats related to these mapped areas is yet to be completed. The technical rules require that this analysis be included in the draft AR.	Revise AR to describe that is unlikely that there are significant threats resulting from these activities and this will be confirmed in the amended AR.
Resident	49	Upon attending the water source protection meeting, regarding the Wallaceburg intake, and discussions that we had, I have found out that there were no individuals that had visited the area. I was disappointed in that. How can you make sound decisions based on flawed information? The area of concern in the IPZ-2 zone is a self-contained system and I do not see it as a threat that cannot be easily controlled. The river only runs backwards maybe 1% or 2% of the year. There are other tributaries to the north that flow by the Wallacburg intake 98% of the time within your two hour time frame that are not even taken into consideration	Email responded to by Brian McDougall on March 4, 2010 indicating that comments would be given to the Source Protection Committee. Reviewed with consultant who confirmed accuracy of calculations.
	50	What makes the outlined area, an area of concern, where other areas like the native reserve are not even considered?	AR notes that more work is required.
	51	Future decisions and or regulations should not be made on flawed or misleading information.	Concern noted
Staff	52	Table 3-1 has a column of zeros under miscellaneous GW use which has a total of 7782 m3/d. Revised table provided.	Updated table received and will be changed in AR

Directions received from Ian Smith, Director, Source Protection Programs Branch, Ministry of Environment, as per letter dated November 5, 2010

No.	Direction	Response	Status	Section
1	The AR be revised to include the enumeration of threats related to the application of nutrients, specifically the application of agricultural source material, non agricultural source material, and commercial fertilizer. Additional details for this direction: It was unclear if by not including these enumerations the persons undertaking these activities that are or would be significant drinking water threats were notified during the consultation process. Should this be the case the appropriate consultation should be conducted with persons identified as undertaking any of these activities that are significant drinking water threats as per direction number 20 below.	In an IPZ with a vulnerability score of 9 or 10, the land application of nutrients may be a significant threat. Through an examination of 2006 aerial photography, and the circumstances that would make that threats significant, it is determined that area within the Wallaceburg IPZ-1 (score of 9), does not have significant threats related to this activity. The LAWSS and Petrolia IPZ scores are lower than 9. Therefore, there are no significant threats related to these activities in the SCR SPA. Text to describe the analysis and findings will be added to the AR. The AR will also be revised to remove this analysis from data gaps, since the work is completed. Technical memos documenting this work will be referred to in the report, and added to the list of references in the Appendices.	**Done**	Section 7 Table 7-1, Section 7.2.1 and 7.2.5, 7.4, Section 9.1 Table 9-1, Section 6 Table 6-1, Appendix 12
2	The AR be revised to describe the correct methodology that was used to enumerate threats related to ASM generation (livestock), throughout the AR. Additional details for this direction: Two different methods were described in the report; one in the introductory section and one in the section that discusses the specific threat.The Source Protection Authority must clarify what method was used in the actual enumeration of threats and document this in the AR.	The method followed will be clearly documented as was done for the LTV AR. Text will be added to Section 7. For the assessment of chemical threats related to the land application of nutrients, vulnerable area is examined (only if a threat can exist there), while the agricultural managed land refers to all agricultural managed land including cropland and pastureland. For the assessment of chemical threats related to the use of land for livestock grazing, pasturing or outdoor confinement area or animal yard, the whole of the farm itself is examined, while the agricultural managed land refers to only that agricultural managed land being assessed, i.e. grazing land, pasture land, outdoor confinement area or animal yard. No significant threats were found related to this activity.	**Done**	Section 7.1.1.3
3	The AR include impervious surface maps for HVAs and SGRAs as required by the technical rules. Additional details for this direction: The percent of impervious areas must be included if these areas are areas where there could be threats.	Map 7-1 shows impervious surface areas for all vulnerable areas (IPZ, HVA and SGRA) in the SCRSPA. New maps 7-1a, 7-1b and 7-1c will replace Map 7-1, to show IPZ, HVA and SGRA impervious surface areas on different maps.	**Done**	Map 7-1 in Appendix 1, Section 7.1.1.1, references to these maps in Section 7.2.1
4	The AR be revised to correct map 7.8 to fix the errors that suggest there could be drinking water threats in an incorrect area and misses an area where they could exist. Additional details for this direction: A yellow area on the map showing where activities can be significant moderate or low contains a pencil like section south of the intake and the delineated IPZ which shouldn't be coloured. In additon, above this, there is a section of the IPZ-1 that is not coloured yellow when it should be.	The Map 7-8 in Appendix 1 will be corrected in the right hand figure showing threats levels.	**Done**	Map 7-8 in Appendix 1
5	The AR be revised to remove references and work plans associated with the confirmation of existing threats (tier 2 risk assessment). Additional details for this direction: this additional work is not required as part of the AR work plan. This work can be conducted as part of the development of policies in the source protection plan. Despite the impact to the overall number of threats identified in the AR this information would not change the policies that the SPC is required to include in their plan.	Text on the confirmation of significant threats will be removed from Section 7.1.5 (Local guidance and technical studies), Section 9.1 (data gaps) and section summary 9 work plan tables. Text in Section 7.3 (Tier-2 risk assessment), Section 9.2 (Next steps), all system summaries and summary 7 will be revised to note that the site-specific risk assessment to be a part of the development of the source protection plan.	**Done**	Section 7.1.5, 7.3, Section 9.1 Table 9-1, Section 9.2, section summaries 4, 7, and 9, all three system summaries
6	The AR be revised to remove the work plan for sampling programs to identify issues.	Discussed with MOE. Table 5-6 will be moved from Section 5.5 (Work Plan) to Section 5.7 (Data Gaps) to indicate that the source of some of the identified issues is a data gap and how to fill that data gap. Text in Section 5-7 will be added to describe this data gap. Also added text on the technical studies as section 5.4, and inserted list of technical reports as Table 5-5.	**Done**	Section 5.4, 5.5, 5.6 and 5.7, Table 5-7, section summary 5, 9

No.	Direction	Response	Status	Section
7	The AR be revised to remove work plans for issues where it has not been determined that the source of the issues is partially or fully anthropogenic. Additional details for this direction: Since the SPC does not have information that will determine if the source of the contaminant for the issue in the AR that meets the criteria in technical rule 114 the SPC is not required to document any further in the AR.	Discussed with MOE. Table 5-6 will be moved from Section 5.5 (Work Plan) to Section 5.7 (Data Gaps) to indicate that the source of some of the identified issues is a data gap and how to fill that data gap. Text in Section 5-7 will be added to describe this data gap. Also added text on the technical studies as section 5.4, and inserted list of technical reports as Table 5-5.	**Done**	Section 5.5, 5.6 and 5.7, Table 5-7, section summary 5, 9
8	The AR be revised to remove the work plans to identify threats and delineate issue contributing areas. Additional details for directions 7, 8 and 9: The technical rules allow or require work plans for specific type of work. The identification of issues or the determination if the issue is anthropogenic or not is not one of the allowed work plans. Any future information that the SPC becomes aware of to identify issues and that may impact the conclusions of the AR can be added at a future date.	Discussed with MOE. In Table 5-6 in Section 5.5, a note will be added to state that all issues are identified as allowed under Rule 115.1. In Section 5.5, 5.6, and Section 7.1.4, text will be revised to state that some of the issues identified are naturally occuring, while the source of the rest of the issues is yet to be determined. Therefore all issues identified are as per Rule 115.1 and are currently not subject to Rules 115 and 116. If more information becomes available to the SPC to determine if an issue is wholly or partially due to anthopogenic sources, ther work to satisfy Rule 115 or a work plan to satisfy rule 115 must be included in a subsequent AR. Work plans will be removed from Section 7.4, Section 9.1 (data gaps) and section summary 9 work plan tables. Text related to this work will be removed from section summaries 5 and 7.	**Done**	Section 5.5 and 5.6, Section 7.1.4 and 7.4, Section 9.1 Table 9-1, Section summary 9 Table 1, Section summary 5, Section summary 7
9	The AR be revised to correct the rounding errors in the grand totals presented for each of the sub watersheds in table 3-1.	Table 3-1 will be corrected in Section 3.	**Done**	Section 3.2.5 Table 3-1
10	The AR be revised to include a description of the analysis undertaken for each factor set out in technical rule 92 that contributes to the area vulnerability factor which was used to determine the vulnerability factor for each IPZ-2 for each of the three intakes under assessment.	More text will be added to Section 4 to describe each factor set out in Rule 92 for the determination of the area vulnerability factor, for each of the three intakes IPZ-2s (factors are Percentage of the Area of the IPZ-2 that is Composed of Land, Land Cover, Soil Type, Permeability of the Land, Slope of the Land, Hydrological, Hydrogeological, and Transport Pathways).	**Done**	Section 4.2.6
11	The AR be revised to ensure the uncertainty analysis documented is consistent with rule 14. Additional details for this direction: The rationale for setting the uncertainty factor is unclear and the level of information provided currently in the AR suggests that the uncertainty level for the scoring is low but it does not indicate how this level was determined using the factors listed in rule 14.	Section 4.2.7 provides a summary of the uncertainty, and points the readers to Appendix 13 for more details. Appendix 13 will be revised to provide additional discussion of these factors: calibration/validation, area and source vulnerability factor accuracy (jn assessing vulnerability of hydrological features). The other factors of data, methods and models used are already provided.	**Done**	Appendix 13
12	The AR be revised to correctly identify that the centre point of the IPZ-1 is the entry point where raw water enters a system not the intake crib. The Source Protection Committee shall reword 'from the crib' to 'from the entry point where raw water enters a system' to be consistent with the rules.	Reference to 'intake crib' could not be found. In Section 4.2.3 (IPZ-1 delineation), text referring to the 'where the intake draws its water from the lake', 'intake centre', and 'intake' related to the IPZ-1 delineation, will be replaced with 'from the entry point where raw water enters a system' to be consistent with the technical rules.	**Done**	Section 4.2.3

No.	Direction	Response	Status	Section
13	The AR be revised to clarify the on-shore portion of the IPZ-1 for the Lambton Area Water Supply. The SPC must ensure the on-shore portion of the IPZ-1 in the marina area matches the legend colour for the on-shore portions of the IPZ-1 to ensure consistency in the mapping.	The difference in color between the legend and the map will be corrected in the right-side frame of Map 4-2.	**Done**	Appendix 1 Map 4-2
14	The AR be revised to include an explanation of the method used to delineate the percentage of managed land areas and livestock density. Additional details for this direction: It appears that the method used is correct but there are insufficient details to fully determine this or explain the method used here.	The response to Direction 14 is the same as for Direction 2. The method followed will be clearly documented as was done for the LTV AR. Text will be added to Section 7. For the assessment of chemical threats related to the land application of nutrients, vulnerable area is examined (only if a threat can exist there), while the agricultural managed land refers to all agricultural managed land including cropland and pastureland. For the assessment of chemical threats related to the use of land for livestock grazing, pasturing or outdoor confinement area or animal yard, the whole of the farm itself is examined, while the agricultural managed land refers to only that agricultural managed land being assessed, i.e. grazing land, pasture land, outdoor confinement area or animal yard. No significant threats were found related to this activity.	**Done**	Section 7.1.1.3
15	The AR be revised to clarify that the Source Protection Committee can only add local threats, other than the 21 prescribed drinking water threats, upon approval from the Director.	Minor text revision will be made.	**Done**	Section 7.1.2, Section summary 7, LAWSS summary
16	The AR be revised to correct the HVA and SGRA mapping references in the report. Additional details for this direction: Map 4-7 and Map 4-8 should be referenced as Map 4-5 and Map 4-7.	In Section 4.4 (HVA), the Map 4-5 (HVA) is correctly referred to. Map 4-6 (aquifer vulnerability) is also referred to. In Section 4.5 (SGRA), Map 4-7 (SGRA delineation) is correctly referred to. Map 4-6 (aquifer vulnerability) and Map 4-8 (SGRA vulnerability score) is also referred to. The text describing the maps referenced in Section 4.4 and 4.5 will be revised to better clarify what the maps show.	**Done**	Section 4.4, 4.5
17	The AR be revised to correct the terminology around conditions in the report. Additional details for this direction: The AR must be clarified that the regulation limits the tools to address conditions when developing policies for significant drinking water threats.	Based on clarification and further information recieved from MOE, the introductory paragraph in Section 6 on page 6-1 will be revised so it clarifies that "... activities that are significant DWT must be managed...", and the reference to conditions in that statement will be removed. This is because Part IV tools of the CWA do not apply to conditions. Text throughout Section 6 will be revised to ensure correct reference is made to the rules that describe what conditions are, as per directions also received on the Lower Thames Valley AR. Text in Section 6.1.3 below Table 6-2, and in Section 7.1.3 will be revised to make reference to rule 68 (event based IPZ-3), 126 (identifying conditions), 140.1 and 141 (conditions that are significant threats).	**Done**	Section 6 and Section 7.1.3, section summary 6
18	The AR be revised to correct the range for moderate and low threat risk levels in the report to ensure consistency with the rules. Additional details for this direction: The range is greater than 60 but less than 80 for moderate, and greater than 40 and up to 60 for low.	Range for moderate and low risk levels in the proposed AR were based on Rules 128 (2) (significant risks), Rule 133 (2) (moderate) and Rule 136 (2) (low). MOE has since confirmed that we are already in compliance with this direction, and no changes to the AR are necessary.	**No change required.**	NA
19	Update Section 5.2 to correctly reference how issues can lead to the identification of significant drinking water threats to ensure the public understands any activity or condition in an issue contributing area can be considered a significant drinking water threat as it relates to that issue.	Text will be revised to indicate that significant threats can be identified through the issues, conditions or event based approach.	**Done**	Sections 5.2, 6.1.3, 7.1.1, 7.1.3, 7.1.4, section summary 5, section summary 7

No.	Direction	Response	Status	Section
20	Once the AR is revised based on these directions, the Source Protection Authority shall consult with the Source Protection Committee and with those persons or bodies impacted by the changes in an appropriate manner before resubmitting the amended AR in accordance with the Act and provide proof thereof with the resubmitted AR.	Discussed with MOE. Notice will be posted on the website as well as in local newspapers. There are no additional property owners affected or to be consulted with. The notice will indicate in a general sense the amendments made to the report, and will invite stakeholders and the general public to comment on the report within the comment period. The notice will also encourage them to call or visit the SCRCA to discuss concerns or questions. The report will be posted for a 15 day comment period on the website, and hard copies made available at the SCRCA. There will be no public meeting.		NA
21	The Source Protection Authority shall include the resubmitted AR a memo or document outlining the changes made to the AR, as per these directions, including chapter references in the AR where changes were made; and	This document outlining the changes made to the AR as per the MOE directions will be sent to the MOE with the amended proposed AR. Section 1 will be updated to reflect this amended proposed AR. Also text will be included in section 1 to indicate that the terms updated or amended AR used throughout the report refers to a future version following approval of this amended proposed AR. Minor corrections to table numbers in Section 1. Table 1-5 added to show summary of consultation on the report.	**Done**	Cover letter, Appendix 4 along with MOE directions letter, Section 1, section summary 1, section summary 9.
22	The AR is to be submitted to the ministry in the form of both hard and electronic version for the ministry's review.	Hard copies and CDs of the report will be sent to the Ministry of Environment on or before February 28, 2011.		NA

5**. Summary of Comments received on the St. Clair Region Amended Proposed Assessment Report**

Commenter	No.	Comment	Response
Resident	1	Unless I missed something in the report as posted on the sourcewaterprotection web site, it would appear that one of the most critical threats has been left out all together. The fact that towns and cities that have sewage treatment plants quite often do not have enough reserve capacity to hold a sudden influence of a heavy series of downpours. Raw sewage is quite often dumped directly into the Thames river by places like the city of London. This is quite often publicized by the local media when these events occur. So there really is no reason to keep this out of the report. Since human waste contains more heavy metals than any type of livestock runoff, this would be a much more dangerous threat to the water supply system. Phosphates are a much bigger threat than Nitrates.	Thank you for your interest in the St. Clair Region Source Protection Area Proposed Assessment Report. Your comments and concerns are important in the process of establishing a Source Protection Plan and we provide the following for your review. The Thames – Sydenham and Region Source Protection Region is comprised of the jurisdictions of the St. Clair Region, Lower Thames Valley and Upper Thames River Conservation Authorities. The Authorities are undertaking Source Protection Planning in partnership, however, the above noted report is specific to the St. Clair Region Conservation Authority area of jurisdiction and therefore does not include the City of London, which is located with the Upper Thames River Conservation Authority jurisdiction. As part the background to the Assessment Reports for areas downstream of the City of London, sewage discharges have or will be assessed for the intake protection zones downstream on the Thames River and Lake St Clair. This work has not been reflected in the above noted report as these activities have no impact on the drinking water systems in the St. Clair Region Source Protection Area. This work will be reflected in the Assessments Reports for the Essex Region Source Protection Area, the Lower Thames Valley Source Protection Area and possibly the Upper Thames River Source Protection Area which are available for review at www.sourcewaterprotection.on.ca and www.essexregionsourcewater.org . The Ministry of the Environment has compiled a database of threats to drinking water which all Source Protection Regions across the province have been using in their assessments. Appendix 10 of the above noted report provides an understanding of how threats have been reviewed in the Thames-Sydenham & Region, as well as providing a list of the 21 activities prescribed as drinking water

			threats (Appendix 10 Page 23). As identified, the second of those activities is, “The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.” The Assessment Report outlines that risks are only assessed within vulnerable areas as delineated according to the Technical Rules as established under the Clean Water Act. In the St. Clair Region there are 3 intake protection zones around the municipal drinking water intakes at Brights Grove, Sarnia and Wallaceburg. All components of municipal waste water treatment systems (treatment plants, lagoons, sewer lines, etc.) were reviewed while conducting the threats and risk assessments for the intake protection zones for the 3 drinking water systems in the St. Clair Region Source Protection Area. None of the components of the waste water treatment systems was found to pose a significant risk to the drinking water sources in these protection zones. Nitrates have been identified as an issue at the Wallaceburg intake, however neither heavy metals or phosphorous (or algal growth which is a typical indicator of high phosphorous levels) were identified as concerns. If you have any further questions or concerns in regard to the St. Clair Region Source Protection Area Assessment Report please contact me at your convenience. Any comments regarding Assessment Reports for other regions would also be welcome and can be submitted via the above noted websites.

Assessment Report Consultation Plan Addendum

Assessment Report Consultation Plan Addendum

Updated Assessment Reports

A consultation Plan was developed to guide the consultation on the Assessment Reports through their various stages. All Assessment Reports in the Thames-Sydenham and Region were updated in November 14, 2014 along with amendments to the Source Protection Plan. This addendum is intended to describe the consultation on the updated Assessment Reports. The consultation on the Assessment Report followed the approaches to consultation during the previous phases of the Assessment Report development as described in the Assessment Report Consultation plan last updated in June 2011.

Local consultation

The November 2014 updates to the Assessment Reports included updated or new technical work. Local consultation similar to that undertaken in Phase 1 and 2 was planned. This local consultation included:

- Open houses held within or near the areas of new or revised vulnerable areas. Table 1 identifies the local consultation open houses which were held across the region.
- Notices of the open houses placed in papers and on the web site.
- Municipalities notified of the open houses
- Updated vulnerable areas included in Source Protection Plan policy pre-consultation with municipalities.

Table 1 - Local consultation open houses

Date	Location	Primary Discussion Topics
Thursday, August 14 3 pm - 7 pm	Sarnia, Clearwater Arena, lower room	• Event Modelled IPZ-Fuel updates
Tuesday, August 19 3 pm - 7 pm	Wallaceburg Municipal Building	• Event Modelled IPZ-Fuel updates • Event Modelled IPZ-Fertilizer (if interest) • Wallaceburg Nitrate Issue
Thursday, August 21 3 pm - 7 pm	Camlachie Community Centre	• Event Modelled IPZ-Fuel updates • Kettle & Stony Point IPZ (if interest)
Wednesday, September 3 3-7pm	Wheatley Legion	• Event Modelled IPZ-Fuel • Wheatley Microcystin Concern • Updates to SGRA
Wednesday, August 20 3 pm - 7 pm	Oxford County Offices, Woodstock	• Nitrate ICA for Woodstock Tabor wellfield • Vulnerability reductions for Sweaburg • Water Quantity results (if interest)

Assessment Report Consultation

Consultation on the Updated Assessment Report will be undertaken together with the consultation on the Amended Proposed Source Protection Plan. This has the added advantage of providing people with both the areas where policy applies (in the Assessment Reports) and the policies (in the Source Protection Plan) which apply to those areas at the same time. In previous consultation, due to the staged or phased approach this was not possible. The Act and regulations have been interpreted to suggest that consultation on updated and amended Assessment Reports and Source Protection Plans must allow for consultation of those affected by the updates/amendments. In order to accomplish this, the consultation on the draft proposed plan and AR will be followed. The following are included in the consultation on the Amended Propose Source Protection Plan and Updated Assessment Reports:

- posting the Assessment Reports with the Source Protection Plan on the web site
- placing notices in newspapers within the region
- posting the notice on the web site
- notifying municipalities of the posting
- notifying First Nations chiefs of the posting
- notifying people believed to be engaged in significant threat activities
- notifying agencies established under the great lakes water quality agreement, a remedial action plan or lakewide management plan
- providing a comment period of greater than 30 days
- hosting open houses within each Source Protection Area. Table 2 identifies the Assessment Report/Source Protection Plan open houses.

Table 2 - Assessment Report and Source Protection Plan Consultation

Source Protection Area	Date	Location
St Clair Region	Tuesday, January 13, 2015 3:00-7:00pm	St. Clair Region Conservation Authority, 205 Mill Pond Cr., Strathroy
Lower Thames Valley	Wednesday, January 14, 2015 3:00-7:00pm	Lower Thames Valley Conservation Authority Administration Building, 100 Thames Street, Chatham
Upper Thames River	Thursday, January 15, 2015 3:00-7:00pm	Watershed Conservation Centre, Fanshawe Conservation Area, 1424 Clarke Road, London

Updated Assessment Report Consultation Comments

Consultation comments on the updated Assessment Report may be found in the change logs with the related revisions to the document. Change logs, compiled from all Assessment Reports and the Source Protection Plan, are bound separate from this Assessment Report and included as a supplemental document in the Source Protection Plan.

Appendix 5 – Watershed Characterization Summary

This section is bound separately.

Appendix 5 Addendum

Species at Risk in the St. Clair Region SPA

	Common Name	Scientific Name	COSEWIC Status	MNR Status	G RANK	S RANK
Unionids	Black Sandshell	*Ligumia recta*	Candidate		G5	S3
	Deertoe	*Truncilla truncata*	Candidate		G5	S3
	Elktoe	*Alasmidonta marginata*	Candidate		G4	S3
	Fawnsfoot	*Truncilla donaciformis*	Candidate		G5	S2
	Kidneyshell	*Ptychobranchus fasciolaris*	END	END	G4G5	S1
	Lilliput	*Toxolasma parvus*	Candidate		G5	S1
	Mapleleaf	*Quadrula quadrula*	THR		G5	S2
	Mucket	*Actinonaias ligamentina*	Candidate		G5	S3
	Mudpuppy Mussel*	*Simpsonaias ambigua*	END	END	G3	S1
	Northern Riffleshell*	*Epioblasma torulosa rangiana*	END	END	G2T2	S1
	Paper Pondshell	*Utterbackia imbecillis*	Candidate		G5	S2
	Pimpleback	*Quadrula pustulosa pustulosa*	Candidate		G5	S3
	Pink Heelsplitter	*Potamilus alatus*	Candidate		G5	S3
	Purple Wartyback	*Cyclonaias tuberculata*	Candidate		G5	S3
	Rainbow	*Villosa iris*	END		G5	S2S3
	Rayed Bean*	*Villosa fabalis*	END	END	G1G2	S1
	Round Hickorynut	*Obovaria subrotunda*	END	END	G4	S1
	Round Pigtoe	*Pleurobema sintoxia*	END		G4	S1
	Slippershell Mussel	*Alasmidonta viridis*	Candidate		G4G5	S3
	Snuffbox*	*Epioblasma triquerta*	END	END	G3	S1

Common Name		Scientific Name	COSEWIC Status	MNR Status	G RANK	S RANK
	Threehorn Wartyback	*Obliquaria reflexa*	Candidate		G5	S1
	Wabash Pigtoe	*Fusconaia flava*	Candidate		G5	S2S3
	Wavy-rayed Lampmussel*	*Lampsilis fasciola*	END	END	G4	S1

Fish	Bigmouth Buffalo	*Ictiobus cyprinellus*	SC	SC	G5	SU
	Blackstripe Topminnow	*Fundulus notatus*	SC	SC	G5	S2
	Brassy Minnow	*Hybognathus hankinsoni*	Candidate		G5	S5
	Brindled Madtom	*Noturus miurus*	NAR	NAR	G5	S2
	Eastern Sand Darter*	*Ammocrypta pellucida*	THR	THR	G3	S2
	Ghost Shiner	*Notropis buchanani*	NAR	NAR	G5	S2
	Grass Pickerel	*Esox americanus vermiculatus*	SC		G5	S3
	Greater Redhorse	*Moxostoma valenciennesi*	Candidate		G4	S3
	Greenside Darter	*Etheostoma blennioides*	SC	SC	G5	S4
	Mottled Sculpin	*Cottus bairdi*	Candidate		G5	S5
	Northern Madtom*	*Noturus stigmosus*	END	END	G3	S1S2
	Pugnose Minnow	*Opsopoeodus emiliae*	SC	SC	G5	S2
	Spotted Gar*	*Lepisosteus oculatus*	THR	THR	G5	S2
	Spotted Sucker	*Minytrema melanops*	SC	SC	G5	S2
	Stonecat	*Noturus flavus*	Candidate		G5	S4
	White Perch	*Morone americana*	Candidate		G5	SE
	Yellow Bullhead	*Ameiurus natalis*	Candidate		G5	S4

	Common Name	Scientific Name	COSEWIC Status	MNR Status	G RANK	S RANK
Reptiles	Butler's Garter Snake	*Thamnophis butleri*	THR	THR	G4	S2
	Eastern Fox Snake	*Elaphe gloydi*	THR	THR	G3	S3
	Eastern Hognosed Snake	*Heterodon platirhinos*	THR	THR	G5	S3
	Eastern Massassauga Rattlesnake	*Sistrurus catenatus*	THR	THR	G3G4	S3
	Eastern Milksnake	*Lampropeltis triangulum*	SC	SC	G5	S3
	Northern Map Turtle	*Graptemys geographica*	SC	SC	G5	S3
	Spiny Softshell Turtle*	*Apalone spinifera*	THR	THR	G5	S3
Odonata	Arrow Clubtail	*Stylurus spiniceps*			G5	S1S2
	Blue-ringed Dancer	*Argia sedula*			G5	S2
	Blue-tipped Dancer	*Argia tibialis*			G5	S3
	Double-striped Bluet	*Enallagma basidens*			G5	S3
	Dusky Dancer	*Argia translata*			G5	S2
	Eastern Amberwing	*Perithemis tenera*			G5	S3
	Flag-tailed Spinyleg	*Dromogomphus spoliatus*			G4G5	S1
	Midland Clubtail	*Gomphus fraternus*			G5	S3
	Mocha Emerald	*Somatochlora linearis*			G5	S1
	Pronghorn Clubtail	*Gomphus graslinellus*			G5	S2
	Royal River Cruiser	*Macromia taeniolata*			G5	S1
	Rusty Snaketail	*Ophiogomphus rupinsulensis*			G5	S3
	Smoky Rubyspot	*Hetaerina titia*			G5	S2

Common Name		Scientific Name	COSEWIC Status	MNR Status	G RANK	S RANK
	Swamp Darner	*Epiaeschna heros*			G5	S2S3

Species at Risk classifications are defined as follows:

- Endangered - A species facing imminent extirpation or extinction.
- Threatened - A species that is likely to become endangered if limiting factors are not reversed.
- Special Concern - A species whose characteristics make it particularly sensitive to human activities or natural events.

Appendix 6 – Conceptual Water Budget

This section is bound separately.

Appendix 7 – Assessment Report Checklist

The Assessment Report Checklist has not been updated from the version in the approved Amended Proposed Assessment Report. Please refer to that version; however locations of the material referenced in the checklist may be off by a few pages.

Appendix 8 – Issues Evaluation Methodology

Thames-Sydenham and Region
Source Protection Region

ISSUES EVALUATION METHODOLOGY

Version 2.0
May 14, 2009

Table of Contents

1. INTRODUCTION

Under the Clean Water Act (2006) Technical Rules (December 2008), the assessment report must identify and describe drinking water quality issues. Identifying issues is a key step in the overall process of protecting drinking water quality. This is because an activity that may contribute to an identified issue is deemed a significant drinking water threat which must be mitigated, through source protection plans, to no longer be a significant threat.

In order to identify issues, the Thames-Sydenham and Region proposes an issues evaluation methodology with three main stages: screening, issue identification and issue description. The first two stages must be done to satisfy the **Rule 114**. The issues also have to be described according to **Rule 115**. The current document is intended to foster discussion on the proposed issues evaluation methodology. The methodology will be finalized upon consideration of comments from consultants and municipality staff working on technical studies in the Region, as well as conservation authority staff. The finalized methodology will serve as a guideline in the determination and description of drinking water quality issues in the Region for the Assessment Report.

The Rule 114 defines a parameter or pathogen being an issue if it is shown to deteriorate or trends towards a deterioration of raw water quality for the purposes of drinking. Hence assessing for the deterioration of the raw water meant for human consumption is an important step in defining issues, which can be accomplished by using a ‘check’ to determine whether a parameter is an issue or not. For treated drinking water, the 'check' is a drinking water standard. For the general health of a watershed and aquatic species in the water bodies, the ‘check’ is an aquatic life water quality objective. Raw water benchmarks for surface and groundwater drinking water sources are yet to be established. While background levels of water constituents may be reviewed, inadequate comprehensive long term (historical) data hinders the assessment of a background level of any contaminant in the raw water. It is important to consult with water treatment plant operating authorities, municipalities, consultants working on the technical studies, conservation authority staff and the Ministry of Environment (MOE) while setting up these 'checks' to identify issues in raw water sources.

Rule 114. *Without limiting the generality of subclause 15(2)(f) of the Act, the description of drinking water issues shall include the following drinking water issues in respect of the quality of water in a vulnerable area:*

Subrule (1) *the presence of a parameter in water at a surface water intake or in a well, including a monitoring well related to a drinking water system to which clause 15(2)(e) of the Act applies, if the parameter is listed in Schedule 1, 2 or 3 of the Ontario Drinking Water Quality Standards or Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines and*
(a) the parameter is present at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water; or
(b) there is a trend of increasing concentrations of the parameter at the surface water intake, well or monitoring well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water;

Subrule (2) *the presence of a pathogen in water at a surface water intake or in a well related to a drinking water system to which clause 15(2)(e) of the Act does apply, if a microbial risk assessment undertaken in respect of the pathogen indicates that*
(a) the pathogen is present at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water, or

(b) there is a trend of increasing concentrations of the pathogen at the surface water intake or well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water; and

Subrule (3) *the presence of a parameter in water at a surface water intake or in a well, including a monitoring well related to a drinking water system to which clause 15(2)(e) of the Act does not apply, if the parameter is listed in Schedule 2 or 3 of the Ontario Drinking Water Quality Standards or Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines and*
(a) the parameter is present at a concentration that may result in the deterioration of the water for use as a source of drinking water, or
(b) there is a trend of increasing concentrations of the parameter at the intake, well or monitoring well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water.

Rule 115 requires that an identified water quality issue be 'described', by listing the parameter or pathogen concerned, the intake or well where it has occurred, areas within vulnerable areas where the drinking water threats due to 'prescribed' (see Rule 118) or 'other' (see Rule 119) activities contribute to the issue, and lastly, listing activities, conditions (from past activities) and naturally occurring conditions associated with the issue.

Figure 1 shows the parameters and pathogens to be considered in the identification of drinking water quality issues under the Clean Water Act. Note that it does not include parameters not in Schedule 1, 2, 3 or Table 4.

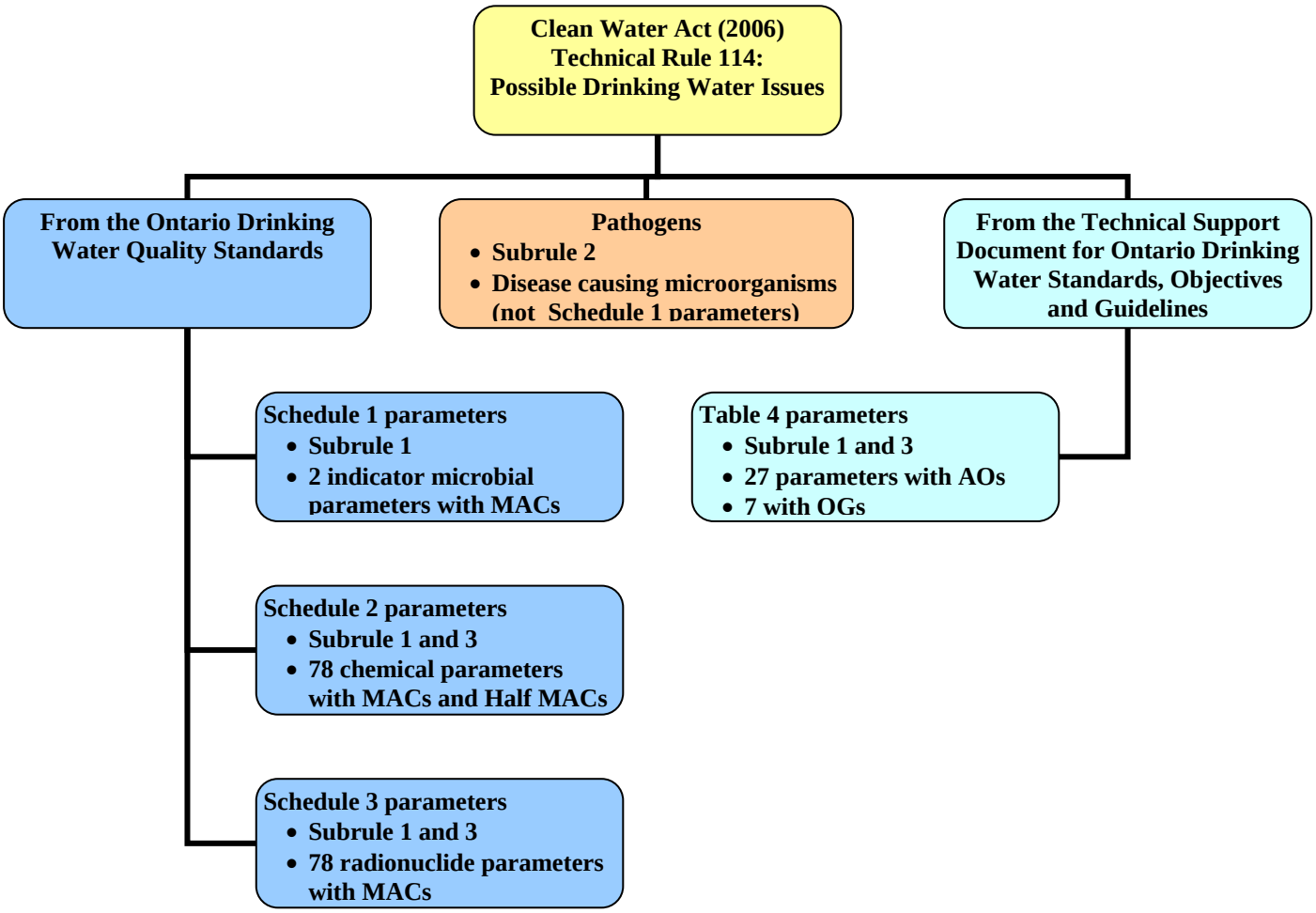

Figure 1: Clean Water Act Technical Rule 114: Possible Drinking Water Quality Issues

The Ontario Drinking Water Standards are human health based criteria established under the Regulation 169/03 under the Safe Drinking Water Act (2002) and are called Maximum Acceptable Concentrations. The Technical Support Document[1] provides criteria for Table 4 parameters to meet aesthetic objectives and plant operational guidelines. The criteria listed below are used to help flag and identify drinking water quality issues with the exception of the microbial parameters as explained in the relevant section.

Maximum Acceptable Concentrations (MACs) are the drinking water standards for chemical, radionuclide and microbial parameters beyond which human health may be adversely affected.

Half MAC is that level at which a Schedule 2 (chemical) parameter in the treated water is flagged for increased sampling and testing requirements under Regulation 170/03 - Section 13-5, Safe Drinking Water Act (2002).

Aesthetic Objectives (AO) are criteria for certain Table 4 parameters at which parameters such as taste and turbidity that may affect the taste, odour or colour of water or interfere with good water quality control practices.

Operational Guidelines (OG) are criteria for certain Table 4 parameters at which parameters such as alkalinity and hardness that may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

2. DATA USED IN THE ISSUES EVALUATION PROCESS

2.1. Data used for Screening

In the screening step, parameters or pathogens are 'flagged' based on certain concerns or previous water quality data review and reports which are described below.

2.1.1. Operating Authority Concerns

Conduct interviews with drinking water systems (DWS) operating authority to note specific concerns in the raw and treated water quality. The consultant/municipality should interview the operating authority (OA), document the outcomes of the interview and have the OA sign the document to confirm the document is an accurate representation of the OA's opinions and concerns. Concerns may include parameters or pathogens that persist even after treatment, or which interfere in the treatment process, or parameters due to past activities that have resulted in increased monitoring at the well or intake.

2.1.2. Thames and St. Clair Watershed Characterization Reports (December 2007)

In the characterization reports, half MAC, MAC, AO and OG were the checks to flag Schedule 2, 3 and Table 4 parameters in raw water to most intakes and some well systems (data from 1990 to 2005, 1 to 12 samples per year). Additional well system data reviewed were annual drinking water system (DWS) reports (data from 2004 to 2006) in which Schedule 2, 3 and Table 4 treated water parameters are checked against the half MAC and parameters flagged. Where data

[1] Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, Ministry Of Environment, PIBS4449e01 (2003, Revised June 2006)

allowed it, upward trends in some Schedule 2 and 3 and Table 4 parameters are shown in the characterization reports. The weekly raw water microbial indicator data (2003 to 2006) is presented to show ranges of bacteria counts, spikes and seasonal variation and this information must be used as per the issues screening methodology for Schedule 1 parameters.

Where the data is not adequate for the purposes of screening to flag issues, other data where available may be utilised to flag parameters. For example, data available at the time of water quality review for the characterization reports for the West Elgin and Wheatley intakes were laboratory analysis sheets that were reviewed to provide raw water data for years 2001-2003 (West Elgin), and 2000-2002 (Wheatley) while annual DWS reports provided limited treated water data for 2005 (West Elgin), and 2003-2005 (Wheatley).

2.1.3. Annual Drinking Water System (DWS) Reports

The annual DWS reports flag parameters that persist in treated drinking water and where required, additional sampling and testing of raw water for specific parameters is also reported. Schedule 2 (chemical) parameters in treated water that exceed the half MAC are flagged for increased monitoring, under the Regulation 170/03 - Section 13-5, Safe Drinking Water Act (2002). Exceedances of the MAC for Schedule 1, 2 and 3 and some Table 4 parameters are provided in these reports. Summary of additional testing and sampling carried out in accordance with the requirement of a certificate of approval, order or other legal instrument are also provided in the annual reports (these may also be raw water samples). A review of the reports must be done to flag parameters with exceedances of half MAC, MAC, and parameters that undergo extra testing by legal order.

2.1.4. Parameters not listed in Schedules 1, 2, 3 or Table 4

In other source protection regions, there have been suggestions to consider parameters not included in Rule 114 for issues identification. Further clarification from the Ministry of Environment is requested and required before considering parameters not listed in the schedules and table. Any such parameters should be brought to the attention of the SPC immediately.

2.2. Data used for issues identification

In the issues identification step, data to be used to determine if the screened (flagged) parameters are issues are:

2.2.1. Drinking Water Surveillance Program (DWSP)

DWSP is a voluntary program and not all drinking water systems participate in this. This dataset provides raw water Schedule 2, 3 and Table 4 parameter data. Data on the flagged parameters should be reviewed as per the relevant methodology outlined in this document to confirm issues.

2.2.2. Drinking Water Information System (DWIS)

This dataset provides Schedule 1 (indicator microbial) data and some chemical parameter data. Data on the flagged parameters should be reviewed as per the relevant methodology outlined in this document to confirm issues.

2.2.3. Other water treatment plant data for specific flagged parameters

Where limited data is available on flagged parameters or pathogens, laboratory analysis sheets (usually available from the water treatment plant) may be used to help decide on whether they are issues or not. Any other such reliable raw or treated water data (like grab sample data from MOE inspection reports) may be used to further substantiate that a flagged parameter is an issue.

3. ISSUES EVALUATION METHODOLOGY

Figure 2 is a flow chart of the proposed issues evaluation methodology. The data sets are described in the previous section. There are separate screening and issues identification methodologies for pathogens, the different types of parameters grouped as in Rule 114, and parameters not included in Rule 114.

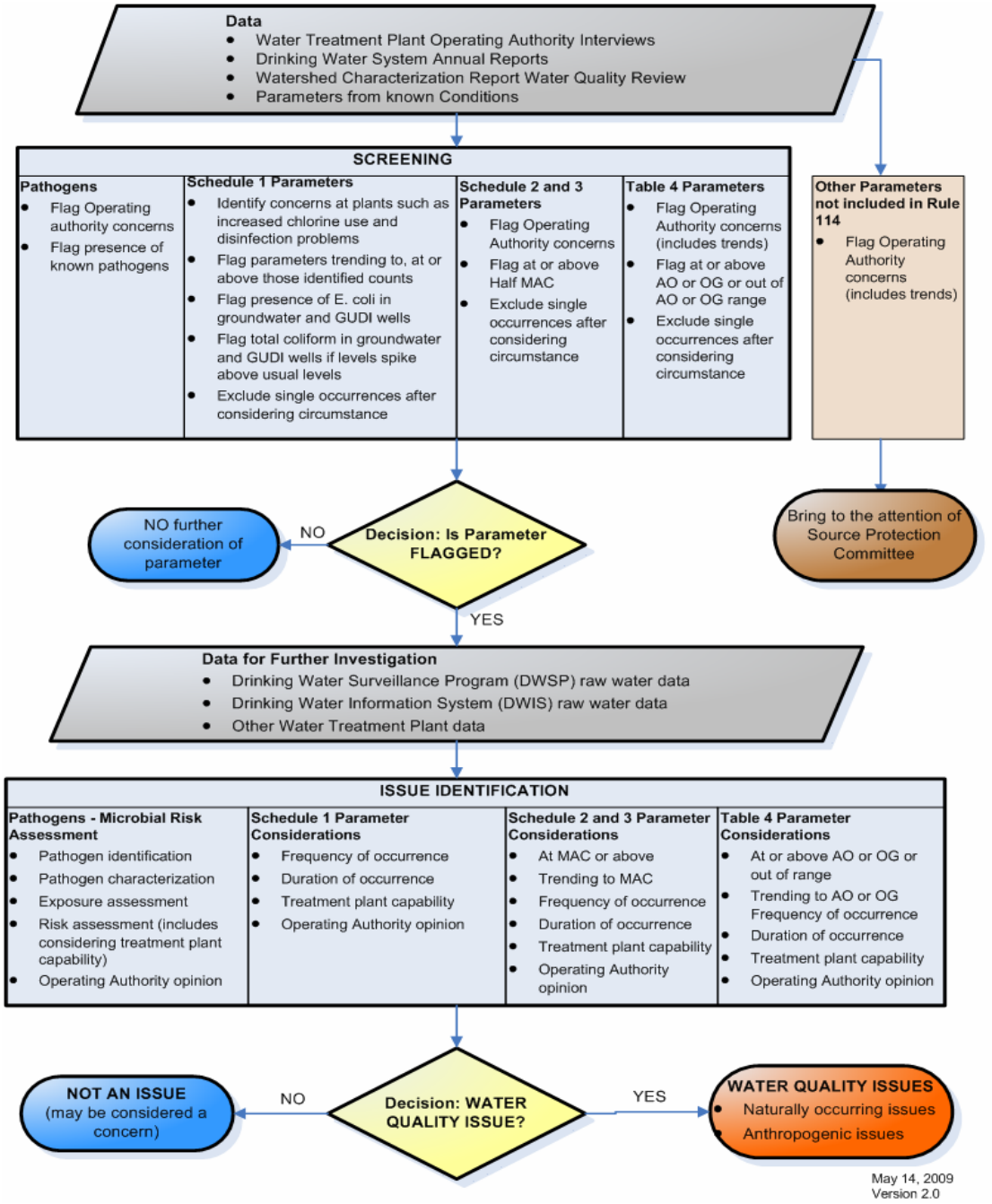

Figure 2: Proposed Issues Evaluation Methodology

3.1. Pathogens

3.1.1. Background

Pathogens are disease-causing bacteria, viruses or protozoa. They can cause severe or fatal waterborne illness in humans. Some are resistant to commonly used disinfectants at water treatment plants. Reliable laboratory detection methods for pathogenic protozoa are yet to be established. There are no established Canadian water quality guidelines for these microbiologic organisms.

It is understood that, under the Clean Water Act (2006), a microbial risk assessment must be done in order to confirm the identification of issues caused by pathogens. The main steps in such a risk assessment are pathogen identification and characterization, exposure assessment and risk characterization[2].

Any pathogens flagged through the pathogen screening process must be brought to the attention of the Thames-Sydenham and Region SPC. The Thames-Sydenham and Region is waiting for direction from the MOE on microbial risk assessment and until such direction is provided, it is suggested to complete the screening step only.

3.1.2. Presence in Raw Water

Pathogens may be found in raw surface water but not in groundwater, unless the groundwater is under the direct influence of surface water sources. Pathogens are not monitored routinely in raw water sources unless a known outbreak of waterborne illness caused by a pathogen or known fecal contamination has occurred. The indicators total coliform and E. coli are used to indicate the possible presence of some pathogens.

The presence of the 'current' bacterial waterborne pathogens (e.g.: Salmonella and Campylobacter) may be associated with the presence of E. coli, a Schedule 1 parameter, but E. coli does not indicate the presence of the 'emerging' bacterial waterborne pathogens (e.g.: Legionella and Helicobacter pylori)[3]. Enteric viruses (such as noroviruses, hepatitis A and rotaviruses) and protozoa (such as Giardia and Cryptosporidium) cause human waterborne illnesses. The presence of E. coli is an indication that enteric viruses or protozoa could also be present; however, because enteric viruses and protozoa are more resistant to disinfection, the absence of E. coli does not necessarily mean that they are also absent[4, 5].

3.1.3. Screening

- Operating Authority concerns must be flagged

[2] Revised Framework for Microbial Risk Assessment. International Life Sciences Institute. 2000. ILSI Press, Washington, D. C., USA

[3] Health Canada (2006) Guidelines for Canadian Drinking Water Quality: Guideline Technical Document — Bacterial Waterborne Pathogens — Current and Emerging Organisms of Concern. Water Quality and Health Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

[4] Health Canada (2004) Guidelines for Canadian Drinking Water Quality: Supporting Documentation — Enteric Viruses. Water Quality and Health Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

[5] Health Canada (2004) Guidelines for Canadian Drinking Water Quality: Supporting Documentation — Protozoa: Giardia and Cryptosporidium. Water Quality and Health Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

- Known presence of a pathogen at a raw water source must be flagged
- Known presence of a pathogen in treated drinking water (some pathogens resist disinfection) must be flagged
- Pathogen causing a past waterborne outbreak linked to the water supply must be flagged
- Single occurrences of pathogen in water samples due to faulty sampling or false laboratory results must be excluded from consideration

3.1.4. Issues Identification

- Microbial risk assessment must be done to confirm that the flagged pathogen is an issue
- The main steps in a microbiological hazard risk assessment are hazard (pathogen) identification, hazard characterization, exposure assessment and risk characterization[6]
- Elements include pathological characteristics, infection mechanisms, resistance to control or treatment, survival, persistence, seasonality, reliability of treatment processes, route of human exposure, exposed population characteristics, treatment, recontamination, infectivity, human dose response data, risk event and magnitude, evaluation of control measures[2]
- The microbial risk assessment takes into consideration the treatment plant disinfection capabilities, i.e. if a pathogen is adequately disinfected at the treatment plant, it may not be considered an issue

3.2. Schedule 1 Parameters

3.2.1. Background

Total coliform and Escherichia coli are the Schedule 1 parameters. They are microbial indicators. Total coliform bacteria are widespread in nature being present in the soil and in the intestines and feces of animals including humans, livestock, poultry and wildlife. For drinking water, total coliform are still the standard test because their presence indicates contamination of a water supply by an outside source. *Escherichia coli* (*E. coli*) is commonly used as an indicator of recent contamination of water by disease-causing bacteria, viruses or protozoa including those that are resistant to commonly used disinfectants. It is found exclusively in the faeces of humans and other animals. A specific strain of E. coli, O157:H7, is pathogenic and is not specifically identified while routinely testing water for Schedule 1 parameters. If however the particular strain is identified, it is examined under the pathogen issues identification methodology. The commonly used unit to enumerate coliform bacteria is counts (of coliform) per 100 mL (of water sample).

3.2.2. Presence in Raw Water

Total coliform is commonly found in raw surface and groundwater sources, at a few orders of magnitude lower in groundwater due to natural geologic protection. E. coli is widely found in surface water sources and rarely present in groundwater. From the municipal raw water quality data review conducted in the Thames-Sydenham and Region watershed characterization report:

- It was observed that the total coliform was present in most raw groundwater sources, ranging from zero to 100 counts/100 mL. Total coliform was also widely present in raw water at surface intakes, ranging from zero to as high as 90,000 counts/100 mL

[6] Revised Framework for Microbial Risk Assessment. International Life Sciences Institute. 2000. ILSI Press, Washington, D. C., USA

- E. coli was found to be absent in nearly all raw groundwater well sources, with a highest count of only 3 per 100 mL in one well. E. coli ranged between zero and 2000 counts/100mL in raw surface water at the intakes

3.2.3. Screening

In the Thames and St. Clair watershed characterization reports, the weekly raw water microbial indicator data (2003 to 2006) is presented to show ranges of bacteria counts and seasonal variation and this information as well as a review of data after 2006 must be used to flag potential issues as per the following criteria:

- Flag concerns and problems at plants due to high counts or trends of total coliform and E. coli in raw surface water and total coliform in groundwater that cause increased chlorine consumption or affect the disinfection capability. This is to be done in consultation with operating authority
- Flag the presence of E. coli (>0 counts/100mL) in raw groundwater and groundwater under the direct influence of surface water (GUDI) wells
- Flag total coliform in groundwater and GUDI wells that spike above usual levels
- Exclude single occurrences of total coliform or E. coli due to faulty sampling or false laboratory result

3.2.4. Issues Identification

The following factors must be considered in determining whether the Schedule 1 parameter is an issue or not:

- Flagged Schedule 1 parameters must be examined for frequency and duration of occurrence, including continuous or repeated occurrence, trends, or frequency of spikes that interfered in treatment processes (for example, a one time spike over 5 years data may not be an issue)
- Consider treatment plant capabilities recognising the multibarrier approach in source water protection (i.e. a parameter might be an issue even if the plant can typically remove or reduce it to acceptable levels, or a parameter might not be an issue if it is adequately treated and there is no evidence of worsening levels)
- Consult operating authority for their opinion on the identified issue

3.3. Schedule 2 And 3 Parameters

3.3.1. Background

Schedule 2 parameters include organic and inorganic chemicals from industrial and agricultural activities as well as municipal waste and natural decomposition of organic matter. Inorganic chemicals include metals and nitrates. Organic chemicals include pesticides (e.g.: atrazine and DDT), polynuclear aromatic hydrocarbons (e.g.: benzo-a-pyrene, chlordane), chlorophenols (e.g.: 2,4-dichlorophenol), volatile organics (e.g.: benzene, vinyl chloride), dioxins and furans (e.g.: 2,3,7,8 TCDD). Schedule 3 parameters, radionuclides, occur naturally or are released during activities like mining or nuclear energy production. Upon ingestion, they may cause cancer or hereditary genetic changes in children[7]. Examples are radium-224, uranium-235 (both natural) and tritium (artificial).

[7] Technical Support Document for the Ontario Drinking Water Standards, Objectives and Guidelines, June 2003 (revised June 2006)

3.3.2. Presence in Raw Water

From the municipal raw water quality data review conducted in the Thames-Sydenham and Region watershed characterization report, certain Schedule 1 inorganic chemicals in the raw source water were found to be close to or above levels at which they could pose a risk to human health. Some of these inorganic chemicals are naturally occurring. In general, Schedule 2 organic chemicals as well as Schedule 3 radionuclides were either detected (and at levels not posing a risk to human health), or below detection levels.

3.3.3. Screening

- Flag operating authority concerns by conducting interviews with drinking water systems (DWS) operating authority to note specific parameters of concern to them in the raw and treated water, including qualitative concerns like nuisance plant growth (algae) at or near the intake (which may lead to flagging a nutrient parameter)
- A review of the annual drinking water system reports must be done to flag parameters with exceedances of half MAC as well as flag parameters that undergo extra testing by legal order
- Use the watershed characterization reports to flag schedule 2 and 3 parameters in raw and treated water at or above the Half MAC
- Make mention of those flagged that are naturally occurring or due to known past activities (conditions)
- A single instance of a parameter at or above Half MAC that is an isolated occurrence, faulty sampling or false laboratory result should be excluded from consideration as an issue

3.3.4. Issues Identification

- Identify, from flagged parameters, those trending to MAC levels and those at MAC levels
- Consider frequency of occurrence (a few times a year, seasonal, continuous presence, etc.) and further upward trending of identified parameters
- Consider treatment plant capabilities recognising the multibarrier approach in source water protection (i.e. a parameter might be an issue even if the plant can typically remove or reduce it to acceptable levels, or a parameter might not be an issue if it is adequately treated and there is no evidence of worsening levels)
- Identify parameters in spills that may have caused the water treatment plant to be shut down
- Obtain operating authority's opinion on identified issues

Note:
Maximum Acceptable Concentrations (MACs): Ontario drinking water standards for chemical, radionuclide and microbial parameters beyond which human health may be adversely affected
Half MAC: The level at which a Schedule 2 (chemical) parameter in the treated water is flagged for increased sampling and testing requirements (under Regulation 170/03 - Section 13-5, Safe Drinking Water Act, 2002)

3.4. Table 4 Parameters

3.4.1. Background

The Table 4 parameters are physical and chemical parameters such as taste and turbidity that may affect the taste, odour or colour of water or interfere with good water quality control practices. Also included are parameters such as alkalinity and aluminum may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

3.4.2. Presence in Raw Water

From the municipal raw water quality data review conducted in the Thames-Sydenham and Region watershed characterization report, certain Table 4 parameters in the raw source water were found to be close to or above levels at which they could affect the aesthetic quality of water or the operation of the water treatment plant. Some of these are naturally occurring.

3.4.3. Screening

- Flag operating authority concerns by conducting interviews with drinking water systems (DWS) operating authority to note specific parameters of concern to them in the raw and treated water, trends of those parameters, and qualitative concerns like taste and odour
- Flag all Table 4 parameters in raw and treated water at or above the respective AO or OG
- A single instance of a parameter above AO or OG should be further checked for isolated occurrence, faulty sampling or false laboratory result
- Flag certain parameters differently
    - The AO of sodium is 200 mg/L, but the local Medical Officer of Health should be notified when sodium exceeds 20 mg/L to inform patients on sodium restricted diets. Flag sodium levels at or above 20 mg/L
    - The parameters 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dichlorophenol, 2,3,4,6-tetrachlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenoxy acetic acid, monochlorobenzene and pentachlorophenol have both AOs and MACs; these would be considered under the issues identification process for Schedule 2 parameters using the half MAC (half Ontario treated drinking water standard) and not under the AO
    - Flag parameters pH, alkalinity and hardness at levels outside the OG range
- Flag qualitative and contributing parameters
    - Flag qualitative parameters like taste and odour based on operating authority interview information. Flag parameters that contribute to the Table 4 parameters even if they are not included in Rule 114; for example increased phosphorus levels may have caused algal growth which in turn may cause taste and odour problems at the intake, so flag the parameters of taste and odour and the contributing parameter phosphorus
    - Flag turbidity at or above AO levels for further investigation. Turbidity can significantly interfere with disinfection, be a source of disease-causing organisms and shield pathogenic organisms from the disinfection process; it is also an indicator of treatment efficiency (particularly filters)[8].
    - If trihalomethanes (THMs) are flagged (under the methodology for Schedule 2 parameters), then flag contributing raw water parameters of dissolved organic carbon (DOC) and turbidity, which are Table 4 parameters. Raw water DOC and the organic content in turbidity combine with chlorine disinfectants at the treatment plant to form trihalomethanes (THMs), a by product that deteriorates the quality of drinking water

3.4.4. Issues Identification

- Further investigate flagged parameters for levels or trending to AO or OG levels and their interferences with proper treatment, for example, investigate flagged turbidity for interference with proper disinfection or filtration, or for contributing to flagged levels of THMs

[8] Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines. MOE PIBS 4449e01, June 2003, revised June 2006

- Consider parameters (including those not identified in Rule 114) contributing to flagged Table 4 parameters
- Consider frequency of occurrence (a few times a year, seasonal, continuous presence, etc.) and further upward trending of identified parameters
- Consider treatment plant capabilities recognising the multibarrier approach in source water protection (i.e. a parameter might be an issue even if the plant can typically remove or reduce it to acceptable levels, or a parameter might not be an issue if it is adequately treated and there is no evidence of worsening levels)
- Identify parameters in spills that may have caused the water treatment plant to be shut down
- Obtain operating authority opinion on list of issues

Note:
Aesthetic Objectives (AO): The level at which parameters such as taste and turbidity that may affect the taste, odour or colour of water or interfere with good water quality control practices.
Operational Guidelines (OG): The level at which parameters such as alkalinity and hardness that may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

3.5. Other Parameters

In other source protection regions, there have been suggestions to consider parameters not included in Rule 114 for issues identification. Further clarification from the Ministry of Environment on the consideration of issues arising due to parameters not listed in Rule 114 is requested and required before considering parameters not listed in the schedules and table. Any such 'other' parameters should be brought to the attention of the SPC immediately.

3.6. Deliverables

The deliverables expected upon completion of the issues evaluation methodology are:

1. List of flagged parameters per intake or well or well system (if individual well data is unavailable, report flagged parameters for the well system), identifying those believed to be naturally occurring
2. List of issues with detailed justification for the identification of each issue, noting those believed to be naturally occurring
3. Supporting items, where it is possible, for issue identification such as tables (showing exceedances above the relevant criteria, ranges of flagged parameters), scatter plots (for schedule 1 parameters, can be obtained from watershed characterization report) and time series graphs (showing trends with or without linear regression depending on number of data points)
4. Completed **Appendix A: Issues Evaluation Database**

While the issues evaluation database summarizes the issues evaluation, it is still required to provide deliverables 1, 2 and 3 in a document separate from the completed Appendix A.

Appendix A: Issues Evaluation Database

Field Name	Rule Reference	Description of contents	Field Type	Field Size	Choices
Issue_ID	114 & 115(1), (2)	*A unique identifier of the issue*	AutoNumber	Single (Integer)	N/A
DWS_no	114 & 115(1), (2)	*Drinking Water System number for the well, intake or system*	Text	10	N/A
Intake_Well_Name	114 & 115(1), (2)	*Identify the name or number of the well or intake*	Text	50	N/A
Intake_Well_Desc	114 & 115(1), (2)	*Include a brief description of the well or intake location and identify whether emergency intake or backup well*	Text	250	N/A
Pa_Name	114 & 115(1), (2)	*Name of parameter (e.g.: trichloroethylene) or pathogen (e.g.: Cryptosporidium)*	Text	50	N/A
Type	114 & 115(1), (2)	*Schedule 1, 2, 3 or Table 4 parameter OR pathogen OR 'Other' (not listed in rule 114)*	Text	10	Sched1 Sched2 Sched3 Table4 Pathogen Other
Natural	114 & 115(1), (2)	*Identify whether the parameter is believed to be naturally occurring*	Text	15	Natural Anthropogenic Both?
Description	114 & 115(1), (2)	*Describe briefly the nature of the issue and why it was identified as an issue - E.g.: exceeded drinking water standard several times in past 10 years*	Text	250	N/A
Issue_Status		*Identify whether the parameter was flagged only or has further been identified as an issue*	Text	10	Flagged Issue
Contrib_Area	115 (3)	*Provide a brief description of the area within vulnerable areas thought to be contributing to the issue*	Text	100	N/A
Threat_ID_Plan	116	*If information as per rule 115 (3) and (4) cannot be ascertained, a plan needs to be provided to obtain this information in a subsequent Assessment report. Provide a brief description of how you would propose to identify the area and threats which are contributing to this issue*	Text	250	N/A
SP_Area	117	*Identify the SP Area or areas (outside the SP Area where the issue occurs) in which contributing threats are believed to be located*	Text	20	LTV SCR UTR ER ABMV Other (specify)

Appendix 9 – Issues Evaluation Flagged Parameters

Appendix 9 – Issues Evaluation Flagged Parameters

In the St. Clair Region Source Protection Authority (SCRSPA), the parameters flagged for further investigation as issues are summarized by drinking water system in the Table 1 below. The raw (untreated) water quality data is compared to a benchmark and parameters may be flagged if they meet the screening criteria. The benchmarks for chemical, physical and radioactive parameters are generally half the applicable human health based Ontario drinking water standards (Maximum Acceptable Concentrations, or MAC), and the full levels of the aesthetic objectives (AO) and operational guidelines (OG), and any plant operating authority concerns. The table also indicates whether the flagged parameter was later identified as an issue or not. No pathogens are flagged or identified as issues in the raw (untreated) source water in the SCRSPA.

Table A9-1a: Drinking Water Quality Parameters Flagged in the Lower Thames Valley Source Protection Area

System	Flagged Parameter	Brief Description of Screening	Identified as an Issue?
LAWSS (St. Clair River intake)	Turbidity	The turbidity levels data for the LAWSS intake raw (untreated) water from the St. Clair Region Watershed Characterization Report as well as from 2005 to 2006 were reviewed. From daily raw water turbidity data from 2005 to 2006, the highest turbidity level was 43 NTU, well above the AO benchmark of 5 NTU. The plant operator noted concerns with increased turbidity levels due to shipping activities.	No
Town of Petrolia (Lake Huron intake)	Turbidity	The turbidity levels data for the Petrolia intake raw (untreated) water from the St. Clair Region Watershed Characterization Report as well as from 2006 to 2007 were reviewed. From daily raw water turbidity data from 2006 to 2007, the highest turbidity level was 161 NTU, well above the AO benchmark of 5 NTU. Storm events cause high flows in the Perch and Cow Creeks resulting in high turbidity levels at the intake.	No
Wallaceburg (Chenal Ecarte intake)	Nitrate	In the St. Clair Watershed Characterization report, there were two exceedences of the half MAC of 5 mg/L, identified for nitrate. The elevated levels were in 5.9 mg/L in 1990 and 9.3 mg/L in 1992 (data from 1990 to 2005). Also, nitrates have been identified by the water treatment plant manager as being a significant concern, and hence are considered a drinking water quality issue.	Yes
	Organic nitrogen	Approximately 72% (52 of 72 samples) of the available data (from 1990 to 2007) measured above the 100% OG benchmark of 0.15 mg/L, with a highest level of 1.8 mg/L in 1990. The trend line implies that the organic nitrogen levels have been decreasing over time; however, considering the consistent sampling measuring above the OG.	Yes
	Turbidity	Turbidity has been identified as a concern from the water treatment plant manager. The plotted turbidity samples of this raw water quality analysis indicate approximately 44% (38 of 77) of the sampling results between 1989 to 2006 measure above the 100% AO benchmark of 5 NTU, with a highest level of 839 NTU in 2004. The water treatment plant manager indicated that elevated turbidity levels cause operational concerns and challenges.	Yes
	Hardness	Hardness levels in approximately 53% (37 of 70) of the samples analyzed from 1989 to 2006 were above the 100% OG benchmark range of 80 to 100 mg/L. The maximum value recorded was 180 mg/L and the minimum recorded value was 93.5 mg/L. The average hardness level for the analyzed data set is 102.5 mg/L.	Yes

Appendix 10 – Threats and Risk Assessment

Threats and Risk Assessment Local Guidance

Thames-Sydenham and Region

Threats and Risk Assessment Local Guidance

Version 1.2
September 09, 2009

1 Table of Contents

1.1 List of Tables

2 Introduction

The Clean Water Act (2006) requires the completion of an Assessment Report and a Source Protection Plan. The Assessment Report is to contain the science behind the plan including:

- delineation of the vulnerable areas,
- assessment of the vulnerability of those areas,
- identification and assessment of drinking water quality issues,
- identification of conditions which may affect drinking water sources,
- identification of threats to drinking water sources,
- assessment of risks to the drinking water sources posed by activities within those vulnerable areas.

The Source Protection Plan is then developed by the Source Protection Committee to reduce the risks that those activities pose to the drinking water sources. The Clean Water Act requires that the Source Protection Committee develop a Terms of Reference which identifies the tasks to complete both the Assessment Report and the Source Protection Plan. This local guidance is intended, along with provincial rules, regulations and the Clean Water Act, to define the deliverables related to Threats and Risk Assessment tasks identified in the Terms of Reference.

This local guidance focuses on the threats and risk assessment portions of the assessment report. It is intended to give clarification and local interpretation of the sections in the Clean Water Act, its regulations and the associated technical rules pertaining to the threats and risk assessment. It must be read in conjunction with the Clean Water Act, its regulations and rules. References to some of those rules on which this local guidance is based are provided within the appendix to this local guidance.

This local guidance is intended to guide the current studies being undertaken by consultants, municipalities and conservation authorities. It will allow those undertaking the work to refine their work plans or develop supplemental work plans and to complete the tasks and deliverables identified in this local guidance. It is not intended to be a comprehensive outline of the work required to satisfy the requirements of the Act, regulations and rules, but must be read in conjunction with the provincial requirements.

This local guidance will allow the current work to proceed to a consistent conclusion so that material can be compiled into the first Assessment Report. In some cases additional work will be required through these studies. An example of this additional work would be site specific investigations to determine the circumstances associated with activities identified as threats.

3 Background

- Ministry Of Environment (MOE) funded municipalities and Conservation Authorities (CAs) to undertake technical studies
- These studies were initially based on agreements and later based on interim MOE source protection guidance.
- The work did not include detailed site specific inventories but instead relied upon desktop analysis of activities with the vulnerable areas and where necessary included drive-by inventories
- The inventories collected through this work included various levels of detail (in some studies the general activity was captured while not differentiating between specific activities such as various types of professional offices or farming)
- Most of the inventories were based on NAICS (North American Industry Classification System) codes as it was generally accepted that future risk assessment would be facilitated through provincial linking of the NAICS code to a hazard score
- The work which was initiated through these studies was intended to be a detailed inventory of activities which could be considered a threat within the entire WHPA or IPZ. At the point that the inventories were initiated there was no guidance available on the level of hazard which might constitute a threat nor was there a list of the activities which could be considered a threat.
- Subsequent to the initiation of these studies the CWA requirements, through regulations and rules, were developed. Specifically a list of prescribed threats was released as well as a table indicating the level of risk posed by an activity being undertaken under certain circumstances. This was different than the anticipated list of hazard ratings for a given NAICS code which was needed to assess the risks posed by the land uses identified in the inventories being developed.
- Although the inventories being developed through the initial studies will be useful in the risk assessment defined in this local guidance they were not developed with the needs now established through the regulations and rules.
- There are other challenges with adopting those inventories for use in this work such as the wide variation in the format and structure of the databases as well as the level of detail which was captured through the inventories.
- The rules now require lists of activities that are or would be threats. Inventories of existing activities are not required to develop these lists due to the requirement to identify what would be a threat if it were to be undertaken. Further, it is not necessary to distinguish whether an activity is currently undertaken from those that would be threats if they were to be undertaken, as a policy will need to be in place to manage the risk. Specifically, policies will be required to prevent activities from becoming a significant risk should such an activity be undertaken in the future. This is a significant departure from the methodology initiated based on interim guidance.
- The inventories will be useful in assisting the SPC to develop policies in that those polices may be significantly different if an activity is being undertaken than if it is not. For example it may be more likely to prohibit future activities than ones which are already in existence

- Assessment Reports also need to include a number of maps including significant drinking water threats
- Maps are needed which indicate where activities associated with chemicals, DNAPLs and pathogens pose significant. As the areas for each type of risk are different and overlap it may be necessary to map these areas on different maps.
- Similar maps are required for areas where acitivites associated with chemicals, DNAPLs and pathogens pose moderate risks as well as maps where those activities pose low risks. Ways of combining these maps with the maps of significant should be considered.
- These maps will all rely upon the vulnerability maps which have been created through previous work on these projects

4 Purpose and Objectives

This local guidance is intended to provide direction and guidance to consultants engaged in studies for the conservation authorities. It is recommended that municipalities working on similar projects utilize this local guidance in undertaking their projects, as ultimately their deliverables will be assembled into the Assessment Report with the other projects guided by this local guidance. This local guidance is intended to describe the minimum requirements to be included in the AR. There are also other aspects of the work related to threats and risk assessment which will be needed to inform and implement the Source Protection Plan (SPP).

The objectives of work described in this local guidance are:

1. to identify the number and types of significant risks,
2. to describe the lists and maps required by the Clean Water Act (and its regulations and rules)
3. to satisfy the requirements of the Clean Water Act, related rules and regulations as they pertain to water quality threats and risk assessment,
4. to provide information useful in developing policies to reduce risks to drinking water sources,
5. to provide information which will be beneficial when implementing the SPP

Although all of these objectives should be kept in mind, the focus of this local guidance is currently on satisfying the requirements of the first Assessment Report (numbers 1, 2 and 3 above) related to threats and risk assessment. The remaining objectives will be the focus of the second tier of this local guidance, described in Sections 5.3, 5.4 and 5.7, but currently beyond the scope of this local guidance.

5 Discussion

5.1 Studies

Threats and risk assessment work is being carried out through various technical studies. These studies are being lead by municipalities or CAs within the source protection region.

They were initiated through agreements with MOE. The work was defined within the agreement and later based on draft guidance modules provided as interim guidance. Those agreements still require the delivery of specific deliverables including threats inventories. These studies are currently being updated to meet the technical rules. This local guidance is focused on the minimum requirements related to threats and risk assessment required to meet those rules and focused on receiving those deliverables in time to meet legislated requirements rather than awaiting the completion of the other aspects of the studies (such as the threats inventories) which can be completed later. Much work has been undertaken on updating the other aspect of the technical work to meet those rules.

Table 1 Current projects involving threats and risk assessment

Ground-water		Surface Water	
Projects	**Systems**	**Projects**	**Systems**
Perth	Stratford St Marys West Perth -Mitchell Perth East -Shakespeare (& Milverton)* Perth South - St Pauls, Sebringville*	Essex - Chatham Kent	Wallaceburg Wheatley South Chatham Kent/Chatham
London-Middlesex	City of London - Fanshawe, Hyde Park Thames Centre - Thorndale, Dorchester Kilworth Heights Subdivision, Melrose, Mount Brydges, Birr	West Elgin	West Elgin
Oxford	Woodstock, Innerkip, Ingersoll, Beachville-Loweville, Mount Elgin*, Embro, Lakeside*, Thamesford, Tavistock, Hickson-King*	Southern Lake Huron	LAWSS* Petrolia*
Chatham-Kent	Ridgetown Highgate		

Municipalities identified with an asterisk (*) include vulnerable areas from water systems in neighbouring municipalities
Note: Milverton is outside of the TSR SP Region but included in the technical study

5.2 Threats Inventories

County groundwater studies developed lists of potential threats within WHPA. They relied largely on professional judgment of the individuals undertaking the studies to identify land uses that could pose a risk to drinking water sources. This has resulted in significant variation in the detail and nature of the inventories. Source Protection technical studies improved those inventories where they existed before and initiated inventories where none existed before (surface water sources). These inventories were based on general land use categories or more specific categories as listed under the NAICS (North American Industry Classification System) classifications. Further information on the NAICS codes may be obtained at: http://www.statcan.gc.ca/subjects-sujets/standard-norme/naics-scian/2002/naics-scian-02index-eng.htm

Previous methodologies and guidance suggested that:

- a detailed parcel by parcel inventory was needed of all activities which might pose a threat to drinking water sources
- the activity would be described by a NAICS code

- each activity would need to be assessed to determine the hazard rating and multiplied by the vulnerability of the area where the activity was occurring
- the province would provide hazard scores related to the NAICS
- a database and look-up tables would be provided to facilitate this work

Since the studies were initiated the prescribed list of activities and the table of threats and circumstances under which they are considered threats have been released. The rules require a different approach where:

- a threat is an activity that occurs *or could occur* in an area
- the table of threats includes detailed descriptions of circumstances and identifies the level of risk (significant, moderate or low) depending on the type of vulnerable area and vulnerability score of a part of the vulnerable area in which the activity is being engaged
- the table includes the risk score of the activity based on the vulnerability zone and score in which the activity is being undertaken.
- the rules only require the number of significant threats to be counted in each vulnerable area.

This allows the inventory to be scoped and focus on:

- those areas where a significant risk could occur (with a vulnerability score of 8 or greater for chemical threats, WHPA-A and B, IPZ-1 and 2 for pathogens and WHPA-A, B and C for DNAPLs)
- the activities within those areas which could be significant

Threats inventories being developed and refined may be utilized if they are detailed enough and organized in such a fashion as to allow them to be compared or linked to the table of threats. The detailed circumstances are difficult to relate to the categories of NAICS codes. Although some links have been provided by the province along with the other look-up tables, this requires significant work to make links between the inventory and the table of activities and circumstances. In most cases additional information would be required to determine the appropriate circumstances under which the activity is being undertaken. Further, the list of NAICS codes and activities is not considered to be complete. These threats inventories will be important for the development of policies and in the implementation of the Source Protection Plan however they may not be the most efficient way to develop the required lists or count the number of locations where significant risks are occurring. Even if these lists are not used to determine the significant risks it will be important that they be completed and delivered to the conservation authorities as part of tier 2 of the work described in this local guidance. A more efficient methodology is described in this local guidance for completing the required deliverables in time for the submission of the Assessment Report.

In many cases the areas where a significant risk could occur is relatively small. Further, depending on the vulnerability score in those areas, the types of activities which need to be assessed to determine whether they are significant are limited. This list may include activities which were not captured in the originating inventories. Similarly, many activities

included in those inventories would not pose a significant risk in that location or perhaps even at locations with a lower vulnerability score.

Even if not utilized for this work it will be important that the inventories of threats be refined as they will be useful for other purposes. However, it may not be the most efficient way of satisfying the requirements of the rules and providing the required content for the Assessment Report. Scoped inventories with a focus on the deliverables identified below may be a more efficient way to collect and report on the information. This local guidance is intended to better describe the required outputs, rather than to define the methodology for creating those outputs.

5.3 WHPA-E and F for GUDI Systems *(beyond the scope of this local guidance)*

Drinking water systems which have been determined to be Groundwater Under Direct Influence (GUDI) of surface water have additional vulnerable areas wich must be defined. A WHPA-E must be defined if the surface influence has the potential for "short circuiting" the travel times established though the delineation of WHPA-B, C and D. A WHPA-F is also to be delineated where the system has issues which are not dealt with through WHPA-A, B, C, D and E.

Most of these areas have yet to be delineated and assessed for vulnerability. As a result the work associated with threats and risk assessment in those areas is beyond the scope of this local guidance. The methodologies described in this local guidance will be applied to those areas upon completion of the delineation and vulnerability scoring of those areas.

5.4 Threats contributing to Issues *(beyond the scope of this local guidance)*

The rules require threats contributing to issues to be identified. The rules also allow for that work to be undertaken later if a work plan is included which identifies how and when that work will be completed. This is due to the significant effort and data which may be required to refine and substantiate the "issues contributing area".

In this region issues assessment on municipal water sources is currently underway. Until the issues assessment has been completed, identifying the threats contributing to the issues cannot be undertaken. It is expected that, in most cases, the issues assessment will identify a work plan for investigating the area and threats contributing to the issues, but will not actually be able to identify specific threats contributing to issues.

Threats contributing to issues are therefore not currently a part of this local guidance. In the future, however, it will be necessary to include, in the lists of threats, the threats which are tied to issues. This is important as threats associated with issues are significant and will therefore need to be added to the count of significant threats.

5.5 Conditions *(beyond the scope of this local guidance)*

Conditions are the result of past activities. Technical Rule 126 describes the types of things which can be considered Conditions.

MOE has indicated that a condition cannot be the result of an activity which is still occurring. This is most likely a result of the fact that there are existing regulatory methods for dealing with these situations. However, if a material is found in a concentration and manner that would be considered a condition then it needs to be documented so that the SPC and MOE can consider the situation.

Although inventorying conditions is beyond the scope of this work and will be considered through separate local guidance, the following is provided in case a situation is identified through the work described in this local guidance.

- The situation needs to be considered to determine if it may be considered an imminent risk to the drinking water system. The operating authority, conservation authority and MOE need to be involved considering the situation.
- Where the potential condition is attributed to an existing activity, the activity should be assessed as a threat.
- Where the circumstances associated with the activity do not adequately describe the situation the unique circumstances surrounding this situation need to be considered and an appropriate hazard score is to be developed using the method described in the rules.
- The criteria for defining conditions may be used as a comparison.

As work associated with conditions is beyond the scope of this local guidance, therefore no allowance is required for this work. Should the situation above be identified a work plan will be developed with the consultant to deal with the situation.

5.6 Activities that are not included in the prescribed list

Rule 119 (see Table 4 in Appendix A) allows the SPC to identify activities which are not on the prescribed list and which pose a risk to a drinking water source. The SPC is also able to identify circumstances not in the list with an activity. In order to identify an activity in this manner the committee (or actually the consultant on their behalf) must calculate the hazard related to the activity in the same manner as the hazards associated with the prescribed activities in the table of threats. The Director must agree with the calculations.

The consultant is to identify if there are any activities which the operating authority is concerned about. The consultant will investigate to determine if the activity is included in the prescribed lists. If it is not included in the prescribed lists or if the circumstances under which the activity is being undertaken are different than those described in the table of drinking water threats, such activities will be listed separate from the prescribed activities considered threats.

Further, through their review of activities occurring in the vulnerable areas, the consultant may identify activities being undertaken in the area which they think may pose a risk to the drinking water system, but which they cannot associate with the prescribed threats. The consultant shall consider activities which are similar in nature to those identified in the prescribed list, activities which involve similar chemicals to those listed, and circumstances which are not included in the prescribed list.

One such activity that the SPC has expressed a concern over is transportation corridors such as pipelines. Known major transportation corridors are to be identified and mapped within the vulnerable areas. The chemicals of concern identified in the threats tables are to be reviewed to determine the most hazardous material (highest hazard score) which may be transported along the corridor within the vulnerable area. This chemical is to be used to assess the risk score.

Activities which are identified in this manner will need to be evaluated to determine the hazard score for the activity. Where the methodologies described above are not able to allow the threat to be assessed the consultant is to provide suggestions as to similar activities or circumstances which could be relied upon in determining the hazard associated with the activity of concern. Doing a detailed analysis of the risk associated with these activities is beyond the scope of this local guidance and will need to be identified through a specific work plan should this situation arise.

The consultant shall also document activities which the operating authority is concerned about which are occurring beyond the vulnerable area. This may be useful in delineation of IPZ-3 and GUDI-F (for a GUDI system) where applicable. There is however no similar methodology for the extension of a vulnerable zone to include activities beyond WHPA-D for non-GUDI systems.

5.7 Future threats

Activities which are or "would be" threats are to be included in the required lists. Generally this is addressed by including all activities listed in the prescribed lists even if they are not being engaged in an areas. Activities not currently being undertaken in the vulnerable areas "would be" threats if the activity was to be undertaken in the vulnerable area in the future. This greatly simplifies the process of identifying the activities which are or would be threats as the lists provide that information. Filtering and sorting of the lists will provide for a list which can be utilized for local consultation on the threats and risks. However, this is considerably more challenging when counting the number of locations at which significant risks are occurring.

O. Reg. 287/07 s13(1)6i requires that we identify the number of locations at which a person is engaging in an activity which is a significant threat. It also includes counting locations where the activity "would be" a *significant* drinking water threat. It is very difficult and in many cases impossible to identify the circumstances associated with a future activity, especially based only on land use identified in Official Plans and bylaws. The circumstances are critical in identifying whether an activity would be significant or not. It is therefore apparent that this was not the intent of the rules. Therefore a different

interpretation of "would be" is required in identifying if future activity should be included in the count of significant threats. MOE has indicated that in this case **"would be" should be interpreted as having the infrastructure in place to undertake the activity** which would be a significant drinking water threat.

As an example, if the structure is in place to house or store the quantity which would make the activity a significant risk, but it is not in use or houses a lower quantity, then this location is to be included as "would be" even although at that location the circumstances are not in place (ie there is not sufficient quantity) to make this a significant risk at this time. An empty fuel tank or chemical storage would be an example of this. The level of risk would be established based on the quantity which could be stored rather than based on the amount which is there at the current time. This is obvious for certain activities as the risk should not be calculated based on the half empty storage tanks at the time of assessment, when they will likely be filled at the time of the next delivery. A barn which is currently empty or houses far fewer livestock than it could house would be another example. Similarly it does not make sense to assess the risk based on en empty chicken barn when the barn could be filled up days or weeks later. This does present significant challenges when the intended activity is less obvious. Empty warehouses or other commercial buildings will require considerable judgment to be exercised in assessing the future risks associated with this activity. Reasonable assumptions will be needed. These assumptions must be documented. These assumptions should be conservative but reasonable. These types of situations will need to be dealt with on a case by case basis and will likely need to be considered through the tier 2 threats and risk assessment described below.

It is likely that in the first tier of threats and risk assessment those areas with the infrastructure in place to undertake an activity which would be a drinking water threat will be assumed to be engaged in that activity. It would only be through direct contact with the person engaged in the activity that we would be able to determine whether or not the activity is currently being engaged in. Through the subsequent tiers, an assessment of whether the activity should be classified as a future threat will need to be made, but at this stage it should be counted as a location where the activity is or would be a significant risk.

5.8 Event Based Significant Threats (beyond the scope of this local guidance)

Rule 130 of the Technical Rules: Assessment Report (Dec 2008) identifies a activity threat as significant if modeling demonstrates that a release of a chemical parameter or pathogen from the activity would be transported to the intake and result in the deterioration of the water for use as a source of drinking water. Currently rule 130 restricts this methodology for identifying a significant risk to IPZ-3, however we understand that MOE is considering amending the rules to allow that same event based modeling to identify significant threats in the other intake protection zones. The work to undertake this event and activity specific modeling is beyond the scope of this local guidance.

6 Deliverables

The Clean Water Act, General Regulation (O. Reg. 287/07) and Technical Rules all make reference to deliverables required in the Assessment Report. Appendix A includes a table of those references. The previous guidance referred to a tier 1 and tier 2 risk assessment where tier 2 involved site investigation and discussions with landowners. Threats and Risk Assessment in most studies in the Thames-Sydenham and Region will require a similar 2 tiered approach where the first tier is based on existing inventories, desktop investigations or windshield surveys. Tier 1 of the Threats and Risk Assessment must be completed in time for Assessment Report Consultation - Phase 2 (October 2009). Where time permits more detailed investigation can be undertaken in tier 1, however in most cases the detailed, site specific investigation will not be able to be completed within tier 1.

6.1 Tier 1 Deliverables

The deliverables required are described in the following table. It is important to note that most of the deliverables do not rely upon a threats inventory in any way. The only exception to this is the enumeration of significant threats. Even this enumeration requires a scoped inventory only.

The scoped inventory is focused on the areas where a threat can pose a significant risk- where the vulnerability score is 8 or higher. Significant Risks can also be from threats which contributes to an issue or are identified through event specific modeling, both of which are beyond the scope of this project (although any threats contributing to an issue, that have been identified through other work, can be brought forward to this work and included in the lists).

While the Act, Regulations and rules identify the deliverables, the following table is intended to provide a local interpretation of how those deliverables may be satisfied. These deliverables are to be based on best available information through desktop exercises relying on existing threats inventories and where necessary or more efficient, windshield surveys. Where there is uncertainty, reasonable, but conservative assumptions are to be made. These assumptions may include what activity is being undertaken or specifics on the circumstances associated with the activity. These assumptions and the level of uncertainty also need to be documented.

The following table considers water quality threats only. Water Quantity threats and the vulnerable areas associated with water quantity are being considered through the Water Budget process and are therefore beyond the scope of this local guidance.

The focus of this local guidance is on the WHPAs and IPZs and the projects associated with these areas being undertaken by consultants and municipalities. Similar methodologies will be applied to the water quality threats associated with HVAs and SGRAs, but not as part of the work currently being undertaken through these technical studies.

Table 2 Local Description of Deliverables related to threats

#	Deliverable	Reference	Description
1.	List of Significant Threats	TR 9 (1)(d), OReg 287/07 s13(1)(3)	• List by prescribed activity for each vulnerability score within the vulnerable areas (WHPA, IPZ) in the study • Include the circumstances under which the prescribed activity is considered a significant threat • Include any local circumstances (which were not identified in the above point) under which the prescribed activity is considered a significant threat • Table, text
2.	Map of areas where pathogen activities can be significant	CWA s15 (2) (h)	• In the Assessment Report maps do not need to be separated out for each of significant, moderate, low and pathogen, DNAPL and chemical, but for the purposes of clarity and consultants submission each combination is to be mapped separately. Suggestions as to ways to map these collectively would be appreciated. The SPC will consider more efficient mapping methodologies in the Assessment Report • Clean Water Act Mapping Symbology (April 2009) and data standards to be met • Maps, text (explain in text the interpretation of the map of vulnerability scores and table of circumstances together that give the areas where activities are significant, moderate or low)
3.	Map of areas where DNAPL activities can be significant	CWA s15 (2) (h)	
4.	Map of areas where chemical activities can be significant	CWA s15 (2) (h)	
5.	List of Moderate Threats	OReg 287/07 s13(1)(4)	• List by prescribed activity for each vulnerability score within the vulnerable areas (WHPA, IPZ) in the study • Include the circumstances under which the prescribed activity is considered a moderate threat • Include any local circumstances (which were not identified in the above point) under which the prescribed activity is considered a moderate threat • Table, text
6.	Map of areas where pathogen activities can be moderate	OReg287 s13(1)2(i)	• As per deliverables 2-4 above
7.	Map of areas where DNAPL activities can be moderate	OReg287 s13(1)2(i)	

#	Deliverable	Reference	Description
8.	Map of areas where chemical activities can be moderate	OReg287 s13(1)2(i)	
9.	List of Low Threats	OReg 287/07 s13(1)(5)	• List by prescribed activity for each vulnerability score within the vulnerable areas (WHPA, IPZ) in the study • Include the circumstances under which the prescribed activity is considered a low threat • Include any local circumstances (which were not identified in the above point) under which the prescribed activity is considered a low threat • Table, text
10.	Map of areas where pathogen activities can be low	OReg287 s13(1)2(ii)	• As per deliverables 2-4 above
11.	Map of areas where DNAPL activities can be low	OReg287 s13(1)2(ii)	
12.	Map of areas where chemical activities can be low	OReg287 s13(1)2(ii)	
13.	Local threats (other Activities) that are or would be drinking water threats	CWA s15(2)(g)(i), TR 7(3), 119-125, OReg 287/07 s13(1)(3), 13(1)(4), 13(1)(5)	• To be brought to the attention of the SPC for consideration as a drinking water threat • Consider any concern of the treatment plant operating authority • Consider any threat identified by the public through consultation on Assessment Report (information to be provided by CA following Phase 1 and 2 consultation sessions) • Include a recommendation as to how to determine hazard rating (consider similar activities or activities with similar chemical, pathogen or DNAPL circumstances) • Hazard rating approved by Director must be listed for each local threat • Must be listed separately from the prescribed activities (No. 1,5,9) • List local circumstances for activities that are significant, moderate or low drinking water threats • Table, text

#	Deliverable	Reference	Description
14.	Activities considered linked to issues	TR 115(4)	• This is a cross reference to the work undertaken through Issues Evaluation, the work is to be undertaken through that project, any issues based threats identified through that process can be brought forward to this project to complete the list of threats if they are available
15.	Number of Locations where Significant Threats occur	OReg 287 Sec 13 (1) 6(i) TR 9(1)(e)	• This is to be the total number of locations at which an activity which is a significant threat is being engaged in within the WHPA or IPZ. • For the purposes of this count a location will be defined as a property parcel. • Where multiple occurrences of an activity are identified on the same parcel it is generally only to be counted once (except as noted in the following point). Where this the case the cumulative effect of the occurrences are to be considered (ie the volumes are to be summed) in evaluating the risk associated with that activity at that location • Where multiple tenants are know to occupy the same property parcel and are involved with the same activity they shall each be included in the count. • Roads and other corridors are to be counted as a single location • Summarized as per the 19 prescribed activities under OReg 287/07 s 1.1(1) which are prescribed drinking water threats related to water quality • The details associated with the activities counted are to be recorded as per deliverable 16 below. • Table, text
16.	Details on locations of significant threats	Information for SPC and project team	• Details on the locations where significant threats exist are to be submitted in a database and not to be included in the technical memo (deliverable 18) • Data to be included with this deliverable will be defined in Appendix B. • This information will allow the total to be recalculated when updated information is available as well as providing the staff and the SCP with a better understanding of the total

#	Deliverable	Reference	Description
17.	List of prescribed Activities that are or would be drinking water threats for each vulnerable area	CWA s15(2)(g)(i) TR 7(3), 118, OReg 287/07 s1.1	• As per Technical Rule 118 these may be collectively listed in the assessment report as "*the activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General)"* • The above statement when combined with the lists of activities which are significant, moderate and low should satisfy this requirement, thus no separate deliverable is required as part of the technical studies.
18.	Technical memorandum	Information to SPC	• to inform Assessment Report compilation • description of the method of calculations and the general nature of assumptions shall be included in the technical memorandum • to include specific description of work but may refer to this local guidance for general description

6.2 Tier 2 Deliverables (beyond the scope of this local guidance)

Deliverables completed in tier 1 will likely need to be refined through site specific investigation. Where an activity was identified as a significant risk, contact with the person engaged in the activity will occur through the Assessment Report Consultation (phase 3). This personal contact may result in refinement of assumptions made through the tier 1 Threats and Risk Assessment and may well eliminate activities from being identified as significant or in some cases from being identified as threats. As a result deliverables 15 and 16 above will be refined in tier 2. Although beyond the scope of this local guidance the following will be required in the tier 2 Threats and Risk Assessment:

- Threats inventories initiated through previous tiers of this work will be finalized and delivered to the municipality and SPA.
- These threats inventories are to satisfy the data standards developed by the MOE and/or the SPA
- It is proposed that the survey or census that was developed by the Regional Municipality of Waterloo and is being applied in the Lake Erie Source Protection Region would be used to ascertain the circumstances around the activities which are being undertaken in the vulnerable areas where a significant risk is possible.
- The work associated with this tier of the project is currently beyond the scope of this local guidance. This will be refined when final guidance and database are received from the MOE.

7 Consultation

The Thames-Sydenham and Region Source Protection Committee has adopted a staged consultation plan for the Assessment Report which goes beyond the regulatory requirements.

- Phase 1 focuses local consultation on the vulnerable areas.
- Phase 2 is again a locally focused consultation adding issues and an overview of threats and risk assessment.
- Phase 3 is a regionally focused consultation on the draft proposed Assessment Report.

Output from the technical studies is required for phase 2 consultation. It is, however, expected that in areas where there may be higher numbers of risks or a great deal of uncertainty related to the circumstances associated with the activities, that more work will be undertaken beyond phase 2 consultation and perhaps beyond the submission of the first assessment report in April 2010.

The consultants' participation in consultation is not required. Results from the consultation may however be brought to the attention of the consultants for consideration in finalizing their submissions.

For more details on the consultation phases please refer to the Assessment Report Consultation Plan.

8 Schedule

The Assessment Reports in the Thames-Sydenham and Region are required to be submitted by April 20, 2010. It is generally accepted that the Assessment Reports will not be complete at that time, however, they will be submitted with data gaps identified. Work will continue on filling those gaps while work on the Source Protection Plan is initiated. An addendum will be submitted which addresses those data gaps, where possible. The schedule for the submission of the addendum has not yet been determined. The addendum needs to be submitted in sufficient time to allow for its approval prior to and allow sufficient time for the submission of a complete Source Protection Plan by its legislated due date of August 20, 2012 (5 years from the appointment of the chair of the Thames-Sydenham and Region Source Protection Committee).

The addendum may include, among other things, an update of Threats and Risk Assessment based on a more detailed inventory of existing threats and circumstances (referred to in past provincial guidance and in this local guidance as Tier 2 Risk Assessment). The Assessment Report submitted in April 2010 must include the deliverables identified in section 6.1 above (Table 2). Prior to submission of the Assessment Report the stakeholders in the region must be consulted. This consultation will be undertaken by the Conservation Authorities as part of the consultation identified in the Source Protection Committee's Assessment Report Consultation Plan. As such the consultant will not be required to participate in the consultation as part of the work

described in this local guidance. Where the specific expertise of the consultant is required their involvement will be arranged for separately, outside of the work described in this local guidance.

The phased approach to consultation, as described in Section 7 above, has been adopted by the Source Protection Committee. The deliverables identified in Table 2 must be completed to allow for consultation in Phase 2 of the Assessment Report Consultation as this is the last local consultation of the components of the Assessment Report.

It is therefore necessary to have completed the work contained in this local guidance by October 23, 2009. The following table outlines the schedule for the completion of this work.

Table 3 Schedule

	Task/Milestone	Description	Date Due
1.	Comments on ToR	• This ToR is to be distributed to that consultants engaged in these projects and technical steering committees • Consultant and municipal comment will be considered along with comments received from the SPC	Aug 14, 2009
2.	Final local guidance	• Local guidance will be finalized and redistributed to consultants for proposals	Sept 8, 2009
3.	Proposals Due	• Proposals to be brief letter form proposal requesting extension of existing work plan to include this work • Proposals to include a cost of undertaking the work and a confirmation of schedule	Sept 16 2009
4.	Draft Tier 1 Report	• Technical memorandum including required lists and maps as per deliverables identified in table 2	Oct 5, 2009
5.	Final Tier 1 Report	• Final report considering comments of technical steering committee	Oct 23, 2009
6.	Tier 2 (beyond the scope of this ToR)	• To follow consultation on preliminary Assessment Report • Timing to align with addendum to Assessment Report	To be determined (summer/fall 2010)

9 Appendix A - Clean Water Act References to threats

This appendix includes excerpts from the Act, Regulations and Rules which are intended to provide a quick reference for the reader. It is important, however, that the current official version of the regulatory material should be referred to when interpreting the requirements related to the deliverables identified in this local guidance. The excerpts included below are based on:

Clean Water Act, 2006
Clean Water Act Ontario Regulation 287/07
Clean Water Act Technical Rules, December 12, 2008
MOE Guidance Modules, October 2006
Thames-Sydenham and Region Assessment Report Consultation Plan, July 29 2009

Table 4 Technical Rules (dated Dec. 12, 2008) references to threats

Rule/Section	Sub Title	Content	References within this Rule/Section
Part I. Rule 9. Sub rule 1. Sub sections (d), (e). On Page 9	**Minimum information** in the Assessment Report	**Rule 9.** An assessment report shall include the following: (1) One or more maps, graphics or tables detailing, ……. **(d) activities that are or would be and conditions resulting from past activities that are drinking water threats** and their respective hazard rating if one is required to be determined in accordance with rule 120, 121 or 139; **(e) the number of locations at which an activity that is a significant drinking water threat is being engaged in**; and	**Rule 120.** The chemical hazard rating of an activity that is not prescribed to be a drinking water threat under O. Reg. 287/07 (General) shall be a rating that in the opinion of the Director reflects the hazard….. **Rule 121.** The pathogen hazard rating of an activity that is not prescribed to be a drinking water threat under O. Reg. 287/07 (General) shall be a rating that in the opinion of the Director reflects the hazard…… **Rule 139.** For the purpose of rule 138, the hazard rating of a condition that results from a past activity is 10. **Rule 138.** The risk score of an area in respect of a condition that results from a past activity shall be calculated……
Part XI. Rule 118. On Page 52	Activities **prescribed** to be drinking water threats	**Rule 118.** The activities prescribed to be drinking water threats for a vulnerable area in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General) **may be collectively listed in the assessment report as "the activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General)".**	**O. Reg. 287/07 (General),** Subsection 1.1(1), Paragraphs 1 through 18 and paragraph 21-list of threats excluding quantity threats. *(see next table)*
Part XI.	**Other** Activities	**Rule 119.** In addition to activities prescribed to be drinking	**O. Reg. 287/07 (General),** Subsection 1.1(1),

Rule 119. On page 52		water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General), **an activity shall be listed as a drinking water threat for a vulnerable area if**, **(1) the activity has been identified by the source protection committee as an activity that may be a drinking water threat;** (2) in the opinion of the Director, (a) the chemical hazard rating of the activity is greater than 4, or (b) the pathogen hazard rating of the activity is greater than 4; and (3) the risk score for an area within the vulnerable area in respect of the activity calculated in accordance with rule 122 is greater than 40.	Paragraphs 1 through 18 and paragraph 21 *(see next table)* **Rule 122.** The risk score of an area within a vulnerable area in respect of an activity that is not listed in the Tables of Drinking Water Threats shall be calculated in accordance with the following formula: A x B where, A = the chemical hazard rating or pathogen hazard rating of the activity determined in accordance with 120 or 121 as the case may be; and B = the vulnerability of the score of the area within the vulnerable area determined in accordance with Part VII or Part VIII, as the case may be.
Rule 126	**Conditions**	Listing Conditions that result from past activities 126. Without limiting the generality of subclause 15(2)(g)(ii) of the Act, the list of conditions that are drinking water threats prepared for the purpose of subclause 15(2)(g)(ii) of the Act shall include each of the following conditions that exist in a vulnerable area and that result from a past activity: (1) the presence of a non-aqueous phase liquid in groundwater in a highly vulnerable aquifer, significant groundwater recharge area or wellhead protection area; (2) the presence of a single mass of more than 100 litres of one or more dense non-aqueous phase liquids in surface water in a surface water intake protection zone (3) the presence of a contaminant in groundwater in a highly vulnerable aquifer, significant groundwater recharge area or a wellhead protection area, if the contaminant is listed in Table 2 of the Soil, Ground Water and Sediment Standards and is present at a concentration that exceeds the potable groundwater standard set out for the contaminant in that Table; (4) the presence of a contaminant in surface soil in a	15(2)(g)(ii)

		surface water intake protection zone if, the contaminant is listed in Table 4 of the Soil, Ground Water and Sediment Standards is present at a concentration that exceeds the surface soil standard for industrial/commercial/community property use set out for the contaminant in that Table; and (5) the presence of a contaminant in sediment, if the contaminant is listed in Table 1 of the Soil, Ground Water and Sediment Standards and is present at a concentration that exceeds the sediment standard set out for the contaminant in that Table	
Rule 130	**Event** Based Activity in IPZ-3	130. An activity listed as a drinking water threat in accordance with rule 118 or 119 is a significant drinking water threat in an IPZ-3 delineated in accordance with rule 68 at the location where the activity is carried on if modeling demonstrates that a release of a chemical parameter or pathogen from the activity would be transported through the surface water intake protection zone to the intake and result in the deterioration of the water for use as a source of drinking water for the intake.	**Rule 118.** The activities prescribed to be drinking water threats for a vulnerable area in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General) **may be collectively listed in the assessment report as "the activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General)".** **Rule 119.** In addition to activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General), **an activity shall be listed as a drinking water threat for a vulnerable area if**, **(1) the activity has been identified by the source protection committee as an activity that may be a drinking water threat;** (2) in the opinion of the Director, (a) the chemical hazard rating of the activity is greater than 4, or (b) the pathogen hazard rating of the activity is greater than 4; and (3) the risk score for an area within the vulnerable area in respect of the activity calculated in accordance with rule 122 is greater than 40. **Rule 68.** An area known as IPZ-3 shall be delineated for each type A and type B surface water intake and each type C and type D surface water intake located in Lake Nippising, Lake Simcoe, Lake St. Clair or the Ottawa River, associated with a drinking water

			system described in rule 58 and shall be composed of the following areas: (1) Subject to rule 69, the area within each surface water body through which, modeling demonstrates, contaminants released during an extreme event may be transported to the intake; (2) where the area delineated in accordance with subrule (1) abuts land, (a) a setback of not more than 120 metres inland along the abutted land measured from the high water mark of the surface water body that encompasses the area where overland flow drains into the surface water body; and (b) the area of the Regulation Limit along the abutted land.

Table 5 O. Reg. 287/07 (General) references to threats

Section	Sub Title	Content	References within this Rule/Section
Section 1.1 (1)	**Prescribed** drinking water threats	1.1 (1) The following activities are prescribed as drinking water threats for the purpose of the definition of "drinking water threat" in subsection 2 (1) of the Act: 1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act. 2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage. 3. The application of agricultural source material to land. 4. The storage of agricultural source material. 5. The management of agricultural source material. 6. The application of non-agricultural source material to land. 7. The handling and storage of non-agricultural source material. 8. The application of commercial fertilizer to land. 9. The handling and storage of commercial fertilizer. 10. The application of pesticide to land. 11. The handling and storage of pesticide. 12. The application of road salt. 13. The handling and storage of road salt. 14. The storage of snow. 15. The handling and storage of fuel. 16. The handling and storage of a dense non-aqueous phase liquid. 17. The handling and storage of an organic solvent. 18. The management of runoff that contains chemicals used in the de-icing of aircraft. 19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body. 20. An activity that reduces the recharge of an aquifer. 21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	Clean Water Act, 2006 Section 2 (1): definitions
Section 13 (1) Numbers 2 to 6	**Other information** to	13(1)The following information shall, in accordance with the regulations, the rules and the terms of reference, be included	Clean Water Act, 2006 **15(2) (i):** 'contain such other information as is

	be contained in assessment report	in an assessment report under clause 15 (2) (i) of the Act: 2. For each vulnerable area identified under clause 15 (2) (d) or (e) of the Act, an identification of the following areas within the vulnerable area: i. Areas where an **activity listed under subclause 15 (2) (g) (i)** of the Act **is or would be a moderate** drinking water threat. ii. Areas where an **activity listed under subclause 15 (2) (g) (i)** of the Act **is or would be a low** drinking water threat. iii. Areas where a **condition listed under subclause 15 (2) (g) (ii)** of the Act **is a moderate** drinking water threat. iv. Areas where a **condition listed under subclause 15 (2) (g) (ii)** of the Act **is a low** drinking water threat. 3. For each area identified under subclause 15 (2) (h) (i) of the Act, the **circumstances** in which the activity listed under clause 15 (2) (g) of the Act **is or would be a significant** drinking water threat. 4. For each area identified under subparagraph 2 i, the circumstances in which the activity listed under subclause 15 (2) (g) (i) of the Act **is or would be a moderate** drinking water threat. 5. For each area identified under subparagraph 2 ii, the circumstances in which the activity listed under subclause 15 (2) (g) (i) of the Act **is or would be a low** drinking water threat. 6. For each vulnerable area identified under clause 15 (2) (d) or (e) of the Act, i. **the number of locations** at which a person is engaging in an activity listed under subclause 15 (2) (g) (i) of the Act that **is or would be a significant** drinking water threat….	prescribed by the regulations' **15 (2) (d) or (e):** *(d) refers to identifying SGRAs and HVAs,* *(e) refers to identifying IPZs and WHPAs* **15(2)(g)(iand ii):** (g) list, for each vulnerable area identified under clauses (d) and (e), (i) **activities that are or would be** drinking water threats, and (ii) **conditions** that result from past activities and **that are** drinking water threats; **15 (2) (h) (i):** (h) identify, within each vulnerable area identified under clauses (d) and (e), (i) the areas where an activity listed under clause (g**) is or would be a significant** drinking water threat, and (ii) the areas where a condition listed under clause (g) **is a significant** drinking water threat; and

Section 15 (2) (c) (iii)	**Consultation on draft assessment report**	**As soon as reasonably possible after publishing the draft on the Internet, the source protection committee shall**, (a)… (b)… (c) give a copy of the notice referred to in clause (a) to, (i) the clerk. ….., (ii) if any part of the reserve…, (iii) **every person known to the source protection committee who is engaging in an activity listed under subclause 15 (2) (g) (i) of the Act that is or would be a significant drinking water threat,** (iv).. (v)..	Clean Water Act, 2006 **15(2)(g)(iand ii):** (g) list, for each vulnerable area identified under clauses (d) and (e), (i) **activities that are or would be** drinking water threats, and (ii) **conditions** that result from past activities and **that are** drinking water threats; **15 (2) (d) or (e):** *(d) refers to identifying SGRAs and HVAs,* *(e) refers to identifying IPZs and WHPAs*

Table 6 Clean Water Act (2006) references to threats

Rule/Section	Sub Title	Content	References within this Rule/Section
Section 15 (2) (g) and (h)	Assessment reports contents	**An assessment report shall, in accordance with the regulations, the rules and the terms of reference ,….** (g) **list, for each vulnerable area** identified under clauses (d) and (e), (i) activities that **are or would be drinking water threats**, and (ii) conditions that result from past activities and **that are drinking water threats**; (h) **identify, within each vulnerable area** identified under clauses (d) and (e), (i) the areas where an activity listed under clause (g) **is or would be a significant** drinking water threat, and (ii) the areas where a condition listed under clause (g) **is a significant** drinking water threat; and (i)…..	**Clean Water Act** **15 (2) (d) or (e):** *(d) refers to identifying SGRAs and HVAs,* *(e) refers to identifying IPZs and WHPAs*

10 Appendix B – Significant Threats Data Requirements

This appendix will contain the data requirements associated with Deliverable 16. The following are provided as examples only and will be replaced with a proper database definition of the fields and data to be submitted.

- Location of the activity (geospatial information – points, lines, polygons) in a geodatabase with object ID's associated with data included in a table below
- Roll#/ PIN of the property (or properties) on which the activity is being undertake, if appropriate and a specification of the date or version of the property data used to identify the parcel) for corridors this would not be applicable.
- Vulnerability score used in assessing the risk associated with this activity
- Activity being considered a threat (ActivityID)
- Circumstances associated with the activity(CircumstanceID)
- Person or company engaged in the activity (if known)
- Circumstances associated with the activity (rolled up to the property parcel)
- Details of the activity being undertaken on the site such as whether there are multiple occurrences at this location and whether it is know to be undertaken by multiple parties
- Risk score calculated based on the above
- An indication of the relative level of uncertainty (high or low)associated with the level of risk at that location
- Assumptions made regarding the activity and circumstances and the level of uncertainty associated with those assumptions
- The source of the information utilized in this assessment needs to be identified

Threats and Circumstances Tables

Threats Tables

The tables included and referenced in this appendix are intended to provide information on the types of activities which are or would be significant, moderate or low threats, as well as the circumstances which would result in the activity being a significant, moderate or low threat.

The province developed tables of drinking water threats which are posted on the MOE website (http://www.ene.gov.on.ca/en/water/cleanwater/cwa-technical-rules.php). These tables include the prescribed activities that can be identified as threats, the vulnerable areas where they can be identified as threats, the circumstances which make them threats and the level of risk that they pose in that area under those circumstances. The Technical Rules require that assessment reports identify the activities which would be threats and the areas where, within the vulnerable areas, they would be considered significant, moderate or low threats. The tables included and referenced in this appendix are intended to help satisfy that requirement.

The tables in this appendix should be read in conjunction with the maps related to Section 7 – Threats and Risk Assessment and the tables included on those maps. These maps, included in Appendix 1 of the Assessment Report, identify the areas where activities are or would be significant, moderate or low threats. The tables on the maps indicate the vulnerability and vulnerable area in which the activities would be significant, moderate or low threats. The tables included in this appendix indicate which activities in each of those vulnerable areas (as identified by the vulnerability score) would be significant, moderate or low. The tables are numbered based on the appendix that they are contained in (A10), the series (1), the vulnerable area (I2 for IPZ-2, WB for WHPA-B), and the vulnerability score (4.6) (eg. A10-1-I2-4.6 would indicate the activities which would be threats in an IPZ-2 with a vulnerability score of 4.6). The tables are included in the appendix in alpha-numeric order.

To determine the circumstances which would result in activities being significant, moderate or low, one can refer to the province's tables of drinking water threats discussed in the previous paragraph. The province has also developed individual tables which list the activities as either significant, moderate or low for a specific type of

vulnerable area and with a specific vulnerability score. There are 76 tables many of which are up to or over 50 pages. As such they have not been included in this Assessment Report, but are available on the internet. A link to the tables is provided at http://www.sourcewaterprotection.on.ca/threats.

An interactive threats tool has also been developed to search, query and filter the threats tables. This tool is based on the lookup tables which the province utilized to develop the tables of drinking water threats. This tool continues to be refined and updated as the province issues updated versions of the lookup tables. It is provided "*as is- with no warranty as to its accuracy or completeness"* . The tool allows the user to explore the activities and the circumstances around those activities and determine the potential level of risk that would result in that area. As the work is continually being updated and improved it is important that the user refer to the official version of the tables of drinking water threats to confirm the results from the threats tool. This tool can be accessed from the web page http://www.sourcewaterprotection.on.ca/threats.

Table A10-1-I1- 9 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-1 with a vulnerability score of 9	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	**Yes**	**Yes**	**Yes**	No	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No
3. The application of agricultural source material to land.	**Yes**	No	**Yes**	No	No	No
4. The storage of agricultural source material.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No
5. The management of agricultural source material.	n/a	No	n/a	**Yes**	n/a	No
6. The application of non-agricultural source material to land.	**Yes**	**Yes**	**Yes**	**Yes**	No	No
7. The handling and storage of non-agricultural source material.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	**Yes**	n/a	**Yes**	n/a	No	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	**Yes**	n/a	**Yes**	n/a
10. The application of pesticide to land.	**Yes**	n/a	**Yes**	n/a	No	n/a
11. The handling and storage of pesticide.	**Yes**	n/a	**Yes**	n/a	**Yes**	n/a
12. The application of road salt.	**Yes**	n/a	**Yes**	n/a	No	n/a
13. The handling and storage of road salt.	**Yes**	n/a	**Yes**	n/a	**Yes**	n/a
14. The storage of snow.	**Yes**	n/a	**Yes**	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	**Yes**	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	No	n/a
17. The handling and storage of an organic solvent.	No	n/a	**Yes**	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	**Yes**	n/a	**Yes**	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	**Yes**	**Yes**	**Yes**	No	No	No
Local Threat - The transportation of fuel by pipeline*	**Yes**	n/a	No	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	**Yes**	n/a	No	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	**Yes**	n/a	No	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I1- 8 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-1 with a vulnerability score of 8	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	**Yes**	**Yes**	No	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	**Yes**	**Yes**	No	**Yes**	No
4. The storage of agricultural source material.	No	**Yes**	**Yes**	**Yes**	**Yes**	No
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	**Yes**	**Yes**	No	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	**Yes**	**Yes**	No	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	**Yes**	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	**Yes**	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	**Yes**	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	**Yes**	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	**Yes**	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	**Yes**	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	**Yes**	**Yes**	No	No	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	**Yes**	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	**Yes**	n/a	No	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I1- 7 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-1 with a vulnerability score of 7	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	**Yes**	**Yes**	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	No	**Yes**	**Yes**	**Yes**	No
4. The storage of agricultural source material.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	**Yes**	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	**Yes**	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	**Yes**	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	**Yes**	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	**Yes**	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	**Yes**	No	**Yes**	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	**Yes**	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I2- 7.2 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-2 with a vulnerability score	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	**Yes**	**Yes**	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	No	**Yes**	**Yes**	**Yes**	No
4. The storage of agricultural source material.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer. *	No	n/a	**Yes**	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	**Yes**	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	**Yes**	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	**Yes**	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	**Yes**	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	**Yes**	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	**Yes**	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	**Yes**	**Yes**	**Yes**	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	**Yes**	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I2- 6.4 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-2 with a vulnerability score of 6.4	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	**Yes**	**Yes**	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	**Yes**	**Yes**	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	No	No	**Yes**	**Yes**	No
4. The storage of agricultural source material.	No	No	No	**Yes**	**Yes**	**Yes**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	No	No	**Yes**	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	No	No	**Yes**	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	No	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	**Yes**	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	No	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	**Yes**	**Yes**	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	**Yes**	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I2- 6.3 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-2 with a vulnerability score of 6.3	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	No	**Yes**	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	No	**Yes**	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	No	No	**Yes**	**Yes**	No
4. The storage of agricultural source material.	No	No	No	**Yes**	**Yes**	**Yes**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	No	No	**Yes**	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	No	No	**Yes**	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	**Yes**	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	No	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	No	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	**Yes**	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	**Yes**	**Yes**	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I1-5 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-2 with a vulnerability score of 5	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	No	No	**Yes**	Yes
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	No	No	**Yes**	**Yes**
3. The application of agricultural source material to land.	No	No	No	No	**Yes**	Yes
4. The storage of agricultural source material.	No	No	No	No	**Yes**	**Yes**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**Yes**
6. The application of non-agricultural source material to land.	No	No	No	No	**Yes**	**Yes**
7. The handling and storage of non-agricultural source material.	No	No	No	No	**Yes**	**Yes**
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	No	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	No	n/a	**Yes**	n/a
15. The handling and storage of fuel.*	No	n/a	No	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	**Yes**	**Yes**
Local Threat - The transportation of fuel by pipeline*	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-I2- 4 Circumstance which would result in a threat by prescribed activity or local drinking water threat in an IPZ-2 with a vulnerability score of 4	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	No	No	**No**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	No	No	**No**	**No**
3. The application of agricultural source material to land.	No	No	No	No	**No**	No
4. The storage of agricultural source material.	No	No	No	No	**No**	**No**
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	**No**
6. The application of non-agricultural source material to land.	No	No	No	No	**No**	**No**
7. The handling and storage of non-agricultural source material.	No	No	No	No	**No**	**No**
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	No	n/a
9. The handling and storage of commercial fertilizer.*	No	n/a	No	n/a	No	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	No	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	No	n/a
12. The application of road salt.	No	n/a	No	n/a	No	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	No	n/a
14. The storage of snow.	No	n/a	No	n/a	No	n/a
15. The handling and storage of fuel.*	No	n/a	No	n/a	No	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	No	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	No	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	No	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	No	No
Local Threat - The transportation of fuel by pipeline*	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways *	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways *	No	n/a	No	n/a	No	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA. * In areas where event based modelling was used to assess potential threats, this activity may also be considered a significant drinking water threat under the circumstances modelled.

Table A10-1-HV-6 Circumstance which would result in a threat by prescribed activity in a HVA with a vulnerability score of 6	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	**Yes**	No	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	**Yes**	No	**Yes**	No
3. The application of agricultural source material to land.	No	No	No	No	**Yes**	No
4. The storage of agricultural source material.	No	No	No	No	**Yes**	No
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	No
6. The application of non-agricultural source material to land.	No	No	No	No	**Yes**	No
7. The handling and storage of non-agricultural source material.	No	No	No	No	**Yes**	No
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	No	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	No	n/a	**Yes**	n/a
15. The handling and storage of fuel.	No	n/a	No	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	**Yes**	No
Local Threat - The transportation of fuel by pipeline	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fuel by road, railway and waterways	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA.

Table A10-1-SG-2 Circumstance which would result in a threat by prescribed activity in a SGRA with a vulnerability score of 2	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	No	No	No	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	No	No	No	No
3. The application of agricultural source material to land.	No	No	No	No	No	No
4. The storage of agricultural source material.	No	No	No	No	No	No
5. The management of agricultural source material.	No	No	No	No	No	No
6. The application of non-agricultural source material to land.	No	No	No	No	No	No
7. The handling and storage of non-agricultural source material.	No	No	No	No	No	No
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	No	n/a
9. The handling and storage of commercial fertilizer.	No	n/a	No	n/a	No	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	No	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	No	n/a
12. The application of road salt.	No	n/a	No	n/a	No	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	No	n/a
14. The storage of snow.	No	n/a	No	n/a	No	n/a
15. The handling and storage of fuel.	No	n/a	No	n/a	No	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	No	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	No	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	No	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	No	No
Local Threat - The transportation of fuel by pipeline	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways	No	n/a	No	n/a	No	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA.

Table A10-1-SG-4 Circumstance which would result in a threat by prescribed activity in a SGRA with a vulnerability score of 4	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	No	No	No	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	No	No	No	No
3. The application of agricultural source material to land.	No	No	No	No	No	No
4. The storage of agricultural source material.	No	No	No	No	No	No
5. The management of agricultural source material.	No	No	No	No	No	No
6. The application of non-agricultural source material to land.	No	No	No	No	No	No
7. The handling and storage of non-agricultural source material.	No	No	No	No	No	No
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	No	n/a
9. The handling and storage of commercial fertilizer.	No	n/a	No	n/a	No	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	No	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	No	n/a
12. The application of road salt.	No	n/a	No	n/a	No	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	No	n/a
14. The storage of snow.	No	n/a	No	n/a	No	n/a
15. The handling and storage of fuel.	No	n/a	No	n/a	No	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	No	n/a	No	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	No	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	No	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	No	No
Local Threat - The transportation of fuel by pipeline	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fuel by road, railway and waterways	No	n/a	No	n/a	No	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways	No	n/a	No	n/a	No	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA.

Table A10-1-SG-6 Circumstance which would result in a threat by prescribed activity in a SGRA with a vulnerability score of 6	*Threat level dependant on circumstances related to the activity*					
	Significant		**Moderate**		**Low**	
Prescribed Drinking Water Threat (Activity)	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**	**Chemical**	**Pathogen**
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	No	No	**Yes**	No	**Yes**	No
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	No	No	**Yes**	No	**Yes**	No
3. The application of agricultural source material to land.	No	No	No	No	**Yes**	No
4. The storage of agricultural source material.	No	No	No	No	**Yes**	No
5. The management of agricultural source material.	n/a	No	n/a	No	n/a	No
6. The application of non-agricultural source material to land.	No	No	No	No	**Yes**	No
7. The handling and storage of non-agricultural source material.	No	No	No	No	**Yes**	No
8. The application of commercial fertilizer to land.	No	n/a	No	n/a	**Yes**	n/a
9. The handling and storage of commercial fertilizer.	No	n/a	No	n/a	**Yes**	n/a
10. The application of pesticide to land.	No	n/a	No	n/a	**Yes**	n/a
11. The handling and storage of pesticide.	No	n/a	No	n/a	**Yes**	n/a
12. The application of road salt.	No	n/a	No	n/a	**Yes**	n/a
13. The handling and storage of road salt.	No	n/a	No	n/a	**Yes**	n/a
14. The storage of snow.	No	n/a	No	n/a	**Yes**	n/a
15. The handling and storage of fuel.	No	n/a	No	n/a	**Yes**	n/a
16. The handling and storage of a dense non-aqueous phase liquid.	No	n/a	**Yes**	n/a	**Yes**	n/a
17. The handling and storage of an organic solvent.	No	n/a	No	n/a	**Yes**	n/a
18. The management of runoff that contains chemicals used in the de-icing of aircraft.	No	n/a	No	n/a	**Yes**	n/a
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	n/a	n/a	n/a	n/a	n/a	n/a
20. An activity that reduces the recharge of an aquifer.	n/a	n/a	n/a	n/a	n/a	n/a
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	No	No	No	No	**Yes**	No
Local Threat - The transportation of fuel by pipeline	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fuel by road, railway and waterways	No	n/a	No	n/a	**Yes**	n/a
Local Threat - The transportation of fertilizer by road, railway and waterways	No	n/a	No	n/a	**Yes**	n/a

Notes:
- n/a means that the combination of zone and activity is not applicable. In the case of activities 19 and 20 which pertain to water quantity threats, these will only be identified in a WHPA-Q1 or Q2, through a Tier 3 Water Budget. Current information indicates that there are none of these identified in the SCRSPA.

Event *Based Areas - Modelled Circumstances*

Intake	Event Based Area	Chemical Modelled	Volume Modelled	Activities considered Significant Threat
Kettle & Stoney Point FN	N/A	None	None	None
LAWSS	EBA-Fuel 34	Fuel	34,000 L	• The handling and storage of fuel • Transportation of fuel along provincial highways, county and local roads, railways and waterways • Transportation of liquid petroleum products through pipelines that cross the SCRSPA and spill in St Clair River
	EBA-Fuel 1000	Fuel	1,000,000 L	
Petrolia	EBA-Fuel 34	Fuel	34,000 L	
	EBA-Fuel 15	Fuel	15,000 L	
Wallaceburg	EBA-Fuel 275	Fuel	275,000 L	
	EBA-Fuel 68	Fuel	68,000 L	
	EBA-Fuel 34	Fuel	34,000 L	
	EBA-Nitrogen Fertilizer	46% Nitrogen Fertilizer	34,000 L or equivalent N	• Transportation of fertilizer along provincial highways, county and local roads, railways and waterways

Local Threats

Ministry of the Environment

Source Protection Programs Branch

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Ministère de l'Environnement

Direction des programmes de protection des sources

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Ontario

ENV1174IT-2011-102

September 16, 2011

Mr. Robert Bedggood
SPC Chair
Thames, Sydenham and Region Source Protection Committee
St. Clair Region Conservation Authority
205 Mill Pond Crescent, Strathroy, Ontario, N7G 3P9

Dear Mr. Bedggood:

We are in receipt of your letter dated August 31, 2011 requesting a Director's opinion regarding the addition of the following activities as local drinking water threats under Technical Rule 119, in vulnerable areas of St. Clair Region Source Protection Area (SCRSPA):

- Transportation of fuel and fertilizer along provincial highways, county and local roads, railways and waterways along corridors pass through the various vulnerable areas in the SCRSPA; and

- Transportation of liquid petroleum products through pipelines that cross the St. Clair Region Source Protection Area (SCRSPA) and spill in St.Clair River.

In accordance with my authority under Rules 119, 120, or 121, I am of the opinion that the hazard rating is greater than 4 for both activities. The transportation activities as set out in Tables 1 and 2 are approved as local threats in the St Clair Region Source Protection Area. Table 1 is presented in a format similar to the tables of drinking water threats and provides the vulnerability score necessary for an activity to be a significant, moderate or low drinking water threat. Table 2 provides a hazard rating related to the conveyance of fuel in a pipeline.

We understand you may be evaluating these activities using the event based modelling approach allowed under Technical Rules 68 and 130. Under that approach, the vulnerability scores in Table 1 and the hazard rating in Table 2 are not used to evaluate the threat: instead the modelling determined if the activity is a significant threat. The tables have only been provided to meet the Technical Rules requirements associated with adding a local threat.

Your rationale for the inclusion of these local threats along with a copy of this letter must be included in your amended assessment report.

Sincerely,

Heather Malcolmson, (A) Director
Source Protection Programs Branch
Ministry of the Environment

c: Keith Willson, Manager, Source Protection Approvals
Paul Heeney, Manager, Source Protection Implementation
Katie Fairman, Manager (A), Source Protection Planning
John Westlake, Supervisor (A), Source Protection Implementation
Melanie Ward, Group Leader, Source Protection Approvals
Clara Tucker, Watershed Management Specialist, Source Protection Planning

ACTIVITY, CIRCUMSTANCES, AND AREAS WHERE THE ACTIVITY IS SIGNIFICANT, MODERATE OR LOW THREAT
St. Clair Region Source Protection Area

TABLE 1: TRANSPORTATION OF FUELS AND FERTILISER

TRANSPORTATION OF FUELS						
Activity	Vulnerability Score to produce a Significant DWT		Vulnerability Score to produce a Moderate DWT		Vulnerability Score to produce a Low DWT	
	IPZ-1,2,3 WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3 WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3 WHPA-E	WHPA-A, B, C, C1, D
1. The transportation of Petroleum hydrocarbons (PH) F1 (C6-10). 2. PH F1 (C6-10) is transported in a quantity of 25-250 L or 25-250 kg. 3. A spill may result in the release of PH F1 (C6-10) to surface water.	---	---	---	---	10 – 7.2	10 - 8
1. The transportation of Petroleum hydrocarbons (PH) F2 (>C10-16). 2. PH F2(>C10-16) are transported in a quantity of 25-250 L or 25-250 kg. 3. A spill may result in the release of PH F2(>C10-16) to surface water.	---	---	---	---	10 – 7.2	10 - 8
1. The transportation of Petroleum hydrocarbons (PH) F3 (>C16-34). 2. PH F3 (>C16-34) is transported in a quantity of 25-250 L or 25-250 kg. 3. A spill may result in the release of PH F3 (>C16-34) to surface water.	---	---	10	---	9 – 6.4	10 - 8
1. The transportation of Petroleum hydrocarbons (PH) F4 (>C34-50). 2. PH F4(>C34-50) is transported in a quantity of 25-250 L or 25-250 kg. 3. A spill may result in the release of PH F4(>C34-50) to surface water.	---	---	---	---	10 - 7	10 - 8
1. The transportation of BTEX compounds. 2. BTEX compounds is transported in a quantity of 25-250 L or 25-250 kg. 3. A spill may result in the release of BTEX compounds to surface water.	---	---	10	10	9 – 6.4	8
1. The transportation of Petroleum hydrocarbons (PH) F1 (C6-10). 2. PH F1 (C6-10) is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of PH F1 (C6-10) to surface water.	---	---	10	10	9 – 6.4	8
1. The transportation of Petroleum hydrocarbons (PH) F2 (>C10-16). 2. PH F2 (>C10-16) are transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of PH F2 (>C10-16) to surface water.	---	---	10	10	9 – 6.3	8

TRANSPORTATION OF FUELS						
Activity	Vulnerability Score to produce a Significant DWT		Vulnerability Score to produce a Moderate DWT		Vulnerability Score to produce a Low DWT	
	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D
1. The transportation of Petroleum hydrocarbons (PH) F3 (>C16-34). 2. PH F3 (>C16-34) is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of PH F3 (>C16-34) to surface water.	---	---	10 - 9	10	8.1 – 6	8
1. The transportation of Petroleum hydrocarbons (PH) F4 (>C34-50). 2. PH F4 (>C34-50) is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of PH F4 (>C34-50) to surface water.	---	---	10	10	9 – 6.3	8
1. The transportation of BTEX compounds. 2. BTEX compounds is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of BTEX compounds to surface water.	---	---	10 - 9	10	8.1 - 6	8-6
1. The transportation of Petroleum hydrocarbons (PH) F1 (C6-10). 2. PH F1 (C6-10) is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of PH F1 (C6-10) to surface water.	---	---	10	10	9 – 6.4	8-6
1. The transportation of Petroleum hydrocarbons (PH) F2 (>C10-16). 2. PH F2 (>C10-16) are transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of PH F2 (>C10-16) to surface water.	---	---	10	10	9 – 6.3	8-6
1. The transportation of Petroleum hydrocarbons (PH) F3 (>C16-34). 2. PH F3 (>C16-34) is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of PH F3 (>C16-34) to surface water.	---	---	10 - 9	10	8.1 – 6	8-6
1. The transportation of Petroleum hydrocarbons (PH) F4 (>C34-50). 2. PH F4 (>C34-50) is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of PH F4 (>C34-50) to surface water.	---	---	10	10	9 – 6.3	8-6
1. The transportation of BTEX compounds. 2. BTEX compounds is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of BTEX compounds to surface water.	---	---	10 - 9	10-8	8.1 – 6	6

TRANSPORTATION OF FERTILIZER

Activity	Vulnerability Score to produce a Significant DWT		Vulnerability Score to produce a Moderate DWT		Vulnerability Score to produce a Low DWT	
	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D	IPZ-1,2,3, WHPA-E	WHPA-A, B, C, C1, D
1. The transportation of Nitrogen (Nitrate). 2. Nitrogen (Nitrate) is transported in a quantity of 25-250 L or 25-250 kg 3. A spill may result in the release of Nitrogen (Nitrate) to surface water.	---	-	10	10	9 - 7	8
1. The transportation of Phosphorus. 2. Phosphorus is transported in a quantity of 25-250 L or 25-250 kg 3. A spill may result in the release of Phosphorus to surface water.	---	-	---	-	10 - 7	10-8
1. The transportation of Nitrogen (Nitrate). 2. Nitrogen (Nitrate) is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of Nitrogen (Nitrate) to surface water.	---	-	10 - 9	10	8.1 - 6	8-6
1. The transportation of Phosphorus. 2. Phosphorus is transported in a quantity of >250-2500 L or >250-2500 kg. 3. A spill may result in the release of Phosphorus to surface water.	---	-	10 - 9	10-8	8.1 – 6.3	8
1. The transportation of Nitrogen (Nitrate). 2. Nitrogen (Nitrate) is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of Nitrogen (Nitrate) to surface water.	---	-	10 - 8	10-8	7.2 – 5.4	6
1. The transportation of Phosphorus. 2. Phosphorus is transported in a quantity of >2500 L or > 2500 kg. 3. A spill may result in the release of Phosphorus to surface water.	---	-	10 - 8	10-8	7.2 – 5.4	6

TABLE 2: CONVEYANCE OF OIL BY WAY OF A PIPELINE

Activity	Circumstance	Hazard Rating IPZ
The conveyance of oil by way of a pipeline	1. The conveyance of oil by way of a pipeline that would be designated as transmitting or distributing "liquid hydrocarbons", including "crude oil", "condensate", or "liquid petroleum products", and not including "natural gas liquids" or "liquefied petroleum gas", within the meaning of the Ontario Regulation 210/01 under the Technical Standards and Safety Act, or is subject to the National Energy Board Act. 2. The rupture of a pipeline in an area where the pipeline crosses a body of open water and may result in the presence of BTEX in surface water.	9.4

Appendix 11- Glossary of Terms and Acronyms

Glossary of Terms and Acronyms has been replaced by one included with the Source Protection Plan

Appendix 12 – References

References

Arnold, J. G., P. M. Allen, R. Muttiah, and G. Bernhardt. Automated Baseflow Separation and Recession Analysis Techniques. Groundwater 33(6):1010-1018. 1995.

Baird Consulting. In-water IPZ-2 Delineation for Essex Region and Chatham-Kent Intakes-Phase II Study. August 2009.

Baird Consulting. In-Lake Intake Protection Zone Delineation for LAWSS and Petrolia Intakes. 2009.

Baird Consulting. Technical Memorandum. Wallaceburg Intake – Additional Model Runs in Support of IPZ-2 Delineation. February 2010.

Baird Consulting, Spill Modelling in Support of IPZ-3 Delineation and Designation of Significant Threats – Petrolia, LAWSS and Wallaceburg Intakes, May 9, 2011

BM Ross & Associates, Ltd. Model Calibration Manual - Stream Gauge Data.1997.

Chatham-Kent Official Plan, adopted January 2005.

City of Sarnia Official Plan, January 12, 2001, Office Consolidation as amended July 2006.

Chapman, L. J. and D. F. Putnam. The Physiography of Southern Ontario, 3rd edition.1984.

DesRivieres, D. The Great Enniskillen Swamp: Speculation, drainage and settlement. Western Ontario Historical Notes. 1972.

Environment Canada. How much habitat is enough? A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern. Second Edition. 2004.

Kreutzwiser, R. D. and R. C. de Loë. REVISED. Agricultural and Rural Water Use in Ontario. A Report to the National Soil and Water Conservation Program, August 31, 1999. Guelph, Ontario: Rural Water Management Group, Department of Geography, University of Guelph. 1999.

Lambton County Official Plan, www.lambtononline.com (August 2006)

Michigan Department of Environmental Quality Water Bureau. State of Michigan Source Water Assessment Program Report, December 2004.

Middlesex County Official Plan, adopted by County Council. Amended by Official Plan Amendment No. 2. September 9, 1997.

Ministry of Environment. Design Guidelines for Drinking-Water Systems. 2008.

Ministry of Environment. Mapping Symbology for the Clean Water Act. April 2009.

Ministry of Environment. Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act. March 2004.

Ministry of Environment. Clean Water Act. 2006.

Ministry of Environment. Great Lakes Water Quality Agreement (GLWQA). 1978.

Ministry of Environment. Safe Drinking Water Act. 2002.

Ministry of Environment. Tables of Drinking Water Threats Glossary. November 2009.

Ministry of Environment. Tables of Drinking Water Threats. November 2009.

Ministry of Environment. Technical Rules: Assessment Report. November 2009.

Ministry of Environment. Technical Support Document for the Ontario Drinking Water Standards, Objectives and Guidelines. June 2006.

Ministry of Natural Resources. Chatham District Fisheries Management Plan 1987-2000. 1990.

Metcalfe-Smith, J., J. Di Maio, S. K. Staton and S. R. De Solla. Status of the Freshwater Mussel Communities of the Sydenham River, Ontario, Canada. American Midland Naturalist 150:37-50. 2003.

Metcalfe-Smith, J. L., D. J. McGoldrick and D. T. Zanatta. Implementation of a Monitoring Program to Track the Recovery of Endangered Freshwater Mussels in the Sydenham River, Ontario in Proceedings of the Species at Risk 2004 Pathways to Recovery Conference. March 2004, Victoria, BC.

Mackenzie, H. and M. Andreae. Benthic Macroinvertebrate Field Study 2004. St. Clair Region Conservation Authority report. 2005.

Manocha, J. and T. Carter. Underground Hydrocarbon Storage in Ontario. Petroleum Resources Centre, OMNR. 1996.

Nelson, M. Sydenham River – Landuse and Landcover Assessment. Unpublished report from School of Rural Planning and Development, University of Guelph. 2001.

Ontario Ministry of Environment and Energy, St. Clair River RAP Project, Michigan Department of Natural Resources, Surface Water Quality Division, The St. Clair River Area of Concern Water Use Goals Remedial Measures and Implementation Strategy Remedial Action Plan Stage 2 – Recommended Plan. 1995.

Ontario Ministry of Natural Resources. Unpublished Stream Survey Data by Scott and Payne. 1975.

Ontario Ministry of Natural Resources and Canadian Wildlife Services, Environment Canada. An Evaluation System for Wetlands of Ontario. Unpublished report.1984.

Ontario Ministry of Finance. Ontario Population Projections, 2006-2031.

Pagilla, K. Water Environment Research Foundation Report 02-CTS-1a. May 31 2010.

Poos, M. Science in support of policy: assessment and recovery of fish species at risk in the Sydenham River. M.Sc. thesis, University of Guelph. 2004.

R.V. Anderson Associates Limited. Lambton Area Water Supply System (LAWSS) Final Report – Drinking Water Issues and Threats. October 2009.

R.V. Anderson Associates Limited. Town of Petrolia Water Treatment Plant Final Report – Drinking Water Issues and Threats. October 2009.

Seidler, A. and M. Andreae. Upper East Sydenham Fisheries Management Plan. Unpublished report. June 2004.

St. Clair Region Conservation Authority. Shoreline Management Plan. November 1996.

Stantec Consulting Ltd. Technical Memorandum: Threats Analysis for the Wallaceburg Water Treatment Plant. Essex Chatham-Kent Source Protection Planning Technical Study. Final Report. March 2010.

Stantec Consulting Ltd. Issues Identification Technical Memorandum. Issues Identification for the Thames, Sydenham & Region Water Treatment Plants. Essex Chatham-Kent Source Protection Planning Technical Study. Final Report. November 2009.

Stantec Consulting Ltd. Potential Threats Analysis for the Thames Sydenham Region Water Treatment Plants. Essex Chatham-Kent Source Protection Planning Technical Study Potential Threats Analysis Technical Memorandum. Final Report. November 2009.

Stantec Consulting Ltd. Technical Memorandum: Delineation, Vulnerability and Uncertainty Level Analysis for the Thames, Sydenham & Region Water Treatment Plants. Essex Chatham-Kent Source Protection Planning Technical Study. Final Report. November 2009.

Staton, S. and A. Doolittle. Sydenham River Riparian Inventory. Annual Report to the IRF, Department of Fisheries and Oceans, Great Lakes Laboratory for Fisheries and Aquatic Sciences. July 2003.

Thames-Sydenham and Region Conceptual Water Budget. June 2007. Approach to Consideration of Transport Pathways in Vulnerability Assessment of Groundwater based Vulnerable Areas. May 2009.

Thames-Sydenham and Region. Threats and Risk Assessment Local Guidance Version 1.2. September 2009.

Thames-Sydenham and Region. Jason Wintermute. Technical Memo regarding Creation of Impervious, Managed Land and Livestock Density Maps. February 2, 2010.

Thames-Sydenham and Region. Jason Wintermute. Technical Memo regarding the Assessment of Chemical Threats from the Use of Land as Livestock Grazing, Pasturing Land, and Outdoor Confinement Area or a Farm-Animal Yard. September 29, 2010.
Thames-Sydenham and Region. Jason Wintermute. Technical Memo regarding the Assessment of Chemical Threats from the Application of ASM, NASM and Commercial Fertilizers. November 9, 2010.

Upper Thames River Conservation Authority, Lower Thames Valley Conservation Authority and St. Clair Region Conservation Authority, Thames-Sydenham and Region Watershed Characterization Report - Thames Watershed and Region. December 2008.

Upper Thames River Conservation Authority. Highly Vulnerable Aquifer Identification Report. November 2009.

Waterloo Hydrologic Inc. Southwest Region Edge-Matching Study Results. 2005.

Waterloo Hydrologic Inc. Six Conservation Authorities FEFLOW Groundwater Model: Conceptual Model Report. 2004.

Waterloo Hydrologic Inc, Ambient Groundwater Chemistry Study of the Thames River and St. Clair Region Watersheds. 2008.

Websites Referenced

http://www.ene.gov.on.ca/en/news/2007/081602mb.php

http://www.mnr.gov.on.ca/en/Business/Water/2ColumnSubPage/STEL02_164560.html

http://www.cglg.org/pub/charter/index.html

http://www.tbs-sct.gc.ca/dfrp-rbif/home-accueil.asp?Language=EN

http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_06c22_e.htm

http://www.ene.gov.on.ca/en/water/cleanwater/cwadocs/Tech_Rules_For_Assessment_Report_16Nov09.pdf

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_030169_e.htm

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_030267_e.htm#BK2

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_070287_e.htm

http://ainc-inac.gc.ca

http://www.tbs-sct.gc.ca/dfrp-rbif/home-accueil.asp?Language=EN

http://www.ijc.org/php/publications/html/aoc_rep/english/report/chapter1/index.html

http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/benzene/index-eng.php

http://www.ene.gov.on.ca/en/about/penalties/SpillPrevention.pdf

http://www.ebr.gov.on.ca/ERS-WEB-External/content/about.jsp?f0=aboutTheRegistry.info&menuIndex=0_1

http://www.ene.gov.on.ca/envision/techdocs/4167e.htm

http://www.ene.gov.on.ca/envision/techdocs/4167e.htm

http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=16696&Attachment_ID=34970

http://www.omafra.gov.on.ca/english/nm/nasm.html

http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm#BK51

http://www.ene.gov.on.ca/envision/land/decomm/condition.htm

http://www.sararegistry.gc.ca/default_e.cfm

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_070288_e.htm#Top

http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_02s32_e.htm

https://www.placestogrow.ca/index.php?option=com_content&task=view&id=4&Itemid=9

http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm

http://www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=D11109CB-1

http://www.ec.gc.ca/raps-pas/Default.asp?lang=En&n=299C927C-1

http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_070284_e.htm

http://www.ene.gov.on.ca/envision/env_reg/er/documents/2009/010-7573%202.pdf

Appendix 13 – Uncertainty Analysis of Vulnerability Assessment

Appendix 13 - Uncertainty Analysis of Vulnerability Assessment

The *Technical Rules* requires that an analysis of the *uncertainty*, characterized by 'high' or 'low' be made in respect of the delineation and vulnerability assessment of surface water *Intake Protection Zones*. The factors to be considered in the analysis include:

- the distribution, variability, quality and relevance of data used;
- the ability of the methods and models used to accurately reflect the flow processes in the hydrological system;
- the quality assurance and quality control procedures applied;
- the extent and level of calibration and validation achieved for models used or calculations or general assessments completed;
- the accuracy to which the area vulnerability factor and the source vulnerability factor effectively assess the relative vulnerability of the hydrological features.

Table A13-1 below summarizes the *uncertainty* assessed for the LAWSS, Town of Petrolia and Wallaceburg *IPZ-1* and *IPZ-2* as identified by the consultants involved in the studies.

Table A13-1 Uncertainty Analysis for the LAWSS, Town of Petrolia and Wallaceburg Intakes			
System/Component		**IPZ-1**	**IPZ-2**
LAWSS			
Uncertainty in Delineation of Intake Protection Zone	In-water	Low	High
	Upland	Low	Low
	Overall	Low	High
Uncertainty in Assigning Vulnerability Scores		Low	Low
Overall Uncertainty Level*		**Low**	**High**
Town of Petrolia			
Uncertainty in Delineation of Intake Protection Zone	In-water	Low	High
	Upland	Low	High
	Overall	Low	High
Uncertainty in Assigning Vulnerability Scores		Low	Low
Overall Uncertainty Level*		**Low**	**High**
Wallaceburg			
Uncertainty in Delineation of Intake Protection Zone	In-water	Low	High
	Upland	Low	Low**
	Overall	Low	High
Uncertainty in Assigning Vulnerability Scores		Low	Low
Overall Uncertainty Level*		**Low**	**Low**
* A combined rating defaults to high level with presence of high uncertainty in any component ** Upland uncertainty levels do not include uncertainty associated with the delineation of St. Anne Island			

IPZ-1 Delineation for LAWSS, Town of Petrolia and Wallaceburg intakes

The in-water portion of the *LAWSS,* Town of Petrolia and Wallaceburg intakes *IPZ-1s* were based on defined distances from the intakes, as per the Technical Rules and as described in Section 4 of this report. The upland portions of the LAWSS and Town of Petrolia *IPZ-1s* were also delineated according to the Technical rules, using a 120 m buffer on shore (as there is no regulation limit for those areas), and including adjacent parcels (known to drain towards the intake) as transport pathways.

For the Wallaceburg *IPZ-1*, the modifications made (extending the downstream extent to incorporate reverse flow conditions) were supported by hydrodynamic modelling and client correspondence. The setbacks on land were also made as per the Technical Rules, with a 120

m setback where overland flow may reach the source water. The dyke system truncated areas of the setback where it was evident that the land drained away from the Chenal Ecarte. There is a high level of confidence in the delineation of the Wallaceburg *IPZ-1*.

The in-water and upland portion of the three St. Clair intakes *IPZ-1*s were delineated with a high level of confidence and assigned a low uncertainty.

IPZ-1 Scoring for LAWSS, Town of Petrolia and Wallaceburg intakes

The area vulnerability scores for all three *IPZ-1*s were assigned a value of 10, as specified in the Technical Rules. The source vulnerability scores were assigned certain values as described in Section 4.2.6, based on known intake water quality concerns, defined depths and distances of each of the three intakes. Therefore, there is low uncertainty in the *IPZ-1* vulnerability scoring for all three intakes in the St. Clair Region SPA.

IPZ-2 Scoring for LAWSS, Town of Petrolia and Wallaceburg intakes

For the *IPZ-2* scoring of all three intakes, a low level of uncertainty is assigned as the score adequately considers the intake water quality, known dimension of length and depth of the intake, the percentage of area that is land within the delineated zones, land cover, soil type, permeability, slope, hydrological, hydrogeological conditions and transport pathways, as described in Section 4.2.6 of this Assessment Report.

IPZ-2 Delineation

a) Common model limitations for LAWSS, Town of Petrolia and Wallaceburg intakes

A 3-dimensional hydrodynamic model called MISED was used to evaluate the current patterns, to delineate the in-water *IPZ-2*s for the *LAWSS*, Town of Petrolia and Wallaceburg intakes. In addition, the delineation for the Petrolia intake was refined by using the HYDROSED model with MISED. Based on the data available, the model, model application, and model calibration, Baird and Associates, who conducted the hydrodynamic modelling (to delineate the in-water *IPZ-2*), recommended that a high level of *uncertainty* be assigned to the in-water delineations of the *IPZ-2* of the *LAWSS*, Town of Petrolia and Wallaceburg intakes. According to Baird, the *uncertainty* is not a reflection of the quality of work, but recognition of the limitations presented.

Data gaps in the delineations for all three intakes include recent bathymetry data and local (at the intake) wind data. MISED model limitations include it: being a partial-lake model (hence cannot model lake-wide circulation movements, cannot accurately model surge conditions on Lake Huron) and not considering dispersion of contaminants through natural diffusion movements. Besides these limitations common to all three intakes, other factors that contribute to the uncertainty level for each *IPZ-2* delineation is described below.

b) IPZ-2 Delineation for LAWSS intake

For the LAWSS *IPZ-2* in-water delineation, the MISED model results were compared with data from one Acoustic Doppler Current Profiler (ADCP) location in the St. Clair River. *IPZ* delineation was derived from lake hydrodynamics. Wave induced currents (which can increase vertical mixing), density influences from creek and river discharges, cross shore processes in the nearshore and undertow effects were not considered. These result in an increase to the level of uncertainty. Reverse particle tracking was used for the in-water *IPZ-2* delineation and the particles were released at the surface and near the lakebed. Both sets of results were considered in delineating the *IPZ-2*. Although the intake is located near the lakebed, releasing particles at the surface provides a conservative approach to the *IPZ-2* delineation since the current speeds at the surface are generally higher than at the bottom. The wind data from Sarnia Airport that was used to define the wind fields in the model for the upper St. Clair River included only day time measurements. The data were therefore interpolated to develop a 24-hour time series. This results in some increase to the level of uncertainty. The in-water *IPZ-2* could be refined in future studies. Upland portions of the *IPZ-2* were delineated according to the Technical Rules, using a 120 m buffer on shore (as there is no regulation limit for that area), *storm sewersheds* as described in Section 4, and including adjacent parcels (known to drain towards the intake) as transport pathways. The upland portion of the *IPZ-2* was based on these defined areas and therefore assigned a low uncertainty.

c) IPZ-2 Delineation for Petrolia intake

For the Petrolia *IPZ-2* in-water delineation, the MISED model with HYDROSED model was used. The MISED model was calibrated with measured water level and current data. It was validated with ADCP data from sites in St. Clair River, Detroit River and Lake Erie, but there

was no ADCP data for Lake Huron. The ADCP data are of limited duration and spatial coverage. The HYDROSED model allowed consideration of wave-induced current.
The hydrodynamic model component of HYDROSED includes the longshore currents in the surf zone, but does not include shoreward mass transport by breakers, which results in undertow, or breaking induced turbulence. These processes could potentially transport a contaminant from shore to the intake. In delineating the IPZ-2s, it has been assumed that any particle that reaches the offshore limit of the surf zone, could be transported through the surf zone. The calculation of nearshore currents using HYDROSED has been verified through laboratory experiments as well as field measurements in several other projects by Baird. Nearshore current velocity is calculated as a function of incoming wave energy (radiation stress), bottom friction and lateral mixing. In the absence of measured data for the study area, default values for bottom friction and lateral mixing parameters were used which, based on the modeller's experience, provided reasonable results for the site conditions. It is, however, difficult to provide specific quantitative evaluation of the results without direct comparisons with field data. The in-water delineation of the Town of Petrolia *IPZ-2* was assigned a high uncertainty.

The tributaries and drainage ditches analyses (flow velocity estimates) in the Town of Petrolia *IPZ-2* conducted by R. V. Anderson Consulting Limited is assigned a high level of *uncertainty*. Discharge flows for Cow Creek (ungauged) was estimated assuming similar watershed characteristics to Perch Creek (gauged). Flows were estimated based on limited cross-section data and the flow velocities were estimated using a 2-year storm return period. However, the velocities calculated for the tributaries and the drainage ditches were based on field measured cross sections, City of Sarnia's 2-year storm return period, and measured sub-watersheds using the available mapping. The upland portions of the *IPZ-2* also included a 120 m buffer on shore (as there is no regulation limit for that area), 120 m setback from in-land watercourses, *storm sewersheds* as described in Section 4, and adjacent parcels (known to drain towards the intake) as transport pathways. The upland delineation of the Town of Petrolia *IPZ-2* was assigned a high uncertainty.

d) IPZ-2 Delineation for Wallaceburg intake

Ice jams frequently impact the flow regime around the Wallaceburg intake. Consideration has been given in the *uncertainty* analysis to the inability to predict the occurrence or locations of ice jams. The St. Clair River, Sydenham River and Chenal Ecarte are all subject to ice jamming. Although they have not been researched specifically through these studies, ice jams will not be included as a data gap due to their unpredictability.

The MISED model domain extends a limited distance up the Sydenham River; therefore particle tracking in the Sydenham River was extrapolated to determine the extent of the Wallaceburg intake *IPZ-2* in the Sydenham River. The MISED model was calibrated and validated with measured water level and current data. Two months of ADCP data collected in the Chenal Ecarte during the spring of 2008 were also used for further calibration, but the data sets were of limited duration and spatial coverage. Although reverse flow conditions were captured in the modelling, it was not possible to calibrate for reverse flow conditions. The in-water portion of the *IPZ-2* is assigned a high level of uncertainty.

The upland portion of the *IPZ-2* was delineated based on the alongshore extents of the in-water *IPZ-2* using residual time of travel calculations, and municipal drain, storm sewer and transport pathway information. This incorporated the presence of tile drains, surface furrows, and other drainage in the study area. Information pertaining to area municipal drains and storm sewersheds required to delineate the *IPZ-2* were provided by reliable sources and therefore have a high level of confidence.

IPZ-3 Delineation

The uncertainty ratings for the IPZ - 3 delineation for all 3 intakes are summarized in Table A13-2 below as listed in Rule 14 (MOE, 2009a). The following table and text is an excerpt from Baird (May, 2011).

Table A13-2 Uncertainty Analysis for IPZ-3 delineation for the LAWSS, Petrolia and Wallaceburg Intakes

Criteria	Rating (High/Low)
Data and data gaps	High

Modelling	High
QA/QC	Low
Model calibration/validation	High
Overall Uncertainty Rating	High

According to Baird, the *IPZ - 3* delineation received an overall high uncertainty rating. The high rating reflects data limitations, as well as limitations of the modelling undertaken not a reflection of the quality of work. The modelling approach is consistent with the Technical Rules and the level of effort permitted based on schedule and budget. The intent of this work is to provide a better understanding of the vulnerability of the intake and this has been accomplished.

Modelling has been used to evaluate whether the release of a chemical parameter or pathogen would be transported to the intake and result in deterioration of the water as a drinking water source, as required for *IPZ - 3* delineation and for designation of significant threats using Rule 130 (MOE, 2009a). The cross - section of the water courses were assumed to be constant throughout and discharge was averaged throughout the channel length. Evaporation, physical changes including decay and chemical changes to the contaminant as it moves downstream were not considered. Besides these limitations common to all three intakes, other factors that contribute to the uncertainty level for each *IPZ-3* delineation is described below.
A limited number of events (defined as up to the 100 year return period) were simulated. The selected events may not cover the full range of spills and plume dispersion that may occur in Perch and Cow creeks, St. Clair River, Sydenham River and in Lake Huron. If different events were selected, the concentrations at the intake would be different, however the modelling demonstrates that under these conditions it is possible for the spill to result in a deterioration of the source water for the purposes of drinking.

a) IPZ-3 Delineation for LAWSS and Petrolia intakes

For the LAWSS and Petrolia *IPZ-3* delineation, the cross sections for Perch Creek and the Cow Creek were estimated from raster imagery. Cow Creek is not gauged and the flow conditions were assumed to be similar to nearby Perch Creek, which is gauged and has similar watershed and tributary characteristics. These result in an increase to the level of uncertainty.

For the purposes of delineating the *IPZ - 3*, a longitudinal dispersion analysis (LDA) is carried out on Perch Creek and Cow Creek. This provides a first-order estimate of the likely dispersion of 2% benzene from a spill on Highway 402 into Perch Creek and Cow Creek. The predictors used in the longitudinal dispersion analysis are empirical equations. They have not been validated for Perch Creek and Cow Creek used in this study, nor have they been validated for the contaminants considered.

b) IPZ-3 Delineation for Wallaceburg intake

For the Wallaceburg *IPZ-3* delineation, limited current data were available to calibrate the MISED model in the Chenal Ecarte (see Baird, 2010). Baird recommended that additional data for model validation in the Chenal Ecarte would be beneficial to future analyses. The hydrodynamics in the MISED model were calibrated with ADCP data as described in Baird (2009, 2010). Validation for one scenario was completed using a spill in the St. Clair River and a monitoring station in the St. Clair River. Additional calibration and validation for the advection/dispersion feature is recommended. These result in an increase to the level of uncertainty.

The hydrodynamics in the Wallaceburg area are extremely complex. There are a large number of tributaries flowing into the Chenal Ecarte, including the Sydenham River. The bathymetry data used to develop the model grid are coarse in this area. These result in an increase to the level of uncertainty. MOE has predicted shorter travel times in the Chenal Ecarte than were predicted by the MISED model, however little information was available to confirm that the MOE values were based on a validated model or data. It is strongly recommended that additional data be collected to improve the level of uncertainty in this analysis including tracer data, ADCP data and improved bathymetry data.

For the purposes of delineating the IPZ - 3, a longitudinal dispersion analysis (LDA) is carried out on East Sydenham River. This provides a first - order estimate of the likely dispersion of a fertilizer spill from Tupperville bridge into the East Sydenham River. The predictors used in the longitudinal dispersion analysis are empirical equations. They have not been validated for

Sydenham River used in this study, nor have they been validated for the contaminants considered.

Summary of uncertainty in the delineation of *IPZ-3*

Although the uncertainty level is high the modelling indicates that these spills can result in a deterioration of the drinking water source. Additional work is required to assess the likelihood of lessor spill quantities and other locations also resulting in a deterioration of the drinking water source. Further calibration and validation of the model is required to be able to rely upon the model results as they pertain to the timing of the arrival and passing of the spill at the intake.

Delineation of the *Highly Vulnerable Aquifer*

The *Highly Vulnerable Aquifer* mapping product is a derivative product based primarily on *ISI* mapping. The *ISI* mapping is based on assigning an index based on aquifer, confining materials and water level information identified by drillers as recorded in the Water Well Information System (WWIS). The *uncertainty* in the *ISI* product is considered high due to a number of factors including:

- *Uncertainty* associated with the location information and therefore the accuracy of the elevation used in interpreting the description of depth in the *WWIS*
- *Uncertainty* associated with the material description in the *WWIS*
- *Uncertainty* associated with water table mapping
- The interpolation process associated with this mapping (and limited data in some areas)

In conclusion, the *uncertainty* is high in the use of the *WWIS*. The high *uncertainty* associated with individual data is offset to some degree by the high amount of data included in the *WWIS*. The location and presence of sand and gravel deposits in the Surficial Geology (OGS) mapping are based on a different data set from the *WWIS*. The level of *uncertainty* is reduced substantially due to the agreement of the two mapping products and the incorporation of professional judgement. The impact of the *uncertainty* in the low and medium vulnerability areas is minimal from a Source Protection Planning perspective. There is *uncertainty* related to the *Highly Vulnerable Aquifers* (*HVA*) although the product is acceptable for the purposes of

delineating the *Highly Vulnerable Aquifers*. This *uncertainty* is associated with the data sets available for use in this analysis and would exist irrespective of whether the other methods identified in the rules were used to delineate the *Highly Vulnerable Aquifers*. Additional work to map the extent and thickness of aquifers in the region would greatly reduce the *uncertainty*.

Delineation of the *Significant Groundwater Recharge Areas*

Groundwater recharge, and thus *Significant Groundwater Recharge Areas*, are difficult parameters to estimate at any level of water budget analysis. This study uses a combination of an empirical method suggested by the MOEE (1995) which relates recharge to soil type, land use and excess precipitation (i.e. precipitation less evaporation) and baseflow separation.

The MOEE method uses the OMAFRA county based soils maps, which are produced at different scales and levels of detail depending upon which county the survey was conducted in. They do not contain any soil information in urban areas. We know that there is some recharge that occurs in urban areas, but the estimate we have at this stage of analysis does not reflect this.

Baseflow separation as a surrogate for groundwater recharge assumes that groundwater discharge to streams is equal to groundwater recharge. Annual baseflow estimates can vary by as much as 100 mm or more, dependent upon the technique used to separate the baseflow from the runoff hydrograph. This analysis uses the second pass of the BFLOW filter algorithm, which provides a reasonable estimate of the baseflow fraction of the hydrograph. Baseflow is furthermore greatly affected by flow added from pollution control plant discharges and flow from tile drainage. These quantities all increase the apparent baseflow and an attempt was made to remove the quantities before running the baseflow separation algorithm. Water that is removed from the surface water bodies and not returned also affects the hydrograph and tends to decrease the amount of apparent baseflow measured in a stream. No attempt was made to remove the water takings before the baseflow separation was conducted as this quantity is small and generally only taken in the summer months.

In general, the process of determining groundwater recharge and significant groundwater recharge carries a high degree of *uncertainty*.

The peer reviewers have had considerable discussion with the consultants who have undertaken the studies for both surface water and ground water vulnerability assessment. Through that discussion it has become apparent that there is considerable subjectivity to the assignment of the *uncertainty* factors. It has been suggested that upon completion of the peer review of all of the reports that an overall assessment and comparison of the *uncertainty* be undertaken so that relative comparison between studies can be made and priorities for future assessment can be identified. It is important to understand that a high *uncertainty* associated with any aspect of the work does not suggest that the conclusions are inappropriate for the purposes that the results are being used. This is merely an acknowledgement of the potential for a better understanding with further analysis or data. If it were identified that the *uncertainty* was too great, additional work would have been undertaken to reduce the level of *uncertainty* if data were available to support the additional work. Even with the completion of additional work, it is unlikely that all *uncertainty* can be eliminated. The Source Protection Committee is satisfied that the *uncertainty* of the vulnerability assessment is low enough for the purposes intended.

Appendix 14 – Ministry of the Environment Communications

Letter confirming Wallaceburg Intake Type
Letter confirming Wallaceburg IPZ-2 Setback on Land
Letter notifying of approval of the Amended Proposed Assessment Report
Letter notifying of approval of Updated Assessment Report

mailed Apr 30, 2010

Ministry of the Environment
Source Protection Programs Branch
8th Floor
2 St. Clair Ave. West
Toronto ON M4V 1L5

Ministère de l'Environnement
Direction des programmes de protection des sources
8e étage
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Toronto (Ontario) M4V 1L5

Ontario

Log: ENV1174IT-2010-108

April 30, 2010

Bob Bedggood
Chair, Thames-Sydenham and Region Source Protection Region
20278 Fairview Road
R.R. #2
Thorndale ON N0M 2P0

Dear Mr. Bedggood:

I am writing to you regarding the classification for the Wallaceburg intake under the Rule 55.1 of the Director's Technical Rules (the Rules) for the completion of the assessment report under the Clean Water Act (CWA) for the St. Clair Region source protection area.

Variation from Rule 55.1 – Classification of Intakes

The Director has the authority under technical rule 55.1 to notify a SPC of the classification of an intake. Based on technical rule 55, the Wallaceburg intake, that is located in Chenal Ecarte channel, is classified as a type C intake. Though this letter, I am providing notice that the intake is to be classified as a Type B intake, instead of a Type C intake. As the Chanel Ecarte channel is considered to be a part (distributory) of the St. Clair River, the Wallaceburg intake can be classified as a Type B intake.

In accordance with my authority under Rule 55.1, I hereby classify the intake as a Type B intake.

This letter notifying you of the classification of the intake must be included in your assessment report.

...2

Mr. Bob Bedggood
Page 2.

We thank you for your efforts in completing the technical studies in support of the assessment report under the CWA. If you have any questions or require additional information, please contact our office.

Sincerely,

Ian Smith, Director
Source Protection Programs Branch
Ministry of the Environment

cc: Chris Tasker, Project Manger, Upper Thames River Source Protection Authority
Teresa McLellan, Liaison Officer
Heather Malcolmson, Manager, Source Protection Planning
Keith Willson, Manager, Source Protection Approvals

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Log: ENV1174IT-2010-125

May 6, 2010

Ralph Coe
General Manager (Thames, Sydenham and Region)
St. Clair Region Conservation Authority
205 Mill Pond Crescent
Strathroy ON N7G 3P9

Dear Mr. Coe:

I am responding to your April 28, 2010 letter regarding your request to use an alternate method under Rule 15.1 of the Director's Technical Rules (Rules) for the completion of the assessment report under the Clean Water Act (CWA) for the St. Clair Region source protection area.

Variation from Rules 62, 65(1) and 68(2) - Setback on Land

The request is to use a setback of 120m, instead of the Conservation Authority Regulation Limit setback, in delineating intake protection zones for onshore areas for the Wallaceburg Water Intake.

Previous versions of the Rules (Dec. 2008) gave an exemption for the Wallaceburg surface water intake and allowed the use of a setback of 120m and not the Conservation Authority Regulation Limit. This exemption was based on the nature of low lying areas and flat floodplain areas that are located downstream of Wallaceburg.

Given this rationale letter and the exemption noted in the previous version of the Rules, we agree that this method of using a setback on land of 120m is an appropriate method for delineating setbacks on land for intake protection zones for the Wallaceburg surface water intake.

In accordance with my authority under Rule 15.1, I hereby provide Director's approval for the use of this alternate method for the St. Clair Region source protection area.

Your rationale for the use of this alternative method must be included in your assessment report, along with a copy of this letter.

We thank you for your efforts in completing the technical studies in support of the assessment report under the CWA. If you have any questions or require additional information, please contact our office.

Sincerely,

Ian Smith, Director
Source Protection Programs Branch
Ministry of the Environment

cc: Bob Bedggood, Chair, Thames-Sydenham and Region Source Protection Region
Teresa McLellan, Liaison Officer
Heather Malcolmson, Manager, Source Protection Planning
Keith Willson, Manager, Source Protection Approvals

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Log: ENV1174IT-2010-75

March 24, 2011

Mr. Robert Bedggood
Thames and Sydenham and Region
Source Protection Committee Chair
Upper Thames River CA
1424 Clarke Road
London, ON
N5V 5B9

Mr. Ralph Coe
General Manager
St. Clair Region SPA
205 Mill Pond Cres.
Strathroy, ON
N7G 3P9

Dear Mr. Bedggood and Mr. Coe:

Thank you for the resubmission of your amended proposed Assessment Report for the St. Clair Region Source Protection Area on February 28, 2011. I have completed my review of the amended proposed Assessment Report and in accordance with my authority under clause 17(3)(a) of the *Clean Water Act, 2006*, I hereby approve your amended Assessment Report.

I would like to remind you that the Source Protection Authority is required to make the approved Assessment Report available to the public as soon as reasonably possible on the Internet and in any other manner the Authority considers appropriate.

As per the *Clean Water Act, 2006* and General Regulation, your Source Protection Plan is due to be submitted to the Minister of the Environment on August 20, 2012, the fifth (5th) anniversary of the date that the chairs of the source protection committees were appointed.

In addition, at this time I would like to advise you that all final Assessment Report data must be uploaded in the ARDB @CAMaps by four (4) months from the date of this letter.

I appreciate the efforts of the Source Protection Committee and Authority in going beyond the regulatory consultation requirements by offering to send CDs of the draft proposed and proposed Assessment Report to interested parties and for posting the amended proposed Assessment Report on the Internet providing an additional opportunity for public input.

Thank you for your work to protect Ontario's sources of drinking water.

Sincerely,

Ian Smith, Director
Source Protection Programs Branch
Ministry of the Environment

c: Andy Bruziewicz, Chairman, St. Clair Region SPA
Chris Tasker, Project Manager, Thames and Sydenham and Region SPA
Keith Willson, Manager, Source Protection Approvals
Heather Malcolmson, Manager, Source Protection Planning
Teresa McLellan, Liaison Officer, Source Protection Implementation
Melanie Ward, Group Leader, Source Protection Approvals
Charley Worte, Conservation Ontario
Mike Garraway, Ministry of Natural Resources

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Log: ENV1174IT-2010-175

November 29, 2011

Mr. Robert Bedggood
Thames and Sydenham and Region
Source Protection Committee Chair
Upper Thames River CA
1424 Clarke Road
London, ON
N5V 5B9

Mr. Brian McDougall, General Manager/Secretary Treasurer
St. Clair Region Source Protection Authority
205 Mill Pond Crescent
Strathroy, ON
N7G 3P9

Dear Mr. Bedggood and Mr. McDougall:

Thank you for the submission of your Updated Assessment Report for the St. Clair Region Source Protection Area on June 30, 2011. I have completed my review of the Updated Assessment Report and in accordance with my authority under clause 19(3) of the *Clean Water Act, 2006*, I hereby approve your Updated Assessment Report, resubmitted with the post-submission revisions.

As per section 20 of the *Clean Water Act, 2006* the Source Protection Authority shall ensure that the approved assessment report is made available to the public as soon as reasonably possible on the Internet and in any other manner the Authority considers appropriate.

I would like to take this opportunity to remind you that as per the *Clean Water Act, 2006* and General Regulation, your Source Protection Plan is due to be submitted to the Minister of the Environment on August 20, 2012, the fifth (5th) anniversary of the date that the chairs of the source protection committees were appointed. At this time, all your committee and authority efforts should be devoted to the development of your Source Protection Plan. If there is technical work that you feel is essential to be included in a future Assessment Report and Source Protection Plan, we request that you bring this to the attention of the minister in your transmittal letter when you submit your plan for review and approval.

In addition, at this time I would like to advise you to submit the updated aspects of the Assessment Report for all final water quality and quantity AR data and upload it as follows:

- Updated water **quality** data are to be uploaded to ARDB@CAMaps within two (2) months of the date on this letter; and
- Updated water **quantity** data are to be uploaded to the Ministry of Natural Resources (MNR) data base within four (4) months of the date on this letter.

I appreciate the extra work the St. Clair Region Source Protection Committee has done to ensure that the Updated Assessment Report was made widely available to the local community. Sending additional notices to key stakeholders provided further opportunity for public input. By allowing for greater stakeholder involvement you have ensured that the source protection program continues to show its high degree of public transparency. The upcoming consultations for the Source Protection Plan will benefit from your extra efforts.

Thank you for your work to protect Ontario's sources of drinking water.

Sincerely,

Heather Malcolmson (A), Director
Source Protection Programs Branch
Ministry of the Environment

c: Andy Bruziewicz, Chairman, St. Clair Region SPA
Chris Tasker, Project Manager, Thames and Sydenham and Region SPA
Keith Willson, Manager, Source Protection Approvals
Katie Fairman, Manager (A), Source Protection Planning
Teresa McLellan, Liaison Officer, Source Protection Implementation
Melanie Ward, Group Leader, Source Protection Approvals
Charley Worte, Conservation Ontario
Mike Garraway, Ministry of Natural Resources