INFORMATION ITEMS

Week Ending June 27, 2014

REPORTS

1. Draft Guidelines for the Preparation of Environmental Impact Studies

CORRESPONDENCE

1. GTA West – Introductory Community Consultation Workshop for Stage 2 of the GTA West Transportation Corridor Route Planning and Environmental Assessment Study.

BOARDS & COMMITTEES

1. None

ITEMS AVAILABLE IN THE CLERK'S OFFICE

1. Application for Liquor Licence – Atmosphere Cafe + etc., 24 Carden St.
2. Application for Liquor Licence - 39 Carden Street (8419116 Canada Inc.), 38-40 Carden Street
3. Application for Liquor Licence – Cherry Blossom Sushi Bar, 103 Clair Rd. E., Unit 107

INFORMATION REPORT

TO	City Council
SERVICE AREA	Planning, Building, Engineering and Environment
DATE	June 26, 2014
SUBJECT	**Draft Guidelines for the Preparation of Environmental Impact Studies**
REPORT NUMBER	PBEE 14-42

EXECUTIVE SUMMARY

SUMMARY OF REPORT

To provide information regarding the release of a draft Guideline for the Preparation of Environmental Impact Studies (EIS Guide) document to the development community, partner agencies and other members of the public. The EIS Guide supports the implementation of the City's Natural Heritage System policies and contributes to improving the preparation and review of Environmental Impact Studies (EIS) as part of the process for reviewing development applications under the *Planning Act*.

To notify Council of the release of this draft EIS Guide and that the deadline for comments is August 15, 2014.

KEY FINDINGS

That the EIS Guide aligns with goals and objectives identified in the Integrated Operation Review (IOR), particularly as it relates to improving the development review process by providing better information management and communication between the proponent, City and the Environmental Advisory Committee (EAC).

That the purpose of this EIS Guide is to:

- Support implementation of the City's Natural Heritage System policies;
- Provide additional clarity for applicants on how to address/satisfy the environmental study requirements within the City's Official Plan as part of a planning application;
- Facilitate the consistent application of the Official Plan requirements for environmental impact study related policies for Terms of References for EIS and EIS reports;
- Provide additional clarity on the process for the submission and review of EIS Terms of References and EIS reports;
- Support improving the quality of Terms of References for EIS being received by the City, and subsequently the submission of EIS and Environmental Implementation Reports (EIRs);

- Support the objectives of the GRCA policies and regulations where they overlap with City Official Plan requirements; and
- Support improving the process and timelines associated with the circulation and review of EIS Terms of References and EIS reports.

FINANCIAL IMPLICATIONS
None

BACKGROUND

The City's Natural Heritage System – the rivers, forests, wetlands and wildlife habitats– play an important role in maintaining and enhancing the quality of life in the City. The importance attached to natural heritage is reflected in the Provincial Policy Statement, 2014 (PPS) and the City's Official Plan policies, as well as the policies and regulations of other agencies including the Grand River Conservation Authority (GRCA).

The protection, maintenance, enhancement and restoration of the City's natural heritage system are important planning objectives within the City's Official Plan. With the recent OMB approval of the Natural Heritage System Amendment (Official Plan Amendment 42), the new and revised policies that implement these objectives are now in place.

Environmental Impact Studies (EIS) are an important tool used through the development review process to help protect, maintain, enhance and restore the City's Natural Heritage System. The Natural Heritage System policies within the City's Official Plan contain minimum requirements for the preparation and submission of environmental studies.

Environmental Impact Studies are typically prepared and submitted in conjunction with planning applications (i.e. Official Plan Amendment, Zoning By-Law Amendment, Draft Plan of Subdivisions, Draft Plan of Condominiums and Consent applications), and are also prepared to support City initiated projects such as developing new municipal facilities, parks and trails. An EIS provides a framework for a proponent to address City and agency requirements related to the protection of the natural heritage and water assets by: providing a site-specific assessment of these assets, determining how and the extent to which these assets are expected to be impacted by the proposed development and identifying site-appropriate mitigation measures to avoid, minimize or compensate for negative impacts, including the identification of opportunities for restoration and enhancement. Often times, an EIS also requires input from other areas of expertise and other related studies (i.e. stormwater management).

The City's Environmental Advisory Committee (EAC) is made up of citizens with technical expertise appointed by Council to provide advice to City staff. The role of EAC is to review and provide feedback on environmental studies submitted in

conjunction with planning applications.

REPORT

In 2012 members of EAC approached City staff about the need to develop a guideline to support and enhance the preparation and review of an EIS. Staff agreed with the Committee that a guideline could assist in the implementation of City Natural Heritage System policies, as well as enhance and improve the process for preparing and reviewing EIS reports. Staff also recognized that an EIS Guide would align with the goals and objectives of the Integrated Operation Review (IOR), particularly as it relates to improving the development review process by providing better information management and communication between the proponent, EAC and the City.

Staff have worked with EAC in compiling and reviewing examples of similar guidelines from other municipalities, as well as looking at current and previous EIS submitted by the development community. These examples and experiences were used in the preparation of a draft EIS Guide for the City of Guelph. The development of this draft EIS Guide has included early input from the GRCA and the Ministry of Natural Resources (MNR).

Draft Guideline for the Preparation of Environmental Impact Studies (EIS Guide)

This EIS Guide is intended to be a resource for the development community (applicants, developers, consultants, etc.) to assist in the preparation, submission and review of an EIS.

This EIS Guide does not create new policies or application requirements, but is intended to provide direction on the implementation of the policies and requirements of the Official Plan and the PPS.

The purpose of this EIS Guide is to:

- Support implementation of the City's Natural Heritage System policies;
- Provide additional clarity for applicants on how to address/satisfy the environmental study requirements within the City's Official Plan as part of a planning application;
- Facilitate the consistent application of the Official Plan requirements for environmental impact study related policies for Terms of References for EIS and EIS reports;
- Provide additional clarity on the process for the submission and review of EIS Terms of References and EIS reports;
- Support improving the quality of Terms of References for EIS being received by the City, and subsequently the submission of EIS and Environmental Implementation Reports (EIRs);
- Support the objectives of the GRCA policies and regulations where they overlap with City Official Plan requirements; and

- Support improving the process and timelines associated with the circulation and review of EIS Terms of References and EIS reports.

City staff are releasing this draft EIS Guide and seeking input from the development community, partner agencies and other members of the public. The deadline for comments is August 15, 2014. The document may be refined subject to comments received. A copy of the draft EIS Guide is included as Attachment 1 and available on the City's website.

CORPORATE STRATEGIC PLAN

2.2 - Deliver Public Service better
3.1 - Ensure a well designed, safe, inclusive, appealing and sustainable City
3.3 - Strengthen citizen and stakeholder engagement and communications

DEPARTMENTAL CONSULTATION

Community and Social Services (Parks and Recreation)
Finance and Enterprise Services (Economic Development)
Operations, Transit and Emergency Services (Forestry)
Planning, Building, Engineering and Environment (Engineering Services and Water Services)

COMMUNICATIONS

A copy of the draft EIS Guide and supporting information is placed on the City's website at http://guelph.ca/living/environment/environment-planning/draft-guidelines-preparation-environmental-impact-studies/. Notices are also being sent to members of the development community (developers, planning and environmental consultants, etc.), as well as local environmental representatives and groups that participate in the review of development applications including EIS.

ATTACHMENTS

Attachment 1 - Draft EIS Guideline dated June 2014

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Guidelines for the Preparation of Environmental Impact Studies

June 2014 DRAFT

Foreword

This section is under development

Acknowledgements

This section is under development

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Introduction

The City of Guelph is committed to protecting its natural heritage and water assets in accordance with the Provincial Policy Statement. One of the key mechanisms to implement this commitment is through the Environmental Impact Study (EIS) process. An EIS is typically required when development is proposed within or adjacent to a significant, or potentially significant, natural heritage feature or area. An EIS provides a framework for an proponent to address the City's (and agencies) requirements related to the protection of natural heritage and water assets by: providing a site-specific assessment of these assets, determining how and the extent to which these assets are expected to be impacted by the proposed development (and/or site alteration), and identifying site-appropriate mitigation measures to avoid, minimize or compensate for negative impacts (including identification of opportunities for restoration and enhancement).

The main purpose of an EIS is to determine opportunities and constraints to development and assess the potential negative impacts on identified natural heritage features and areas, and their related ecological and hydrologic functions, based on site-specific assessments and technical analyses. However, an EIS also serves as both a planning and decision making tool.

"Mitigation", as it relates to natural heritage conservation, is defined as a three step process, as follows: (1) avoid, (2) minimize, and (3) compensate. In this process, avoiding impacts is always the preferred option, followed by minimizing impacts. Compensation for unavoidable impacts may not be an option for some features or functions, and where it is permitted should only be explored when all options for avoiding and minimizing have been carefully considered and deemed not feasible.

As a planning tool, an EIS can: (a) assist in avoiding or minimize negative environmental impacts by informing the design, timing and execution of a development proposal, and (b) compensate for unavoidable negative impacts by identifying opportunities for natural heritage enhancement and restoration. As a decision-making tool, an EIS should provide the information required by the City and the GRCA to determine whether the proposal complies with the applicable plans, policies and regulations. Ultimately, the EIS assists in informing the decisions made by City staff and Guelph City Council with respect to the nature and extent of the proposed development.

The purpose of this guide is to:

- assist proponents in the preparation of acceptable Terms of Reference and EIS reports by providing an outline of what is expected
- help proponents address the EIS requirements under the City's current Official Plan framework by providing technical guidance
- ensure greater consistency in the scope and quality of EIS submitted
- facilitate the review of EIS Terms of Reference and EIS reports by the City's Environmental Advisory Committee (EAC), and the River Systems Advisory Committee (RSAC) when appropriate, and support the relevant objectives of the Grand River Conservation Authority (GRCA), Province, and Federal government[1].

This guide contains four main sections, as follows:

- Planning Context for an EIS (*Section 2*)
- Process for Scoping an EIS Terms of Reference (*Section 3*)
- Process for Completion and Approval of an EIS (*Section 4*)
- Components of an EIS (*Section 5*)

Section 2 identifies and briefly describes the planning documents that trigger the need for an EIS, as well as information on when an EIS is required and who is qualified to prepare an EIS. *Sections 3 and 4* describe the submission requirements and the City's review process for an EIS Terms of Reference and an EIS respectively. *Section 5* provides a specific guidance regarding the expected content of an EIS – and a Terms of Reference. In particular, *Sections 5.1, 5.2 and 5.4* have been written to explain the level of information required in a Terms of Reference.

[1] Although this guide speaks to related policies and legislative requirements from the GRCA, Province and Federal government that need to be considered through the EIS process, this guide does not replace guidance from these jurisdictions, and it is the proponent's responsibility to consult with the appropriate individuals and sources directly.

Planning Context and Triggers for an EIS

The requirement for an EIS comes from the provincial requirement to apply the "no negative impacts"[2] test when development or site alterations are proposed within or adjacent to certain significant natural heritage features or areas. The local conservation authority may also require an EIS to support an application for development or site alteration within their regulated areas. The specific policy triggers at the provincial and municipal levels are presented below.

1.1 Provincial Context

The Province recognizes that the long term protection of natural heritage is an integral component to Ontario's prosperity. Through the Provincial Policy Statement (2014) which provides direction for, among other things, use and management of natural heritage and water resources in Ontario. Under the Wise Use and Management of Resources section of the Provincial Policy Statement (Section 2.0), there are policies that speak to:

- the long-term protection of natural heritage features and areas, and water quantity and quality
- the need for a natural heritage system to be identified[3]
- sustaining the diversity and connectivity of natural heritage systems by maintaining, restoring and, where possible, improving linkages between and among natural heritage features and areas, surface water features and ground water features, and
- ensuring development is in accordance with provincial and federal requirements related to fish habitat and the habitat of endangered and threatened species.

The Provincial Policy Statement also recognizes the Official Plan as the most important vehicle to implement the Provincial Policy Statement, and has policies specific to natural heritage features that don't allow for development or site alteration unless it can be

[2] The test of "*no negative impacts*" related to significant natural heritage features and areas is defined under the Provincial Policy Statement (2014) as "*degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified*".

[3] Notably, this requirement is not Province-wide but only applicable to Ecoregions 6E and 7E; the City of Guelph falls within Ecoregion 6E.

demonstrated that there will be no negative impacts[4] to the feature or its ecological functions. Typically an EIS is the mechanism by which this demonstration is provided.

Notably, Ontario's Ministry of Natural Resources (MNR) – a branch of the Provincial government - is responsible for interpreting and enforcing the requirements of the Endangered Species Act (2007), which includes legislation related to the habitat of provincially endangered and threatened species. Although an EIS is typically not required as part of the screening, assessment and permitting processes related to the Endangered Species Act, proponents are required to comply with the procedures and regulations under the act. This process is often undertaken in conjunction with a municipal EIS, and may impact its outcome if such species are confirmed within or adjacent to the study area. Links to Species at Risk websites, along with links to other planning and technical resources, is provided in Appendix A.

1.2 City of Guelph Official Plan

The Natural Heritage System policies are part of the City of Guelph's Official Plan and represent a comprehensive approach for maintaining, restoring and enhancing the Natural Heritage System.

In 2009, the City completed a Natural Heritage Strategy which provided the technical basis for updating the City's natural heritage data, mapping and policies within the framework of a Natural Heritage System. This study informed the development of the Natural Heritage System policies and schedules contained within the Official Plan.

The City's Natural Heritage System is comprised of Significant Natural Areas, Natural Areas, and other related components (e.g., wildlife crossings, the urban forest). It also includes a specific section related to Environmental Study Requirements which sets out the minimum requirements for Environmental Impact Studies.

1.3 When is an EIS Required?

An EIS is required in the City of Guelph when development is proposed within or adjacent to certain natural heritage features or areas. Under the City's current Official Plan, no development or site alteration is permitted within certain natural heritage features and

[4] The test of "no negative impacts" related to significant natural heritage features and areas is defined under the Provincial Policy statement as "degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified".

areas (i.e., Significant Natural Areas). However, an EIS is still required for proposed development in lands adjacent to such features and areas, as per *Table 1* below. Development or site alteration may be permitted within other types of natural heritage features or areas (i.e., Natural Areas) in the City of Guelph only if an EIS can demonstrate that the feature or area does not meet the criteria for significance or preservation specified in the Official Plan. For these natural heritage features and areas, an EIS is required for proposed development within or adjacent to the feature or area, as per *Table 1* below.

Table 1 identifies when an EIS is required and provides a summary of the natural heritage features and areas, and the associated adjacent lands that trigger an EIS requirement, as identified in the City's Official Plan. According to the Official Plan, an EIS may be required as part of a development application or with applications under the City's Site Alteration By-law or Private Tree Protection By-law. As well, municipal project such as park or municipal infrastructure developments may require an EIS, or may follow an Environmental Assessment process that conforms to the City's Official Plan.

The mapping of the Natural Heritage System included in the Official Plan is based on the best available information at the time the natural heritage policies in the Official Plan were updated (2010). It is important to understand that the City has not been comprehensively surveyed for all flora, fauna or their habitats. Furthermore, natural systems are dynamic and can change over time. As such, when new or updated information becomes available additional natural heritage features and areas may be identified. Newly identified natural heritage features and areas must meet the applicable definitions and criteria contained within the Official Plan.

Table 1. Summary of adjacent lands for natural heritage features and areas

Natural Heritage Features and Areas	Development involves lands within the natural heritage feature or area	Development involves adjacent lands
Significant Natural Areas		
Significant Areas of Natural and Scientific Interest (ANSI)	Development is not permitted	EIS required for development within 50 m - 120 m
Significant Habitat of Endangered and Threatened Species		EIS required for development within 120 m
Significant Wetlands (Provincially and Locally Significant)		EIS required for development within 120 m
Surface Water and Fish Habitat (cool. cold and warm water)		EIS required for development within 120 m
Significant Woodlands		EIS required for development within 50 m
Significant Valleylands		EIS required for development within 50 m
Significant Landform		EIS required for development within 50 m
Significant Wildlife Habitat (including Ecological Linkages)		EIS required for development within 50 m
Restoration Areas		No adjacent lands
Natural Areas		
Other Wetlands	EIS required	EIS required for development within 30 m
Cultural Woodlands		EIS required for development within 50 m
Habitat for Significant Species		EIS required for development within 50 m

1.4 What Qualifications are Required to Prepare an EIS?

An EIS is to be prepared by a qualified professional, or team of professionals, with relevant environmental expertise. In general, an EIS should be authored, or at least reviewed, by a Senior Ecologist or comparable professional with more than five years of applied experience conducting environmental impact assessments.

The associated field program is to be completed by professionals qualified in the disciplines relevant to the components of the report to which they are contributing.

For example:

- If the boundary of a wetland, including a Provincially Significant Wetland, requires confirmation, then the assessor must be a wetland evaluator certified by the Ministry of Natural Resources (OMNR).
- If Ecological Land Classification (ELC) is being completed or refined, then the assessor must have completed ELC training and obtained a certificate from a recognised training program.
- If bird studies are being completed, then the assessor should be a qualified biologist specializing in avian identification in the field.
- If a tree assessment is being completed, then the assessor should be a Certified Arborist or Registered Professional Forester.

The main author preparing the EIS must also work in conjunction with other professionals to integrate the information contained in other supporting plans and studies (i.e., hydrogeological studies, storm water management plans, geotechnical reports, lot grading and drainage plans) as required.

1.5 Grand River Conservation Authority (GRCA)

The *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* (O. Reg. 150/06) made under the *Conservation Authorities Act* requires proponents to acquire permission from the GRCA prior to any development or site alteration within or adjacent to river or stream valleys, watercourses, hazardous lands and/or wetlands. Development or site alteration taking place on these lands may require a permit to confirm that the control of flooding, erosion, dynamic beaches, pollution or the conservation of land is not affected. An EIS may be required to satisfy the GRCA's permitting requirements under this regulation; however an EIS completed for the City can typically fulfill the GRCA requirement as well.

Typically, EIS developed for the City of Guelph within GRCA regulated areas will be circulated to the GRCA to: (a) address their regulatory requirements, and (b) for their comment and review.

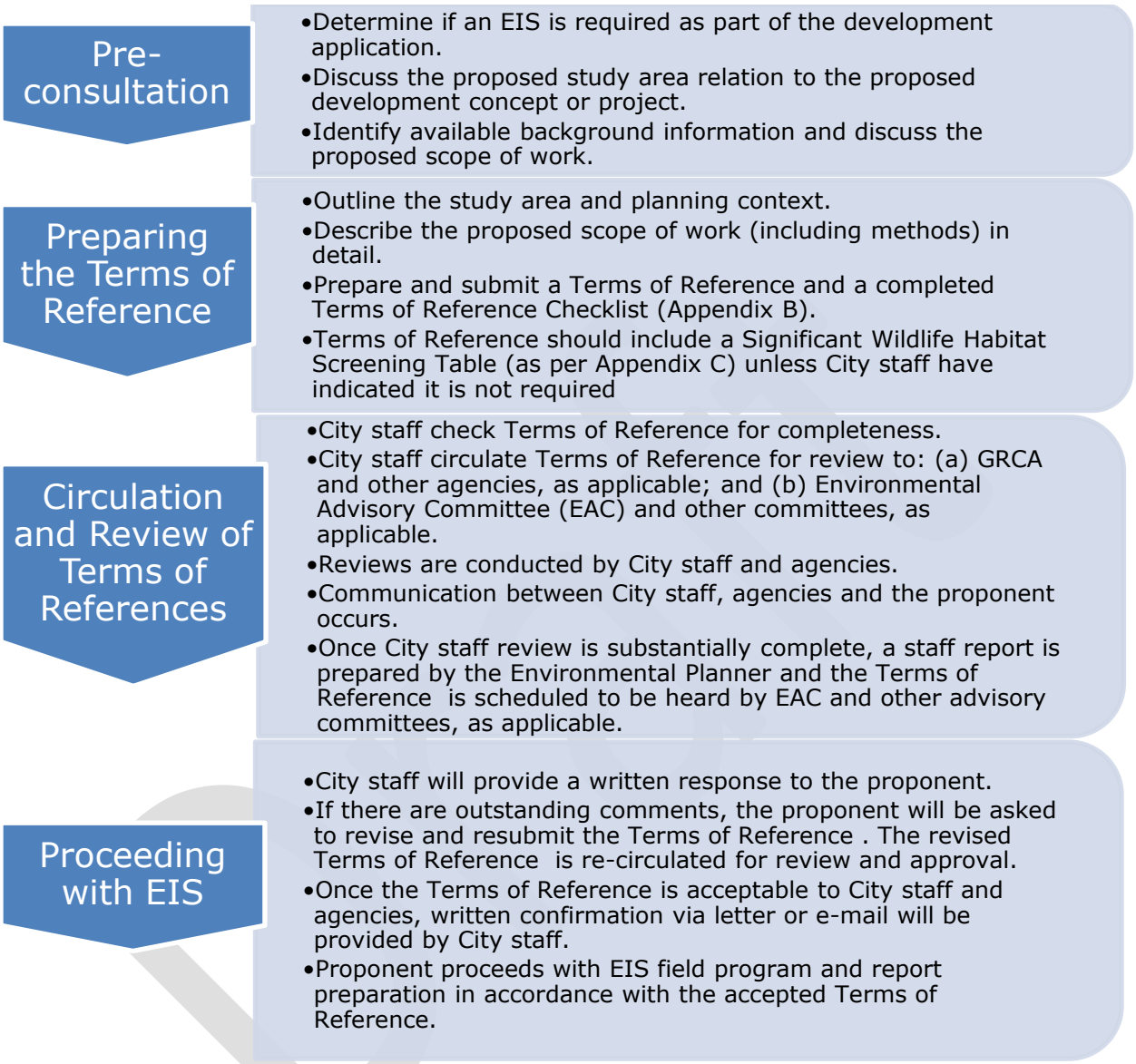
Process for Scoping the Terms of Reference

It is recommended that an EIS be started early in the development process to identify natural heritage features and areas that need to be protected, and potential development constraints associated with these features and areas, prior to the development of a detailed site plan. There are also specific timing windows associated with different types of surveys which, if missed, can delay the planning process. Therefore, having a Terms of Reference that has been approved by the City as early in the process as possible is highly recommended.

A Terms of Reference for an EIS must be submitted to, and approved by, City staff prior to the submission of an EIS. The Terms of Reference will: establish the extent of the study area, characterize the general nature and extent of the development proposal, briefly summarize the planning context and known triggers for the EIS (e.g., natural heritage designations, GRCA regulatory areas, etc.), outline the proposed approach and methods for undertaking the study, and outline the components to be addressed through the study analyses. Although it is understood that only preliminary information is usually available at the time of Terms of Reference development, it is expected that the Terms of Reference clearly outline the proposed report components, study approach and methodology.

Figure 1 outlines the process for submitting a Terms of Reference. Further details regarding this process are provided in the following sub-sections (3.1, 3.2, 3.3 and 3.4). *Appendix B* provides an EIS Terms of Reference Checklist that identifies all the elements to be addressed. Section 5 of these guidelines provides more information regarding the City's expectations with respect to background review, field assessments, data analyses, monitoring and reporting.

Figure 1. Process for Submitting an EIS Terms of Reference



1.6 Pre-consultation

Within City's Official Plan under the General Policies for Environmental Study requirements it states that: "*The scope of an EIS must be determined in consultation with the City, the GRCA and applicable Provincial ministry, where one or more of the potentially impacted features or functions fall under their jurisdiction*". Where an EIS is required as part of a complete development application, development of a Terms of Reference for the EIS is led by the City's Environmental Planner in advance of developing the EIS.

Telephone or e-mail inquiries for natural heritage information may form part of, but do not constitute, pre-consultation for *Planning Act* applications. Pre-consultation consists of a formal meeting between the proponent and City staff to review and discuss a development concept, natural heritage policies and regulations that need to be considered, available background reports and/or data, and the scope of the EIS. GRCA and other agencies may take part in pre-consultation where it is recognized that there is a concurrent review process.

Pre-consultation helps ensure that potential natural heritage features and areas, and other potential regulatory constraints, are identified early on, and that the full range of potential constraints to development are considered through the EIS (and the broader planning) process.

Specifically, pre-consultation is needed to:

i. Establish the extent of the study area[5] and the scope of the EIS;
ii. Identify critical information and analysis required by the City to make informed decisions related to the City's Natural Heritage System, and its ecological and hydrologic functions;
iii. Identify requirements for related studies (e.g., hydrologeologic, geotechnical, stormwater management)
iv. Ensure that all existing relevant studies and background information are considered;
v. Establish realistic timelines for the preparation and review of an EIS; and,
vi. Avoid unnecessary field work, addendums and major design changes later in the planning process.

As part of this process, all sources of background information to be considered should be identified (as per item ii above), particularly sources and / or data that will require a formal request and take some time to obtain. Some of this information may be found within City documents such as subwatershed plans, environmental management plans, and the *Natural Heritage Strategy Phase 2* Report, or within other documents including environmental studies completed for adjacent properties, provincial/federal databases, local environmental/naturalist groups and relevant scientific literature. For reference, a list of potentially useful background resources has been included in *Appendix A*. However, this list

[5] Typically the "subject property" refers to the parcel(s) of land owned by the proponent on which development (and / or site alteration) is being proposed. The "study area" typically includes the subject property as well as adjacent lands that need to be considered in relation to natural heritage features and areas, regulated features and / or their functions. This area is typically within 50 m to120 m from the natural heritage feature boundary (see *Table 1*).

is not exhaustive, and the resources listed will not be applicable to every development proposal within the City.

1.7 Components of the Terms of Reference

Based on feedback received through the pre-consultation meeting (and input from qualified professionals as required), the proponent will prepare a Terms of Reference. The primary purpose of the Terms of Reference is to establish the scope of the EIS, since the level of study required can vary depending on the type of development proposed, the site conditions, and the nature of the natural heritage features and areas (and / or regulated features) within and / or adjacent to the subject property.

Generally, a Terms of Reference should include:

- INTRODUCTION:
  - A general description and mapping of site / subject property, surrounding landscape and study area.
  - A general description of development concept and a concept plan.
  - A general description and mapping of the natural heritage features and areas (and regulated features) triggering the requirement for an EIS.
- PLANNING CONTEXT: Current and applicable land use designations and zoning, required development applications, and a list of relevant plans, policies, and regulations to be considered. (Note: this could be included in the Introduction).
- BACKGROUND REVIEW: A list of all background sources to be reviewed. (Note: could be included in the Characterization section)
- CHARACTERIZING THE NATURAL ENVIRONMENT - APPROACH AND METHODOLOGY: Proposed field work and methodology for assessing the various disciplines (i.e., soils, geology, hydrology, hydrogeology, fish habitat, vegetation and wildlife) in the context of the EIS. The presence or absence of any natural hazards and any ecological connections / linkages / landscape functions will also need to be considered. This section should also identify any natural heritage assessments that do not need to be undertaken and a rationale for their exclusion. This should include a Significant Wildlife Habitat Screening Table (as per *Appendix C*) unless the City has indicated one is not required.
- DATA ANALYSIS: A brief outline of the proposed approach to undertaking the following analyses: evaluation of significance, assessment of opportunities and constraints, impact assessment, evaluation of alternative options / measures,

recommended mitigation measures (including opportunities for enhancement, restoration and / or compensation), and environmental policy analysis. The requirements related to water balance analyses should also be specific in the Terms of Reference. More detail about the expectations regarding these analyses is provided in *Sections 5.3 to 5.8*.

- MONITORING: Outline the scope of the monitoring plan and the type(s) of monitoring being proposed.
- CONCLUSION: A statement that a summary of all recommendations emerging from the EIS, as well as a statement about whether or not there will be no negative impacts (if the recommendations are implemented) will be provided as part of the EIS

A checklist has been developed to assist in developing a complete Terms of Reference, provided in *Appendix B*. It should be submitted to the City along with the Terms of Reference.

More specific guidance related to the various components that should be considered for inclusion is provided in *Section 5*.

1.8 Circulation and Review of EIS Terms of Reference

The City's Environmental Planner will screen the submitted EIS Terms of Reference for completeness and, if found to be complete, circulate to the GRCA, other City staff, and any other applicable agencies and / or advisory committees for review and input. Reviews are conducted and communication between City staff, agencies and the proponent occurs. There may be a need for technical discussions and meetings during the course of review.

Once City staff review is substantially complete, the Terms of Reference will be scheduled to be presented to the Environmental Advisory Committee (EAC) and/or other advisory committee(s), if applicable. A staff report will be prepared by the Environmental Planner and presented to the committee(s) summarizing staff comments and recommendations. In order to provide a comprehensive report, the Environmental Planner may wish to receive feedback from key agencies or City departments (e.g., such as GRCA or the Parks and Recreation Department) prior to taking the Terms of Reference to committee.

1.9 Approval of EIS Terms of Reference

The Environmental Planner will consolidate all comments received from partner agencies and the advisory committees and provide a written response to the proponent. Based on the comments received from agencies and the committee(s), staff will determine whether the Terms of Reference establishes the appropriate scope to address City requirements, or if revisions are required. If there are outstanding comments, the proponent will be asked to revise and resubmit the Terms of Reference.

Once City staff and other affected agencies (e.g., the GRCA) are satisfied that all comments have been adequately addressed, a letter or email confirming approval of the Terms of Reference will be provided to the proponent. The proponent may then proceed with the EIS field program and report preparation in accordance with the accepted Terms of Reference.

Where an EIS is required under GRCA policies and regulations, but is not otherwise required to address City policies, the proponent should contact the GRCA directly regarding the EIS process and requirements.

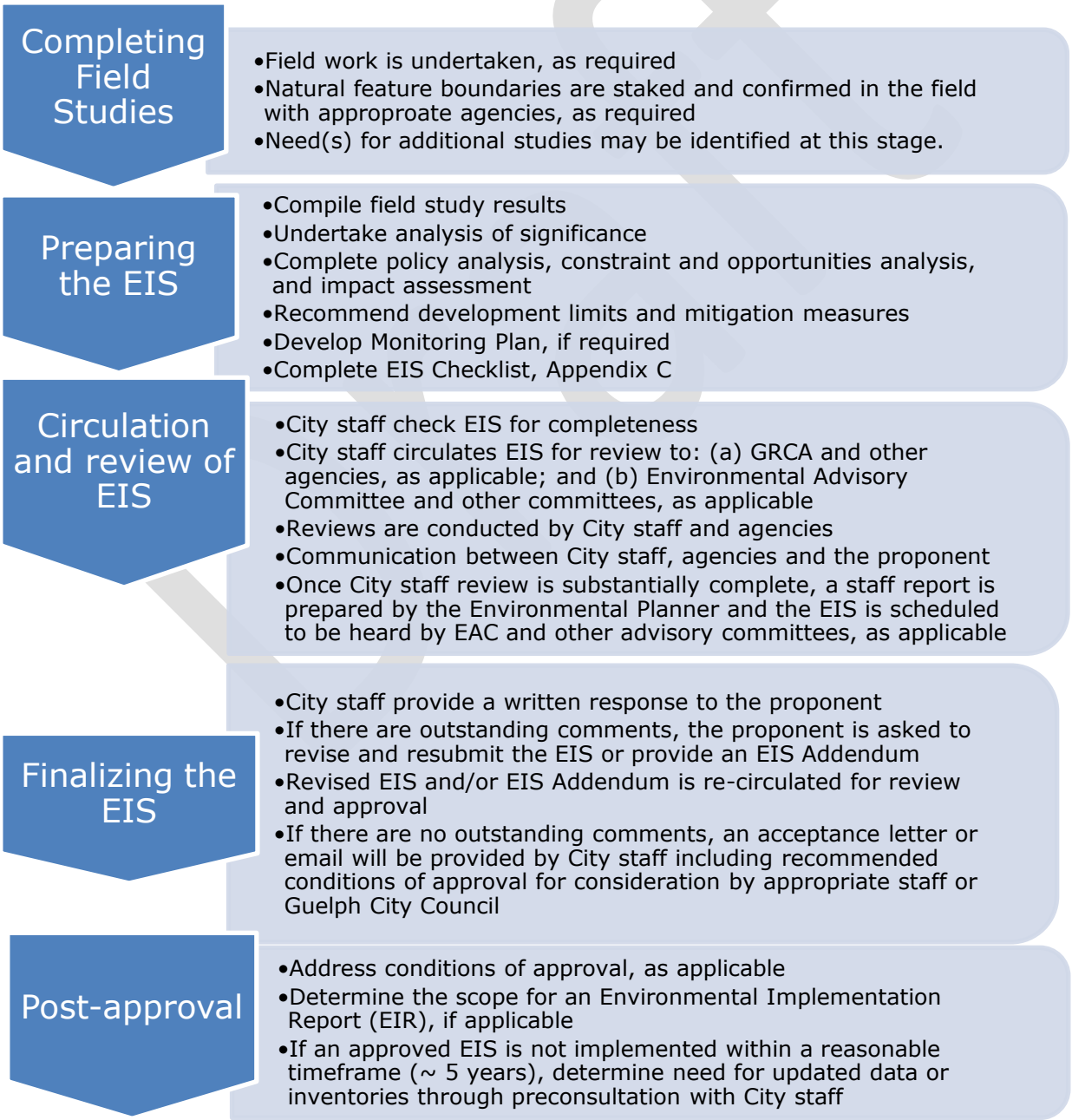
Process for Completion and Approval of an EIS

Upon the City's approval of the Terms of Reference, the proponent can complete the required field studies, and prepare and submit the EIS. A diagram outlining the process for completing and submitting an EIS is shown in *Figure 2* below. More details about this process are provided in Sections 4.1 through 4.5 below.

1.10 Process for Preparing and Submitting an EIS

Depending on the nature of the natural heritage features and areas within the study area, and the extent of current background information available, an EIS may require a multi-season field program targeting the full range of wildlife groups, or may be scoped to focus on one or two seasons of data collection for only some types of plants or wildlife. Proponents should engage the City, GRCA and other agencies as applicable (e.g., MNR,

Figure 2. Process for Preparing and Submitting an EIS



Department of Fisheries and Oceans (DFO)) in order to identify these requirements early in the development process. Field studies and the confirmation of feature boundaries must be completed (with appropriate personnel in attendance) according to the approved Terms of Reference, as described in Section 3 of these guidelines. More detailed guidance related to undertaking field studies is provided in Section 5.2 of these guidelines and the supporting appendices.

From time to time the need for additional field studies may be identified following finalization of the Terms of Reference. This could happen for several reasons, such as:

- A significant species or significant natural feature or area not previously known to be found in the area is identified during the course of field work
- Changes to a species status (e.g., becomes listed under the *Endangered Species Act* or *Species at Risk Act* while the study is in progress), or
- Changes to a natural heritage feature or area's status while the study is in progress (e.g., completion of a wetland evaluation or re-evaluation).

In such cases, City staff will work with the proponent to minimize potential delays. The proponent should contact City staff to discuss any potential changes to the study scope as soon as the information arises. A revised method or approach should be proposed and agreed to by the proponent, the City and any applicable partner agencies prior to any additional field study taking place.

1.11 EIS Submission Requirements

When preparing the EIS, the structure of the EIS should mirror the approved Terms of Reference. All of the information gathered needs to be included within the EIS and submitted as a complete document, either in the body of the report or in the appendices.

Report standards

A checklist for EIS submission is included as part of this guide in *Appendix H*. As part of this checklist, minimum reporting standards have been included to assist in the preparation of the EIS Report. A copy of the completed checklist is to be provided along with the EIS submission to assist in staff's review for completeness.

Field data collection and "shelf life"

An EIS must be based on data that is current and collected using established protocols and standards. This includes the field data collected by the proponent as it informs the analysis, recommendations and conclusions that are provided within the EIS.

Field data reflects the site conditions at the time of collection. Over time, conditions on site can change due to a variety of reasons (e.g., vegetation growth, disturbances, and shifts in vegetation community composition). This can affect the accuracy and representativeness of the field data. The "shelf life" of field data can vary depending on the type of data, the site or the surrounding conditions. The City generally considers field data older than five years to be limited in its accuracy, and will generally request that updated field studies be completed in such cases. Older field data can, and should, still be used as sources of background information for the scoping of a Terms of Reference and preparation of an EIS.

Digital information

Through the preparation of an EIS, boundaries of natural heritage features may be refined. In order to maintain updated Official Plan and Zoning by-law mapping, spatial data (once finalized through an approved EIS) should be sent to the City in an AutoCAD, ESRI shape file or ESRI geodatabase format. Typical digital mapping data that would be submitted include Ecological Land Classification polygons (and related metadata), as well as records of significant species observations.

As part of the submission, a digital PDF version of the EIS report, including all maps, drawings and figures, is to be submitted on a DVD or flash drive. Within the digital submission, species lists should be provided in excel spreadsheet format.

Hard copy submission

When submitting the EIS, a minimum of sixteen (16) hard copies of the EIS are required. This includes copies for internal City departments, partner agencies, and EAC. In circumstances where a development proposal is in proximity to the City's *River System*, an additional nine (9) copies of the EIS may be required for the City's River System Advisory Committee. The precise number of copies should be confirmed with the City's Environmental Planner prior to submission.

1.12 Circulation and Review of EIS

The EIS is to be submitted to the City as part of a complete development application. Once the submission has been received, staff will check for all of the required studies and reports as per mandatory preconsultation requirements. As part of this process, the City's Environmental Planner will review the EIS for completeness. In the event that there is insufficient content or amount of detail within the document, the application will be deemed incomplete, and City staff will provide preliminary comments on issues that need to be addressed. This will be based in part on the City's EIS checklist and the approved Terms of Reference.

If major issues which require further clarification or coordination are identified during the review, the proponent may be asked to revise or supplement the EIS prior to it being presented to the City's advisory committees. If no major issues requiring further clarification or coordination are identified, the Environmental Planner will proceed with the preparation of a staff report to facilitate the advisory committee review. Feedback from other City departments and/or partnering agencies may be required in order for the Environmental Planner to finalize a staff report. It is expected that the staff report provided to advisory committees is comprehensive and succinct.

Once a complete application is received, City staff will circulate to partnering agencies, other City departments/staff and advisory committees (as applicable) for a detailed review. The City's Environmental Planner will coordinate the review of the application with the Environmental Advisory Committee (EAC) and the River System Advisory Committee (RSAC), as applicable. Once staff review is substantially complete and a staff report prepared by the Environmental Planner, the application will be scheduled on the appropriate advisory committee agenda(s).

Environmental Advisory Committee (EAC) review

EAC is a citizen technical advisory group mandated to review development applications requesting approval of a Plan of Subdivision, Zoning Bylaw or Official Plan Amendment (or any combination thereof) and to provide environmental advice. As a technical committee the EAC is expected to make informed comments on areas such as ecology, biology, hydrogeology, and hydrology. The members of the Committee are appointed by City Council based their technical abilities, and are expected to use these abilities to make unbiased comments and formulate their opinions (as outlined in the EAC GuideBook). EAC's review of

a submitted EIS informs staff comments and recommendations, as well as Council's decision.

City staff must circulate an EIS to EAC a minimum of thirty (30) days prior to the proposal being heard at a meeting of the Committee, and a Terms of Reference a minimum of fifteen (15) days prior. The Environmental Planner will prepare and present a staff report summarizing the EIS and staff comments for the Committee. The proponent, as well as members of the public, will also be provided with an opportunity to address the committee prior to their decision to either support, defer, or reject an EIS. More information regarding EAC, their mandate and procedures can be found on the City's website.

River Systems Advisory Committee (RSAC) review

Where development applications are adjacent to the City's river system, the associated EIS may also be circulated to RSAC for review and input. RSAC is a citizen technical committee appointed by Council that provides advice and assistance to City staff and Council on issues that impact the City's river system. More information regarding RSAC and their mandate can be found on the City's website.

It will be determined during the Terms of Reference review process (see Section 3 of these guidelines) whether the EIS is to be circulated to RSAC. In cases where RSAC is to be circulated, City staff will circulate the EIS a minimum of thirty (30) days prior to being heard at a meeting of the committee. The Environmental Planner will prepare and present a staff report summarizing the EIS and staff comments for the committee. The proponent, as well as members of the public, will be provided with an opportunity to address the committee prior to their decision to either support, defer, or reject an EIS.

Peer review

In some circumstances the City may determine that an independent peer review of the EIS is required. A peer review may be required when technical expertise cannot be provided by City staff, under circumstances where there is an extraordinarily high level of public interest, or where there is a substantial difference of opinion between the proponent and City staff. In these cases, the City will arrange for the services of a third party peer reviewer. The cost of such a review may be shared between the City and the proponent or may be paid entirely by the proponent and will be determined on a case by case basis.

1.13 Finalizing the EIS

The Environmental Planner will consider the feedback and input from the GRCA, advisory committees and other City staff when making a decision regarding whether to approve, defer or reject the EIS. The response will include technical comments, explain whether a resubmission is required in order to address any outstanding concerns and outline the procedure to move forward.

In some cases, an EIS Addendum will be adequate to address any outstanding comments and issues. In other cases, a revised EIS may be required. In either case, a cover letter explaining the purpose of the submission and including a comments-response matrix is helpful to facilitate the review process. A revised EIS or an EIS Addendum should be date stamped. Revised submissions or Addenda will be re-circulated to the appropriate City staff, partner agencies and the advisory committees.

Once all outstanding comments are addressed, the Environmental Planner will provide the proponents and the City's Development Planner with a letter or email confirming that the EIS is acceptable to the City including the date/version of the final submission. This correspondence will also include conditions of approval recommended by the Environmental Planner to be considered by Council. In addition, all motions passed by advisory committees will be provided for Council's consideration in decision-making.

1.14 Post approval

Post Approval Addenda

Although, normally, the approved EIS is the document that is used as the basis for recommendations made in the Subdivision or Site Plan Agreement, in some cases a post approval EIS addendum is needed. Post approval addenda to the EIS may be required by the City for reasons related to the planning process or the changes in the applicable environmental legislation or science, such as:

- The amount of time that has elapsed between initial approval (i.e., Draft Plan Approval of Subdivision) and final approval/registration when construction may begin
- The initial development application may have been red-line revised due to other technical requirements such that the recommended development limits and/or mitigation measures need to be re-considered.

- Changes to the status of a species (e.g., it becomes listed under the *Endangered Species Act* or *Species at Risk Act*) or of a natural heritage feature or area (e.g., a wetland is evaluated as Provincially significant) that potentially impact the development limit and / or recommended mitigation measures;
- A different mitigation practice is proposed in response to new or emerging science; or
- Changes to the development proposal which affect the development limits and /or mitigation plan set as out in the approved EIS.

The purpose and scope of any proposed EIS addendum should be reviewed and approved by City staff. Depending on the extent of the changes, staff may also consider it more appropriate to update the approved EIS.

Environmental Implementation Report (EIR) requirements

Depending on the nature and complexity of the development application, the City may require the preparation of an Environmental Implementation Report (EIR) as a condition of approval in addition to an EIS. While an EIS typically confirms site-specific conditions and applicable policies / legislation, and recommends an appropriate development limit and mitigation measures based on this information, and EIR is intended to provide more specific direction for implementing these recommendations.

An EIR typically:

- A description of how all the conditions of approval are have been met;
- Indicates how municipal infrastructure servicing, including but not limited to trails, stormwater management facilities and the protection of natural heritage system and the associated ecological and hydrological functions have been addressed;
- Provides detail on how the protection of significant natural heritage features and their functions, and the NHS as a whole, have been addressed;
- Identify and provide specific direction for any other special requirements to support the protection and / or management of a significant natural feature or area (e.g., management prescriptions, content and layout of educational packages, etc.);
- Provides site-specific details for mitigation measures (including restoration/compensation plans);
- Provides site-specific guidance for any monitoring plans; and

- Provides site-specific details for any landscaping plans, including demarcation and trail design, typically prepared by a member of the Ontario Association of Landscape Architects (OALA).

Components of an EIS

This section provides guidance related to the requirements related to the expected format, content and supporting field work to be completed as part of an EIS. For some topics, this guidance is supplemented by appendices that describe recommended methodologies and / or preferred options for undertaking field studies for certain types of field work.

The format of the EIS is expected to mirror the sections below, which are also included in *Appendix H* (the EIS Submission checklist). The expected format of the report itself and associated maps is also provided in *Appendix H*. The required sections, for which additional guidance is provided below, are as follows:

- Introduction (*Section 5.1*)
- Planning Context (*Section 5.2*)
- Background Review (*Section 5.3*)
- Characterization of the Natural Environment (including Field Studies) (*Section 5.4*)
- Data Analyses (*Section 5.5*)
- Monitoring (*Section 5.6*)
- Recommendations and Conclusion (*Section 5.7*)

Notably, not all of the sub-components described under *Section 5.4* will necessarily be appropriate or required for every EIS, but this section identifies all the components that need to be considered. Ultimately, the approved Terms of Reference (see Section 3 of these guidelines) will dictate the scope of work required.

1.15 Introduction

The introduction section is intended to provide an overview of the development proposal, the subject property and the site context.

- SUBJECT PROPERTY[6]: A description of the subject property. This generally includes an overview of vegetation cover and known natural heritage features and areas, hard surfaces or any existing buildings / structures. In addition, historical context should be provided with particular focus on any past filling or grading activities, changes in vegetation cover and / or site contamination.
- DEVELOPMENT PROPOSAL: In describing the development proposal, the proponent should detail the type and scale of proposed development along with details such as the proposed density and land uses. Related improvements to servicing, infrastructure and stormwater facilities expected to be required, as well as design features such as trails and / or public amenities being proposed should also be outlined.
- SITE CONTEXT / STUDY AREA: A brief description of the subject property in relation to the surrounding landscape with respect to vegetation cover and known natural heritage features and areas in the adjacent lands, land uses and any existing buildings or associated infrastructure.

Maps and/or other supporting visuals need to be included showing both the subject property and the broader study area[7]. A current aerial photograph should be included in the introductory map showing information such as roads, lot lines, easements, existing buildings, drainage features, and known natural heritage features and areas including watercourses. Maps should be scaled to include the surrounding lands.

1.15.1 Trails and demarcation

All development should be planned with consideration for trails, and in particular with the objective of providing trails to reflect the intent of the *Guelph Trail Master Plan.* Where trails are incorporated into the proposal, the EIS should include details such as the general alignment, the design standard and the timing of construction. Where trails are located between rear lot lines and protected natural features and areas, consideration should be given to balancing appropriate access and connectivity, and protecting the natural feature / area by, among other things, preventing encroachments into natural features and areas by providing clear demarcation of boundaries.

[6] Typically the "subject property" refers to the parcel(s) of land owned by the proponent on which development (and / or site alteration) is being proposed.

[7] The "study area" typically includes the subject property as well as adjacent lands that need to be considered in relation to natural heritage features and areas, regulated features and / or their functions. This area is typically within 50 m to120 m from the natural heritage feature boundary (see *Table 1*).

1.16 Planning Context

The Planning Context for the development proposal must be established either within the Introduction (for simpler EIS), or in a standalone section following the Introduction (for more complex EIS). The Planning Context section must:

- Identify the current zoning and land use designations for the subject property and study area
- Identify the required planning applications, if any, required for the proposed development (e.g., Official Plan Amendment, Zoning By-law Amendment, Plan of subdivision)
- Where a property is not uniformly zoned or assigned a single land use designation, include maps of existing and proposed zoning and land uses, and
- Identify environmental legislation, regulations and policies that are relevant to the proposed development, including specific clauses that are relevant to the proposal.

The purpose of this section is to establish the planning framework, and particularly the environmental planning context, within which the EIS will be screened for compliance in the Environmental Policy Analysis section at the end of the EIS. In the City of Guelph, key planning documents to be considered include, but are not limited to:

- City of Guelph Official Plan (including OPA 42 Natural Heritage System OMB Approved , June 4 2014 consolidation)
- City of Guelph Zoning By-Law
- Provincial Policy Statement (2014)
- Significant Wildlife Habitat Technical Guideline (2000) and Draft Ecoregion 6E Criteria Schedules (MNR 2012)
- Secondary Plans, if applicable
- Subwatershed Studies, if applicable
- GRCA policies and regulation, if applicable, and
- Federal and Provincial Species at Risk legislation, if applicable.

1.17 Background Review

The Background Review section may be included within the Characterization of the Natural Environment section (below), or may be a standalone section. Its primary purpose is to identify all the relevant sources of background information for various aspects of the natural

environment (i.e., geology, soils, hydrology, hydrogeology, aquatic and fish habitat, terrestrial vegetation (including wetlands), wildlife).

Relevant background sources may include, but are not limited to:

- current and historical air photos
- watershed or subwatershed studies
- secondary plans and supporting studies
- EIS and / or EIR from adjacent lands
- natural heritage databases
- data on file with the City, GRCA, MNR and / or Department of Fisheries and Oceans (DFO) for the study area,

A number of on-line sources are identified in *Appendix A*, Background Resources.

Depending on the nature of the study area and the proposed development, it is also possible that additional technical studies will be required in addition to the EIS. Additional technical studies typically required when development is proposed within or adjacent to natural heritage features and areas and / or natural hazard lands include geotechnical studies, hydrogeologic and hydrologic studies, and archaeological studies. The key findings from such studies will need to be integrated into the EIS, particularly as they relate to the natural environment.
In addition, professionals with expertise in other disciplines (e.g., surface water, hydrogeology, etc.) may be required to conduct additional analyses specifically related to mitigating anticipated impacts on the natural environment related to the proposed development. For example:

- Proposed development south of Clair Road that may impact the significant portions of the Paris Moraine (i.e., Significant Landform as identified in OPA 42) will require the expertise of a professional geoscientist or a professional with equivalent expertise.
- Proposed development that may impact a Significant Wetland will require a pre-construction and post-construction feature-based water balance by an engineer with expertise in water resource engineering. .

The primary purpose of an EIS is to assess potential impacts to natural heritage features and areas within a NHS. However, because these features and areas are inextricably linked to the local geology and soils, as well as the surface water and ground water dynamics, an EIS is also typically a multi-disciplinary study. In order to come up with a reasonably comprehensive assessment of existing conditions and an appropriate suite of recommended mitigation measures, an EIS needs to integrate the expertise from a range of disciplines. This is done, in part, through a background review that incorporates relevant results from other disciplines' studies.

1.18 Characterizing the Natural Environment (including Field Studies)

The purpose of the characterization section is to (a) describe the methods used to undertake the field studies, and (b) accurately identify and describe all known or candidate natural heritage features and areas on the subject property and, to the extent possible, within the broader study area. This characterization should be based on a synthesis of information / data collected through the background review and field assessments.

For the EIS Terms of Reference, the characterization will generally be based on a preliminary review of available background information, any observations made during preliminary site visits, and information gathered through pre-consultations with the relevant agencies and the City (see Section 3). Based on the available information, the Terms of Reference will identify the need for field studies to fully characterize the natural heritage feature(s) and area(s) on the subject property, and their ecological functions.

Field study protocols must be identified in the Terms of Reference to allow for a comprehensive review and discussion at the study design stage. The protocols should also be included in the EIS.

Proponents must ensure that the recommended survey protocols: (a) are suitable for the type of natural heritage features and areas on site, and (b) are designed to provide the information needed to determine whether a feature is significant (or not) according to the City's Official Plan. Details regarding the field program should also include:

- Proposed timing of work (i.e., season, time of day, weather dependencies)
- Proposed level of field effort (i.e., number of visits, field hours, number of searchers)
- Map(s) showing proposed locations for species-specific surveys(e.g., amphibian surveys)

- Technology being used (i.e. GPS, broadband bat detectors) to support field assessments

Additional technical guidance related to aquatic, vegetation and wildlife survey protocols is provided in *Appendix D*, *Appendix E* and *Appendix F* respectively.

1.18.1 Geology and Soils

The Terms of Reference and the EIS should provide a general description of the geology and soils within the study area. This should include a general description of the physiographic region and recognition, where appropriate, of areas identified as Significant Valleylands and / or Significant Landform in the City's Official Plan. The Terms of Reference should indicate whether a geotechnical report is being completed. Typically such a report will be required on sites with shallow bedrock, particularly where foundational works and / or underground parking are proposed. The Terms of Reference should also indicate, in cases where the proposed development may impact Significant Landform, that the team includes a Professional Geoscientist, or professional with comparable expertise.

As part of the EIS, a more detailed assessment of the soils on the subject property should be undertaken. This should include a characterization in terms of its composition and drainage properties, with particular attention to the identification of any organic or sandy soils.

Mapping should be included to show the site-specific surficial and bedrock geology, as well as the soil types within the study area.

Site-specific soil studies, if required, should be completed according to the protocols outlined in the ELC field manual (see *Appendix E*), or may be provided through geotechnical studies.

1.18.2 Hydrology and Hydrogeology

The EIS Terms of Reference and the EIS should identify any known surface water and groundwater features in the study area, and whether or not additional site-specific hydrogeological, hydrologic and / or fluvial geomorphological work is required to supplement existing background information. Such studies may be incorporated into the EIS

but are more typically provided as standalone studies whose findings need to be integrated into the EIS, as appropriate.

The EIS should characterize known surface water and groundwater features in the study area. Although the EIS will not necessarily need to incorporate findings from a site-specific hydrologic or hydrogeologic studies, at a minimum a review of the available hydrologic and hydrogeologic information based on existing background information should be included. This information should outline the regional and local hydrogeology of the study area, and should include (but not be limited to) a description of the following:

- geomorphological and topographic features
- surficial and bedrock geology, as well as soil types, (described in the section above) as the relate to drainage and infiltration in the study area
- hydrogeological conditions preferably for all four seasons (winter, spring, summer and fall)
- surface and groundwater features onsite, within adjacent lands and in the surrounding area, including areas of high water table, water quantity and quality
- recharge and discharge zones, including seepage areas and springs
- existing catchment areas, drainage patterns, watercourses and drainage basin boundaries
- existing flows (quantity and quality) into and out of the natural features and areas, including rivers, creeks, lakes, ponds, springs, seeps and headwater features, and
- flood-related hazards (i.e., floodplains) (including mapping of these natural hazards)

Sources to consider include: watershed or subwatershed studies (including sub-watershed or wetland catchment boundaries where available), the Grand River Source Protection Plan (once approved) and Assessment Report (approved August 16, 2012), Environment Canada - Water Survey of Canada (real-time hydrometric data).If applicable, references to infiltration targets made in watershed or subwatershed studies should be included. Alternately, infiltration targets may need to be established for the subject property through the hydrogeological analyses.

Site-based and feature-based water balances may be required as part of the EIS to help demonstrate no negative impacts to certain natural heritage features and areas, or their functions. Changes to catchment areas, drainage/infiltration patterns, hydroperiod, flow regimes, etc. should be considered when determining if a water balance is needed. When developing feature-based water balances, consideration should be given to the natural seasonal fluctuations in the amounts of water flowing into a feature, and the period(s) of

time which it remains in that system. Prior to undertaking a water balance, the Water Budget Reference Manual (2013) prepared for MNR should be reviewed. This manual specifically discusses water management rationale and methodologies for water budget analyses.

1.18.3 Aquatic and Fish Habitat

The Terms of Reference should identify any known aquatic and / or fish habitat and confirm if aquatic and / or fish habitat and / or benthic invertebrate assessments are being undertaken by qualified individuals as part of the EIS. Details should also be provided as to the protocols to be used for any proposed assessments, including the anticipated timing and frequency of surveys. Surface water features that may not directly support fish use, but may contribute indirectly to downstream fish habitat must also be considered.

The Terms of Reference will largely be based on a preliminary review of available data from the GRCA, MNR and DFO as well as review of DFO's Species at Risk mapping and the Natural Heritage Information Centre (NHIC) database to determine whether the fish habitat may be suitable for species listed under the Provincial *Endangered Species Act* and / or the Federal *Species at Risk Act*. Additional background may also be available through background studies (e.g., subwatershed studies, fisheries management plans, etc.). Depending on the nature of the study area and the scope of the proposed development, consideration for mussels may also be required (see *Appendix D* for further guidance).

The need for additional fish surveys or inventories should be determined based on available information and site conditions including factors such as the proximity of development or grading, nature of the proposed works and the sensitivity of the fish habitat. Additional requirements may be suggested by agencies, including GRCA, in order to address DFO's Fisheries Protection Policies under the *Fisheries Act*.

The EIS should characterize the aquatic and fish habitat on the subject property and, relying primarily on background information, in the broader study area, including confirming the thermal regime of any known or potential fish habitat. Fish habitat assessments and, if required, benthic invertebrate assessments, should be conducted on surface water features that may directly support fish use, as well as those that contribute indirectly to downstream fish habitat.

This fish habitat assessment should include information about the surface water feature(s) and the contributing vegetation, such as:

- Flow description (source of flow, seasonality, permanent or intermittent, low flow conditions)
- Channel characterization (i.e., width, depth, morphology, substrate, bank stability)
- Water quality, including results of benthic invertebrate surveys, if required
- Riparian habitat description (e.g., naturalized or anthropogenic, species composition)
- In-stream vegetation and other cover elements (e.g., woody debris, undercut banks, boulders)
- Aquatic connections and barriers to aquatic connectivity (e.g., upstream and downstream culverts, fish passages, drainage features, dams, weirs, etc.)
- Fish community/species, including aquatic Species at Risk

More information on completing aquatic surveys, fish surveys and fish habitat assessments, and benthic invertebrate assessments is provided in *Appendix D.*

Typically permits are required from MNR prior to undertaking fish community surveys (i.e., Scientific Collector's Permits). It is the proponent's responsibility to obtain any required permits prior to undertaking fisheries field studies, if required.

1.18.4 Terrestrial Vegetation (including Wetlands)

The Terms of Reference should consider the coarse-level ELC included in the City's Official Plan as the preliminary vegetation classification, and will normally need to include field studies to refine and update this data layer, as described in *Appendix E*. The Terms of Reference should also identify if any additional plant identification work and if a tree inventory (and any associated tree preservation and / or compensation plans) are required. A detailed summary of the field studies proposed should be included in the Terms of Reference. More information regarding study methods and techniques for ELC and plant surveys can be found in *Appendix E.* More information regarding requirements for tree inventories, preservation and compensation plans can be found in *Appendix G.*

If woodland and / or wetland features are present on the subject property, feature boundaries may need to be staked and confirmed in the field. If required, the Terms of Reference should indicate that the staking of wetland boundaries will be done in

consultation with the GRCA and City staff should be provided the opportunity to attend, and that the staking of woodland boundaries will be done in consultation with City staff.

Vegetation Communities: Ecological Land Classification (ELC)

As part of the City's Natural Heritage Strategy, vegetation across the City was classified to community level using the Ecological Land Classification (ELC) system based on 2008 air photos and supplemented with targeted field assessments in some areas. This classification should be refined to ecosite or vegetation type and updated, as required, through field assessments as part of the preparation of the EIS.

More detailed ELC assessments (as described in *Appendix E*) will assist in the assessments of Significant Woodlands, Significant Wetlands, Habitat of Endangered and Threatened Species, Significant Wildlife Habitat, Cultural Woodlands, Other Wetlands, and Habitat of Significant Species (as defined in the City's Official Plan).

The results and details of these assessments, including any feature stakings that took place, need to be provided in the EIS (e.g., a description of the dominant species and vegetative structure of each ELC ecosite or vegetation type) and illustrated in a map. Any ELC vegetation types that are considered provincially significant by NHIC should be noted.

Wetlands

With respect to wetlands, the Provincially Significant Wetlands (PSW) mapping in the Official Plan has been adopted from the MNR, while the mapping for non-PSW wetlands has been adopted from the ELC work done over 2006 and 2008 as part of the City's Natural Heritage Strategy. In some cases the wetland mapping has been updated (e.g., as the result of a wetland evaluation, more site-specific studies completed subsequently), but in some areas it has not. Therefore the proponent should verify that they have the most current PSW mapping (if applicable) from MNR for their study area.

The results and details of these assessments, including any feature stakings that took place, need to be provided in the EIS (e.g., description of the wetland communities, a summary of the results of any wetland evaluations or assessments) and illustrated in a map.

Plants (Botanical Assessments)

As part of an EIS, plant surveys are typically completed in conjunction with the ELC assessments, recording the relative abundance of each species and documenting the locations (with a GPS unit) of significant species and / or plant populations. Surveys should be timed, to the greatest extent possible, to visit the site during the time(s) of year when the target plants are easiest to identify. This varies depending on the species group and habitat type (see *Appendix E*).

The EIS should include details about the methods used to complete the plant surveys, including the survey dates and scope of surveys undertaken.

The plant or botanical assessments should be used to generate a list of all identified plants with details on the species' current statuses at the global, federal, provincial and local levels and whether it was observed as part of the current field studies or reported by a previous study. Significant species should also be linked to the ELC polygon in which they were found either in a table and / or on a map. The results of the botanical assessments are to be summarized in an annotated checklist included in the EIS as a table within the report or an appendix.

For Butternut, which is a federally and provincially Endangered tree that occurs in the City of Guelph, MNR has established a specific process for assessment of these trees in cases where they may be impacted by development. It is the proponent's responsibility to ensure that should such species be identified on the subject property that the appropriate assessments are undertaken, and that permits (if required) are obtained from MNR.

Trees

As part of the EIS, an inventory and assessment of the trees (of at least 10 cm diameter at breast height) on the subject property should also be undertaken to address the City's Private Tree Protection Bylaw. Guidance related to Tree Inventory, Preservation and Compensation Plans is provided in *Appendix G*.

1.18.5 Wildlife

As part of an EIS, wildlife assessments are typically required in order to screen for provincially Endangered and / or Threatened Species as well as screen for Significant

Wildlife Habitat. In the City of Guelph proponents must also screen for Habitat for Significant Species which are not captured by either of the other categories listed above. As part of the Terms of Reference, preliminary wildlife information based on background reviews and pre-consultations should be summarized and used as a basis, in conjunction with knowledge of the general habitat types known to be on the subject property and in the broader study area, for determining what, if any, wildlife studies are required as part of the EIS. As part of these guidelines, a Significant Wildlife Habitat screening table has been developed (see *Appendix C*) as illustrated in *Table 2*, which should be included in the Terms of Reference to rationalize the proposed wildlife field program.

Table 2. Sample Table to Screen for Significant Wildlife Habitat

Significant Wildlife Habitat Type	Known or Candidate SWH present?	Rationale (Habitat presence or absence)	Field studies required?
Seasonal Concentration Areas			
Deer Yarding Areas (as identified by MNR)	*Yes*	*Deer yard identified by MNR*	*Yes, winter deer browse surveys proposed*
Waterfowl Stopover and Staging: Aquatic	*No*	*No wetland communities found on or adjacent to property*	*No*
°°°°			

As part of the EIS, a wildlife surveys should be completed (as per the approved Terms of Reference), and results should be summarized in both text and tabular format. Typically tables or lists highlighting significant species records are included in the EIS (with applicable current species statuses at the global, federal, provincial and local levels) are included in the report, and a complete table of all species identified on the subject property and broader study area (either through field studies and / or background review) is included in the report appendices. Methods used, including a summary of survey dates and protocols used, should also be included in this section of the EIS.

While mapping of the confirmed locations of significant species and / or habitats is desirable for transparency and to facilitate decision-making, there needs to be consideration for

MNR's data sensitivity policies which prohibit making the locations of certain Species at Risk public.

Wildlife surveys in southern Ontario typically include targeted surveys for breeding birds and breeding amphibians, as well as general or incidental surveys for reptiles and mammals. Targeted surveys are also increasingly required for certain mammals (i.e., bats and deer). In some jurisdictions, targeted surveys for damselflies, dragonflies and butterflies are also being requested. However, more typically, notable insects are recorded incidentally.

The surveys required for a particular subject property need to be identified in the Terms of Reference, along with the anticipated timing and scope of these surveys, along with a map identifying locations of species-specific surveys if applicable. From time to time, it may occur that a survey is identified as being required part way through the completion of field work due to an unexpected observation. *Appendix F* provides guidance related to the collection and reporting of wildlife data records, as well as a summary of current and potentially applicable techniques and protocols for undertaking wildlife surveys for key groups currently in use in southern Ontario.

In addition, surveys (if required) should be completed to identify known or candidate Significant Wildlife Habitat. Often, wildlife surveys completed as part of the more generalized wildlife assessments will also be used to screen for Significant Wildlife Habitat. However there may some cases where specialized surveys for specific wildlife habitat types may be required. This screening assessment should be completed using the Significant Wildlife Habitat Technical Guide, the Draft SWH Ecoregion 6E Criterion Schedule, and the Natural Heritage Reference Manual for technical guidance. The Significant Wildlife Habitat screening table developed for Guelph (as provided in *Appendix C*), and completed using preliminary information for the Terms of Reference, should be updated and revised based on the results of these field studies. Use of this table will help City staff verify that the proponent has considered the various habitat types.

The table in *Appendix C* divides the types of Significant Wildlife Habitat into five categories, as follows:

i. Seasonal Concentration Areas
ii. Rare Vegetation Communities
iii. Specialized Habitats for Wildlife
iv. Wildlife Movement Corridors (including Ecological Linkages), and

v. Habitats for Species of Conservation Concern.

The EIS should discuss the various types of Significant Wildlife Habitat according to these categories.

In many instances to support the identification of Significant Wildlife Habitat, habitats will need to be classified using ELC to a vegetation type. In combination with the criteria and technical guidance available from the MNR, ELC information should also be used to assist in screening for candidate Significant Wildlife Habitat.

Although the Ministry of Natural Resources (MNR) provides technical guidance related to Significant Wildlife Habitat, and also identifies some types of Significant Wildlife Habitat (e.g., deer yarding and winter concentration areas) the confirmation or designation of Significant Wildlife Habitat is ultimately under the jurisdiction of the local municipal planning authority. It is, however, the proponent's responsibility to, through the EIS process, screen for any areas of Significant Wildlife Habitat either (a) identified by MNR, or (b) that qualify as candidate Significant Wildlife Habitat based on the available technical guidance.

Where a known (as identified by MNR or previously through studies for the City) or candidate Significant Wildlife Habitat is identified, this analysis should then inform the identification of opportunities and constraints, as described below. Permits are required from MNR for some types of specialized field work that may impact certain Endangered or Threatened species (e.g., amphibian trapping). It is the proponent's responsibility to secure any required permits with MNR directly.

1.18.6 Natural Hazards

Natural hazard lands often overlap with natural heritage features and areas identified for protection, although the rationale for and approaches used to identify their limits are different. These lands also typically require development setbacks, which are different from buffers to natural heritage features and areas in that their primary purpose is to minimize the risk of hazards for people and their property related to the protected area (e.g., flooding, erosion), rather than help protect the protected area from the anticipated impacts associated with the development and the people who will be living in it.

The Terms of Reference should identify the known natural hazards on the subject property and in the broader study area based on background information which is typically available from the GRCA who regulates such areas. Terms of Reference (and EIS) mapping should also identify the extent of the regulated areas in the study area, which typically extend from 15 m to 120 m from the feature limit.

Proposed development within or adjacent to a natural hazard land may result in the need for one or more of the following:

- staking requirements (e.g., top of bank) with the GRCA and City staff
- additional technical studies such as flood mapping or modeling, geotechnical reports or fluvial/hydro geomorphological studies

The results of this additional field work and / or studies need to be incorporated into the EIS, and illustrated on a map where appropriate.

GRCA permits and approvals, if required to conduct additional technical work, should be pursued by the proponent directly with the GRCA.

1.18.7 Connectivity and Ecological Linkages

Although an EIS is a site-specific study, it is important that local and regional scale connectivity, ecological linkages, and landscape functions are considered through the EIS process to ensure maintenance of the Natural Heritage System within the City, and of the protected natural heritage features and areas in the surrounding County.

The Terms of Reference should identify any existing Ecological Linkages, as identified in the City's Official Plan and applicable subwatershed studies. The Terms of Reference should also recommend, if deemed necessary, any special field work to assess the wildlife use of existing or potential ecological linkages. In particular, this may include specialized studies to detect wildlife movement such as pit fall traps for amphibians or infrared cameras.

Ecological Linkages, as defined in the City's Official Plan, means "*areas identified based on the principles of conservation biology that connect Significant Natural Areas and/or protected Habitat for Significant Species and along which wildlife can forage, genetic interchange can occur, and populations can move from one habitat to another in response to life cycle requirements. Ecological Linkages provide or enhance connectivity where it is otherwise lacking, ensuring a systems based approach…. Ecological Linkages can also*

include those areas currently performing, or with the potential to perform linkage functions through restoration measures. Although linkages help to maintain and improve the Natural Heritage System and related ecological functions, they can also serve as habitat in their own right". The location of identified Ecological Linkages may be modified, or width refined, in accordance with the Official Plan policies through the EIS process. As per these policies, additional Ecological Linkages may also be identified through site-specific studies undertaken as part of the EIS process.

Based on the results of the wildlife habitat assessments, the EIS should recognize existing Ecological Linkages and corridors, and their associated functions, and, if appropriate, recommend additional Ecological Linkage areas that would support the connectivity of the NHS. The EIS may also recommend modifications to the location, and refinements to the width, of identified Ecological Linkages based on the findings of site-specific assessments. Ecological Linkages and connections should be confirmed through the EIS after the assessments of all the other natural features and areas, and their ecological functions, has been completed. Key considerations should include the scale at which the linkage is intended to function, the nature of adjacent land use(s), and the significance, sensitivity and ecological requirements of the species whose movements the linkage is intended to support.

1.19 Evaluation of Significance

The evaluation of significance is the step whereby all identified natural heritage features and areas, and associated ecological functions (in the study area, and particularly on the subject property) are screened against the in effect and applicable policies and guidelines to confirm whether or not they are considered "significant" in the City of Guelph. An overview of the applicable source of policies or guidelines and the approval authorities is provided in *Table 3*.

Table 3. Summary of sources of criteria to determine significance and approval authorities

Natural Heritage Features and Areas	**Source of Criteria for Significance**	**Approval Authority**
Significant Natural Areas		
Significant Areas of Natural and Scientific Interest (ANSI)	Ministry of Natural Resources (MNR)	MNR
Significant Habitat of Endangered and Threatened Species	Ministry of Natural Resources (MNR)	MNR
Significant Wetlands (Provincially and Locally Significant)	Provincially Significant Wetlands (PSW): Ministry of Natural Resources (MNR) Locally Significant Wetlands (LSW): City of Guelph Official Plan	PSW: MNR LSW: City of Guelph[1]
Surface Water and Fish Habitat (cool. cold and warm water)	Grand River Conservation Authority (GRCA) / MNR	DFO[1]
Significant Woodlands	City of Guelph Official Plan	City of Guelph
Significant Valleylands	City of Guelph Official Plan	City of Guelph[1]
Significant Landform	City of Guelph Official Plan	City of Guelph
Significant Wildlife Habitat (including Ecological Linkages)	City of Guelph Official Plan	City of Guelph
Restoration Areas	City of Guelph Official Plan	City of Guelph
Natural Areas identified for protection[2]		
Other Wetlands	City of Guelph Official Plan	City of Guelph
Cultural Woodlands	City of Guelph Official Plan	City of Guelph
Habitat for Significant Species	City of Guelph Official Plan	City of Guelph

[1]Verification of the extent and significance of Locally Significant Wetlands, Fish Habitat, and Significant Valleylands is typically done in consultation with GRCA

[2] Natural Areas (as set out in the City's Official Plan) may be identified, in whole or in part, for protection if they meet certain criteria established d in the policies. Natural Areas identified for protection will be designated as protected natural areas within the Natural Heritage System.

The Terms of Reference should identify all known or previously identified significant natural heritage features and areas within the study area, and provide a brief statement describing the approach to be taken to the evaluation of significance.

The approach to be used in the EIS should include a discussion of each natural heritage feature and area on the subject property and why it does, or does not, meet the established criteria for significance. In all cases, the most current applicable policies and guidelines should be applied. Depending on the number of features and / or areas under consideration, a summary table may be useful.

1.19.1 Habitat of Endangered and Threatened Species

Under the Provincial *Endangered Species Act* it is illegal to kill, harm or harass a Provincially Endangered or Threatened Species, or to damage or destroy its habitat, except where otherwise exempted, regulated or permitted. It is the responsibility of the proponent to ensure due diligence in order to meet the requirements under the *Endangered Species Act*. Questions or points of clarification regarding the ESA should be directed to MNR.

When preparing the Terms of Reference, proponents should perform a Species at Risk (SAR) screening exercise by consulting with the NHIC and the MNR Guelph District Office to inquire about any SAR records in the study area. The Terms of Reference should include:

- any information provided by MNR Guelph District or other sources regarding the potential for SAR in the study area and recommended field study methods to verify for the presence of this or these species, and
- a statement about how sensitive information regarding the presence/location of Endangered and Threatened Species will be shared with the City (i.e., so that locational information is not released to the public).

Should Endangered and /or Threatened Species and their habitats be identified within or adjacent to the development proposal, the City will work with the proponent and MNR to address and implement requirements under the *Endangered Species Act and the Provincial Policy Statement*.

1.20 Opportunities and Constraints

The purpose of the opportunities and constraints analysis is to:

- identify all of the constraints to potential development related to natural heritage features and areas identified for protection, as well as natural hazards, including their respective buffers and setbacks, and

- identify opportunities for development on the subject property that work within the limitations of the site specific constraints.

An opportunities and constraints analysis should, ideally, be completed prior to, or at least in conjunction with, the development proposal layout. This allows for the exploration of design options that try, the greatest extent possible, to avoid negative environmental impacts and to identify opportunities to mitigate unavoidable impacts (e.g., through naturalization, habitat restoration, the identification of enhanced or new Ecological Linkages, etc.). A comprehensive exploration of opportunities for mitigation is best done with consideration for the proposed development proposal, and exploration of alternatives, as described in the impact assessment and evaluation of alternatives sections below.

The constraints will include all the natural heritage features and areas identified as significant and / or for protection through the significance analysis (described in the section above), plus any applicable buffers, as well a natural hazard features and areas to be protected, and their associated setbacks. Key considerations, where applicable, should include:

- Significant Natural Areas and any associated buffers, including Ecological Linkages
- Natural Areas to be protected (if any) and any associated buffers, and / or Natural Areas proposed for removal
- identification of areas of alternate Significant Landform
- meander belts for watercourses and setbacks for bank erosion
- natural hazards and any associated setbacks, and
- fish habitat types (i.e., cold, cool or warm water) and associated buffers, as well as Fisheries Management Zones, if applicable.

The City's Official Plan currently identifies minimum buffers for some components of the NHS (e.g., Significant Woodlands, Significant Wetlands, Fish Habitat), leaves buffer determination entirely to the discretion of the site-specific environmental study for other components of the NHS (e.g., Significant Wildlife Habitat), and for some components of the NHS does not require a buffer at all (e.g., Ecological Linkages, Significant Landform). The opportunities and constraints analysis is where final buffers should be established (called "established buffers" in the Official Plan) and rationalized for various components of the NHS, as appropriate.

These established buffers should incorporate the minimum buffers (where applicable) and determine an appropriate buffer to protect the natural heritage feature and area from

anticipated site-specific impacts associated with the proposed development. Key considerations related to buffer determination should include: natural heritage feature / area sensitivities to development, site-specific biophysical factors (e.g., soils, drainage patterns, slope towards or away from the feature), and proposed adjacent land uses.

Setbacks to natural hazards should be determined with consideration for GRCA's applicable policies, and in consultation with GRCA.

The EIS should include a map delineating the constraints and opportunities at the site-specific scale, including natural heritage feature and area boundaries, as well as their associated buffers, and natural hazard boundaries, and their associated setbacks. This should allow for the identification of a consolidated constraint line, which should generally be used to establish the development limit. Notably, there may be some types of development (e.g., stormwater management ponds, trails) that are permitted in the portions of the buffers and / or setbacks to some features. This should be confirmed in consultation with the City and / or GRCA as appropriate prior to finalizing the development limit.

1.21 Impact assessment

Impact assessment is a formal process used to predict the environmental consequences (positive or negative) of a plan or project prior its implementation in order to inform decision –making. The primary purpose of the impact assessment section is to list and describe all potential and / or anticipated impacts to the protected natural heritage features and areas (and their ecological functions) in the study area related to the proposed development, and consider mitigation options.

Terms of Reference Considerations

The Terms of Reference should state the intent of this section, identify the types of potential impacts and describe briefly how they will be assessed. Generally, a table or matrix is helpful for summarizing, for each natural heritage feature and area being considered: (a) the significant characteristics and functions of that feature / area, (b) the anticipated impacts to that feature / function (if any), and (c) the mitigation options to avoid, minimize or compensate for these impacts. As noted in the introduction, avoidance is always the preferred option, followed by minimizing impacts. Compensation will not be an option in most cases (e.g., the City's policies do not permit removal and replacement of Significant Wetlands or Significant Woodlands), and where it is an option it should only be considered where neither avoiding nor minimizing impacts are feasible options.

Site-based and feature-based water balances to demonstrate no negative impact to the natural heritage features and areas, and their functions, if required, should be identified in the Terms of Reference. Changes to catchment areas, drainage/infiltration patterns, hydroperiod, flow regimes, etc. should be considered when determining if a water balance is necessary.

EIS Considerations

In the EIS, the impact assessment section should start by including a more detailed description of the proposed development. As part of the more detailed description of the development proposal in the impact assessment section, the EIS should provide a general description of the proposed development as well as details around elements of the development that may impact the natural heritage features and areas identified for protection, and / or their ecological functions. These elements generally include:

- the number and types of buildings and area of associated parking areas, with specific mention of basements and / or underground parking being proposed in areas where there is a shallow groundwater table
- grading (i.e., fill placement including the amount, depth, and ultimate slope of the fill), including clearly identifying the location of the fill placement, and whether a City of Guelph site alteration permit and/or GRCA permit is required
- storm water management (e.g., including the number, size and type of proposed facilities and / or measures, including Low Impact Development measures)
- servicing, particularly servicing to be located within or adjacent to natural heritage features and / or areas identified for protection, and
- trails and / or trail connections.

In general, the impact assessment should consider potential impacts of the proposed development to the significant natural heritage features and / or areas on the subject property as well as within the broader study area, and their ecological functions, including linkages / connections between them and to hydrologic and hydrogeologic resources in the study area. The impact assessment section of an EIS must identify all stressors, threats and other potential impacts of a development proposal on the natural features and areas in the study area, and particularly on the subject property, as well as their ecological functions. Discipline-specific guidance related to impact assessment is provided below.

- GEOLOGY AND SOILS: Specific attention should be paid to sites characterized by shallow soils over bedrock, karst, Significant Landform, and/or steep slopes, and potential impacts to those features.
- HYDROGEOLOGY AND HYDROLOGY: The impact assessment should include an analysis of anticipated changes to site infiltration, surface water features, and / or surface water drainage and / or groundwater inputs to other natural heritage features or areas in the study area. For example, any alterations to watercourses such as channel realignments, dredging or culvert works must be identified. Results of site-based and feature-based water balances (if required), should be included and discussed.
    - If a water budget was completed, the EIS should identify any anticipated changes to groundwater infiltration, and any expected impacts to wetland features. The analysis should also take into consideration the changes in water quantity and quality, as well as the associated effects on natural heritage features and functions on the subject property and surrounding lands.
- AQUATIC AND FISH HABITAT: Potential impacts to any type of fish habitat (i.e., direct, indirect or contributing) need to be considered though the EIS. Particular attention should be given to cold or coolwater fish habitat, and any aquatic Species at Risk in the area. Potential impacts to aquatic habitat that is not considered fish habitat should also be considered.
- TERRESTRIAL VEGETATION: Potential impacts to the natural heritage features and areas on the subject property identified for protection, as well as those identified for removal (if any) should be identified. Potential impacts to vegetation communities and significant plant species should be discussed separately. Anticipated impacts to trees (of at least 10 cm diameter at breast height) outside the protected natural heritage features and areas should also be addressed in this section.
- WILDLIFE: Potential impacts to wildlife should be described according to the type of wildlife (i.e., birds, amphibians, reptiles, mammals – including bats, and in some cases according to habitat affinities some sub-groups of wildlife may have (e.g., area-sensitive forest birds, grassland birds). Categories that align with those in the Significant Wildlife Habitat table should be used, where appropriate.
- NATURAL HAZARDS: Any potential impacts to natural hazard lands related to the proposed development should be identified, along with mitigation options that are supported by input and / or other reports completed by the appropriate technical

expert(s). For example, references to findings of geotechnical studies, hydrogeological studies, flood modelling, etc. may be appropriate.

- ECOLOGICAL LINKAGES AND CONNECTIVITY: Maintaining and enhancing connectivity within and among protected natural heritage features and areas can be challenging in developed and particularly urban areas. Any potential impacts to identified or recommended, Ecological Linkages in the City should be identified and options to minimize those impacts should be discussed.

Impact assessment should include consideration of: direct impacts, indirect impacts, induced impacts and cumulative impacts, as described below.

Types of Impact Assessment

Impact assessments should consider the magnitude, time and duration of potential impacts relative to the sensitivity of natural heritage features and areas, in the following contexts.

Direct impacts

Direct impacts are generally defined as those that are directly related to the approved development plan. These include impacts usually associated with (a) the layout of the proposed development as well as (b) the construction activities associated with implementation of the proposed development. Options for mitigating these impacts may include (a) exploring alternative layouts and (b) managing construction practices.

The full range of potential impact types should be described and quantified (to the extent feasible) in relation to the potentially affected natural heritage features and areas (and their associated buffers) and /or natural hazards (and their associated setbacks).

Indirect impacts

Indirect impacts may be caused by altered uses and activities on the subject property after construction has been completed. For example, changes in site conditions may have an effect on drainage patterns which, over time, may negatively impact a natural heritage feature and area previously relying on those water inputs to sustain itself. Another example would be the introduction of residential lots abutting a protected woodland may result in encroachments to that woodland edge (e.g., dumping of yard waste). Options for mitigating such impacts may include re-directing adequate quantities of clean runoff to that feature, or

ensuring there is some type of barrier between the rear lot lines and adjacent woodland (e.g., a buffer, a trail, a combination of both).

Induced impacts

Induced environmental impacts are a type of indirect impact that are generally the consequence of changes in human behaviours in response to the new development. For example, induced impacts may occur due to increased pedestrian and recreational uses of a protected natural area after construction has been completed because it is now more accessible. In particular, the creation of informal trails and the introduction of domesticated animals may both cause disturbances to wildlife and disturb natural heritage features and areas.

1.22 Evaluation of Alternative Options

This step involves consideration of the different mitigation options in relation to the identified potential impacts (as described in *Section 5.7*).

- For example, a road is needed within the proposed development to connect the community to a main arterial; however the proposed road alignment runs through an Ecological Linkage intended, among other things, to provide a pathway for amphibian migration in the spring and fall. Options that could be considered include: (a) moving the road so that it does not intersect with the linkage at all, (b) shifting the alignment of the road so that it runs parallel to the linkage, and (c) incorporating specialized amphibian movement culverts into the road.

The alternatives considered should:

- Be restricted to what is feasible
- Seek to avoid impacts first, then minimize and, if and neither avoidance nor minimizing are feasible, seek to compensate (if it is an option), and
- Be undertaken as an iterative process with the planners and other experts on the team to try and achieve a recommended plan that best achieves protection / maintenance of the NHS and still fulfills the various planning, design and servicing requirements associated with the proposed development.

The consideration of alternative options may be combined with the following section that identifies and describes recommended mitigation measures.

1.23 Recommended Mitigation Measures

As stated in the introductions, "mitigation", as it relates to natural heritage conservation, is defined as a three step process, as follows: (1) avoid, (2) minimize, and (3) compensate. In this process, avoiding impacts is always the preferred option, followed by minimizing impacts. Compensation for unavoidable impacts may not be an option for some features or functions, and where it is permitted should only be explored when all options for avoiding and minimizing have been carefully considered and deemed not feasible.

The EIS should identify a suite of recommended mitigation measures that:

- address all of the potential impacts identified to protected natural heritage features and areas, and their functions, as part of the impact assessment
- are appropriate for the site based on the characterization of the natural environment
- are compliant with the applicable environmental policies, guidelines and legislation,
- are based on known best practices and / or established technologies, and
- include consideration for enhancements within degraded natural areas, naturalization and / or restoration adjacent to other protected natural features and areas, and opportunities for enhancing the urban forest and integrating Low impact Development design measures outside the NHS.

The approximate timing, duration and location of the recommended mitigation measures should be provided in the EIS, and may be further refined in an Environmental Implementation Report.

Mitigation measures in response to direct and indirect impacts that should be considered include, but are not limited to, the following construction practices:

- sediment and erosion controls, including adequate silt fencing around wetlands and watercourses
- location of fill piles, construction access, machinery storage and temporary access routes outside of natural heritage features and areas, and their buffers
- temporary dewatering during grading and construction
- installing tree protection fencing and signage
- ensuring timing windows for in-water works and / or vegetation removal respect established federal legislation

- integration of measures to try and get pre-construction infiltration to approximate post-construction infiltration (e.g., Low Impact Development measures)
- implementation of appropriate buffers
- implementation of appropriate setback distances from the crest of steep slopes, and
- installation of wildlife culverts or passages, where appropriate.

Mitigation should also include consideration of enhancement, naturalization and restoration opportunities to improve natural heritage features and areas, and their ecological functions. Considerations should include:

- natural heritage features and areas suitable for enhancement (e.g., invasive species removal and replacement with appropriate native plants)
- creation of wetlands, forests, meadows or vegetated riparian zones (e.g., within buffers)
- enhancements to, or the creation of new, Ecological Linkages, and
- naturalization and / or tree planting in areas on the subject property outside the NHS (e.g., naturalized storm water management facilities).

A Compensation Plan may be required to offset residual impacts such as tree removal required as part of the proposed development, and may consist of vegetation and/or tree replacement planting plans. The plan(s), if required, should provide details on recommended plant species, caliper, soil volumes and planting locations. Compensation Plans are generally done in conjunction with Tree Inventory and Preservation Plans. Details on their preparation are provided in *Appendix G.*

Another category of mitigation that is often recommended in response to indirect and induced impacts associated with proposed developments in urban areas is fostering stewardship through outreach, education and engagement. The EIS should identify opportunities to promote environmental stewardship (e.g., through signs around and within the protected natural heritage features and areas, pamphlets distributed to neighborhood residents, etc.). These materials should be educational (e.g., provide highlights about the local natural heritage) and preventative (e.g., discourage common residential impacts such as yard waste disposal, shed/landscaping encroachments and pet disturbances), and should be consistent with other City-wide environmental outreach materials. Typically, the City requires the proponent to provide each new tenant or home buyer a copy of Guelph's environmental brochure, the *EnviroGuide.* The need for a site-specific insert should be

identified depending on the adjacent natural features or design features proposed for the development.

1.24 Monitoring Plan

Monitoring is a critical piece of the impact assessment process because it allows, at least for some parameters, to verify if the recommended mitigation measures (a) have been implemented and (b) appear to be mitigating the anticipated impacts. Monitoring can also identify if new, unanticipated issues, have emerged during or following construction.

Environmental monitoring can be divided into three types (i.e., compliance, performance and effectiveness) described below.

- COMPLIANCE MONITORING is done to ensure that the development has implemented the mitigation measures according to the approved recommendations, plans and specifications. This is the most basic and straightforward type of monitoring, but one of the most critical types, because it is typically during construction that natural heritage features and areas, as well as trees / vegetation outside the NHS, identified for protection are most vulnerable to sudden damage and degradation. Examples include inspections prior to and during construction to verify if: the right types of silt fencing has been correctly installed and maintained, the correct tree protection measures have been implemented and are being maintained, the right tree species have been planted in the right places, etc. A range of compliance monitoring measures that follow-up on recommended mitigation measures should be recommended in the EIS.

- PERFORMANCE MONITORING is medium to long-term monitoring that occurs post-construction to ensure that the implemented mitigation measures are performing as intended. This type of monitoring can be more complex as it requires comprehensive baseline data (for comparative pre-development reference), and may not be possible to link causally to site-specific mitigation measures or even be verified on a site-specific scale. With Low Impact Development measures integrated within private lots, access may also be an issue. Nonetheless, targeted site-specific monitoring for parameters that can be measured and linked to site-specific changes should be recommended through the EIS. Examples include:
    - Monitoring of protected wetland hydrology to see if the water quantity, quality and timing of hydroperiods is comparable to what it was pre-development

- Monitoring of encroachments into the protected Significant Natural Area from adjacent residential lots to see if fencing and / or buffers have been effective at limiting or preventing encroachments, and
- Monitoring protected natural heritage features and areas for any changes to their size, shape, species diversity and connectivity to the NHS, and
- Monitoring the fish community, benthic macroinvertebrate community and water temperature of a protected watercourse to see if it is comparable to what it was pre-development.

- In addition, where an innovative but unproven solution has been proposed, monitoring should be done to evaluate a mitigation measure's effectiveness and to inform the City of its use in other applications.

- EFFECTIVENESS MONITORING is basically the tool used to bring all the monitoring components assessed into a comprehensive monitoring plan so that it can be used to inform adaptive management on the site, if needed, and mitigation measures recommended elsewhere in the City. A monitoring plan should be included in the EIS to assess the overall effectiveness of recommended mitigation measures, identify any unexpected negative impacts, and recommend alternative approaches to address these impacts.

The monitoring plan in the EIS will explain how and when monitoring results will be provided to the City, and should include details on the timing (before, during or after construction), frequency, and duration of the various monitoring activities. In some circumstances, this plan will also include an initial round of pre-development monitoring to obtain information on baseline conditions. Monitoring protocols should be established to standardize the procedures and ensure that findings can be compared from year to year.

1.25 Environmental Policy Analysis

The purpose of the Environmental Policy Analysis section is to ensure that the EIS, including recommended mitigation and monitoring measures, complies with all the applicable environmental policies and legislation, as identified in the Planning Context section. These policies and legislation include:

- City of Guelph Official Plan (including OPA 42 Natural Heritage System OMB Approved , June 4 2014 consolidation)
- City of Guelph Zoning By-Law
- Provincial Policy Statement
- Secondary Plans, if applicable
- Subwatershed Studies, if applicable
- GRCA policies and regulations, if applicable, and
- Federal and Provincial Species at Risk and/or other legislation.

This analysis may be presented in a table format.

1.26 Recommendations and Conclusion

This section should:

(a) summarize all the recommendations presented in the EIS for ease of implementation, with references to earlier sections and / or appendices where details are provided, as appropriate, in a text or table format

(b) provide a general statement as to whether or not the EIS complies with applicable policies and legislation, and

(c) include a list of conditions of approval to be completed during the preparation of the Environmental Implementation Report or at another detailed design stage or implemented during / following construction.

Appendix A: Background Resources

City of Guelph

Official Plan, latest Consolidation

http://guelph.ca/plans-and-strategies/official-plan/

OPA 42 – Natural Heritage System

http://guelph.ca/plans-and-strategies/natural-heritage-strategy/

Subwatershed Studies

- Clythe Creek Subwatershed Overview, 1998
- Eramosa-Blue Springs Watershed Study, 1999
- Hanlon Creek State of the Watershed, 2004
- Mill Creek Subwatershed Study, 1996
- Torrance Creek Subwatershed Study, 1998

Zoning By-Law

http://guelph.ca/city-hall/by-laws-and-policies-2/zoning-by-law/

River Systems Management Plan

http://guelph.ca/wp-content/uploads/RiverSystemsManagementStudy.pdf

Natural Heritage Strategy: Terrestrial Inventory & Natural Heritage System

http://guelph.ca/wp-content/uploads/NaturalHeritageStrategyPhase2_finalReport.pdf

Guelph Trail Master Plan

http://guelph.ca/plans-and-strategies/guelph-trail-master-plan/

Guelph Tree By-law

http://guelph.ca/living/environment/trees/tree-by-law/

Department of Fisheries and Oceans (DFO)

Fisheries Protection Program

http://www.dfo-mpo.qc.ca/pnw-ppe/fpp-ppp/index-eng.html

Distribution of Mussel Species at Risk

http://conservation-ontario.on.ca/projects/DFO.html

Mussel Critical Habitat information
http://www.conservation-ontario.on.ca/projects/DFO.html

Environment Canada

Water Resources – Real Time Hydrometric Data

http://www.wateroffice.ec.gc.ca/index_e.html

Ministry of Environment (MOE)

- MOE Guideline B-7

- MOE Procedure B-7-1
- MOE Guideline D-f
- MOE Procedures D-5-4 and D-5-5

Ministry of Municipal Affairs and Housing (MMAH)

Provincial Policy Statement

http://www.mah.gov.on.ca/Page215.aspx

Ministry of Natural Resources (OMNR)

Natural Heritage Reference Manual

http://www.mnr.gov.on.ca/en/Business/LUEPS/Publication/249081.html

Significant Wildlife Habitat Technical Manual

http://www.mnr.gov.on.ca/en/Business/FW/Publication/MNR_E001285P.html

Natural Heritage Information Centre

http://nhic.mnr.gov.on.ca/MNR/nhic/

Species at Risk
http://www.mnr.gov.on.ca/en/Business/Species/index.html

Water Budget Manual

http://www.waterbudget.ca/waterbudgetreferencemanual

Ministry of Transportation (MTO)

MTO Drainage Management Technical Guidelines

http://www.mto.gov.on.ca/english/engineering/drainage/

Grand River Conservation Authority (GRCA)

Grand River Assessment Report (for the Grand River Source Protection Plan)

http://www.sourcewater.ca/index/document.cfm?Sec=7&Sub1=8

Grand River Source Protection Plan and Area

http://pdf.communicationx.net/g/grand-river-source-protection-area-w1570.html

Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

http://www.grandriver.ca/index/document.cfm?Sec=17&Sub1=0&sub2=0

Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

http://www.grandriver.ca/PolicyPlanningRegulations/regulation150_06.pdf

GRIN: Regulation Mapping

http://www.grandriver.ca/GRIN/WatershedViewerLaunch.cfm

Grand River Assessment Report

http://www.sourcewater.ca/

Other

Atlas of the Breeding Birds of Ontario

http://www.birdsontario.org/atlas/index.jsp

Geology Ontario http://www.geologyontario.mndm.gov.on.ca/

Geological Survey of Canada http://www.nrcan.gc.ca/earth-sciences/dir/index_e.php?id=5025

Appendix B: EIS Terms of Reference Checklist

Applicant: _____ **Consultant:** _____

_____ _____

Phone: _____ **Phone:** _____

Email: _____ **Email:** _____

Address: _____ **Address:** _____

_____ _____

_____ _____

Development Application Address: _____

_____

_____

Reporting Standard

- ☐ 8½ by 11 paper, double-sided.
- ☐ A title page that includes: the name of the applicant, address of the subject property, lists the principal author of the report, the consulting firm, and the date the report was completed.

Content

The following is a checklist of all the potential sections that may need to be addressed as part of an EIS. However, depending on the scope and scale of the proposed development and/or site alteration, as well as the nature and extent of natural heritage features and areas to be considered, not all elements will necessarily be required. Components not included in the Terms of Reference, with a rationale for their exclusion, should be marked as "N/A".

Introduction

- ☐ Description of subject property (natural features and areas, land covers, existing hard surfaces or buildings)
- ☐ Description of the type and scale of the development proposal (including any required servicing, infrastructure upgrades or stormwater facilities)
- ☐ Describe the historical and present uses of the subject property:
  - ☐ grading/filling activities;
  - ☐ brownfield contamination;

- Description of the site context / study area and the subject property's relationship to the surrounding landscape;
- Include map(s) of the development location, subject property and study area;
    - Orthographic map with known natural heritage features / areas overlaid

Planning Context (may be included in the Introduction)

- Current land uses designation and zoning for the subject property and for the adjacent lands;
- Identify the required development applications;
- Include map(s) of the development location and extent of the area to be studied including Zoning/Land Use
- Identify environmental legislative, regulatory and policy requirements that may affect the development proposal, including clauses relevant to the proposal;

Background Review (may be included in the Characterization of the Natural Environment)

- Identify relevant information from existing studies, plans, databases and other sources to be analyzed as part of the EIS

NOTE: Natural heritage records are generally considered in need of field verification after a period of five years

Characterizing the Natural Environment: Approach and Methodology

- Detailed study methods for studying natural heritage features and areas, wildlife habitat and Species at Risk (including time of year, level of searcher effort, etc.)
- Identify and describe the approach and methods to be used to assess the natural environment of the subject property and the adjacent lands for:
    - Geology and Soils
    - Hydrology and Hydrogeology
    - Aquatic and Fish Habitat
    - Terrestrial Vegetation (including wetlands)
        - Vegetation Communities (Ecological Land Classification)
        - Plants
    - Wildlife
    - Natural Hazards
    - Connectivity and Ecological Linkages

- Identify whether there are potential natural heritage features and areas that do not need to be assessed, and provide a rationale for their exclusion;
- Include completed "Screening for Known or Candidate Wildlife Habitat," (see *Appendix F*);

Data Analysis: Approach and Methodology

- Evaluation of Significance and Natural Hazards
    - Assess the various natural heritage features and areas against the appropriate policies and guidelines to determine significance:
    - Assess the various natural heritage features and areas against the appropriate policies and guidelines related to natural hazards:
    - Assessment of appropriate buffers and / or setbacks;
- Natural Heritage and Natural Hazard Opportunities and Constraints

- Impact Assessment
  - Direct Impacts
  - Indirect Impacts
  - Induced Impacts
- Evaluation of Alternative Options / Measures
- Recommended Mitigation Measures (including avoidance, enhancement, restoration, compensation, outreach, education and stewardship)Environmental Policy Analysis (confirmation of policies and legislation to be addressed)

Monitoring

- Monitoring Plan (outline of the scope and types of monitoring to be included)

Recommendations and Conclusion

- Recommendations Concluding Statement (confirm they are to be provided)

Appendix C: Significant Wildlife Habitat Screening Table

The following table has been developed based on the categories provided in the MNR's Significant Wildlife Habitat Technical Guide (2000) with consideration for the MNR's Draft SWH Ecoregion 6E Criterion Schedule (2012), and the City of Guelph's biophysical context. These categories may need to be revised or refined based on subsequent updates to these guidance sources.

Significant Wildlife Habitat Type	**Known or Candidate SWH present within or adjacent to the Subject Property?**	**Rationale (Habitat Presence or Absence)**	**Field studies required?**
Seasonal Concentration Areas[8]			
Deer Yarding Areas (as identified by MNR)			
Deer Winter Concentration Areas (as identified by MNR)			
Colonial Bird Nesting Habitat: • tree/shrub • cliff/bank • ground			
Waterfowl Stopover and Staging Areas: • Aquatic • Terrestrial			
Waterfowl Over Wintering Areas[9] (as identified by MNR)			
Raptor Wintering (Feeding and Roosting) Areas			
Turtle Wintering Areas			
Reptile (Snake) Hibernacula			
Bat Hibernacula			

[8] The categories for Migratory Stopover Areas (for shorebirds, landbirds, butterflies and bats) have been excluded because of the distance of Guelph from the Great Lakes.
[9] Not specifically listed in the available guidelines, but identified by MNR in the City of Guelph

Significant Wildlife Habitat Type	Known or Candidate SWH present within or adjacent to the Subject Property?	Rationale (Habitat Presence or Absence)	Field studies required?
Bat Maternity Colonies			
Rare Vegetation Communities[10]			
Alvar			
Prairie			
Savannah			
Rare Forest Types			
Cliff/ Talus			
Rock Barrens			
Sand Barrens			
Other Rare Vegetation Types, including Old Growth Forest			
Specialized Habitats for Wildlife			
Waterfowl Nesting Area			
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat			
Woodland Raptor Nesting Habitat			
Amphibian Breeding Habitat: • Woodland • Wetland (includes bullfrog concentration areas)			
Turtle Nesting Habitat			
Woodland/Specialized Raptor Nesting			
Bald Eagle Wintering Areas			
Seeps and Springs			
Wildlife Movement Corridors			

[10] Provincially rare communities recorded in the City of Guelph include (Dougan & Associates 2009, Guelph Natural Heritage Strategy, Phase 2: Terrestrial Inventory & Natural Heritage System, Volume 1) : Buttonbush Mineral Thicket Swamp (ELC Code: SWT2-4, NHIC Rank: S3), Silky Dogwood Mineral Thicket Swamp (ECL Code: SWT2-8, NHIC Rank: S3/S4), White Cedar Treed Carbonate Cliff (ELC Code: CLT1-1, NHIC Rank: S3), Carbonate Open Cliff Ecosite (ELC Code: CLO1), Carbonate Shrub Cliff Ecosite (CLS1), Carbonate Treed Talus Ecosite (TAT1)

Significant Wildlife Habitat Type	Known or Candidate SWH present within or adjacent to the Subject Property?	Rationale (Habitat Presence or Absence)	Field studies required?
Animal Movement Corridors (including Ecological Linkages[11]) - Deer Movement Corridors - Amphibian Movement Corridors - Other Wildlife Movement Corridors			
Habitats of Species of Conservation Concern[12,13]			
Marsh Bird Breeding Habitat			
Woodland Area-Sensitive Breeding Habitat			
Open Country Bird Breeding Habitat			
Shrub / Early Successional Breeding Bird habitat			
Terrestrial Crayfish Habitat			
Global Species of Conservation Concern (i.e., G1, G2 and G3) as identified by the NHIC[14]			
Federal Species of Conservation Concern (i.e., listed as endangered, threatened or special concern federally)			
Provincial Species of Conservation Concern (i.e., listed as special concern provincially or S1, S2 or S3 by the NHIC)			

[11] Ecological Linkages are identified as part of the City's Natural Heritage System and may be refined based on the applicable policies.
[12] Excluding species listed as Provincially Endangered or Threatened, which are addressed through the requirements of the *Endangered Species Act* (2007)
[13] In the City of Guelph, habitats for species that are locally / regionally significant, but do not qualify as Significant Wildlife Habitat or provincially Endangered or Threatened, are addressed under the policies for "Habitat for Significant Species".
[14] NHIC = Natural Heritage Information Centre of Ontario

Appendix D: Aquatic and Fish Survey Guidance

This appendix includes guidance related to:

- Fisheries Assessments
- Benthic Macroinvertebrate Assessments, and
- Mussel Assessments

Fisheries Assessments

When detailed and current (i.e., within five to six years) fisheries information is not available, and there are watercourses and / or ponds on-site, a fisheries assessment may be required.

Background Information

Existing information sources (e.g. Fisheries Management Plans, Sub-Watershed Studies) should be reviewed and referenced prior to the completion of the fisheries assessments. In addition, the Ontario Ministry of Natural Resources (OMNR) and the Grand River Conservation Authority (GRCA) should be contacted to request background information regarding fish community records.

Scoping and Assessments

Fisheries assessments may include one or more of the following:

- habitat assessments
- detailed habitat mapping
- fisheries inventories, and
- spawning surveys.

The determination of the surveys and inventories required will depend on site conditions and the proposed application. The required surveys will be determined through the EIS Terms or Reference approval process. Notably, fisheries inventories and spawning surveys should not proceed until the appropriate permits have been requested and provided.

Survey Methodologies

Surveys, as required through the Terms of Reference, should be completed using methods detailed in the *Ontario Stream Assessment Protocol* (OSAP) (2010)[15]. It is recommended that:

- habitat assessments follow the methods outlined in the OSAP manual
- detailed habitat mapping be completed using the methods and symbols described in the most current Ministry of Transportation (MTO) / Department of Fisheries and Oceans (DFO) / Ontario Ministry of Natural Resources (OMNR) Fisheries Protocol, and
- spawning surveys be completed using the appropriate methods and timing for the species of interest.

[15]Stanfield, L. (Ed.) 2010. *Ontario Stream Assessment Protocol (OSAP), Version 8*. Fisheries Policy Section. Ontario Ministry of Natural Resources. Peterborough, Ontario. 376 pages.

Timing of Surveys
Fisheries inventories should be completed in the spring to ensure any fish usage of intermittent or ephemeral systems is identified. Inventories of permanent features may occur throughout the spring and summer. Habitat assessments and detailed habitat mapping should be completed during snow/ice free conditions. Spawning surveys should be completed during the appropriate timing windows for the species of interest.

Benthic Invertebrate Surveys

Benthic invertebrate community sampling is conducted to assess the aquatic ecosystem condition or integrity. Benthic communities are sensitive to changes in water quality and serve as useful indicators as they are relatively sedentary for much of their life cycle.

Background Review
A review of and building on any GRCA data from existing benthic monitoring locations within or near the study area, as well as datasets from previous studies in the sub-watershed or watershed area should be undertaken.

Scope of Surveys
Benthic surveys are typically required when there is potential for a watercourse/waterbody to be directly or indirectly impacted by changes in adjacent land uses associated with development. The benthic invertebrate survey methods used depend on how the data will be used (e.g., statistical comparisons or general qualitative comparisons). The Grand River Conservation Authority (GRCA) should be consulted to determine the survey protocol to be used, as well as to confirm the benthic site collection locations.

Sampling Approach
Regardless of what protocol is followed, the "Before/After/Control/Impact" (BACI) experimental design should be considered in the sampling design for an EIS study. This design approach incorporates sampling from stations that may be impacted by the development (i.e., 'test' or 'exposure' sites), and sampling of these sites before and after development has occurred. These exposure sites are compared to 'control' sites) located outside of the influence of development (e.g., often upstream, or in adjacent tributaries with similar habitat conditions), during the same time period as the 'test' sites are sampled. The number of years of pre-construction and post-construction monitoring sampling required should be determined in consultation with the GRCA. Often, interim sampling is recommended within the construction period, as well as before and after.

Sampling Protocols
There are three well-established Benthic Invertebrate Sampling Protocols used within the Province of Ontario, as described below, listed from most frequently to least frequently used in EIS studies.

1) Ontario Stream Assessment Protocol (OSAP) (OMNR, 2010)
The Ontario Stream Assessment Protocol (OSAP) (2010)[16], which is a generally accepted standard in Ontario, contains a series of standardized methodologies for identifying sites, evaluating benthic macroinvertebrates, fish communities, physical habitat and water temperatures in wadeable streams. These standardized methods that ensure data

[16] Stanfield, L. (Ed.) 2010. *Ontario Stream Assessment Protocol (OSAP), Version 8*. Fisheries Policy Section. Ontario Ministry of Natural Resources. Peterborough, Ontario. 376 pages.

repeatability and allows data to be shared, used for multiple purposes and stored in a common database.

The OSAP Benthic Macroinvertebrate Assessment protocol describes several standard tools for assessing benthic macroinvertebrate communities to assess water quality. Information such as physical habitat conditions (depth, velocity, substrates) is also collected in conjunction with the benthic data to aid in interpreting data. The OSAP protocol outlines three sampling methods for collecting benthics, and can be used in most wadeable streams with flowing water, which are as follows:

1. Rapid Macroinvertebrate Collection

   This module describes a rapid sampling technique for determining if a site contains large-bodied benthic macroinvertebrates (benthos) that are known to be sensitive to most impacts (based on benthos tolerances to organic pollution). Resulting data can be used in reconnaissance surveys as a coarse indicator of water quality conditions.
2. Stationary Kick Survey

   This module describes a stationary kick technique for evaluating the relative abundance of taxonomic groups of benthos from within riffle habitats. This approach can be used to provide a more comprehensive list of taxa than Rapid Macroinvertebrate Collections. However, If estimating relative abundance of taxa in the riffle and pool habitats of a site is critical to the study, the Transect Travelling Kick and Sweep Survey for Macroinvertebrates should be used.
3. Transect Travelling Kick and Sweep

   This sampling technique (detailed in the manual) is for determining relative abundance estimates for benthos in the riffle and pool habitats. This approach can be used to estimate composition in a meander sequence by generating a composite sample of pools and riffles. This is also the standard sampling procedure for the Ontario Benthos Biomonitoring Network (OBBN) described below.

2) Ontario Benthic Biomonitoring Network (OBBN) (MOE, 2007)

The OBBN[17] protocol is a well-accepted protocol used within Ontario, developed in co-ordination with the Ministry of the Environment. This protocol generally recommends using collection methods that are qualitative in nature, focusing on capturing all microhabitats within a wadeable watercourse/waterbody.

The OBBN Protocol identifies the preferred collection method for wadeable habitats as the travelling kick and sweep method (as described above) using a ”D” frame kicknet. A sampling reach should be long enough to encompass two riffles and one pool, often extending one meander wavelength, within typical alluvial systems. Therefore, three sub-samples are collected from each habitat within the sampling site for one composite sample.

For non-wadeable habitat, grab sampling, including the use of Ponar Grab, Ekman Dredge, or Coring, can be used. Different sampling designs are required for these habitats, as outlined in the OBBN manual. Sampling methods should be consistent within a habitat class across all stations and areas. Further details on siting sampling sites are outlined in the OSAP protocol found in the manual.

3) Environmental Effects Monitoring (EEM) (Environment Canada 2010)

This national survey protocol completed by Environment Canada is typically used when monitoring mining, pulp and paper operations, and wastewater treatment plants. It is not

[17] Jones, C., K. M. Somers, B. Craig, and T. B. Reynoldson. 2007. *Ontario Benthos Biomonitoring Network Protocol Manual.* Ontario Ministry of Environment, Queen’s Printer for Ontario, Toronto.

normally used for land development related EIS because it is only appropriate where there is a known/fixed discharge location (i.e., waste water treatment plant) and lab fees associated with the EEM protocol are often more expensive based on the number of replicates required. This protocol focuses on quantitative collection methods for benthic organisms within wadeable habitats as a means to more accurately compare between data sets and years.

The EEM Protocol includes several methods of benthics collection, with a focus on quantitative sampling procedures using Fixed Area Collection sampling equipment within wadeable and non-wadeable environments. Several replicates (often five, with minimum of three pooled samples/replicates) are required at each station for quantitative sampling. Further details on siting sampling sites, are outlined in the EEM Protocol.

Timing of Surveys

Surveys should be completed within the spring and fall, as these seasons capture the most diverse community assemblages. Slightly different communities would be expected within each season, therefore when comparing data between years, the same sampling periods should be repeated. Sampling periods used for collection of any pre-existing benthic data in the watershed or sub-watershed should be repeated.

The timing for spring collection is short, and should occur between spring freshet and peak times for insect emergence. The fall timing window is less restrictive, although benthics will generally be smaller and can be more difficult to identify.

Habitat Assessment

Physical stream measurements and in-situ water quality parameters should be completed as part of the benthic collection work. The OBBN field collection sheet, or something comparable, should be completed for all benthic sampling events as part of the habitat assessment.

Sample Identification

Samples or replicates can be sub-sampled after collection, using accepted sub-sampling procedures outlined in the OBBN protocols. Benthic identification should be completed by a trained professional, and benthics should be identified to the lowest possible taxonomic level. Samples can be sorted live or preserved, to be sorted at a later date.

Benthic Analysis

Various metrics for comparing benthic communities should be tabulated. These include but are not limited to, total invertebrate density, species richness, family richness, percentage of various feeding groups, and percentage of tolerant species. Other indices such as Shannon's Diversity Index and the Family Biotic or Biotic Index should also be considered.

Statistical tests, including ANOVA pairwise comparisons can be used if data is collected using the OSAP protocols, but may not be required for an EIS.

Requirements for the EIS

Field standard operating procedures should be included (specifying sampling equipment and protocols appropriate to the study) for pre-construction, during construction and post-construction sampling as part of the Terms of Reference and the EIS. The EIS should also include summaries of the aquatic habitat assessments and benthic analyses, and include all raw data, field notes, and representative photos of sites and, if possible, specimens. Analyses should include a summary of benthic results and comparisons between stations.

Mussel Surveys
There are no known records of Species at Risk, or other Mussels, in Guelph's Speed or Eramosa Rivers, however freshwater mussels lack mobility and are often found below the substrate surface, therefore their presence in the aquatic environment can be overlooked. In terms of good practice, proponents with projects adjacent to these rivers should always contact the Department of Fisheries and Oceans (DFO) to screen for records of potential mussels and mussel habitat.

Mussels may be directly impacted by works when physical alterations of aquatic habitat or dewatering is required, or may be indirectly impacted by sedimentation accumulation due to the absence of erosion and sedimentation controls. If the potential for a Mussel Species at Risk is present within the study area, and impacts are possible, a detection and/or salvage survey may be required. For mussels that are not Species at Risk, the general practice is to remove any mussels encountered within an area being directly impacted as part of fish rescue efforts at the time of construction. A formal mussel salvage survey is not typically required, however (as with all matters related to Species a Risk) this should be confirmed with OMNR.

Determining the presence of a Species at Risk (SAR) Mussels
DFO's Distribution of Mussel Species at Risk mapping, which is available online (http://conservation-ontario.on.ca/projects/DFO.html), should be consulted to determine if a Species at Risk is likely to be found within the watercourse reaches within the project area and vicinity. If such records are found, a follow up discussion with DFO staff is needed to verify if a Mussel Detection Survey is required to confirm for species presence/absence. Often, detection surveys are not required or recommended because even if the species is likely to occur within the study area detection surveys can cause unnecessary harm to the mussels present.

If a mussel detection survey is deemed necessary, permits under the *Species at Risk Act* (SARA) and/or the *Endangered Species Act* (ESA) (as applicable) will be required prior to initiating this work. Methods involved in Mussel Detection Surveys are outlined in detail in the *Protocol for the Detection and Relocation of Freshwater Mussel Species At Risk in Ontario-Great Lakes Area (OGLA*) (2008)[18].

Mussel Salvage and Relocation Surveys
Mussel salvage and relocation surveys will typically be required when the project may result in negative impacts (direct and/or indirect) to the aquatic environment, and where there is some probability that mussel SAR may be directly impacted as a result. SARA and/or ESA permits are required to undertake a Mussel Salvage and Relocation. Often a mussel expert (often identified by DFO or OMNR) specifically trained in identification of mussel SAR will need to be on site during the Salvage and Relocation Operations.
Details of the Survey Relocation Protocols can be found in the *Protocol for the Detection and Relocation of Freshwater Mussel Species At Risk in Ontario-Great Lakes Area (OGLA*) (2008).

Identifying Critical Habitat for Freshwater Mussels

[18] G.Mackie; Morris T.J., Ming, D. 2008. *Protocol for the Detection and Relocation of Freshwater Mussel Species At Risk in Ontario-Great Lakes Area (OGLA*).

Critical Habitat information for mussels can be downloaded from an on-line geodatabase (http://www.conservation-ontario.on.ca/projects/DFO.html).

Appendix E: Ecological Land Classification and Plant Survey Guidance

This appendix includes guidance related to:

- Ecological Land Classification (i.e., vegetation community classification in southern Ontario), and
- Botanical Surveys

Ecological Land Classification

Description

Ecological Land Classification (ELC) is a tool developed by the Ontario Ministry of Natural Resources (OMNR) to provide consistent description, identification, classification and mapping of ecological land units in southern Ontario. ELC is completed based on the available field manual, which includes five data cards used to gather and summarize information. Each distinct ecological community is outlined as a unique polygon.

The ELC system establishes a hierarchy of four levels whereby the more information one is able to collect, the more detailed the assessment can be. The hierarchy, from most coarse to most refined level, consists of:

- Community Class (e.g., Forest)
- Community Series (e.g., Deciduous Forest)
- Ecosite (e.g., Dry-Fresh Sugar Maple Deciduous Forest)
- Vegetation Type (e.g., Dry-Fresh Sugar Maple-Beech Deciduous Forest Type)

In Guelph, ELC communities should be identified to "Vegetation Type" or "Ecosite" based on the field manual. Notably, some communities, particularly those classified as "cultural", cannot be classified to Vegetation Type.

Biophysical data is collected and recorded on the data cards for each polygon (community). ELC should be performed by personnel certified in ELC who are familiar with the vegetation types and plant species found in southern Ontario. The types of data cards available through the ELC system are described briefly in **Table E-1** below. While the data cards for Stand and Soil Characteristics, Plant species, and Community Description and Classification are typically used, the Management / Disturbance and Wildlife data cards are not required for ELC and some Ecologists may use alternate data collection sheets for these purposes.

Table E-1. Description of data collected on ELC data cards

Data Card	Information Collected
Stand & Soil Characteristics	– Tree Tally (for forested communities) – Stand Composition – Soil Assessment (including texture, depths to mottles and gley, depths to organics and bedrock, moisture regime) – Community Profile Diagram
Plant Species List	– Plant List (vascular plants) indicating the layer(s) in which they occur and abundance

Community Description & Classification	– Polygon Description including system, site, substrate, topographic feature, history, cover, plant form and community – Stand Description including the dominant plants in each vegetation layer – Community Classification including Vegetation Type
Management/Disturbance	– i.e. non-native species, trails, browse, logging etc.
Wildlife	– Incidental wildlife species observations

Timing

Normally site visits at three different times over the growing season (i.e., spring, early summer, late summer) are required to gather the information necessary for a comprehensive ELC assessment (see **Table E-2**). However, for some habitat types or for habitats where recent background information is available, all three may not be required. The number of visits will depend on the types of habitats present in the study area and the scope of the work required. While a lot of information can be collected in one visit, particularly during the spring or summer, more than one visit is typically required to accurately describe the vegetation present on site. Repeat field visits also allow for confirmation of species that could not be fully identified during earlier visits.

Table E-2. Timing windows for flora surveys ins Ontario

Time	Flora Type	Flora and Habitats of Focus
Spring (April – June)	Spring Ephemerals	– Forest Habitats
Early Summer (June – August)	Peak Season Flora	
Late Summer (August – September)	Late Flowering Flora	– Wetland, Alvar and Prairie Habitats – Goldenrod and Aster Species

Scope

Depending on the nature of the project and/or the habitats on site, the extent of ELC surveys may be scoped in the following ways:

- Number of visits (e.g., it may be acceptable to complete only one survey for a dense pine plantation with little to no understory).
- Number of prism sweeps and soil augers in each community (e.g., in unforested communities prism sweeps may be omitted; multiple soil augers may not be necessary if in depth geotechnical work is being completed on site).
- Minimum polygon size (i.e., small vegetation communities smaller than 0.5 ha are typically considered inclusions within larger polygons and are not described individually). Minimum size for polygon description may be increased or decreased beyond the standard 0.5ha depending on the size of the site and the level of detail required for the study. However, in the City of Guelph, particularly for wetlands, it may be appropriate to use 0.2 ha as the lower threshold because of the "Other Wetlands" category which captures wetlands between 0.2 and 0.5 ha.
- Which ELC data cards need to be completed (e.g., it may be determined that it is not necessary to complete the Management/Disturbance assessment).

Components Typically Required in an EIS

- A description of the methodology used to assess ELC (e.g., timing and extent of surveys, data cards used, etc.)
- A written description of each ELC Vegetation Type / Ecosite identified, outlining the dominant plant species within the overstorey, shrub layer, and ground flora of each ELC vegetation type
- The location and "element ranking" of each provincially significant ELC vegetation type identified (see NHIC website)
- A summary of disturbances in each ELC vegetation type, including the descriptions of intensity and extent of invasive species, and
- Copies of completed data cards in the Appendices

Botanical Surveys

Description

A botanical (or plant) inventory is completed as part of the ELC system. For each Vegetation Type / Ecosite a list of vascular plant species should be compiled with corresponding relative abundance values for each vegetation layer (canopy, sub-canopy, understory, ground layer). Prior to undertaking field work, the OMNR's Natural Heritage Information Centre (NHIC) website should be consulted to determine if there are any records of significant plant species from the study area. When significant species (Species at Risk, Provincially and/or Regionally Significant), or populations thereof, are identified in the field, their location should be recorded with a GPS and / or marked on an aerial photograph. The abundance and distribution of each significant floral species should be noted (i.e., is the population widespread and scattered, or localized to a few clumps).

Plant specimens may be collected if it is not possible to confirm the species in the field, as long as it is not a Species at Risk (SAR) or one of very few specimens (>10 individuals) of that species growing in the area. If a specimen cannot be collected, it should be photographed for later identification.

Floral surveys should be completed by personnel with strong plant identification skills, and difficult to identify species (e.g., some graminoids, *Crataegus* spp.) of collected specimens should be verified by experts if needed.

If previous site-specific inventories have been undertaken this information should be incorporated into the vascular plant list, with notations clearly indicating which species were directly observed and which were reported by others.

Timing

In order to compile a comprehensive species list, typically floral surveys at three distinct times of the growing season (as shown in **Table E-3**) are needed to capture species that flower at different times of the year to facilitate identification. However, for some habitat types or for habitats where recent background information is available, all three may not be required. The number of visits will depend on the types of habitats present in the study area, and the scope of the work required. Repeat field visits can also allow confirmation of species that could not be identified at earlier stages.

Table E-3. Timing windows for flora surveys in southern Ontario

Time	Flora Type	Flora and Habitats of Focus
Spring	Spring Ephemerals	– Forest Habitats

(April/May – June)		
Early Summer (June – August)	Peak Season Flora	
Late Summer (August – September)	Late Flowering Flora	– Wetland, Alvar and Prairie Habitats – Goldenrod and Aster Species

Scope

Depending on the nature of the project and/or the habitats on site, the timing and frequency of surveys required to complete flora surveys may be scoped (e.g., it may be acceptable to complete only one survey for a dense pine plantation with little to no understory).

Notably, if there are records for rare or significant species, additional time may be required to verify for the presence / absence of specific species (e.g., Species at Risk, regionally rare species, species endemic to certain areas or habitat types).

Components Typically Required in an EIS

- A description of the methodology used to assess the flora (e.g., timing and extent of surveys, data cards used, etc.)
- Mapped locations of significant species (e.g., national, provincial, or regional, see below) or at least an indication of which ELC polygon(s) they were found within (subject to restrictions on publication when required by OMNR for the protection of Species at Risk).
- One (or more) summary table of all significant species observed along with their current global, federal, provincial and regional / local status and the ELC polygon(s) in which they were observed.
    - In Guelph, the regionally / locally significant plant list for Wellington County should be used as the reference for regional / local significance.
- An appendix list of vascular plant species observed or reported on the site, including scientific and common names, with an indication of the relative abundance of each species on the property (e.g., common, uncommon, rare).

Appendix F: Wildlife Survey Guidance

Wildlife surveys in southern Ontario typically include targeted surveys for breeding birds and breeding amphibians, as well as targeted or incidental surveys for reptiles, and incidental surveys for mammals. Targeted surveys are also increasingly required for certain mammals (i.e., bats and deer). In some jurisdictions targeted surveys for damselflies, dragonflies and butterflies are also being requested. However, more typically, notable insects are recorded incidentally.

The following provides guidance related to the collection and reporting of wildlife data records, as well as a summary of current and potentially applicable techniques and protocols for undertaking wildlife surveys for these key groups currently in use in southern Ontario.

Wildlife Data Records

Data records for all searches should be presented in tabular form and included as an appendix in the EIS. They should include:

i. Date
ii. Total time spent searching; Start time; Finish time
iii. Location of observation (e.g., Transect number, plot number, point number, GPS coordinates, ELC polygon)
iv. Approximate number of individuals
v. Weather conditions; temperature; wind speeds
vi. Habitat type and/or ELC community
vii. Rarity Ranking; Provincial/National/Local Status
viii. Breeding information
ix. Name of field study participants

Survey Techniques

Area Search **Birds, Amphibian, Mammals, Reptiles**

Area searches are intensive searches to identify and locate all targeted species within a given property. Property-wide searches should be considered in circumstances where a wide variety of habitat types are expected and thought should be given to ensure that all unique vegetation communities are searched to obtain a representative sample of the wildlife utilizing the habitat(s) within and / or adjacent to the subject property.

On properties with prior agricultural or anthropogenic influences, a targeted approach may be more appropriate.

Standardized Area Search **Birds, Amphibians**

Standardized area searches are searches from fixed sampling plot locations that have been established in potentially suitable habitat for target species. In circumstances where this survey technique is applied, plots must be established in representative and unique vegetation communities. These plots remain in fixed locations within and between years.

This technique is typically most appropriate where surveys will be completed to monitor changes over multiple years.

Line Transects **Birds, Reptiles**
Line transects are a form of sampling that involves searching for wildlife along pre-determined routes. Transects should be randomly placed and should generally run through representative habitats (i.e., not along roads or habitat edges). Line transects are recommended in large areas of uniform habitat. In cases where wildlife is assumed to be randomly distributed and sample sizes are sufficient, line transects may also be used to estimate density and abundance of wildlife populations.

The data collected should include the specific transect where the observation occurred, the observer's position along the transect, and the distance from the transect.

Behavioural Studies **Birds, Amphibians, Mammals, Reptiles**
Behaviour studies consist of observations made over a period of time to determine how wildlife is using a particular area or feature (e.g., deer corridor). For these studies, specific vantage points must be identified and observations should coincide with the timing of significant seasonal events (e.g., migration movements).

Point Counts **Birds, Amphibians**
Point count assessments consist of observations performed at systematically placed points throughout an area. Standardized protocols which identify the time of year or day that the surveys can be completed, and the length of time that each point is surveyed, are typically provided to ensure that the data collected is representative of the conditions at the site.

Incidental Observations **Birds, Amphibians, Mammals, Reptiles**
Incidental wildlife observations consist of observations made during the completion of other surveys that are not necessarily targeting the species observed, but are collected during the course of field surveys targeting other species or areas. Information recorded from incidental observations can include the species observed and level of evidence observed (e.g., tracks, scat, singing male, nesting, etc.). Where rare or significant species are observed, the location of the observation should also be recorded (i.e. marked on a field map, GPS coordinates recorded, etc.).

Survey Protocols

- Seasonality
- Time of Day
- Searcher effort

Birds: Ontario Breeding Bird Atlas Protocol[119]

Under the *Ontario Breeding Bird Atlas (OBBA) Guide for Participants* two rounds of breeding bird surveys in southern Ontario should be completed between May 24th and July 10th. If

[19] Ontario Breeding Bird Atlas. 2001. *Guide for Participants*. Atlas management Board, Federation of Ontario Naturalists, Don Mills.

unseasonably warm or cold conditions are encountered in the spring, survey dates may need to be adjusted.

Surveys must be completed between dawn and five hours after dawn and should only be completed in conditions that are favourable for surveying birds. This generally consists of good visibility with no precipitation and little to no wind (wind conditions should be classified as a 3 or less on the Beaufort Wind Scale). It is also recommended that the first round and second round of surveys be completed a minimum of one week apart as this allows the surveyor to distinguish between possible and probable breeders.

Species codes, habitat codes, breeding codes and levels of breeding evidence codes are all provided under this protocol and should be used to record data collected from these surveys.

Detailed information pertaining to this protocol is available in the OBBA Guide for Participants.

Marsh Birds: Marsh Monitoring Program[20]

For projects with potentially suitable habitat for marsh breeding birds it is recommended that surveys for these species be completed using the protocol provided in the *Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds*. Focal species for this program include American Bittern, American Coot, Black Rail, Common Moorhen, King Rail, Least bittern, Pied-billed Grebe, Sora, Virginia Rail and Yellow Rail. Habitat for these species typically consists of large flooded cat-tail marshes.

Under this protocol two rounds of surveys should be completed between May 20th and July 5th a minimum of 10 days apart. If unseasonably warm or cold conditions are encountered in the spring, survey dates may need to be adjusted.

Surveys can either be completed in the morning or evening. Morning surveys can begin 30 minutes before sunrise and end no later than 10 am. Evening surveys can begin four hours before sunset and end no later than sunset. Surveys should only be completed in conditions that are favourable for surveying birds. This generally consists of good visibility, warm temperatures (a minimum of 16 C°), no precipitation and little or no wind (3 or less on the Beaufort Wind Scale). Survey stations must be established prior to or during the survey, and each station must be surveyed for 15 minutes using the Marsh Bird Broadcast Audio File, which can be obtained by registering for the Marsh Monitoring Program with Bird Studies Canada, and an appropriate audio source that will broadcast the calls so that they can be heard well at a distance of 100 m.

Detailed information pertaining to this protocol is available in the *Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds*.

[20] Bird Studies Canada, Environment Canada and the U.S. Environmental Protection Agency. 2009. *Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds - Edition 17*.

Raptor Nests

For projects with potentially suitable habitat for nesting raptors (i.e., forests) it is recommended that nest surveys for these species be completed in the early spring between March 23rd and April 23rd prior to "leaf out". Surveys should consist of a thorough investigation of potentially suitable habitat searching for active or inactive stick nests and evidence of raptor activity.

If an active raptor nest is encountered, the species utilizing the nest, its location and overall conditions should be recorded. Activity in the general proximity to the nest should be avoided to the extent possible to ensure that the nest is not disturbed. The location and a general description of inactive stick nests should also be recorded.

Detailed information on raptors and their nests is available in *Forest Raptors & Their Nests in Central Ontario: A Guide to Stick Nests & Their Users*[21].

Amphibians: Frogs and Toads

For projects with potentially suitable habitat for amphibians it is recommended that surveys for these species be completed using the protocol provided in the *Marsh Monitoring Program Participant's Handbook for Surveying Amphibians*.

Under this protocol, three rounds of surveys should be completed between the following dates at least 15 days apart:

- Round 1: April 15th – April 30th when night-time air temperatures exceed 5°C;
- Round 2: May 15th – May 30th when night-time air temperatures exceed 10°C; and
- Round 3: June 15th – June 30th when night-time air temperatures exceed 17°C.

These dates are provided only as a guideline, as air temperature and lack of wind are the most important variables to pay attention to when deciding when to conduct surveys. If unseasonably warm or cold conditions are encountered in the spring, survey dates may need to be adjusted.

Surveys can begin half hour after sunset and end before midnight. Each station is surveyed for three minutes. Surveys should only be completed in conditions that are favourable for surveying amphibians.

This consists of nights that are damp, foggy or have light rain falling. Persistent or heavy rainfall and nights with strong winds (3 or less on the Beaufort Wind Scale) are to be avoided.

Detailed information pertaining to this protocol is available in the *Marsh Monitoring Program Participant's Handbook for Surveying Amphibians*[22].

[21] Kandyd, S., and Naylor, B. 1998. *Forest Raptors & Their Nests In Central Ontario: A Guide to Stick Nests & Their Users.* Southcentral Sciences Section Field Guide FG-03.

Salamanders

For projects with potentially suitable habitat for salamanders it is recommended that surveys for these species be performed in the early spring between late-March to mid-April, ideally immediately following snow melt and/or the first spring rains. Surveys can consist of one or more of the following three techniques:

> (1) Visual surveys of potentially suitable habitat can be completed in the evenings during the period specified above as this is when the majority of salamanders are most likely to be active. A visual inspection of the habitat, including carefully overturning and replacing potential cover can be completed as part of this survey. Visual inspections of vernal pools is also recommended. Egg mass surveys can also be completed during daylight hours.
>
> (2) Fine mesh dipnets can be used to catch amphibians at all stages of development in aquatic habitat. Capture occurs by sweeping or churning the water. Correspondence with OMNR prior to survey commencement recommended as permits for these surveys may be required.
>
> (3) Pitfall or funnel traps, often in association with drift fences, are the most common way of trapping terrestrial amphibians. Traps should be checked daily, before noon to minimize mortality. Correspondence with OMNR prior to survey commencement is required as permits for these surveys will need to be obtained.

Detailed information pertaining to these protocols is available in the *Wildlife Monitoring Programs and Inventory Techniques for Ontario*[23]

Mammals

Survey techniques for bats and deer, the two mammals most likely to need species-specific surveys in Guelph, have been provided below. Notably, the approach taken should be confirmed with OMNR prior to proceeding, particularly for bats, as several bat species are listed as provincially Endangered.

Bats

Criteria from the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) in conjunction with methods found in the appendices of *Bat and Bat Habitats: Guidelines for Wind Power Projects*[24] can be used to evaluate the significance of bat maternity colonies.

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[22] Bird Studies Canada, Environment Canada and the U.S. Environmental Protection Agency. 2009. *Marsh Monitoring Program Participant's Handbook for Surveying Amphibians - Edition 17*.

[23] 6 – Konze, Karl and McLaren, Margaret. 1997. *Wildlife Monitoring Programs and Inventory Techniques for Ontario*. Ontario Ministry of Natural Resources. Northeast Science and Technology Technical Manual TM-009. 139 pp..

[24] Ministry of Natural Resources. 2011. Bats and Bat Habitats: Guidelines for Wind Power Projects

In order to confirm the presence of bats, surveys to identify potentially suitable habitat for these species (i.e., old buildings, barns or cavity trees) should be completed prior to June.

To identify potential maternity roots in woodlots the following steps should be taken:

- the Ecological Land Classification system should be used to determine if Mixed Forest or Deciduous Forests are present at the site;

- If these communities are present, the density of snag and cavity trees that are greater than 25 cm diameter at breast height (dbh) will need to be calculated using the methodology provided in the *Bat and Bat Habitats: Guidelines for Wind Power Projects*; and

- If snag/cavity tree density greater than 10 snags greater than 25 cm dbh per hectare, the site is considered a candidate for maternity colony roots.

If potential bat habitat is present at the site that may be negatively impacted by the proposed works, exit surveys should be completed to confirm if bats are present at the site. If bats are present acoustic monitoring may be required to identify the bat species present. Detailed information pertaining to these protocols for monitoring and evaluation bat habitat is available in the *Bat and Bat Habitats: Guidelines for Wind Power Projects*.

Deer

Surveys to survey for white-tailed deer can be completed by recording incidental observations, recording pellet group counts and/or surveying wildlife transects.

If the purpose of the study is to confirm the presence or boundary of a winter deer yard, a survey of the habitat at the site will be required. Correspondence with the OMNR will be required in order to confirm survey protocols and details on the evaluation of winter deer yards. Some information pertaining to the habitat specifications of winter deer yards is available in the *Forest Management Guidelines for the Provisions of White-tailed Deer Habitat*[25].

If the purpose of the study is to confirm the presence of deer migration corridors, transects can be completed in order to evaluate the use of habitat at the city. If the corridor crosses a road, deer mortality data can also be requested from the city.

More information pertaining to protocols that can be used to monitor deer populations is available in the Wildlife Monitoring Programs and Inventory Techniques for Ontario[26].

[25] Voigt, D.R., Broadfoot., J.D. and Baker, J.A., 1997. *Forest Management Guidelines for the Provisions of White-tailed Deer Habitat.* Ontario Ministry of Natural Resources Forest Management Branch.

[26] Konze, Karl and McLaren, Margaret. 1997. *Wildlife Monitoring Programs and Inventory Techniques for Ontario.* Ontario Ministry of Natural Resources. Northeast Science and Technology. Technical Manual TM-009. 139 pp.

Reptiles

Snakes

For projects with potentially suitable habitat for reptiles it is recommended that visual surveys be completed by overturning all objects that provide cover (i.e., large branches, logs, rocks, etc.). Once the area beneath these objects has been thoroughly searched, the objects should be returned, to the extent possible, to their original positions.

Snakes (and skinks) are most likely to be observed under cover objects in the morning after cool evenings when they seek out there area to try and maintain their body temperatures. This technique is likely to be most successful in the spring and fall, when temperatures in the evenings are typically much cooler than daytime temperatures. Artificial cover boards can be installed as part of this survey protocol, however it is important to realize that it may take for the cover board to become utilized as habitats.

Due to their cryptic nature, potential snake hibernacula can be difficult to locate. Snake hibernacula can be found in a variety of natural and artificial settings including, but not limited, old building foundations, rock piles, beneath logs, and chimney crayfish burrows. Potential hibernacula should be identified during site visits and can be monitored in the early spring to try to confirm any activity.

Roadside surveys can also be used to detect snakes in the spring and fall when they are most likely to be encountered in sunny but cool weather basking on roads or roadsides, which are warmer than the surrounding habitat.

More information pertaining to protocols that can be used to monitor snakes is available in the Wildlife Monitoring Programs and Inventory Techniques for Ontario[27].

Turtles

For projects with potentially suitable habitat for turtles can be completed through visual surveys of the ponds or wetlands at the site. Searching for basking turtles is the most effective method of confirming their presence within suitable habitat.

In open water wetlands, surveys can be completed from the shoreline using binoculars to scan the perimeter of the shoreline and potential basking sites. If required, the surveyor should access the wetland from different locations or walk the shoreline to ensure all suitable habitat is surveyed. Basking sites should be surveyed from the sunlit side as this is the site that the turtles are most likely to be located.

In wetlands that lack large pools of open water, basking turtles may be dispersed throughout the wetland. These habitats should be surveyed using evenly spaced transects or aerial surveys to cover all areas of the wetland.

[27] Konze, Karl and McLaren, Margaret. 1997. Wildlife Monitoring Programs and Inventory Techniques for Ontario. Ontario Ministry of Natural Resources. Northeast Science and Technology. Technical Manual TM-009. 139 pp.

Surveys for basking turtles will likely be most successful if completed in the early spring when water temperatures are still cooler than air temperatures and vegetation is less obstructive to viewing turtles than later in the spring, summer or fall.

Ideally surveys should be completed between 8 am and 5 pm on sunny days when the air temperature is at least 10 °C. Surveys can also be carried on partially cloudy or overcast days but only when air temperatures are greater than 15 °C, and greater than water temperatures. Surveys on the first warm, sunny day after several days of inclement weather will generally be more productive than surveys after several days of warm, sunny weather.

Surveying roads with sandy or gravely shoulders near wetlands during the late May to early July nesting season may also be undertaken as turtles could be nesting during this time.

More information pertaining to protocols that can be used to monitor snakes is available in *the Wildlife Monitoring Programs and Inventory Techniques for Ontario*[28]and the *Occurrence Survey Protocol for Blanding's Turtle in Ontario*[29].

[28] Konze, Karl and McLaren, Margaret. 1997. *Wildlife Monitoring Programs and Inventory Techniques for Ontario.* Ontario Ministry of Natural Resources. Northeast Science and Technology. Technical Manual TM-009. 139 pp.

[29] 12 – Ministry of Natural Resources. 2013. *Draft Occurrence Survey Protocol for Blanding's Turtle (Emydoidea blandingii) in Ontario*. Ontario Ministry of Natural Resources, Species at Risk Branch. Peterborough, Ontario. Ii + 17 pp.

Appendix G: Tree Inventory, Preservation and Compensation Plan Guidance

This appendix is based on the City's draft *Tree Protection Policies and Guidelines*, produced in 2008. The City is currently working on a *Tree Technical Manual* to guide the protection and establishment of trees as part of the recommendations from the *Urban Forest Management Plan* (2012). This appendix provides preliminary guidance and which will be supplemented by more detail once the *Tree Technical Manual* is completed and released.

The City encourages the protection and integration of healthy, non-invasive trees into the urban landscape. During the preparation of a development proposal, proponents may be required to prepare a tree inventory and compensation plan in conjunction with the Environmental Impact Study. This plan will:

- address the feasibility of retaining desired trees
- specify measures for tree (and vegetation) protection and tree (and vegetation) removal that are consistent with best practices required for these trees during site grading and building construction, and
- identify the type and extent of tree (and vegetation) compensation required.

Tree Inventory and Preservation Plans

The detailed tree inventory should include the following:

- A description of site-specific biophysical features(i.e., soils, topography, drainage, surface and ground water features)
- Photographs of representative trees or groups of trees, as well as of all City-owned trees within or near the site (i.e., within 6 m) which may be impacted by the proposed development
- An assessment of vegetation adjacent to the site that may be impacted by the development
- Screening for and identification of Species at Risk
- Identification of significant natural heritage features or areas on site or within the adjacent lands (i.e., 120 m of the site)
- Identification of invasive tree and shrub species and their abundance on site
- Data for each tree over 10 cm diameter at breast height (dbh) measured 1.4 metres above grade in chart format, including:
    - Tree identification number, corresponding to plans provided

- Common and scientific name
- Diameter at breast height (DBH) and diameter of canopy
- Tree condition (structural; vigour)
- Tree health (biological)
- Notation of on-site versus off-site trees, as well as trees on City-owned property
- Proposed action: retain, relocate, or remove
- Reason for action

The mapping should include the following:

- Metric scale
- Aerial photography
- Key plan
- True north arrow
- Property limits
- Location of existing and proposed structures (walkways, curbs, roads, parking, retaining walls, berms, etc.)
- Existing and proposed grades
- Individual or groups of trees, including dripline, and vegetation to be protected
- Individual or groups of trees, including dripline, and vegetation to be removed
- Trees, including dripline, on adjacent properties within 6 metres of property line
- Boundaries of significant natural heritage features/areas as well as any buffers or setbacks
- Stormwater management facilities / areas, roads and other infrastructure
- Location and type of tree protection fencing
    - Plans should use the City's standard specification for tree protection fencing (SD 90-a) and for tree protection signage (SD 90-c) located on the City website in the Bids and Tender Document.

The report should analyze the tree inventory and provide discussion around the following items:

- Evaluation of development concept (i.e., preliminary layout of servicing, blocks, lots, and streets, the proposed land use designations and the proposed grading) in relation to the inventory to assess the potential for vegetation retention
- Consideration of changes in drainage patterns, edge disturbance, sun scorch, wind throw and grading

- Explanation of measures (e.g., relocation, soil aeration, root/branch pruning) that could reduce the need for vegetation removal
- Measures to address the requirements of the *Migratory Birds Convention Act* (1994)
- Actions required to control the spread of invasive tree or shrub species
- Chart summarizing recommendations

In order to minimize or eliminate the negative impacts from construction activity, the report should outline measures to be taken before, during and after construction to prevent damage to vegetation and encourage optimal tree health. These measures may include, but are not limited to:

- Pruning, watering and mulching;
- Establishment of Tree Protection Zones (TPZ) (i.e., where no grading or construction activities are permitted)
- Soil compaction prevention in construction access areas
- Root-sensitive excavation, and
- Root pruning.

When tree removal is necessary, the following should be considered:

- Tree(s) approved for removal must be clearly marked on-site (e.g., with orange or red spray paint)
- Tree removal cannot proceed without City approval of the report
- Approved tree removals should be carried out prior to site works and in such a manner as to minimize site disturbance and damage to trees / vegetation to be retained
- Once approved tree removals have been undertaken, tree protection fencing should be installed prior to any additional work taking place, and
- Removal of all trees and tree parts from Termite Management Areas should adhere to City procedures for removal and disposal of termite infested material and soils.

Compensation Plans

When trees equal to or greater than 10 cm DBH are proposed for removal, the plan should recommend a compensation approach so that, over time, the loss in ecosystem functions[30] related to the presence or trees and canopy cover are replaced or, where feasible,

[30] "Ecosystem functions" provided by trees in urban areas include, but are not limited to: air pollution filtration, surface water filtration and attenuation, cooling through shade, provision of habitat and ecosystem connectivity, economic benefits such as increasing property values, and supporting human physical health, mental health and well-being.

enhanced. While the primary intent of a Compensation Plan is to support tree re-establishment, alternative forms of vegetation compensation may be considered on a case-by-case basis in consultation with the City.

Generally, compensation is required for healthy, non-invasive trees of 10 cm DBH or greater. The plan should include maps completed to the same standard as the Tree Inventory and Preservation Plan (described above) and which include the following:

- Locations of proposed plant material overlaid on retained/relocated trees and existing and proposed infrastructure / utilities
- Plant list including size, species and quantity of proposed plant material
    - Minimum acceptable sizes[31] for plant material are:
        - 60mm caliper for deciduous trees measured at 1 metre from ground
        - 1500mm height for coniferous trees
        - 600mm height for deciduous shrubs (species exemptions)
        - 800mm height and 400mm spread for coniferous shrubs (species exemptions)
    - Plant material to conform to the latest edition of the Canadian Nursery Trades Association Specifications and Standards
    - Spacing of plant material should account for the ultimate size and form of the selected species and the ultimate purpose of the planting whether it be for screening, shade, naturalizing, rehabilitation, etc.
    - Provide an indication of soil volume allotments per tree, particularly for trees proposed within the urban matrix.
    - Minimum of 100 mm of shredded pine-bark mulch or equivalent on all planting beds

If compensation cannot be accommodated on site, the plan should outline cash-in-lieu to be provided to the City in order to compensate for the removal of healthy, non-invasive trees equal to or greater than 10 cm DBH with plantings elsewhere in the City.

[31] There may be cases where planting smaller stock or a range of tree sizes is preferable, particularly for naturalization or restoration projects.

Ontario

GTA West
Planning *with* Vision | Planning *for* People

June 20, 2014

Ms. Blair Labelle, Clerk
City of Guelph, City Clerk's Office
1 Carden Street, City Hall
Guelph, ON N1H 3A1

Dear Ms. Labelle:

RE: Introductory Community Consultation Workshop for Stage 2 of the GTA West Transportation Corridor Route Planning and Environmental Assessment Study

The Ontario Ministry of Transportation (MTO) has initiated Stage 2 of the Environmental Assessment (EA) Study for the GTA West Transportation Corridor. Building on the recommendations from Stage 1, the EA Study continues with a focus on identifying the route and developing the preliminary design for a new transportation corridor within the previously identified Route Planning Study Area. The new transportation corridor will include: a 400-series highway, a transitway, and potential goods movement priority features. As part of the study, a preferred route and interchange locations will be selected and developed.

As part of the study's consultation program, a number of Community Consultation Workshops will be held at key project milestones to allow the Project Team to disseminate project information and to gather information from attendees about study issues and community interests. Please note that these Community Consultation Workshops are generally intended for members of the public. Due to the interactive nature of these workshops, it is important that the attendance be kept to a manageable size. The GTA West Project Team is providing other opportunities to disseminate similar project information and gather information from municipal staff and other external agencies.

As you may be aware, the GTA West Project Team identified the need to postpone the Introductory Community Consultation Workshops originally scheduled for May 2014. These workshops have now been rescheduled for the evenings of **July 24, 2014 (in Woodbridge, ON), July 29, 2014 (in Mississauga, ON), and August 13, 2014 (in Brampton, ON).** Please note that each workshop event will present identical information and provide the same opportunities to provide input to the Project Team, and as such, if you are informing members of your community of the events, you can note that it is only necessary to attend one of the workshops noted above.

The focus of this first round of workshops is to provide an overview of the study objectives, process and timelines, and to provide an opportunity for attendees to apply for participation in the Community Advisory Group (CAG) and the Greenbelt Transportation Advisory Group (GTAG). Some of the interactive activities will include providing input on key issues and existing features within the study area to be considered in the development of the route and interchange alternatives, as well as providing input on where the route should go.

If any members of your community are interested in attending one of the workshops described above, we would ask that you urge them to contact Trish Martins (905-747-1743), or contact us through our toll-free telephone line (1-877-522-6916) by **July 11, 2014** to register for one of the workshops. Please note that confirmation of their intent to attend one of these workshops is

necessary to ensure adequate accommodations at the venue. As such, it will not be possible to accommodate those who do not RSVP in advance.

We thank you for your interest in this study, and look forward to your participation on this project.

Sincerely,

Mr. Patrick Puccini, P. Eng.
GTA West Project Team Member
URS Canada Inc.
1-877-522-6916
project_team@gta-west.com