ENSC 501: School of Environmental Studies Independent Study

Contributing to multi-stakeholder policy evaluation: Evaluating environmental assessments preformed for infrastructure projects on the Oak Ridges Moraine

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ABSTRACT: Infrastructure projects on the Oak Ridges Moraine have become an issue of interest for their role in facilitating further development in an area of environmental sensitivity. The Oak Ridges Moraine is a glacial landform, which stretches 160 km just north of the Greater Toronto Area in Southern Ontario. It is a multi-jurisdictional region composed of 34 municipalities and is protected under the *Oak Ridges Moraine Conservation Plan (2002*) which restricts the types of activities that are allowed in certain designated areas. The local governments are required to implement the ORMCP through their official plans and decision-making. Infrastructure however is mandated through infrastructure master plans that do not have provincial oversight and have no clear requirement to implement ORMCP. Infrastructure projects are required to undergo environemtnal assessment. The purpose of this study is to contribute to monitoring the implementation of the Oak Ridges Moraine Conservation Plan through an evaluation of infrastructure environmental assessments. The methodology used in this analysis was developed by Broughton (2008) using multi-source criteria. The criteria were used to assess two selected cases: the Leslie Street Class Environmental Assessment Bethesda Sideroad to Bloomington Road and the North Richmond Hill Elevated Tank and Yonge Street Watermain. Both of the cases complied with the majority of the criteria, however, a connection to broader issues identified in the literature such as growth was not established. The works presented will contribute to the next Monitoring the Moraine Status Report to be prepared by the Monitoring the Moraine Project.

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1.0 Introduction

1.1 The Oak Ridges Moraine Plan

The release of the Oak Ridges Moraine Conservation Plan (ORMP) was motivated by the conflict and backlash, which arose during the 1990's due to increasing development pressures on the 160 km stretch of environmentally sensitive land. The Moraine was formed by successive glaciations and is comprised of gently rolling hills and kettle lakes among other features (Bradford, 2010).. As a water resource, it is the source to major above ground flow in the form of rivers and creeks and below ground flow in the form of aquifers. It crosses 34 municipalities and ranges from 3km to 23 km in width (Hanna and Webber, 2010).

Figure 1: Location map of the Oak Ridges Moraine, Ontario Canada (Adapted from Hanna and Webber, 2010).

Gilbert, Sandberg and Wekerle (2009) argue that the transition of the Oak Ridges Moraine from a landscape feature to a provincially protected and locally valued environmental asset can be viewed through the lens of bioregional citizenship. Although civil society groups had existed previously to promote awareness and education on the Moraine, the Royal Commission on the Future of the Toronto Waterfront, a mainly Provincial initiative looking at planning and management of the Toronto waterfront and environs, in the early 1990's cemented the identity of the region. This identity is an area characterized by the intersection of urban, rural and natural values in the newly coined "Greater Toronto Bioregion." The environmental movement working on moraine protection focused on "agricultural lands, ecological biodiversity and groundwater resources, while seeking to preserve the mutual benefits of both natural environments and property rights" (Gilbert, Sandberg and Wekerle, 2009).

Prior to the provincially legislated Oak Ridges Moraine Conservation Act and its associated Plan, development decisions were regulated by the Ontario Planning Act and associated Provincial Policy Statement (PPS) that advised Municipalities to consider the social and economic well being of communities when approving land use (Hanna, Webber and Slocombe, 2007). Hanna and Webber have compiled an extensive chronology of planning on the Oak Ridges Moraine, which stretches back to 1946 (2010). However, the policy documents that lead to legislation are more recent (Appendix 1). Among these was a provincial greenlands study, *Space for All: Options for a Greater Toronto Area Greenlands Strategy*. This study found that uncoordinated efforts and "fragmented governance" in the GTA was the main impediment for conservation of the

ORM. Through independent planning at the local level and no provincial oversight, the approaches to protection of environmentally significant regions did not take a strategic view or account for cumulative effects of planning decisions. This was the first study to discuss the threat that low density housing developments posed to the ORM. Recommendations were made to develop guidelines for planning and implement a systems approach to protect the ORM and green space within the GTA (Hanna and Webber, 2010). Interim guidelines were established by the Province in 1991 which gave details on specific environmental site specific studies that should be conducted and suggested emerging planning concepts such as compact growth and using existing infrastructure (reference?).

Following the recommendations in the *Space for All* report, the province of Ontario created a technical working group which aimed to more clearly define the land use and environmental issues on the ORM. This group carried out extensive research, including work on a natural heritage system, water resources and landforms. The committee made recommendations to create a clear and systematic approach to planning for the ORM which at the time was not fulfilled by the provincial government which maintained that these conservation efforts were to be exercised at the local level (Blocking, 2005).

Development proposals on the Oak Ridges Moraine were becoming contentious and controversial as of 1999 as local governments responded to pressure from public opposition. Approval for developments were being delayed or turned down and developers appealed to the Ontario Municipal Board for resolution. From this point the Province stepped in and introduced a moratorium on development and a stakeholder

committee was created to advise an Oak Ridges Moraine plan (Hanna and Webber, 2010).

The *Oak Ridges Moraine Conservation Act* and Plan were passed in 2001and 2002 after public and stakeholder consultation. The legislation sets out objectives for maintaining the ecological and hydrological integrity of the region and defines the types of activities, which can take place in certain land use designations. The plan defines the boundaries of the protected regions and those areas where residential and aggregate development are permitted. As with other provincial policies, Ontario municipalities and local governments are required to implement the ORMCP through their official plans and development application decisions (Ontario Ministry of Municipal Affairs and Housing, 2008).

1.2 Policy Monitoring Effort on Oak Ridges Moraine

The foundations for monitoring in the ORM are closely tied to the grassroots nature of the environmental movement organizations (EMO) in the area. These organizations positioned themselves in opposition of several large subdivision plans for the ORM and in favour of conservation and proper environmental planning of the ORM leading to the passage of the ORM Conservation Plan (Whitelaw et al., 2008).

The Monitoring the Moraine, coalition which is made up of STORM (Save the Oak Ridges Moraine Coalition), Citizens Environmental Watch and Centre for Community Mapping, holds the position that the most effective way to protect the ORM is to ensure that the ORMCP is being implemented as designed. The Monitoring the

Moraine Project, with over 20 years collective experience in environmental advocacy, aimed to develop a framework which volunteers and citizens could participate in to monitor the changes to the Moraine as a landscape post implementation of the ORMCP, and to facilitate better access to information for all stakeholders including decision-makers (Monitoring the Moraine, 2007). Through multiparty community based monitoring, which will be discussed in section 2.1 of this document, the MTM is able to collect information on the success of the ORMCP and make it available for stakeholders and appropriate levels of government. The MTM has utilized status reports as policy monitoring tools, the first report released in 2006 focused on the implementation of the ORMCP in official plans and watershed plans.

Although compliance was seen in most upper and lower tier municipalities, the status report put pressure on remaining non-compliant municipalities as well as the provincial government to improve allocation of resources and support for municipalities (Broughton, 2008). The focus of the subsequent MTM report was on the influence of infrastructure development on the ORM.

The focus was chosen in part because of the lack of clarity of the relationship between the ORMCP and infrastructure projects. As mentioned previously the ORMCP is implemented through official plans which are approved by the Ministry of Municipal Affairs and Housing. Infrastructure projects are set out in master plans, which have no provincial oversight. As well, there is no explicit requirement how the ORMCP should be integrated into practice e.g inform infrastructure planning. The standardized and required evaluation procedure for infrastructure at the municipal level is the Municipal Class

Environmental Assessment and therefore can be used as tool to monitor infrastructure projects for their implementation of the ORMCP (MEA, 2007).

1.3 Purpose of Research

This project will contribute to the development of community based policy monitoring information specific to the MCEAs reviewed and will contribute information to the next Monitoring the Moraine Status Report.

1.4 Research Objectives

1. Determine the level of compliance of selected environmental assessments (EAs) for infrastructure preformed on the ORM using Broughton's (2008) EA evaluation criteria, (sec. 3.1 will outline Broughton's criteria further).
2. Test Broughton's criteria for their usefulness in evaluating EAs on the ORM
3. Make recommendations on how to adapt the criteria for future monitoring.

2.0 Literature Review

This section will discuss selected issues within the literature including community based monitoring, multi-party policy evaluation and environmental assessment as these topics relate to municipal infrastructure projects and the foundations of the criteria employed in this analysis.

2.1 Multiparty policy evaluation

This section aims to synthesize the literature written in the field of multi-party policy monitoring (MPPM) and contextualize the criteria used in this evaluation.

Multiparty, or multiple stakeholder, environmental monitoring (MPPM) is a burgeoning methodology which has its roots in the fields of policy monitoring, multi-party evaluation and community based ecological monitoring (Broughton, 2008). It is distinguished by drawing on the rigorous and developed framework of policy evaluation that in the rationalist tradition uses the policy and goals of plans to evaluate effectiveness and being an externally motivated multiple perspective methodology (Howlett and Ramesh, 1995, 169). MPPM also incorporates elements of best practices drawn from stakeholder groups and applicable literature (Bouwen and Taillieu, 2004)(Broughton, 2008).

MPPM is part of a larger trend in the area of governance of projects involving environmental and natural resources;.governance as opposed to government is a term which takes into account the wider policy actors and actions that contribute to political processes (Lebel et al., 2006). The shift has been toward active collaboration between

stakeholders in government and civil society in the development and implementation of plans and programs (Bouwen and Taillieu, 2004).

There are several motivating factors for the trend in planning and monitoring collaboration that are both internal and external to the planning process. There is a need for MPPM as government resources and programs are shrinking due to budget cuts and there is still a need for timely and locally significant information for decision makers (Milne et al, 2006). Further, there is increased civil and professional engagement, and the push for representation and transparency in decision making in environmental matters which has contributed to the increased involvement in monitoring (Whitelaw et al,, 2003; Bouwen and Taillieu, 2004).

Policy monitoring is seen to be most effective as an agent for change when the criteria that is used for evaluation purposes is congruent with the objectives of the government who has the power to review the policy (Howlett and Ramesh, 1995, 175). There is a limited policy monitoring and evaluation done at the municipal level and although there is a developed literature on methodology, there is a gap in implementation. Planning departments cite limited resources as the reason for reduced monitoring programs and follow up (Seasons, 2003).

2.3 Environmental Assessment Process

Environmental Assessment (EA) is an institutionalized and directed approach to identifying, planning, and mitigating human development impacts on nature in an effort to approach sustainable development (IAIA, 2009). As a step in the proactive planning

process, EA aids in revealing the implications of development prior to project approval (Jay et al., 2007). Although EA documents may include predictions of effects to socio-economic and environmental spheres it is important to distinguish that EA attempts to reflect values that society considers important and is not an absolute and measurable quantity (Noble, 2006, 12). Underlying EA practice are the core values of integrity, sustainability and utility which should guide planners and decisions makers (Noble, 2006, 4). Further, the International Association for Impact Assessment and UK Institute for Environmental Assessment have defined EA best practice principles:

- As early in the decision making process and throughout the life cycle of the proposed activity;
- To all development proposals that may cause potentially significant effects;
- To all biophysical and relevant socio-economic factors, including health, culture, etc and cumulative effects consistent with the concept and principles of sustainable development;
- To provide for the involvement and input of communities and industries affected by a proposal, as well as the interested public;
- In accordance with internationally agreed measures and activities.

(IAIA and IEA, 1999).

A review of the generalized elements of an environmental assessment will follow in an effort to better contextualize the sections and queries utilized in Broughton's criteria

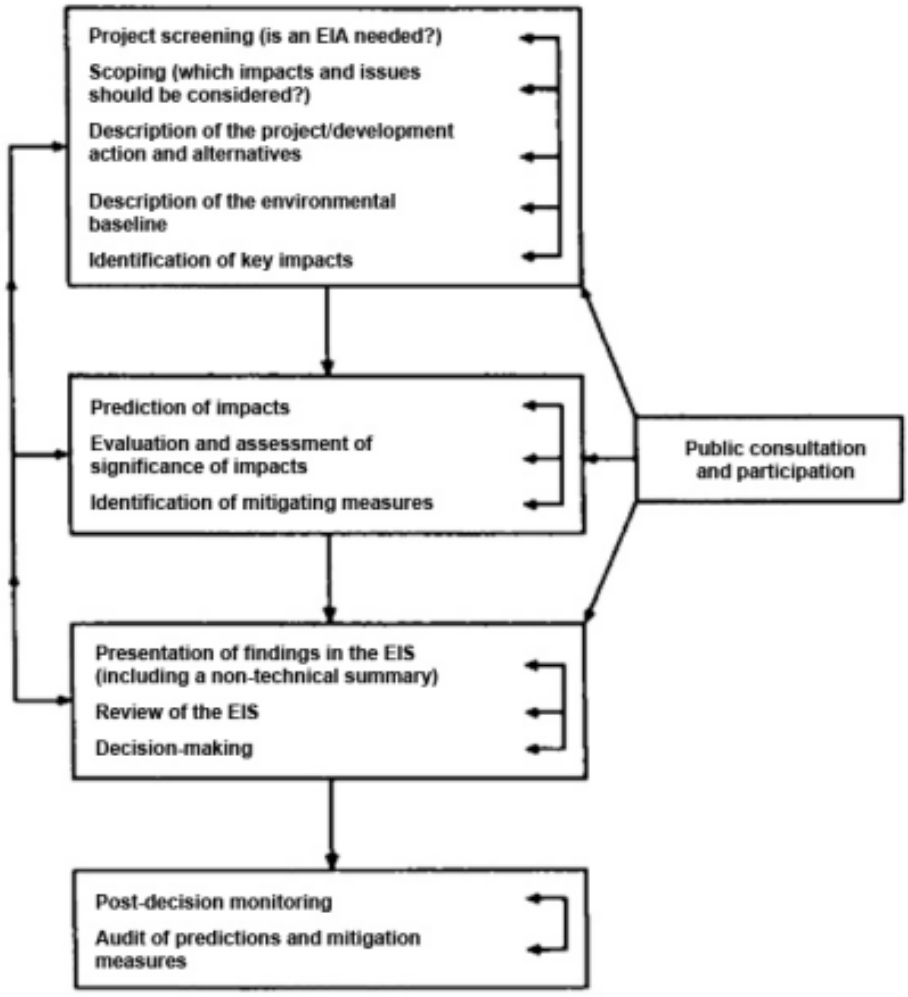

Figure 2: Indicative of the exchanges in the iterative EA process between sections of screening, scoping, defining alternatives, impact evaluation and mitigation and monitoring ((Adapted from Glasson, Therivel and Chadwick, 2005)

(sec. 3.0). The key elements in the process of EA are screening, scoping, defining alternatives, impact evaluation, impact mitigation and monitoring (Figure 2).

2.3.1 Screening

Conceptually, screening is the initial step in EA, which aims to evaluate whether the respective project requires an environmental assessment. Keeping in mind that this decision is based on the values articulated by a framework preceding development projects, screening should identify and require EA for projects with risk of adverse effects or that are located in environmentally sensitive regions or that have high public interest. In the context of the Municipal Class Environmental Assessment, the screening stage involves categorizing the project as a schedule A, B, or C based on anticipated environmental impacts (MEA, 2007).

2.3.2 Scoping

Once the decision that the project is required to submit to an EA, scoping as an exercise defines boundaries temporally and geographically. Essentially, it requires decisions to be made as to what will be included in the EA; this may include identifying all the potential impacts due to alternative approaches and selecting several elements of focus (Snell and Cowell, 2006). The elements of focus are sometimes referred to as valued ecosystem components (Kilgour et al., 2007).Alternatively, scoping can be an exercise in incorporating scientific and social values and concerns into the assessment such as the precautionary principle or perhaps efficiency (Snell and Cowell, 2006).

Restrictive scoping has been raised as a concern in the literature. This occurs when the EA limits the boundaries or elements that are investigated and can lead to impacts and outcomes of a project being missed such as cumulative effects (Whitelaw et al., 2009; Snell and Cowell, 2006; Copper and Sheate, 2002).

2.3.3 Defining Alternatives

Alternatives in EA describe the explorations of different means to achieve the same ends. The choices can include variations in location and design of the project or they can include demand side solutions such as conservation. Alternatives are mainly project specific although a more generic type alternative is the consideration of a no action alternative, which can mean “no change” i.e. continue with existing process or “no activity” i.e. not building the project. This necessary alternative provides a baseline to compare against any action. An issue of concern in defining alternatives is that the rigor in analysis is placed on alternatives after being chosen and not on the methodology used to choose alternatives (Steinemann, 2001).

2.3.4 Impact Evaluation and Mitigation

At the stage of impact evaluation the project details are becoming more defined certain alternatives are selected referring back to the valued ecosystem components. Evaluation and mitigation are interrelated and if there is a chance that there will be a negative effect there should be acknowledgement of the risks. There should also be a clear indication as how the impacts will be reduced or the previous condition will be restored after disruption (Zubair, Bowen and Elwin, 2009).

2.3.5 Monitoring

The environmental monitoring effort includes both the biophysical and policy realms.

In an ideal sense, this would include follow up on all the direct and indirect effects of all the valued ecosystem components, however, in reality monitoring depends on the resources and support available to the project. Arts, Caldwell and Morrison-Saunders (2001) helped to define that monitoring should be more holistic in nature and include all follow up elements post-decision approval and identifying the 'implementation gap' between project plans and their execution. Further, follow up is a necessary step to address the predicted effect of the activity and gives another opportunity for proponents and responsible parties "to take adequate measures to mitigate or prevent negative effects on the environment" (Arts, Caldwell and Morrison-Saunders, 2001).

2.3. Public Participation and Input

As EA is largely driven by the values of society; throughout the process there should be extensive public participation . Public participation can be a source of information for citizens on the details of the project as well as to provide a forum for stakeholder input. It can increase the quality of the final project, increase the legitimacy of the process of assessment and allow for social learning which connects citizens to active democratic participation (Webler, Krantenholz and Renn, 1995). Flexibility is important in the process and is necessary because of the predictive nature of environmental assessment. Public input may result in required changes to the project design.

2.4 Environmental Assessment and Infrastructure

Infrastructure planning and project evaluation is becoming more complex with more influence from the increasing prominence of environmental regulation as well as societal and political influence. The private sector and the public has become more involved in infrastructure EA though the shift to more "organizational and communicative processes" (Niekerk and Voogd, 1999).

The planning and implementation of infrastructure projects departs from many more isolated type projects in that it has links to higher planning levels as it is mandated from a regional level. Infrastructure has a network quality to it and cannot be viewed solely as an isolated project. It is for this reason that the discussion of EA for infrastructure in the literature discusses it also in the context of a Strategic Environmental Assessment (SEA). This type of impact assessment is used to evaluate programs, plans and policy. In the case of a plan-mandated infrastructure, such as the infrastructure master plans for Ontario municipalities, which include projects such as roads, waterworks or solid waste developments, SEA may be more appropriate. SEA allows for a better view of the synergism that leads to direct and indirect effects across the implementation of many projects. SEA has less temporal and geographical restrictions and due to the wider scope can better incorporate cumulative effects analysis (Arce and Gullon, 2000).

3.0 Methodology

3.1 Environmental Assessment Document Analysis

Two class environmental assessment documents were analyzed using the evaluation criteria devised by Broughton (2008). The criteria are presented in *Towards a Multi-Party Policy Monitoring Framework for Evaluating Infrastructure Environmental Assessments on the Oak Ridges Moraine* (Appendix 2). Broughton developed the criteria based on the Oak Ridges Moraine Conservation Plan, the Municipal Class Environmental Assessment guidelines, the best practices of environmental assessment detailed in the literature and action research she carried out with Moraine stakeholders.

The rationale behind using Broughton's evaluation criteria is that it is the framework, which was developed in partnership with the MTM and is the standard criteria used for policy evaluation of infrastructure on the ORM for reporting through the Status Reports. Broughton's criteria are divided into sections based on the stages of the environmental assessment process detailed in the literature review (sec. 2.3). In the first column is the unmodified questions posed by the evaluation criteria and in the second column is the qualitative analysis as to whether the element was found in the contents of the environmental assessment document with a page reference if applicable.

3.2 Selection of Cases and Background Information

In consultation with the Monitoring the Moraine organization, the Leslie Street Upgrade from Bethesda Sideroad to Bloomington Road and the North Richmond Hill Elevated Tank and Yonge Street Watermain projects were selected for evaluation. The Leslie Street upgrade is part of the future reconstruction of Bloomington Road and the purpose is to address the safety and operational issues of this 2.0 km section of the road, which is below the standards of the Regional Municipality of York. The Haynes Lake section is the most problematic and the surrounding environmentally sensitive regions make the area more challenging. For these reasons the project was given a Schedule C designation (for more detail on Screening please see sec. 2.3.1 of this document) (Ogilvie, Ogilvie & Company and Dillon Consulting, 2008). This project has entered the detailed design phase (Regional Municipality of York, 2010). The second case study is the North Richmond Hill elevated tank and Yonge Street water main, which was given two different Schedules, because of the related but distinct projects. The elevated tank received a Schedule B, which required public consultation and more in depth evaluation and the water main received a Schedule A designation which is pre-approved in the Long Term Water Master Plan and is not required to undergo the full municipal class environmental assessment. The purpose of this project is to address the storage requirements for Water Pressure District 9 in the North Richmond Hill community of Oak Ridges for current standards of emergency and maximal supply as well as meet the needs of Official Plan projected population growth for 2011(KMK Consultants Limited, 2007). This project has completed the construction phase as of 2009 (Regional Municipality of York, 2010).

Class environmental assessment documents were obtained through email and phone follow up requests to the respective project managers of the infrastructure projects at the Regional Municipality of York. The project managers contact information was found through using the two project names above as search criteria. Direct contact was made after attempts to secure the EA documents from the Region's website proved unsuccessful. The two environmental assessments are included as Appendix 3 and 4.

Functionally, the use of case study analysis was employed to garner specific information and not a statistical generalization on an inadequately characterized area of study, that being the implementation of the ORMCP in EA documents (Yin, 2009). The specific project selection was made to evaluate the consistency of EAs executed for two categories of project types, both road and water, within an upper tier municipality.

4.0 Results

Table 1 illustrates the application of Broughton's criteria (Appendix 2) to the *Leslie Street Class Environmental Assessment (Schedule C) Bethesda Sideroad to Bloomington Road* (Appendix 3) and the *North Richmond Hill Elevated Tank and Yonge Street Watermain Class Environmental Asessment Phase 1 and 2 Report* (Appendix 4). The first column of the criteria is the original criteria posed by Broughton and the second column is an analysis as to whether the EA document meant the criteria.

Table 1: Application of Broughton's Multiparty Evaluation Criteria to Leslie Street Class EA

Evaluation Criteria	**Leslie Street Class Environmental Assessment Bethesda Sideroad to Bloomington Road**
1) Screening	
a) Does the screening criteria include whether the project is on the Oak Ridges Moraine?	Yes project is identified to be on the Oak Ridges Moraine (ORM) (sec. 1 p.12, sec.4 p.33, p.71).
b) Does the screening criteria include land use designations, hydrologically sensitive features, and natural heritage features established by the ORMCP?	Natural Linkage, Natural Core, Rural Settlement Area, Countryside Area land use designations are used. Most of the study region along Leslie Street is considered Natural Linkage. The section of study area that is considered Natural Core is adjacent to Haynes Lake (sec. 4 p.33) The assessment also notes that within the study area there are natural heritage and hydrologically sensitive features, which include the Bloomington wetland, the Wilcox-St. George Provincially Significant wetland complex, the Simeon Lake Area of Natural and Scientific Interest (ANSI), and Haynes lake which is a kettle lake (sec.4, p.71). Parts of the study area are located on a High Vulnerability Aquifer and Landform Conservation Area Category 2 (sec. 4 p.71).

	The assessment does note that all the above mentioned land is within the ORM (sec. 4 p. 71).
c) Does the screening criteria include whether the project impacts growth outside urban settlement areas?	No, the assessment does not touch on growth outside urban settlement areas.
d) Is the Schedule for the environmental assessment appropriate?	The environmental assessment addresses that the project was being carried out as a Schedule C project due to its classification as an area with the potential for significant environmental effects and as a result required an Environmental Study Report (ESR) (p. 32).
2) Scoping Valued Ecosystem Components (Located primarily in section 5.2 of the EA).	
a) Does the scope include natural heritage features and hydrological features established by the ORMCP?	The scoping does include natural heritage and hydrological features such as the wetlands and woodlands. The scope does address the fragmentation and restoration of Natural Core Areas of the ORM. However, the scope does not approach the specific features identified as being in the context of the ORM. Compliance with the Oak Ridges Moraine Conservation Plan is identified as a separate evaluation factor.
b) Does the scope include social and economic values?	Social and economic values are included - impact on residents, recreation features, fulfilling environmental and planning legislation, agricultural resources, existing businesses, archeological and heritage resources, cost, complexity of construction and traffic (sec. 5.2 p. 107-108).
c) How broadly scoped is the environmental assessment? Does the environmental assessment recognize how other issues such as housing, recreation and employment are integrated?	Outside of the valued ecosystems components which pertain directly to the focused study area there is little mention of a broad scope. The assessment looks at the impact on recreation and community features, housing in relation to impact in property of residences and displacement, employment is not evaluated directly. The impact to businesses is evaluated instead.

d) Is the environmental assessment placed within a context of livability and sustainability?	The EA is not placed in the context of these concepts.
3) Defining Alternatives	
a) At minimum do the alternatives distinguish between alternate locations and designs? Are there alternatives that are in least restrictive land-use designation or off the moraine?	The EA divides the road into sections Bethesda Sideroad, Haynes Lake Arena and North of Haynes Lake and looks at each section separately. The alternatives focus on route realignment intersection improvements (sec 5.3 p.85), corridor alternatives (sec. 5. 4.1 p.88) and road improvements to regional standards (sec. 5.5 p. 105). Although there are not alternatives that are off the moraine there are alternatives which consider the impact significance to the ORM core area, wildlife corridor and the wetlands. There are alternatives considered that avoid completely the provincially significant wetlands it was rejected due to cost and bisection of ORM natural core area (sec. 5.4 p. 88). The route which was selected mirrored the existing road corridor and represented a route with more opportunity for habitat connectivity (sec. 5.4.2.9 p.104).
b) Do alternatives move beyond location and design? Examples include modal split, new vs. intensification of existing infrastructure, prioritization of projects, other issues related to infrastructure (i.e. housing, recreation, employment, etc), underlying causes of infrastructure problem, new technology like wastewater reuse?	Yes, alternatives do go beyond design and location. Traffic demand management, non-structural alternatives and changing demand through alternative mode are considered. Alternatives also considered the impact to housing and a heritage site.
c) Are alternatives that require coordination with another jurisdiction or another scale of governance considered?	Alternatives with required the co-ordination of other scales of government are not included which may be due to the fact that the road in the jurisdiction of the Town of Richmond Hill. It is mentioned that the TRCA and indirectly the Department of Fisheries and Oceans may have to authorize if any fish habitat is impacted (sec 6. p.153).
d) Is the no-build alternative considered?	Do-nothing and closing of Leslie Street alternatives were

There are two ways to test the no-build alternative. Municipalities should establish the need by testing the "no-build alternative" rather than the less restrictive test in the MCEA.	presented and considered. This alternative was rejected because it did not address the problem of safety in road conditions and did not present a chance to enhance the wildlife corridor (sec.5.1. p.82).
e) Are demand-side alternatives considered?	Yes, traffic demand management, changing transportation mode to non-auto (mass transit and bicycle) and non-structural alternatives are presented but the problem as outlined in the EA cannot be solved through traffic demand management as they are related to safety and operational issues (sec 3.1 p.29)
f) Is all information about all present and future development scenarios incorporated, including alternatives identified in master plans and growth plans?	No clear information included in assessment.
4) Impact Prediction and Evaluation	
a) Does the environmental assessment identify direct physical impacts?	Yes, the EA deals with the physical impacts on the existing environment in the design section (sec. 6, p.114).
b) Does the environmental assessment identify indirect effects of future development and urban growth including linkages to potential future projects.	No the EA does not cover this issue this may be covered at a higher planning level.
c) Does the environmental assessment identify structural, functional and compositional effects?	The EA focuses on functional elements focusing on elements such as fish and amphibian breeding activities, wildlife movement and connectivity and integrity of wetlands or riparian zones (sec. 6. 1.2 p. 119-133).
d) Does the environmental assessment identify upstream and downstream effects on the flows of wildlife and fish?	Yes, the EA does discuss flows of fish and wildlife - the proposed design aims to increase the facility of fish and amphibian movement through larger culverts (sec. 6.1.2 p.119), revegetation at the Haynes Lakes Berczy Creek crossing and improved watercourse culvert (sec 6.1.2. p.123). The EA also does consider upstream and downstream effects on fish and wildlife from water quality threats such as road salt (sec. 6.4 p.131). As well, there

	will be a wildlife structure which will allow for passage of wildlife below the new road (sec. 6.1.2 p.125-129). This increased wildlife utility is meant to offset the impact of 3,700 m sq. of wetland and 4,800 m sq. of woodland east of Leslie Street.
e) Does the environmental assessment identify social impacts? If so, are they addressed separately or as sustainable assessment?	Socio-economic impacts are detailed to affect land uses in the Haynes Lake section of the construction, the impacts to property and land use are considered minimal (sec.6.4 p.152).
f) Does the environmental assessment identify cumulative impacts?	The EA does not touch on cumulative impacts.
g) Are significance judgments made about impacts?	The EA details the net effects of the actions required during the construction.
h) Are impacts measured qualitatively as well as quantitatively?	The impacts are measured generally in quantitative method and qualitative impacts are discussed in relation to social impacts (sec. 6.4 p. 152).
i) Is the capacity of the natural environment and the availability of resources considered in measuring the impact of the project?	Not clearly discussed in the assessment.
j) Is infrastructure facilitating development off the moraine, where it would not have been allowed on the moraine (i.e. leapfrogging effect).	This is not discussed and may be more applicable at the regional planning level.
5) Impact Mitigation	
a) Does the environmental assessment discuss methods to control the severity of impacts?	Yes, the mitigation methods address the controlling the severity of impacts to wildlife such as nest checks and tree cutting not during the breeding season and stabilization of sediment. As well during construction there will be considering made to minimize noise and dust (sec. 6.2 p.142).
b) Does the environmental assessment discuss ways to avoid the impact, including the area of the impact? Does it suggest whether the area of impact could be moved to off the moraine?	Yes, the EA discusses how to avoid or minimize impacting specific impact to wildlife lifecycles, water quality and habitat areas (sec.6.4 p.146). It does delve into the whether the area of impact should be

	situated on the Moraine. More specifically for this project, whether the road can be moved away from Natural Core and Linkage Areas, Natural Heritage Features and Hydrologically Sensitive Areas as defined by the ORMP and how it is not reasonable to do so without impact to other features and property (sec. 6.2 p.140).
c) Does the environmental assessment discuss ways to improve or restore ecological functions beyond pre-construction conditions?	Yes, the EA discusses regeneration of woodland with native species as a contribution to higher water quality than present and increased habitat and the wildlife structures will facilitate improved connectivity between the Berczy wetlands and Haynes Lake as well as lower salt levels being deposited in both watercourses (sec 6.4 p.146-150).
d) Will the infrastructure be built to be flexible and adapted to local conditions?	The infrastructure will allow for future improvements to the riparian zone, wildlife connectivity and safety. The infrastructure is very much designed around local conditions however further adaptation is not mentioned.
6) Public Review and Consultation	
a) Are the aims of public consultation clearly stated?	Yes, the aims of public consultation were to provide open consultation on the planning process and details of the project. As well as allowing, the public to make their "opinions, values and concerns" know to the study team (sec 1.8 p.11).
b) Does the environmental assessment meet or exceed statutory requirements for notification and participation?	The project is Schedule C, which requires 3 formal public consultations. The requirements were fulfilled (sec 1.8).
c) How early in the process is participation sought?	The first stakeholder meeting was held in December 2005 to discuss the four alternative corridors (sec. 1.8 p.11).
d) How often is participation sought?	There were two Public Consultation Centres in 2006 to discuss the four corridor alternatives as well as three Stakeholder Advisory Committee meetings, which involved the "most" affected or interested in the study (sec 1.8 p.11).
e) Are the methods used for public consultation appropriate	There was a degree of flexibility when there was a request to open

for the Project?	the Stakeholder Advisory Meetings to the wider public during the process. There were multiple methods of communication used at the public consultation sessions which included a walk through Open House, a presentation and then discussion period (sec 1.8 p.12)
f) Does the environmental assessment utilize local knowledge?	Not addressed through the assessment.
g) Is input from public consultation used in the environmental assessment?	Yes, major comments and responses were included in the EA.
h) Does the consultation program target specific groups, such as special interest groups, developers, and impacted residents as well as the general public.	Yes, there was a Stakeholder Advisory Committee which targeted special interest groups which included environmental NGOs, Richmond Hill Chamber of Commerce, Agricultural Groups, etc as well as the general public (sec. 1.7 p. 9).
7) Monitoring (Discussed mainly in section 6.4).	
a) Does the project monitor all of the valued ecosystem components?	No the project does not monitor all the valued ecosystem components. The monitoring focuses on the more natural environmental aspects VECs. Groundwater and surface water quality and some of the terrestrial will be monitored (sec. 6.4 p. 154).
b)Are socio-economic components included in the monitoring program?	No socio-economic components will be monitored according to the EA.
c) Does the project make provisions for community based monitoring programs or link to monitoring data from other departments or agencies	The monitoring will be done in conjunction with consultation with TRCA.
d) Are there mechanisms to link monitoring to future management decisions?	Yes, anticipated during the permitting process for the Fisheries Act, the TRCA and MNR. Further links may be made in regional planning documents.
8) Environmental Assessment Planning Process	
a) Does the environmental assessment reflect values and objectives of strategic provincial policy other than the	The EA mentions how the project fits within the York Region Transportation Master Plan (YRTMP) although there is little or

ORMCP: Planning Act, Provincial Policy Statement, Greenbelt Plan, Places to Grow Act?	no reference to how the broader policy context. The connection to the Planning Act, the 2005 Provincial Policy Statement, the Greenbelt Plan, Places to Grow are all referenced in the York Region TMP (Regional Municipality of York, 2009, 24). This is a revised edition of the 2002 YRTMP which identified the project (sec. 1.3 p.5).
b) Does the environmental assessment reflect values and objectives of strategic regional and local policy, such as community visions, growth plans, master plans and official plans?	Yes, the EA references the YRTMP as well as secondary plans, official plans and local municipal plans and is in line with these documents policy objectives (sec. 1.1 p. 1).
c) Is the environmental assessment flexible enough that new considerations, such as new ecosystem components and new alternatives, can be incorporated at later stages.	There is no reference to the ability to add additional considerations in later stages.
d) Is the decision making process tiered?	Yes, there does seem to be integration of decision making at the planning level. There is reference to joint decisions in reference to salt management (sec. 6 p. 131), road design standardization (sec. 6 p. 115).

Table 2: Richmond Hill Elevated Tank and Yonge Street Water Main Class EA

Evaluation Criteria	**Richmond Hill Elevated Tank and Yonge Street Water Main Class Environmental Assessment**
1) Screening	
a) Does the screening criteria include whether the project is on the Oak Ridges Moraine?	Yes, the EA mentions that the project in located on the Oak Ridges Moraine (p.1-1). The entire project is on the ORM.
b) Does the screening criteria include land use designations, hydrologically sensitive features, and natural heritage features established by the ORMCP?	The land use designations described in the EA include Natural Core Area, Natural linkage areas, Countryside Areas and finally settlement areas (p. 2-4).
c) Does the screening criteria include whether the project impacts growth outside urban settlement areas?	It does not make specific reference to whether the project will impact growth outside of urban settlements but it does facilitate servicing the anticipated growth (p. 2-1).
d) Is the Schedule for the environmental assessment appropriate?	There are two parts of this infrastructure project the Yonge Street Water Main project is given a schedule A designation and the Elevated Tank was given a schedule B designation. The schedule A section is pre-approved (p.1-3).
2) Scoping Valued Ecosystem Components	
a) Does the scope include natural heritage features and hydrological features established by the ORMCP?	There are two alternative sites evaluated, both consider natural heritage features and hydrological features. There are no ANSIs, evaluated wetlands, ESAs, ORM Woodlots on the preferred site on Bloomington Road West and Yonge Street Main. The alternative to the preferred site is 30m from a minimum protection zone of a ORM woodlot and small seasonal wetland 110m NW of site (p. 7-2, 7-8).
b) Does the scope include social and economic values?	Yes, socio-economic values are evaluated in the EA such as noise, social impact on surroundings, aesthetic, recreational use (p. 7-5, p. 7-10).
c) How broadly scoped is the environmental assessment? Does the environmental assessment recognize how other	Scoping includes social-economic, cultural, and environmental elements.

issues such as housing, recreation and employment are integrated?	The assessment does recognize recreational issues however housing and employment are not touched upon.
d) Is the environmental assessment placed within a context of livability and sustainability?	The EA is not placed in the context of these two concepts.
3) Defining Alternatives	
a) At minimum do the alternatives distinguish between alternate locations and designs? Are there alternatives that are in least restrictive land-use designation or off the moraine?	The EA does distinguish between alternative designs and locations. In considering location an optimum elevation was required to minimize the size of the tank required and proximity to existing infrastructure was considered. There are no sites which are not on ORMCP land. There are (preferred) alternatives which are in Settlement areas which avoid use and development in the more vulnerable Natural Core and Natural Linkage designated regions (p.5-1). The EA also details that locations of the elevated tank were also evaluated as to whether they were in an area of high groundwater vulnerability (p.5-2).
b) Do alternatives move beyond location and design? Examples include modal split, new vs. intensification of existing infrastructure, prioritization of projects, other issues related to infrastructure (i.e. housing, recreation, employment, etc), underlying causes of infrastructure problem, new technology like wastewater reuse?	Alternatives do consider connecting to an adjacent system however the surrounding systems have capacity for expansion. Intensification of existing infrastructure is also considered by increasing supply from external water providers, increasing pumping capacity and increasing storage capacity (p.4-3).
c) Are alternatives that require coordination with another jurisdiction or another scale of governance considered?	The study area is on land which is managed by Ontario Realty Corporation which may trigger a ORC Class EA. This investigation will incorporate the ORC Class EA requirements (p. 2-5).
d) Is the no-build alternative considered? There are two ways to test the no-build alternative. Municipalities should establish the need by testing the “no-build alternative” rather than the less restrictive test in the MCEA.	The no-build alternative is considered as the do nothing alternative in which no action would be taken to expand the system (p.4-1). This option was rejected as it violates the goals and objectives of the Regional Official Plan, does not meet the needs of the

	anticipated growth in the region and puts adequite service to current residents at risk.
e) Are demand-side alternatives considered?	Yes, the EA considers the options to limit growth to a number of residents that the existing system could service and reduce water consumption to promote conservation and efficiency (p.4-1).
f) Is all information about all present and future development scenarios incorporated, including alternatives identified in master plans and growth plans?	The EA cites the YR Long Term Water Master Plan with the details that apply to the study area which is in Richmond Hill Pressure District #9 (p. 4-1).
4) Impact Prediction and Evaluation	
a) Does the environmental assessment identify direct physical impacts?	There are two preferred sites evaluated for impacts. The Bloomington Road West and Yonge Street Watermain site will have the direct impacts of anthropogenic vegetation and minimal disturbance to urbanized wildlife (p.7-2). There are no significant wildlife habitat areas and ground water is not expected to be encountered during the construction. At the second site in Briar Nine Park and Nature Reserve the direct impacts would be removal of cultural vegetation and some minor impact to largely urbanized birds and animals (p.7-8).
b) Does the environmental assessment identify indirect effects of future development and urban growth including linkages to potential future projects.	Although the reference to future developments or projects is vague. There is reference to meeting the needs of projected urban growth (p. 3-4).
c) Does the environmental assessment identify structural, functional and compositional effects?	The assessment does seem to touch on functional and structural components. Both preferred sites are evaluated for structural elements such as wildlife habitat and vegetation as well as functional components such as wetland viability (p.7-2)(p.7-8).
d) Does the environmental assessment identify upstream and downstream effects on the flows of wildlife and fish?	It reviews the effects on amphibians and wildlife flows without going to much detail due to the limited wildlife population (p.7-2)(p.7-8).
e) Does the environmental assessment identify social impacts? If so, are they addressed separately or as sustainable	Social impacts are discussed as part of the socio-economic section which is deemed to be positive in providing improved service to

assessment?	residents and may have a visual impact if the alternate site must be selected (p.7-10).
f) Does the environmental assessment identify cumulative impacts?	No it does not discuss cumulative effects.
g) Are significance judgments made about impacts?	Yes, that the impacts will be minor and the EA states that the majority of the indirect effects will be preventable if proper construction procedures are followed (p.7-2, p.7-8).
h) Are impacts measured qualitatively as well as quantitatively?	The potential impacts to the natural and cultural environment use qualitative descriptions but the majority of the information has been evaluated quantitatively.
i) Is the capacity of the natural environment and the availability of resources considered in measuring the impact of the project?	Yes, the EA discussed the minor impact due to the low capacity of the existing habitat and resources (p.7-10).
j) Is infrastructure facilitating development off the moraine, where it would not have been allowed on the moraine (i.e. leapfrogging effect).	Not discussed in the assessment.
5) Impact Mitigation	
a) Does the environmental assessment discuss methods to control the severity of impacts?	Several methods to control the impacts are discussed such as a spill prevention plan, a groundwater contingency plan, following prescribed localized construction plans, dust control, noise control and silt fencing drainage control (p.7-11).
b) Does the environmental assessment discuss ways to avoid the impact, including the area of the impact? Does it suggest whether the area of impact could be moved to off the moraine?	Through good practices in construction and the localized site the EA claims indirect impacts may be avoided and direct impacts will be minimal. The EA does not suggest as to whether the impact site could be moved off the moraine.
c) Does the environmental assessment discuss ways to improve or restore ecological functions beyond pre-construction conditions?	Not included in the document.
d) Will the infrastructure be built to be flexible and adapted to local conditions?	It may also for future connections to the other regions as outlined in the alternatives section.

6) Public Review and Consultation	
a) Are the aims of public consultation clearly stated?	The aim of public consultation was stated as contributing to preferred alternatives and identifying issues related to long term water supply in the area (p.6-2).
b) Does the environmental assessment meet or exceed statutory requirements for notification and participation?	Yes, there were two public consultation meetings as required by the Schedule B designation for the elevated tank (p. 6-1). No consultations are required for the Schedule A water main.
c) How early in the process is participation sought?	Participation was sought at the point of considering alternative sites and VECs.
d) How often is participation sought?	Public participation was requested twice June 8, 2006 and October 11, 2006. First to consider alternatives and then to provide feedback on preferred alternatives and preliminary design. Additional stakeholder consultation was requested at the convenience of the concerned group (p.6-2).
e) Are the methods used for public consultation appropriate for the Project?	Yes, the public consultations had display boards with alternatives being considered, consultants were available to answer questions, project information booklets were available and comment sheets were provided. At the second public consultation, there was a presentation to attendees (p. 6-2).
f) Does the environmental assessment utilize local knowledge?	Comments from the public and special interest groups were collected there is no direct discussion on how exactly this will be integrated into the decision making process.
g) Is input from public consultation used in the environmental assessment?	Yes, concerns are brought up as part of the assessment are included in the site assessment section and addressed it is not clear if these are the same concerns brought up by the public (p. 7-6).
h) Does the consultation program target specific groups, such as special interest groups, developers, and impacted residents as well as the general public.	Yes, environmental organizations, developers, ratepayers association, and residents from the alternative site were invited to participate (p.6-3).
7) Monitoring	

a) Does the project monitor all of the valued ecosystem components?	There is no reference to how a monitoring program will be implemented.
b)Are socio-economic components included in the monitoring program?	Not included in assessment.
c) Does the project make provisions for community based monitoring programs or link to monitoring data from other departments or agencies?	There is no reference in the assessment to links to these types of programs.
d) Are there mechanisms to link monitoring to future management decisions?	Not included in the assessment.
8) Environmental Assessment Planning Process	
a) Does the environmental assessment reflect values and objectives of strategic provincial policy other than the ORMCP: Planning Act, Provincial Policy Statement, Greenbelt Plan, Places to Grow Act?	The EA states that the development of the Elevated Tank and the Water Main do not reflect the values of Greenbelt Act and the ORMCP (p.2-5).
b) Does the environmental assessment reflect values and objectives of strategic regional and local policy, such as community visions, growth plans, master plans and official plans?	The EA references the York Region Official Plan, the York Region Long Term Water Master Plan, York Region Water and Wastewater Supply and Demand Monitoring Report and the interregional water agreements with Region of Peel and City of Toronto. The project does serve the goals of the YR Water Master Plan of meeting expanded needs of the system (p. 2-1).
c) Is the environmental assessment flexible enough that new considerations, such as new ecosystem components and new alternatives, can be incorporated at later stages.	Not stated clearly in the assessment.
d) Is the decision making process tiered?	Yes, there will be input from the ORC, the Region of York, as well as Aurora and Richmond Hill.

5.0 Discussion

5.1 Specific Adherence to Broughton's criteria

Both EA documents fulfilled the majority of criteria as set out by Broughton The following analysis will discuss the commonalities and differences between both documents. The criteria which were not fulfilled dealt with issues with longer temporal and spatial scopes such as urban growth and cumulative effects and will be discussed in section 5.1.2. Major differences between the impact evaluation and monitoring sections of the EA documents were linked to how the project was initially screened i.e. which Schedule was designated are discussed in section 5.1.3. The role of the public in the decision making process as relayed through the criteria is covered in section 5.1.4. Fulfilling ORM related criteria is discussed further is section 5.2.

To meet the research objective of reviewing Broughton's criteria, section 5.3 discussed issues related to its application. Section 5.4 reviews the limitations of the results and analysis.

5.1.2 Issues of Scope

For both EAs ? the scoping involved elements of social, economic and environmental values and is considered to be broadly scoped for involving these three qualities (criteria 2 b and 2c). However, there is no reference in either EA to the project or assessment being informed by the concepts of sustainability or livability (criterion 2d).

Although both EA documents did not delve into the root cause for the underlying infrastructure problem that the projects aim to solve, the alternatives that were provided went beyond design and location, and evaluated demand management options (criterion 3b). The “no build” option did allow both assessment documents to gauge a baseline as to how action would address their problem statement. The Leslie Street Road EA addressed how the “no build” option did not address the safety and structural issues of the road. Whereas, the NRH elevated tank EA stated that the “no build” option did not allow the municipality to comply with needs outlined in the Regional Official Plan (criterion 3d) (Steinemann, 2001).

The impacts discussed in the assessments were mainly related to the direct impacts to the immediate study area. Direct impact evaluation was principally a quantitative pursuit and qualitative details were reserved for socio-economic and cultural indicators (criteria 4h and 4e). Along with other impacts evaluated, restrictive or limited scoping can cause the EA to not consider cumulative effects as was the case for both of the EA reviewed (criterion 4f)(Cooper and Sheate, 2002). The EA documents did not discuss the projects implications to urban growth, facilitating growth or leapfrogging the moraine. All elements which were outside of this project level EA but these issues are some of the very issue which motivated community involvement and influenced the decision for moraine conservation and may be approached at the strategic level (Hanna and Webber, 2010)(Arce and Gullon, 2000)..

The follow up methods such as monitoring were not clear from the NRH elevated tank EA and were limited to environmental indicators for the Leslie Street Road EA (criteria 7a, 7b, 7c). The link to future management decisions were mainly related to

permits and requirements by regulation in environmentally sensitive regions (criterion 7d).

5.1.3 Influence of Screening

Steinemann identified the focus of environmental assessment in practice has the tendency to put more emphasis on analysis after many scoping decisions are already made and not illuminate how these decisions were made (2001). This was the most apparent in the initial screening of study areas for both EA documents as there was no clarification as to how the study areas were initially chosen.

Due to the nature of the Schedule C designation, which from a regulatory perspective requires more in depth environmental analysis and characterization, the Leslie Street Road EA discussed in detail the affects to the flows of wildlife, fish and amphibians in depth (criterion 4d) (MEA, 2007). The NRH elevated tank EA had a more abbreviated discussion due the more urbanized site alternatives presented. Further, the Leslie Street Road EA had a detailed plan for mitigation of impacts, which involved improving the wildlife corridor to conditions superior than prior to development (criterion 5c). The NRH elevated tank EA had no mention of this type of detail. Screening may have also had an effect on the lack of monitoring and follow up included in the NRH elevated tank EA which fulfilled none of Broughton's criteria (criterion 7). The Leslie Street EA in comparison had detailed follow up for environmental indicators. There was, however, regard for wildlife in relation to the ecosystem composition and structure in both EAs (criteria 4c).

Both assessments discuss impact mitigation strategies that target environmental and social impacts during the construction phase. These include taking precautions to

avoid biological lifecycle disruption such as considering breeding seasons to spill prevention and contingency plans (criterion 5a).

5.1.4 Integration of public feedback into the decision making process

Public participation was elicited and the requirements set out in the MCEA were fulfilled (criterion 6b). It was not clear exactly how the public values or concerns were being incorporated into the project specifications and how this communication would be maintained throughout the development process (criteria 6f and 6g). A variety of stakeholders were identified and incorporated into both assessments at the selection of alternatives stage (criteria 6h).

There was an element of flexibility in staff and consultants to provide more information in the form of direct dialogue and presentation. The staff and consultants also acquiesced to the requests from stakeholders to open meetings to more members of the public. (criteria 6e) (Webler, Krantenholz and Renn, 1995).

The Environmental Assessments did make the connection between how these projects were integrated into the planning process through reference to the regional infrastructure master plans for Transportation and Waterworks respectively, and through higher levels of decision making processes (criteria 8a, 8b, 8d).

5.2 Direct Regard for the ORMCP

The criteria, which pertained directly to the ORMCP, were fulfilled from identification that the project was located on the moraine (criterion 1a) to the types of

land use designations that were located in the study area (criterion 1b), and the scoping of hydrological and natural heritage features in the study area. As well, the EA documents take into account Alternatives that avoided Natural Core and Natural Linkage areas (criterion 3a). The Leslie Street Road EA discusses if the area of impact could be moved to avoid environmentally sensitive regions or be moved off the moraine and reasonably defends the position that the infrastructure cannot be moved. The NRH Elevated Tank EA does not discuss moving the site of impact (criterion 5b).

5.3 Facility of application of Broughton's criteria

Broughton's criteria are a specific and well-supported approach to evaluating environmental impact assessments on the Oak Ridges Moraine. Drawing on the legislation from sec. 41 of the Oak Ridges Moraine Conservation Plan and Municipal Class Environmental Assessment guidelines gives the methodology a clear advantage in applicability and comparison of assessment documents. In considering Broughton's criteria three elements of method evaluation were considered:

1. Can the criteria be used to evaluate significant qualities of the document?
2. How much knowledge is required to use the criteria? Who is the audience?
3. How much effort is required for the evaluation?

(Jefferies et al, 1991)(Yin, 2009).

The criteria were able to evaluate specific details on how the EA documents complied with the standards of the literature and the ORMCP. They helped to connect the specific execution of an isolated project level EA to larger issues of urban growth,

strategic directives from higher-level plans and scoping related to plan implementation. In terms of the knowledge required to use the method, at a minimum the reviewer would need background information on the process of environmental assessment and connecting the terminology used in the EA documents to that employed in the criteria. Other important concepts such as tiered decision-making, the importance of scoping and structural, functional, and compositional ecosystem characteristics, etc. would be an asset to a potential evaluator. Reasonably though, the terminology could be adapted to match the EA documents without compromising on utility for a wider use by a non-academic "citizen" policy monitor. Further, to complete the evaluation, the reviewer is required to examine the complete EA document and analyze in detail. The EA documents are cumbersome and laden with scientific and planning jargon. Overall though the criteria are useful and will aid in the completion of comparable EA evaluations from across the Oak Ridges Moraine.

Recommendations and future research directions are discussed in detail in section 6.

5.4 Limitations of Results

The results are limited by the fact that they cannot be generalized for all the projects or environmental assessments that are executed on the moraine. However, the results are qualitative and give detail on two specific project level environmental assessments. The results provide an adequate amount of detail and the recommendations will contribute to a grouping of environmental assessments reviewed from across Oak

Ridges Moraine Conservation Plan Area to be used in the Monitoring the Moraine Status Report.

There are other factors which may be contributing to the results and were not considered in the scope of this project. These are staff, budget, the design standards of the firm performing the assessment, political will surrounding the project and the integration of non-governmental organizations or other policy actors.

6.0 Conclusion and Further Research Directions

The objectives of this project were to evaluate the level of compliance of several environmental assessment documents prepared for infrastructure projects on the Oak Ridges Moraine using Broughton's (2008) criteria while testing the facility of the criteria to be applied to EA documents and make recommendations as to how to adapt the criteria.

The Leslie Street Road expansion and the North Richmond Hill Elevated Tank and Water Main Class Environmental Assessments fulfilled the majority of the criteria used in this analysis. Criteria that were not fulfilled were related to issues outside of the scope of the environmental assessment. Along with a grouping of other infrastructure environmental assessments they will contribute to policy monitoring on the Oak Ridges Moraine and the Monitoring the Moraine Status Report.

Further Research Directions

1. Although discussed briefly in section 5.3 Broughton's (2008) criteria could be adapted for a "citizen science" or community monitoring application. An EA database should be compiled online including infrastructure and development projects of interest to the Monitoring the Moraine coalition which would be easily accessible for evaluation.
2. Further research could be executed to determine the influence of the planning process and staff on the implementation of the EA

3. The criteria could be applied to an individual EA and to EAs in other jurisdictions in Southern Ontario.
4. Over time a project could track the efficacy of the MTM EA policy monitoring based on improvements seen in practice.

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