Appendix A: Peer Review Evaluation Table

Surface Water System Name: **Goderich Surface Water Intake (HCCL)** **Peer Reviewer Name:** **Stu Seabrook, P.Eng.**

Consultant Study: **Surface Water Vulnerability Analysis for Goderich Intake (August 14, 2007)**
Surface Water Vulnerability Analysis for Goderich Intake – Addendum: Numerical Modelling in Support of IPZ-2 Delineation June 22, 2009)

Evaluation Category		Specific items to be assessed	In the peer reviewer's professional opinion was appropriate professional judgment where applicable?	Identify any critical issues or deficiencies that would have implications on the source protection planning process	Identify any long term opportunities for improvement in subsequent rounds of the process (if any)	Peer Reviewer to provide professional opinion on compliance with rules
1	Does the work meet the requirements of the Assessment Report Technical Rules (December 12, 2008)?	Classification of Intakes – Rule 55	Intakes were identified as Great Lakes intakes, but in accordance with Technical Rules, should be identified as "Type A". Professional judgment not applicable.	Delineation of IPZ-2 and vulnerability assessment consistent with appropriate Intake Classification (Type A)	N/A	Yes - Compliance in principal. Slight documentation adjustment required to achieve compliance with terminology in rules.
		Data to be used – Rules 56 & 57	The report does not explicitly state the source of georeferenced information used to define the relevant waterbodies and watercourses. Professional judgment not applicable.	N/A	N/A	N/A - Additional documentation is required to confirm this.
		Areas of Surface Water Intake Protection Zones – Rules 58 & 60	IPZ-1 and IPZ-2 boundaries are defined individually, without consideration of IPZ-3 or IPZ-Q. Professional judgment not applicable.	N/A	N/A	N/A - Study not yet complete with respect to IPZ-3 and IPZ-Q.
		Delineating IPZ-1 – Rules 61, 63, 64	IPZ-1 boundaries do not appear to be terminated at the 120 m setback (or Regulation Limits) where they abut lands. No discussion is provided, and therefore it is not possible to assess professional judgment on this matter. Extension of IPZ-1 is proposed to mouth of Maitland River (North), and STP outfall (South) based on potential contaminant sources. Additional relevant detail is requested in the comment record.	Adjust or justify.	N/A	No. Adjustment to onshore boundary is required, or justification for additional on-shore area included is required. The extension of the IPZ-1 should be reviewed with the Municipality with regard to planning implications.

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		Delineating IPZ-2 – Rules 65 & 66	Only in-water and alongshore IPZ-2 delineation is provided. It is based on hydrodynamic simulation with 2 hour time of travel consideration. Some additional documentation is requested to support professional judgment with regard to Maitland River extents, and to confirm modelling details (See comment record). In-land extent of IPZ-2 is noted in the report to be greater of 120 m setback or extent of regulated areas. It is not clear from the mapping which is relevant, or from where the 120 m setback is measured.	N/A	Improved knowledge of alongshore process influences and better physical data for tributaries.	Generally yes, to the extent completed to date – pending confirmation that the 120 m setback (where applied) is measured from the "high water mark" (which is not well defined by the rules) and that areas in excess of the 120 m setback (eg. STP property and north bank of Maitland River) are coincident with Regulated Area delineations). It is expected that the IPZ-1 on-land delineation will be addressed at the same time.
		Delineating IPZ-3 – Rule 70	IPZ-3 was not assessed at this stage of reporting.	N/A	N/A	N/A – not assessed.
		Consideration of Transport Pathways in adjusting the delineated vulnerable area(s) – Rules 72, 73, 74 & 75	No adjustment to IPZ-2 is discussed. Therefore, it is premature to comment on this item.	N/A	N/A	N/A – preliminary level of assessment only to date.
		Assigning vulnerability scores to intake protection zones – Rules 86, 87, 88, 89, 90, 91, 92, 93, 94, 95 & 96	Scores are assigned in accordance with technical rules for Type A intakes, although criteria are qualitative in nature given that the up-tributary analyses are not yet complete. Reference is made to 2006 guidance in relation to area vulnerability factor – this should be updated and reference specific considerations as outlined in Technical Rules (Rule 92).	N/A	Better understanding of threat delivery mechanisms through better understanding of hydrodynamics and its relation to raw-water quality.	Yes – to the extent completed to date, based on available information, although the vulnerability scoring should be confirmed after the up-tributary delineations are complete.

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		Assigning uncertainty factors to (1) delineate intake protection zones, and (2) assessment of vulnerability of intake protection zones – Rules 13, 14 & 15	A qualitative uncertainty analysis is completed with regard to zone delineation and vulnerability. However, the uncertainty assessment references Guidance Modules, and should be revisited to ensure consistency with Technical Rules.	N/A	Improved hydrodynamic assessments would reduce uncertainty, although it is difficult to forsee a "low" uncertainty. Technical rules assign uncertainty on basis of physical data and historic water quality considerations rather than understanding of relationship between hydrodynamics and water quality. This would seem relevant to vulnerability. More consistent (regular) water quality data would be beneficial.	Yes, to the extent completed to date, but should be revisited to include discussion on the relevant factors used in the decision making process (Rule 14) to fully support the professional judgment. Little discussion is provided in terms of quality of data.

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Evaluation Category		**In the peer reviewer's professional opinion was appropriate professional judgment applied where applicable?**	**Identify any critical issues or deficiencies that would have implications on the source protection planning process**	**Identify long-term opportunities for improvement in subsequent rounds of the process**
2	Appropriateness of model selection and or assessment technique a. Peer reviewer's opinion on any assumptions used when the consultant selected the model or assessment technique?	The model selection process and assessment technique is generally well documented and justifiable. The model and assessment technique is considered to be appropriate for achieving a planning level solution at this scale of problem.	See below.	Better understanding of the probability of various environmental scenarios and critical input conditions (potentially wave influence) with respect to the resulting physical processes driving the currents in the region would improve the overall assessment, but this is not specifically directed by the guidance or technical rules.
3	Were the decisions made while developing, calibrating and running the models or assessment technique reasonable? a. Appropriateness of the calibration technique employed given the availability of data, observed hydrodynamic conditions and the required use of the model	Decisions made while developing, calibrating and running the models are assumed to be related to the scope and budget for the project. In general, the modelling provides a	There is insufficient data to calibrate the model, and presentation of the calibration data does not address directional / event considerations. This shortcoming is reflected in the high uncertainty scoring of the IPZ-2.	Additional field data collection would improve the certainty in the analyses, although the complexities of the physical and environmental inputs cannot be fully resolved. Further refinement of the model

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	b. Appropriateness of any assumptions used in the development of the model or assessment technique.	scientific basis for the delineations which is based on local physical characteristics of the water bodies, and regional driving processes. There is some concern with regard to processes excluded in the modelling (such as waves). Relevant comments and questions are noted in the report comments accompanying this form.	In general, the model is well suited to the task, providing it is defined with adequate resolution within regions of interest, and boundary conditions are imposed appropriately. It is suggested that comment is provided regarding the expected impact of ignoring wave processes.	domain, and inclusion of additional processes (such as waves) and scenarios (combinations of environmental inputs) would improve the understanding of the hydrodynamics of the region and its response.
4	In the peer reviewer's professional opinion do the overall results appear reasonable?	**Peer Reviewer to provide overall professional opinion on the vulnerability product and the appropriateness given the hydrodynamic setting**		
		It is this reviewer's opinion that the IPZ delineations are not necessarily conservative in the nearshore region, due to the fact that wave processes are not included in the analyses. While some assumptions in the application of boundary conditions may be conservative (i.e. steady state fully developed velocity profiles) the alongshore currents generated by waves in the relatively shallow waters are a significant contribution to the local velocities. There is insufficient measured data for full calibration and verification of the model abilities, and as a result, it is not possible to assess the reliability of the results. Tributary travel times are not yet calculated, and therefore are not reviewed. Given the expense of field data, these assumptions are not unexpected. However, it is considered important that they are prominently noted in the reports, and prioritized with respect to uncertainty and data gaps based on the current understanding of the local and regional hydrodynamics.		
Peer Reviewer Signature and Stamp _____				

Note – the reporting reviewed to date does not include up-tributary delineations, and therefore, comment can not be provided on this aspect of the analysis.