Report to Planning and Environment Committee

To: **Chair and Members**
Planning & Environment Committee

From: **Gregg Barrett, AICP**
Director, Planning and City Planner

Subject: **Draft Environmental Management Guidelines Update**

Meeting On: October 5, 2020

Recommendation

That, on the recommendation of the Director, City Planning and City Planner, the following actions be taken with respect to the Environmental Management Guidelines Update:

(a) The draft Environmental Management Guidelines (2020) attached as Appendix 'A', **BE CIRCULATED** for public review and comment: and,

(b) The members of external resource groups including EEPAC, First Nations communities, local Conservation Authorities (Upper Thames River, Lower Thames Valley and Kettle Creek Conservation Authorities), the London Home Builders Association, the London Development Institute, Nature London, and the Urban League **BE THANKED** for their work and comments during Pre-consultation and Phase 1 which helped guide the preparation of this initial draft.

Executive Summary

- The objective of this project is to undertake a document review and update of the current Environmental Management Guidelines (EMGs) (2007) to improve stakeholder usability of the EMGs as a tool that sets out the requirements for the preparation of environmental studies that may be required to implement the London Plan and other approved provincial policies and legislation.
- The project to update to the current version of the Environmental Management Guidelines (2007) was initiated in August 2019 with a Pre-consultation initiation letter (**Appendix A)**.
- The Terms of Reference for the update to the EMGs provided in **Appendix B** were completed based on input from External Resource Groups (ERGs) and First Nations communities and outline the scope of the project, including the consultation program. AECOM was selected to prepare the EMG update.
- The consultation program described in **Appendix C** describes the process on on-going consultations.
- The draft EMGs in **Appendix D** were completed by AECOM, with input from the External Resource Groups and First Nations. The Draft EMGs reflect current municipal and provincial policies and guidance documents, as well as updates to scientific literature and current industry best practices.
- The responses to the External Resource Groups and First Nations comments from the Pre-consultation Phase are included in **Appendix E**.
- Further engagement and consultation with External Resource Groups and First Nations to finalize the EMG update will commence this fall.
- The finalized EMGs will be presented to Planning and Environment Committee (PEC) at the conclusion of Phase 2.

Analysis

1.0 Introduction

The Environmental Management Guidelines (EMGs) provide direction regarding the standards, procedures and requirements for preparing environmental reports and studies that may be required to evaluate planning applications, municipal infrastructure projects, Conservation Master Plans, Subject Land Status Reports, Environmental Assessments or Environmental Impact Studies. This update is intended to improve the EMGs so that they are current with respect to applicable policy and legislation, incorporate the latest best practises and scientific knowledge (as well as create space for available Traditional Knowledge), and provide a clear understanding of City expectations for the completion of environmental studies. The updated EMGs will describe the expected consistent approach to preparing environmental studies that may be required to establish boundaries of natural heritage features, assess the potential impacts of development and site alteration on the Natural Heritage System, and identify protection, mitigation, and compensation measures that may be needed to protect Natural Heritage System features and functions.

2.0 Previous Documents/ Reports Pertinent to this Matter

January, 2007 – City of London Environmental Management Guidelines.

August 26, 2014 – Planning and Environment Committee Report for Environmental Impact Study, Performance Evaluation for the City of London.

3.0 Background

3.1 London Plan

The EMGs provide a framework for implementing London Plan policy to protect the Natural Heritage System and state that updates are required to reflect changes to provincial policy and scientific knowledge.

> Under **Policy 1423**_ "The City may prepare environmental management guidelines setting out in more detail the requirements of environmental studies for development and site alteration. Environmental studies are the means by which the City establishes the precise boundaries of natural features and areas and the significant ecological functions within them. They also assess the potential impacts of development and site alteration on the Natural Heritage System and on their adjacent lands, and are required prior to the approval of development to prevent negative impacts on the Natural Heritage System, and to demonstrate that there will be no negative impacts on the natural heritage features and areas or their ecological functions."
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> Additionally, under **Policy 1424**_ "These guidelines shall be updated as required to reflect changes to provincial policy and technical documents and to reflect improvements in scientific knowledge regarding natural features and ecological functions."

3.2 Provincial Policy Statement

The EMGs provide a framework and direct proponents to Provincial policies. This update is in accordance with PPS 4.14 and 4.15 and further establishes a framework for measuring the effectiveness of policy implementation.

> The Provincial Policy Statement (2020) in policy 4.8 and 4.9 encourages municipalities to; "*identify performance indicators for measuring the effectiveness of some or all of the policies. The Province shall monitor their implementation, including reviewing performance indicators concurrent with any review of this Provincial Policy Statement. Municipalities are encouraged to monitor and report on the implementation of the policies in their official plans, in accordance*

with any reporting requirements, data standards and any other guidelines that may be issued by the Minister."

3.3 Environmental Impact Study, Performance Evaluation for the City of London (Beacon, 2014)

The update and improvement of the EMGs was included as a recommendation in the staff and Beacon Report completed in 2014. Issues noted, which had previously been identified by Environmental and Ecological Planning Advisory Committee (EEPAC) and Council, were included as next steps. These recommendations included the following:

- Environmentally Sensitive Area (ESA) Boundary delineation review to address plantations;
- Ecological Buffers review; and,
- Update the EMGs to meet the latest PPS.

4.0 Pre-consultation

Pre-consultation began in August, 2019 and was initiated by way of an invitation letter to the identified External Resource Groups and First Nations communities (**Appendix A**). This Phase identified and included External Resource Groups and First Nations early in the process so that they could help shape the direction of the update and inform the Terms of Reference (see the Terms of Reference (ToR) in **Appendix B**) prior to consultant procurement. This phase included presentations for EEPAC, The London Development Institute (LDI) as well as First Nations communities including Chippewas of the Thames First Nations and Oneida Nation of the Thames. Other External Resource Groups were consulted via email and provided written comments.

External Resource Groups and First Nations were invited to provide initial comments to guide the production of the terms of reference and the Draft EMGs. This step in not the City's normal practice, and indicates the City's efforts to ensure that the preparation of this important Guideline Document included very early participation in the process of updating these guidelines. External Resource Groups and First Nations were also invited to shape the engagement and consultation process, with the understanding that not all groups have the capacity or desire to be included in the same way. A total of 235 written comments were received and reviewed to inform the terms of reference, subsequent External Resource Group and First Nation workshops and draft EMGs preparation in Phase 1.

Staff initiated the procurement process to select a consultant to assist with the EMGs update process in October 2019 and AECOM was retained in November 2019.

5.0 Phase 1: Project Initiation, Background Review and Draft Preparation

Phase 1 began in November, 2019. This Phase consisted of AECOM's review of the background information gathered in consultation with the External Resource Groups and First Nation communities during Pre-consultation. Workshops were completed with these groups to identify key concerns and relevant updates.

5.1 The Community Engagement Process

Facilitator-lead workshops with External Resource Groups commenced in January, 2020 and continued through February, 2020. Seven meetings were held with nine External Resource Groups, with most meetings consisting of multiple groups. **Appendix C** outlines the External Resource Group engagement and consultation process, including the dates of meetings and workshops.

5.2 First Nations Communication/Consultation

The Provincial Policy Statement (2020) in policy 1.2.2 clearly states that "*Planning authorities shall engage with Indigenous communities and coordinate on land use*

planning matters." First Nations that are included as part of the consultation for this project include:

- Chippewas of the Thames First Nation
- Munsee-Delaware Nation
- Oneida Nation of the Thames

Five meetings were held with the three First Nation communities. **Appendix C** outlines the First Nations engagement and consultation process, including the dates of meetings and workshops.

5.3 Draft Environmental Management Guidelines

The Draft EMGs are attached in **Appendix D.** Of the 235 comments that were received during this phase of the project, 171 have been incorporated, 18 were not incorporated, and 46 were not applicable due to being out of scope or for other reasons. **Appendix E** includes the list of comments, indicates whether the comment was included or not and provides a response from AECOM.

The updated Environmental Management Guidelines document includes seven sections. An introduction describing the policy and consultation scope is followed by six complementary guidelines. In general, these guidelines are ordered to outline the processes sequentially. The sections found within the document include:

1. **Introduction** - Includes the updated policy basis for the guidelines as well as First Nations engagement and consultation requirements.

2. **Preparation of Environmental Studies** – Formerly Section 1.0, this guideline outlines pre-consultation, study scoping and reporting requirements for various environmental studies. An updated Environmental Study Scoping Checklist has been included, taking the place of the previous checklist and Terms of Reference. Updated study requirements for Environmental Assessments, Subject Land Status Reports and Environmental Impact Studies are also included to reflect industry best practice.

3. **Evaluation of Significance and Ecological Function –** This guideline combines portions of Sections 3.0 and 4.0 of the 2007 EMG and includes criteria for assessing the significance of natural heritage features. Significance evaluation is included for woodlands, Environmentally Significant Areas and other London-specific natural heritage assessments including valleylands, Significant Wildlife Habitat and wetlands. These evaluations have been revised to remove criteria that are no longer applicable and to refine London-specific evaluation requirements.

4. **Boundary Delineation** – Formerly Section 3.0, this guideline refines the protocols and requirements for delineating natural heritage features based on current best practice and updates to scientific literature. Updated figures depict the criteria of eight boundary delineation guidelines. Critical function zones have been introduced to assist in delineating wetlands, based on the understanding that ecological function is not limited to the extent of vegetation communities or soil composition.

5. **Buffer Determination** – Maintained from the 2007 EMGs as Section 5.0, this section outlines a consistent approach to establishing buffers for development projects. Mandatory minimums are included based on updated scientific literature quantifying buffer requirements to ensure natural heritage feature function.

6. **Ecological Compensation** – Newly added in the EMGs, this section incorporates updated best practices to attain net environmental benefit when negative impacts cannot be avoided. This revised section outlines the requirements to establish a compensation plan and identifies resources necessary to subsequently implement the plan. The former Section 6.0 – Guide

to Plant Selection for Natural Heritage Areas and Buffers was revised and included in this section for brevity, identifying appropriate resources when selecting plants.

7. **Environmental Monitoring –** Newly added in the EMGs, this section outlines the requirements for developing an environmental monitoring plan from project initiation through to post assumption. Guidance on the requirements for pre-construction, construction and post-construction monitoring are included.

Additionally, Section 2.0 Data Collection Standards for Ecological Inventory (2007) has shifted to Appendix B and has been updated to reflect current best practice and environmental inventory methodology.

The completion of the draft EMGs completes Phase 1 of this project and the start of the consultation phase of the project with the public, First Nations and the External Resource Groups (Phase 2).

6.0 Phase 2: Draft Review/Completion of Environmental Management Guidelines (2020)

Phase 2 will include up to two meetings with each External Resource Group and First Nation community to discuss any comments identified through the review of the Draft EMGs. These meetings will work to review and resolve comments and explain previous comment responses, if required. Comments received through this process will be compiled and addressed as was done in Phase 1.

Due to Covid-19 concerns, meetings will now be scheduled via a remote platform (Zoom/Microsoft Teams, etc.).

The City of London and AECOM will review the comments and finalize the EMGs document for presentation at a future public participation meeting of the Planning and Environment Committee (PEC). Depending on the status of the current health emergency, a presentation to the public, External Working Groups and First Nations may be held at an EEAPC meeting prior to the public participation meeting at PEC. All feedback received throughout the process will be considered, however, all comments may not be incorporated in the final draft recommended to Council.

7.0 Project Timeline

The submission of this report and appended Draft EMGs document constitutes the conclusion of Phase 1 of the project and signifies the initiation of Phase 2.

EMG Timeline

- ✓ Pre-consultation (Complete)
  - ✓ ERGs and First Nation Consultation and Engagement
  - ✓ Collection of Initial Comments to Guide EMG Draft
  - ✓ Development and Revision of Terms of Reference
  - ✓ Procurement
- ✓ Phase 1 (Complete)
  - ✓ Background Review
  - ✓ Pre-consultation Comment Review
  - ✓ ERG and First Nation Consultation Workshops
  - ✓ Draft Development
  - ✓ Staff Review
  - ✓ Draft Circulation of EMGs to PEC
- o Phase 2
  - o Public, External Resource Group and First Nations comments received and discussed
  - o Final Version of EMGs circulated to all participants
  - o Presentation of Final EMGs at PEC

8.0 Next Steps

Further engagement and consultation with the public, External Resource Groups and First Nation communities to finalize the draft will commence this fall. Comments input into the comment spreadsheet format (**Appendix D**) will receive written response. All feedback will be considered throughout the process.

The consultation process will be completed this year, and final Environmental Management Guidelines (2020) will be presented at a public participation meeting at the Planning and Environment Committee in early 2021.

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Submitted by:	**Michael Fabro, MEB, P. Eng.** **Manager, Sustainability and Resiliency**
Recommended by:	**Gregg Barrett, AICP** **Director, City Planning and City Planner**

September 28, 2020
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Appendix A – Pre-Consultation Initiation and Invitation for the Update to the Environmental Management Guidelines (2007) for the City of London

City Planning
206 Dundas Street
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RE: Pre-Consultation Initiation and Invitation for the Update to the Environmental Management Guidelines (2007) for the City of London

The City of London's Environmental Management Guidelines (EMG) provide direction regarding the policies, procedures and requirements for preparing environmental reports and studies that may be required to evaluate planning applications, municipal infrastructure projects, Secondary Plans, Conservation Master Plans, Subject Land Status Reports, Environmental Assessments or Environmental Impact Studies. The EMG update process will consider the recommendations of the EIS Performance Monitoring Study completed in 2014. A link to the Planning and Environment Committee staff report (August 26, 2014), and study can be found here. This review to the EMG is intended to update this document to connect standards and practices to reflect the policies of The London Plan and to align the Guidelines with other City planning initiatives.

The London Plan identifies the purpose of the Guidelines in Policy 1423_:

> The City may prepare environmental management guidelines setting out in more detail the requirements of environmental studies for development and site alteration. Environmental studies are the means by which the City establishes the precise boundaries of natural features and areas and the significant ecological functions within them. They also assess the potential impacts of development and site alteration on the Natural Heritage System and on their adjacent lands, and are required prior to the approval of development to prevent negative impacts on the Natural Heritage System, and to demonstrate that there will be no negative impacts on the natural heritage features and areas or their ecological functions.

The EMG are intended to be tools to implement existing policies and do not replace or supersede such policies. Approved Provincial or procedural policy will not be explored as part of this update. Whenever possible, reference will be made to these approved documents to focus the EMG update scope to London-specific items.

Consultation with external resources (stakeholders and community groups) and First Nations will be completed throughout this update process. This letter inviting groups to engage in the process is intended to initiate the resulting process. The Draft Terms of Reference (ToR) for the update project are attached, and you are encouraged to comment on both the ToR and the existing EMG (approved by Council in 2007) (link, also attached).

Next Steps & Invitation to Participate and Provide Comments:

August 15, 2019, 5:00pm: Presentation on EMG Update Process at the EEPAC Meeting in Committee Room 1 and 2, Second Floor, City Hall.

- We are intending to kick-off this pre-consultation process with a project presentation at EEPAC. All external resources and First Nations receiving this invitation are invited to attend, hear an overview of the project, ask questions and make initial comments related to the ToR. The slides from this presentation will be made available on the City's website.

- Meetings will be established for external resource groups that would prefer this mode of engagement.

September 19, 2019: Deadline to provide comments on the Draft Terms of Reference for the EMG Update and current version of the EMG.

- We are requesting any comments relating to the ToR and initial EMG comments by September 19 so that we can circulate the final ToR for consultant selection on September 27, 2019. In order to assist us in responding to your comments we have included a comment spreadsheet. All comments received will be considered and will help guide the revisions in order to effectively update the EMG. Initial EMG comment responses and a draft of the revised EMG will be circulated for comment in early 2020.

Improving the usability and effectiveness of the City's EMGs will ensure the City's Natural Heritage System is identified, the impacts of development are assessed, and that the identified natural heritage features and functions are protected over the long-term as required by the Provincial Policy Statement and the City's Official Plan.

We are appreciate your feedback on how we can best engage with you throughout this process and are open to scheduling meetings, corresponding via email or holding conference calls as appropriate.

We look forward to working with you on this initiative.

Best Regards,

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Ecologist | Planner
Long Range Planning and Sustainability
City of London

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Appendix B – Terms of Reference for the Environmental Management Guidelines (2007) Update

The Corporation of the City of London

Invitation for Informal Quote to Undertake the Consultation and Preparation of the Environmental Management Guidelines (2007) Update for the City of London

1.0 Introduction – Goals and Objectives

Goal

The City of London (herein after referred to as the City) is seeking qualified consultants to design and complete an update to the current version of Environmental Management Guidelines (EMGs). The goal of the project is to update the existing Guideline Document to reflect current best practices, current scientific literature and Traditional Knowledge, and propose new science-based guidelines including Traditional Knowledge (if offered), improved guideline implementation processes, and to align the guideline with the Provincial Policy Statement (2014) and with London's new Official Plan, the London Plan (2016). Consideration should also be given to the draft 2019 Provincial Policy Statement, currently not in force.

> The Provincial Policy Statement (2014) in policy 4.14 and 4.15 encourages municipalities to; "*identify performance indicators for measuring the effectiveness of some or all of the policies. The Province shall monitor their implementation, including reviewing performance indicators concurrent with any review of this Provincial Policy Statement. Municipalities are encouraged to establish performance indicators to monitor the implementation of the policies in their official plans."*
>
> The London Plan states in policy 1423_ "*The City may prepare environmental management guidelines setting out in more detail the requirements of environmental studies for development and site alteration. Environmental studies are the means by which the City establishes the precise boundaries of natural features and areas and the significant ecological functions within them. They also assess the potential impacts of development and site alteration on the Natural Heritage System and on their adjacent lands, and are required prior to the approval of development to prevent negative impacts on the Natural Heritage System, and to demonstrate that there will be no negative impacts on the natural heritage features and areas or their ecological functions."*
>
> Additionally, London Plan policy 1424_ states "*These guidelines shall be updated as required to reflect changes to provincial policy and technical documents and to reflect improvements in scientific knowledge regarding natural features and ecological functions*."

- The EMGs provide direction regarding the standards, procedures and requirements for preparing environmental reports and studies that may be required to evaluate planning applications, municipal infrastructure projects, Conservation Master Plans, Secondary Plans, Area Plans, Subject Land Status Reports, Environmental Assessments or Environmental Impact Studies.

  Updating the EMGs will ensure that there is a consistent approach in the preparation of environmental studies that may be required to establish boundaries of natural heritage features, assess the potential impacts of development and site alteration on the Natural Heritage System, and identify protection, mitigation, and compensation measures that may be needed to protect Natural Heritage Features and functions.

Objective

The objective of the study is to undertake a document review and update of the EMGs (2007) to identify relevant implementation processes and science-based reference documents, identify data gaps, and to improve stakeholder usability of the EMGs as a tool that sets out the requirements for the preparation of environmental studies that may be required to implement the London Plan and other approved provincial policies and legislation.

2.0 Background - Current Environmental Management Guidelines

Improving the usability and effectiveness of the City's EMGs for stakeholders and First Nation communities will ensure the City's Natural Heritage System is identified, the impacts of development are assessed, and the identified natural heritage features and functions are protected as required by the Provincial Policy Statement and the City's Official Plan. The EMGs are tools to implement existing policies and do not replace or supersede these policies. Revision of these approved policies will not be considered as part of this update.

The current version of the EMGs was approved by Council in 2007 and is available on the City's website in this link. The EMGs update process will consider the recommendations of the EIS Performance Monitoring Study that included engagement with the London Development Institute (LDI) and Environmental and Ecological Planning Advisory Committee (EEPAC). A link to the Planning and Environment Committee staff report (August 26, 2014), and study can be found here.

3.0 Scope of Work

3.1 Review Background Documents and Best Practices

The consultant will assemble a background review, taking into consideration all relevant background reference documents, and comments received on the current version of the EMGs: This review would include, but not be limited to, the following:

- Provincial Policy Statement (2014)
- Draft Provincial Policy Statement (2019)
- The London Plan (2016) – the City of London's new Official Plan has been Council adopted and approved by the Minister of Municipal Affairs and Housing. More than 80% of the plan is in force and effect. Portions of The London Plan are currently under appeal before the Local Planning Appeal Tribunal (formerly the Ontario Municipal Board), and until those appeals are resolved the previous Official Plan (1989) also remains in effect.
- The City of London Official Plan (1989) – portions of the 1989 Official Plan remain in effect until the appeals process is resolved.
- The City of London (2017). *London Invasive Plant Management Strategy*.
- Ontario Ministry of Natural Resources and Forestry (2010). *Natural Heritage Reference Manual 2nd edition (March 2010).*
- Environment Canada (2013). *How Much Habitat is Enough? Third Edition*. Environment Canada, Toronto, Ontario.
- Ontario Ministry of Natural Resources and Forestry (2015). *Significant Wildlife Habitat Ecoregional Criteria Schedules: Ecoregion 7E.*
- Ontario Ministry of Natural Resources and Forestry (2014). *Significant Wildlife Habitat Mitigation Support Tool.*
- Ontario Ministry of Natural Resources and Forestry (2014). *Significant Wildlife Habitat Mitigation Support Tool Version 2014*. Southern Region Resources Section, Peterborough, Ontario.
- Oldham, M. J., Carolinian Canada and Ontario Ministry of Natural Resources and Forestry (2017). *List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E).*
- Beacon Environmental Ltd. (2014). *Environmental Impact Study (EIS) Performance Evaluation for the City of London.*
- Environmental and Ecological Planning Advisory Committee (EEPAC) (2019). *A Wetland Conservation Strategy for London: A Discussion Paper on Best Practices.* EEPAC, London, Ontario.
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- Categorizing and Protecting Habitat under the Endangered Species Act, Feb 2012, Ontario.
- Forest Edge Management Plan Guidelines, Toronto and Region Conservation Authority, 2004.
- Conservation Halton Ecological Monitoring Protocols, version 1.0, February 2017.
- Ecological Buffer Guideline Review, Beacon Environmental for the Credit Ontario Ministry of Natural Resources and Forestry. 2012. Natural Heritage Assessment Guide for Renewable Energy Projects. Second Edition.
- Gartner Lee Ltd, Harold Thomas Lee. 2001. Ecological Land Classification for Southern Ontario: Training Manual. Ontario Ministry of Natural Resources.
- Upper Thames River Conservation Authority, Dec 2012. 2014. UTRCA's Environmental Planning Policy Document (June, 2006).
- Middlesex Natural Heritage Systems System Study using SWOOP imagery (2014).
- Ontario Ministry of Natural Resources and Forestry. July 2017. A Wetland Conservation Strategy for Ontario, 2017—2030.
- Existing references used in the Current EMG (2007) document.

- Similar guideline documents from other Ontario Municipalities and Conservation Authorities
- Other Secondary Source literature

3.2 Consultation

Consultation with the public, external resource groups (stakeholder and community groups) and First Nations will be completed throughout the update process.

As the EMGs are tools to implement existing policy and do not replace or supersede these policies, the specifics of the EMGs that are included in such policies will not be part of this consultation process.

External Resources

External resource groups that will be included as part of the consultation for this project include:

- Environmental and Ecological Planning Advisory Committee
- Advisory Committee on the Environment
- Upper Thames River Conservation Authority
- Lower Thames Valley Conservation Authority
- Kettle Creek Conservation Authority
- The Urban League of London
- The London Development Institute
- London Home Builders Association
- Nature London

First Nations Consultation

First Nation communities will be invited to engage in all stages of the EMGs update; Pre-consultation, Phase 1 and Phase 2. Pre-consultation will guide the project engagement process and establish the desired on-going consultation with First Nations communities. Community engagement requirements will be included in the revised EMGs at the direction and desire of the communities:

Oneida Nation of the Thames: *Elected Council* - Initial contact is made with Consultation Coordinator, who will coordinate a meeting with the Environment Committee, if required. *Clan Mothers* – Consultation Coordinator will coordinate a meeting, as required.

Chippewas of the Thames First Nation: Initial engagement to begin with Consultation Coordinator, as dictated by Wiindmaagewin Consultation Protocol. Wiindmaagewin will guide the consultation process

- Dialogue with the First Nation and mutual agreement is paramount

To foster consistent inclusion of First Nation communities related to environmental planning and approval initiatives the City of London proposes to develop engagement standards with the communities to include in the EMGs update. These standards could consist of consultation during the initial EIS project stages for development projects that have not involved prior consultation, as typically completed during the EA process. Inclusion throughout the study process and during post construction monitoring as appropriate will also be explored during the EMGs revision in collaboration with the communities.

> The Provincial Policy Statement (2014) in policy 1.2.2; '*Planning authorities are encouraged to coordinate planning matters with Aboriginal communities.*"

First Nations that will be included as part of the consultation for this project include:

- Chippewas of the Thames First Nation
- Munsee-Delaware Nation
- Oneida Nation of the Thames
- Other First Nations if applicable

Pre-consultation: The City of London

Initial project initiation with external resources and First Nations will be undertaken by the City of London to establish a clear engagement process.

A presentation at EEPAC will be completed by City staff during this stage to introduce the project and consultation process. All external resources and First Nations will be invited to attend this project initiation presentation and engage in the process from the outset.

The City of London will circulate the ToR to the external resource groups and First Nations for comment. Comments from this initial consultation stage will be considered in the revision of the ToR prior to retaining a consultant and will guide the consultation process throughout.

Phase 1: Project Initiation, Background Review and Draft Preparation

Phase 1 will begin with a project kickoff meeting between the consultant and the City of London. The consultant will be responsible for circulating meeting minutes.

Comments on the existing EMGs document and how this policy tool can be improved or revised will be invited and gathered during this initial stage. Given the potential for a high volume of responses, an excel spreadsheet matrix will be circulated to organize comments. Responses will be completed in subsequent project phases. These initial comments will be considered in the revision of the Terms of Reference and circulated to the retained consultant during Phase 1 of the project.

The City of London will circulate the comments gathered during the Pre-consultation Phase to the retained consultant as part of the background review. Comments will be addressed within the spreadsheet and circulated to the external resource groups and First Nations. Consolidated comments will be circulated to all engaged external resource groups and First Nations.

The consultant will be responsible for up to two meetings per external resource group or First Nation during Phase 1 of the consultation process. The consultant will be responsible for meeting minutes.

Based on the review of the background materials identified in Section 3.1 and in consultation with the City of London's Ecologist Planners, the consultant will complete the first revision of the EMGs, considering the initial comments provided by external resource groups and First Nations on suggested EMGs revisions.

A presentation at EEPAC will be completed by the consultant during this stage to present the initial draft of the revised EMGs. All external resource groups and First Nations will be invited to attend the EEPAC presentation and engage in the process. The revised EMGs document will be circulated to all external resource groups and First Nations in coordination with this presentation for review and comment.

Phase 2: Draft Review, Comment Resolution

The consultant will be responsible for up to two meetings per external resource group and First Nation during Phase 2 of the consultation process. These meetings will work to review and resolve comments provided by the external resource groups and First Nations and explain comment responses. The retained consultant will be responsible for circulating meeting minutes to the City of London and the involved external resource groups and First Nations for the meetings. The consultant will accept one round of comments from all external resource groups and First Nations within the EMGs comment spreadsheet in response to the draft EMGs.

Based on comment resolution completed within the EMGs comment spreadsheet and during the external resource groups and First Nations meetings, the consultant will revise the EMGs draft. The City of London and consultant will resolve any outstanding comments and finalize the EMGs document for presentation at EEPAC and Planning and Environment Committee (PEC). The consultant will be responsible for presenting to EEPAC and PEC.

All external resource group and First Nation feedback will be considered throughout the process, however, all comments may not be incorporated in the final draft recommended to Council.

3.3 Revise the Environmental Management Guidelines

Specific updates will be completed as required based upon the review of current best practices, background documents, including scientific literature and Traditional Knowledge, and comments

received. This update will confirm and update the existing EMGs sections, assessing if those sections are necessary and if any additional sections or deletions are warranted.

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1. **Guidelines for the Preparation and Review of Environmental Impact Statements (EIS)**
2. **Data Collection Standards for Ecological Inventory**
3. **Guideline Documents for Environmentally Significant Areas Identification, Evaluation and Boundary Delineation**
4. **Guideline Document for the Evaluation of Ecologically Significant Woodlands**
5. **Guidelines for Determining Setbacks and Ecological Buffers**
6. **Guide to Plant Selection for Natural Heritage Areas and Buffers**

4.0 Summary of Deliverables

The process to update the EMGs for the City of London will include:

1. Development of updated draft EMGs and a "final" EMGs in consultation with the Ecologist Planners, external resource groups and First Nations based on municipal, provincial and federal policies. Use of secondary sources where appropriate to develop robust policies and procedures that foster the identification, protection and restoration of the Natural Heritage System in the City of London.
2. Responses to written comments.
3. Minutes of all meetings.
4. Attend, present (prepare slideshow) and answer questions on the updated EMGs at an EEPAC meeting
5. Attend, present (prepare slideshow) and answer questions on the updated EMGs to London City Council at a future Planning and Environment Committee Meeting.

5.0 Timeline

Pre-consultation *(August 1 – November 1, 2019)***:**

August 1, 2019 – Circulate Terms of Reference, EMGs initial comment matrix and EEPAC presentation invitation to external resource groups and First Nations
August 15, 2019 – City of London project initiation presentation at EEPAC
September 19, 2019 – External resource groups and First Nations response deadline for ToR and comments on the 2007 version of the EMGs
September 27, 2019 – City of London to revise the ToR for bid circulation
***October 11, 2019* – ToR circulated and invitation to bid sent out**
November 1, 2019 – **Deadline for Bid Submission**
November 15, 2019 – **Project Award to Successful Bidder**

Phase 1 – Background Review and Draft Development *(November 15, 2019 – May 21, 2020)***:**

November 29, 2019 – Kick-off Meeting between successful bidder and the City of London
December 6, 2019 – Begin engaging external resource groups and First Nations (via email with up to two meetings per group)
December 20, 2019 – Background review and address initial EMGs comments. Circulate consolidated comments to engaged external resource groups and First Nations
***April 16, 2020* – EEPAC presentation and circulation of the updated Draft EMGs for comment**
May 21, 2020 – Deadline to receive comments on the Draft EMGs from external resource groups and First Nations

Phase 2 – Draft Revision and Planning and Environment Committee Presentation *(June 1 – July 27, 2020)***:**

June 1, 2020 – Begin external resource group consultation on the Draft EMGs (up to two per group)
July 10, 2020 – Final Version of Revised EMGs circulated

July 27, 2020 – Consultant Presentation of Final EMGs at Planning and Environment Committee

Appendix C – External Resource Group Engagement / Consultation

EMG External Resource Group Engagement

The City's EMGs update process has provided a level of consultation that exceeds what is typically undertaken for updating guideline documents. The multi-phase, process has included presentations to Advisory Committees of Council, presentations to local community groups and collection of information from the External Resource Groups (ERGs) and First Nation Communities.

The ERGs and First Nations included representatives and alternates from each group and was facilitated by staff and AECOM. The ERGs and First Nations commented on the production of the Terms of Reference (ToR) and on the EMGs draft formation. A table outlining the EMG update process including the meetings with EMGs is outlined in **Table 1,** below.

External Resource Groups

Council Advisory and other community groups were invited to provide members to comment throughout the EMGs update and include:

- Advisory Committee on the Environment (ACE)
- Environmental & Ecological Planning Advisory Committee (EEPAC)
- The London Development Institute (LDI)
- London Home Builders Association (LHBA)
- Nature London (NL)
- The Urban League of London (UL)

Conservation Authorities:

- Upper Thames River Conservation Authority (UTRCA)
- Lower Thanes Valley Conservation Authority (LTVCA)
- Kettle Creek Conservation Authority (KCCA)

First Nation Communities:

- Chippewas of the Thames First Nation (COTTFN)
- Munsee-Delaware Nation (MDN)
- Oneida Nation of the Thames (ONOTT)

Presentation of the EMGs Update at EEPAC

The project was initiated at EEPAC on August 15, 2019 with a presentation discussing the project and associated ToR.

The received feedback from ERGs and First Nations helped to guide the following:

- Development of the ToR
- Consultation objectives and preferences
- Priorities for the technical update
- Draft EMGs

Feedback was obtained through the circulation of a comment response table to ERG members to ensure comments and their corresponding responses were recorded for increased transparency.

ERGs and First Nations Comments and Responses

ERGs and First Nations completed pre-consultation in October 2019 and have submitted comments on how the EMG (2007) can be improved or revised. The review and compilation of comments was not done quantitatively or statistically as there were no limits on how many comments group members could include. The comments received during the engagement process from the ERGs to date were used to identify items for consideration in the EMGs.

Detailed, written responses to the ERGs and First Nations comments on the 2007 EMGs are included in **Appendix D**.

Workshop and External Resource Group Meetings

During Pre-consultation and Phase 1, 12 meetings were conducted with ERGs and First Nations members. These meetings utilized a facilitator to:

a) better understand the issues, concerns and value of the EMGs from the ERG perspective;
b) gather further insight and ideas about how to integrate ERG priority comments and suggestions and,
c) identify additional important comments for consideration.

Table 1. Outline of Steps Taken in the EMGs Update Process

Date	EMGs Update Process
Pre-consultation	
August 8, 2019	Invitations sent to ERGs and First Nations stakeholders to attend the Project Initiation Presentation at EEPAC. Draft ToR circulated
August 15, 2019	Project Initiation Presentation at EEPAC of Draft ToR to discuss the initial scope and request feedback and comments on the group's consultation and engagement preferences **Pre-consultation - launched**
August 22, 2019	Meeting with COTTFN
September 10, 2019	Meeting with the LDI
September 17, 2019	Meeting with ONOTT
October 10, 2019	Finalized ToR Circulated to Procurement
October 2019	Collection of EMGs (2007) comments
November 2019	Procurement finalized and AECOM retained **Phase 1 - launched**
Phase I	
November 2019 – December 2019	Project Kickoff and background review of ERG Pre-consultation comments Workshop design development
January 6, 2020	ACE | EEPAC – Workshop with AECOM facilitator (Meeting 1)
January 8, 2020	COTTFN | ONOTT – Workshop with AECOM facilitator (Meeting 1) **MDN was invited to this workshop but a representative was unable to attend*
January 8, 2020	LDI | LHBA - Workshop with AECOM facilitator (Meeting 1)
January 13, 2020	UTRCA | LTVCA | KCCA - Workshop with AECOM facilitator (Meeting 1)
January 13, 2020	NL | UL - Workshop with AECOM facilitator (Meeting 1)
January 13, 2020	ACE | EEPAC – Workshop with AECOM facilitator (Meeting 2)

Date	EMGs Update Process
February 24, 2020	COTTFN – (Meeting 2)
March 2, 2020	MDN – (Meeting 1)
March 2020 – July 2020	AECOM Draft Production
August – September 2020	Staff Review and Revision
October 5, 2020	Planning and Environment Committee draft EMGs presentation and comment response circulation **Phase 2 - launched**

Appendix D – Draft Environmental Management Guidelines (AECOM, 2020)

AECOM Imagine it. Delivered.

City of London - Environmental Management Guidelines (2020)

DRAFT FOR REVIEW

City of London

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1. Introduction

The following Environmental Management Guidelines are intended to provide technical guidance in implementing the policies of ***The London Plan*** (2016a; hereafter ***The London Plan***) as they relate to the identification and protection of London's Natural Heritage System (NHS). The Natural Heritage policies of ***The London Plan*** provide direction for the identification and protection of natural heritage features and areas and the ecological functions, processes, and linkages that they provide over the long term. These guidelines are aligned with federal and provincial policies, provincial and municipal planning processes, relevant data sources, current scientific knowledge and best management practices. As an integral part of the environmental planning process, these guidelines also include the provisions for stakeholder and First Nations engagement and consultation.

The City of London has prepared these Environmental Management Guidelines for the effective, consistent, and streamlined implementation of policies and legislation related to the protection of the NHS. The preparation of these guidelines included consultation with external resource groups (including local nature groups, development organizations, conservation authorities, and the Environmental and Ecological Planning Advisory Committee (EEPAC) and the First Nations communities within close proximity to the City of London, to include a wide range of knowledge-bases and perspectives.

Although these guidelines provide a framework for implementing policies related to the NHS, it remains the responsibility of the proponent to review policy, as well as scientific and technical literature to ensure the most up-to-date information is used throughout the process.

This document replaces the previous Environmental Management Guidelines (2007).

1.1 The London Plan

The London Plan identifies these Environmental Management Guidelines as measures to provide technical guidance in the application of its Natural Heritage Policies. These policies are based on the policies of the *Provincial Policy Statement* which represent minimum standards. Within the framework of the provincial policy-led planning system, planning authorities and decision-makers may go beyond these minimum standards to address matters of importance to a specific community, unless doing so would conflict with any policy of the *Provincial Policy Statement*. The requirement for the preparation and up-date of these guidelines is outlined in ***The London Plan***.

This document also cites related requirements from other policies and legislation (e.g., *Provincial Policy Statement*, *Endangered Species Act*, etc.) that must be considered. Further, additional requirements and/or studies may be required as part of the approvals process under provincial, federal, or conservation authority's jurisdiction (e.g., Overall Benefits Permits for Species at Risk, additional hydrogeological studies under the *Conservation Authorities Act*, etc.).

1.2 First Nations Engagement & Consultation

The City of London recognizes the importance of creating a working relationship with neighbouring First Nations communities and exploring opportunities for collaboration on common objectives, and has incorporated feedback from the following First Nation communities:

- Chippewas of the Thames First Nation (COTTFN);
- Munsee-Delaware Nation (MDN); and,
- Oneida Nation of the Thames (Oneida).

Early engagement and consultation with local First Nation communities within the vicinity of the Thames River provides important insight, information, and is critical in protecting the NHS within and beyond the City of London's boundaries. Consultation is based on whether a proposed development will have a direct or indirect effect on the Thames River. COTTFN, MDN and Oneida have a deeply spiritual, cultural and practical reliance on the river that flows downstream of the City of London, through their communities. Early engagement and consultation will allow the communities sufficient time to assess, conduct early consultation with their respective advisory committees , and Chiefs and Councils (if required) and formulate a response back to the developer. Proponents are expected to plan and budget for First Nation engagement and consultation. It is expected that the applicable consultation protocols will be followed for each of the First Nations being engaged.

The following subsections, provided by each of the respective First Nations, outlines the background and distinctiveness of each Nation, and provides reference to their consultation and engagement processes.

1.2.1 Chippewas of the Thames First Nation

Chippewas of the Thames First Nation (COTTFN) is an Anishinabek community also known as Deshkan (At/On/In Antlered [Thames] River in the Ojibway language). Their community is approximately 10,800 acres in size, and is located southwest of London, Ontario. There are roughly 3000 members, with nearly 1000 members living on-reserve. Their people and ancestors have lived and travelled throughout Turtle Island (North America) for countless generations. Traditions of hunting, fishing, and storytelling endure to this day, and will be passed on for countless generations to come.

COTTFN has developed its own consultation protocol called Wiindmaagewin (to talk through) — a document and a process that will guide the development of positive working relationships. The background to the consultation process, along with Wiindmaagewin can be reviewed at the following link: https://www.cottfn.com/consultation/.

1.2.2 Munsee-Delaware Nation

The traditional lands of the Munsee speaking peoples covered an area in what is now the United States, from the mouth of the Delaware River up to its source, then east to the Hudson River and then south to its mouth and including Manhattan and Staten Islands. Their language is one of the oldest of the Algonkian languages and are acknowledged by the Algonkian speaking peoples as Grandfather.

The ancestors of Munsee-Delaware Nation (MDN) moved to their present location in 1783 based on a promise from the Crown for land lost in the United States. MDN has developed its own policy for "receiving free, prior and informed consent from Munsee-Delaware Nation" outlined in the Munsee-Delaware First Nation Consultation and Accommodation Policy. General and contact information for MDN can be found at their website: http://munseedelaware.squarespace.com/.

1.2.3 Oneida Nation of the Thames

Established in 1840 as the 'Oneida Settlement', the Oneida people are known within the Iroquois Confederacy as Onyota'a:ka (People of the Standing Stone). Much like their ancestors, the Oneida peoples of today, maintain a deeply rooted connection to the land and to their Iroquois culture and traditions.

The Oneida Nation of the Thames (Oneida) is home to 2,172 residents and has a total membership of 6,270. Located in picturesque southwestern Ontario, the Oneida Nation Settlement borders lush and fertile agricultural lands and is nestled along the eastern shore of the Thames River 30 kilometres south of the City of London.

(Placeholder for consultation direction). https://oneida.on.ca/

1.3 Guideline Document Organization

The Environmental Management Guidelines document is organized in the following six separate, but complementary guidelines:

2. Preparation of Environmental Studies;
3. Evaluation of Significance and Ecological Function;
4. Boundary Delineation;
5. Buffer Determination;
6. Ecological Compensation; and,
7. Environmental Monitoring.

In general, these guidelines can be read in chronological order and are intended to outline the processes sequentially. However, there is considerable reference between and among sections to ensure that the processes are being completed efficiently and effectively. It is important to consider information from all of the guidelines outlined in this document, as well as external sources of information, as required.

2. Preparation of Environmental Studies

2.1 Preconsultation & Determination of Required Studies

The London Plan identifies various studies that may be required to ensure the protection of the City's NHS. The determination of the type of studies, plans and reports that are needed for a development, or site alteration project requires pre-consultation with the City of London and conformance with these Environmental Management Guidelines (EMGs). In cases where the proponent or applicant is a party other than the City, pre-consultation will involve the preparation of the study Terms of Reference (ToR) by the proponent/applicant through engagement with City staff, including the Ecologist Planner.

The City of London's Subdivision Approval Process includes mandatory pre-consultation through the submission of an Initial Proposal Report (IPR) followed by a Proposal Review Meeting. One of the key components of the Proposal Review Meeting is the identification of the studies required for a complete application. The information and level of detail required for the IPR submission is outlined in the City of London's Initial Proposal Report Guidelines (2008) as updated from time to time.

An Environmental Impact Study (EIS) will often be coordinated with other inter-related technical studies that may or may not include: hydrogeological, hydrological/stormwater management, geotechnical, noise and vibration, air quality, etc.

2.2 Environmental Study Scoping

Following the determination of the type of environmental study required, scoping of the study requirements must be completed. Study scoping ensures that the proponent, the City of London, relevant agencies, and EEPAC agree to the required investigations, assessments and documentation.

Environmental study scoping shall include the following:

- **Preconsultation** to determine the type of study required
- Completion of the **Environmental Study Scoping Checklist**
- An **Environmental Study Scoping Meeting**
- **Finalizing the Environmental Study Scope**

The following outlines the general requirements for Environmental Study Scoping.

2.2.1 Environmental Study Scoping Checklist/ Terms of Reference

The completion of the Environmental Study Scoping Checklist (ESSC) is the first step in determining the scope of the environmental study, whether it is the Natural Environment component of an Environmental Assessment (EA) for an infrastructure project, Subject Land Status Report (SLSR) or an EIS for a land development application. The ESSC constitutes the ToR for the study and is referred to as the ESSC hereafter.

The proponent and/or their consultant is required to complete the ESSC as a draft for submission to the City of London.

Appendix A provides a template for the ESSC.

2.2.2 SLSR and EIS Study Scoping Meeting

The proponent for an environmental study must prepare and submit an Environmental Study Scoping Letter that provides a brief summary of the project, identifies the study area, provides the "draft" ESSC and a request to the City of London to convene an Environmental Study Scoping Meeting (Scoping Meeting). The intent of the Scoping Meeting is to review, discuss and agree to the ESSC for the Environmental Study to the satisfaction of the City.

The Scoping Meeting should be held with the proponent and the Technical Review Team (TRT) identified in the ESSC. Typically the TRT will include a City Ecologist Planner and the City's Planner for the file, a representative from the local conservation authority, a representative from the City's EEPAC, and, where applicable, a First Nations community representative. Other TRT members may include representatives from the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP), or other agencies.

During the Scoping Meeting the attendees will review the draft ESSC. The limits of the study area, the scope of the study investigations, the required evaluations and assessments, considerations for avoidance, mitigation and compensation, and documentation shall be discussed and agreed to. The TRT is to provide required edits to the draft ESSC.

The City of London may request a site visit, including TRT members, as part of the Scoping Meeting or as a follow-up to the meeting if it is determined that a site visit would inform the study scoping.

2.2.3 Finalized ESSC Checklist

Once all comments regarding the draft ESSC have been received by the proponent, the ESSC shall be finalized and sent to the City of London for approval. The City of London will then send written (e-mail or letter) approval and finalized copy of the ESSC to the proponent and the Scoping Meeting attendees.

The final ESSC will then form the basis for the Environmental Study scope. The proponent and their consultant(s) may then proceed to conduct the required investigations.

In cases where field investigations are time-sensitive, the proponent may choose to initiate investigations prior to finalization of the ESSC. However, conducting investigations prior to ESSC finalization is done at the proponent's risk should the investigations conducted not meet the ESSC requirements.

2.3 Background Information Review & Field Investigations

While the SLSR/EIS identified through the pre-consultation process may vary significantly in level of effort and detail, there are common reporting elements to these studies. These common elements include: background information review and field investigations.

A comprehensive background review of existing reports, atlases, information centers, data bases, etc. is an important first step in establishing an understanding of the environmental conditions of a project site. Agency, First Nations, stakeholder and environmental organizations consultation is an integral part of the background review and should include information requests for the study. Further details regarding background review requirements are provided in the City of London's **Data Collection Standards** found in **Appendix B.**

In some cases, field investigations may not be required if recent investigations have been completed to an appropriate level of detail, or if there are no NHS features within or adjacent to the study area. In such cases a site visit to confirm the presence or absence of features and other conditions should be

completed. Further details regarding field investigation requirements are provided in the City of London's **Data Collection Standards** found in **Appendix B**.

2.4 Subject Lands Status Reports

Consistent with ***The London Plan*** policy 1428, a SLSR shall provide an assessment of natural features and areas on the subject lands including, but not limited, to those areas included in the Green Space or Environmental Review (ER) Place Types on Map 1 (***The London Plan***), or a component of the NHS identified or delineated on Map 5 (***The London Plan***).The objective is to inventory, evaluate, assess significance of features and functions, delineate boundaries, and make recommendations for an appropriate land use designation.

An SLSR must be scoped with the City and in consultation with relevant agencies, based on the features and agency jurisdiction. The SLSR shall include all of the items noted in the ESSC found in **Appendix A.**

If an SLSR has not been completed, the City may require that the matters to be addressed in a SLSR as part of the EIS. If a SLSR is completed as part of an EIS, the results of this initial stage of the EIS are to be reviewed and confirmed by the City, in consultation with relevant agencies, prior to completing the balance of the study.

2.5 Environmental Assessment for Infrastructure Projects

As per policies set out in ***The London Plan***, infrastructure shall not be located within the NHS. New or expanded infrastructure shall be permitted within the NHS only where it is clearly demonstrated through an EA process under the *Environmental Assessment Act*, including an EIS, that it is the preferred alternative for the location of the infrastructure.

The EIS undertaken as part of the EA shall be completed to further assess potential impacts, identify mitigation measures, and determine appropriate compensatory mitigation, if required. Any alternative where the impacts of the proposed works as identified in the EIS would result in the loss of the ecological features or functions of the component of the NHS affected by the proposed works, such that the natural heritage feature would no longer be determined to be significant, shall not be permitted.

The Natural Environment and EIS component of an EA is scoped and completed in accordance with these Environmental Management Guidelines.

2.6 Environmental Impact Studies

2.6.1 The Purpose of an Environmental Impact Study (EIS)

EISs are required where development or site alteration is proposed within or adjacent to components of the City of London's NHS. The purpose of an EIS is to demonstrate that there will be no net negative impacts to the NHS' features and functions as a result of the proposed development or project works. This is to be achieved through environmental investigations of the NHS, the adjacent lands and biophysical interactions between. An EIS will contain recommendations for avoidance of impacts, mitigation of impacts, environmental management strategies, monitoring requirements or other processes to protect significant NHS features and functions.

The City will require that an EIS be completed to its satisfaction in accordance with ***The London Plan*** policies, Provincial Policies, and in consultation with the relevant public agencies prior to the approval of planning and development applications.

2.6.2 The Requirement for an EIS

When is an EIS Required?

EISs are required for development or infrastructure projects that are proposed wholly or partially within or adjacent to the NHS.

Table 2.1 identifies circumstances under which an EIS is required based on the proximity of lands to components of the City's NHS as delineated on Map 5 and Map 1 of ***The London Plan***. The City may require that the EIS consider areas beyond those outlined in **Table 2.1** to ensure the protection of Natural HeritageFeatures and functions based on site-specific and functions based on site-specificc conditions and the proposed land uses.

Table 2- 1. Areas Requiring Environmental Study

Natural Heritage System Components*	Trigger Distance Requiring an SLSR/EIS and Area of Adjacent Lands
• Fish Habitat • Habitat of Endangered and Threatened Species • Locations of Endangered and Threatened Species • Provincially Significant Wetlands (PSW) and connecting lands within a wetland complex • Wetlands and Unevaluated Wetlands • Significant Woodlands • Significant Valleylands and Valleylands • Significant Wildlife Habitat • Significant Areas of Natural and Scientific Interest (ANSI) • Environmentally Significant Areas (ESAs) • Upland Corridors	Within 120 metres
• Woodlands • Significant groundwater recharge areas, wellhead protection areas and highly vulnerable aquifers • Special Concern Species	Within 30 metres
• Environmental Review (ER) lands	Within a distance appropriate to the specific components of the NHS contained on the lands

**** London Plan 1434_. See Table 13.***

When is an EIS not Required?

It is possible that an EIS may not be required for a development application for lands that contain Natural Heritage Features. The conditions under which an EIS is waived may vary and may include the implementation of an ecological buffer that meets or exceeds the City's buffer requirements and mitigation requirements as stipulated by the City. Ultimately, the waiver of the EIS requirement will be at the discretion of the City of London.

2.6.3 EIS Process

The EIS process involves the following sequential steps and are common to all EISs regardless of scope:

1. **EIS Scoping** – Study scoping should be completed before field investigations are initiated. EIS Scoping shall follow the process and requirements as outlined in **Section 2.2** of these guidelines, including the completion of the ESSC (**Section 2.2.1**). If determined as a requirement during study scoping, a site visit may be conducted before field investigations are initiated.
2. **Background Review & Information Requests** - The proponent must complete a comprehensive review of background information to form the basis for a description of existing conditions, as outlined in **Section 2.3**. The background review should follow the City of London's Data Collection Standards found in **Appendix B**.
3. **Field Investigations** – In accordance with the agreed to ESSC, field investigations must be completed at the appropriate times and frequencies for each of the ecology (and related) sub-disciplines. Field investigations must be completed in compliance with the City of London's Data Collection Standards found in **Appendix B.** Dates of investigations, names of investigators, conditions at the time of investigations, any variance of methods, data sheets, and photographs, should all be recorded at the time of investigations. Quality assurance and quality control measures should be implemented with review to be completed by a senior professional with experience in the discipline.
4. **Evaluation of Significance** – The evaluation of significance should be conducted for natural heritage features within the study area in accordance with federal, provincial and City of London policies. The City of London evaluation criteria, as outlined in **Section 3**, should be applied to unevaluated vegetation patches and other features not previously evaluated. The evaluation criteria to be applied to a specific feature or subject lands for the EIS should be identified in the EIS ESSC. However, if during the course of investigations it becomes evident that other evaluation criteria are appropriate, then they should also be applied.

   Impact & Net Effects Assessment – The impact assessment for any project should identify the potential impacts that may be generated from the design and layout, the construction, and the operations of the project. The proponent should identify any existing impacts to study area features prior to project initiation, and the potential long-term and short-term impacts of the project. For each potential impact, possible avoidance, mitigation and/or compensation measures should be proposed and discussed. For any proposed development or works adjacent to a Natural Heritage Feature, ecological buffers (see **Section 5**) must be included in the mitigation measures. The net effects of the project should then be assessed based on the resulting net impacts after avoidance, mitigation and or compensation measures would be implemented. If the project is assessed to result in a significant net negative impact, then the proponent should include additional mitigation and/or compensation measures, or re-work the proposed project plan and design. The objective for any EIS is to achieve no net negative impact, or a net environmental benefit.

   The MNRF's **Natural Heritage Reference Manual** provides a "Sample Checklist for Use in Assessing Impacts of Development" which can be referred to for robust information, however the proponent must give additional consideration of development activities and potential impacts on a case-by-case basis.

A Net Effects Table Template is provided in **Appendix C**.

5. **Environmental Management Recommendations** – The environmental management recommendations for a proposed development or project works is the primary "deliverable" of an EIS. Recommendations should be developed based on the avoidance, mitigation and compensation measures identified in the Impact Assessment and Net Effects Assessment. The most important mitigation measure is determining the necessary ecological buffers (**Section 5**). At a minimum, a post-construction/ post-development monitoring component must be included as part of the recommendations outlining the necessary monitoring requirements and how Net Environmental Benefit has been achieved.
6. **EIS Report Submission** – The proponent, or their consultant, is to submit the EIS report to the City of London for review and comments.
7. **EIS Report Review & Approval** – Once received the City of London will distribute copies of the EIS report to the TRT for their review and comments. All review comments from the TRT should be sent to the City of London for consideration and forwarding to the proponent and their consultant. The City may decide to:
    - ***Approve the EIS*** – the City may approve the EIS with no required revisions, or with minor revisions
    - ***Return the EIS report for revisions*** – the City may return the EIS report for revisions based on the comments received from the TRT
    - ***Reject the EIS report*** – the City may reject the EIS based on the project's non-conformance with ***The London Plan*** policies, or based on the inadequacies of the EIS report itself

    The final acceptance of an EIS report should be provided in written correspondence (e-mail or letter) to the proponent.

Further details and the documentation requirements for the above steps are outlined in **Section 2.6.5.**

2.6.4 EIS Report Requirements

The following section outlines the required format and minimum standards for an EIS.

An EIS report for submission to the City of London shall include the following components and sections:

Title Page

Executive Summary

Authors' Signature Page

Table of Contents

1.0 Introduction

2.0 Physical Environment

3.0 Natural Environment

- 3.1 Aquatic Habitat & Species
- 3.2 Wetlands
- 3.3 Terrestrial Habitat & Species

4.0 Evaluation of Significance

5.0 Proposed Development or Works

6.0 Impact & Net Effects Assessment

7.0 Avoidance, Mitigation & Compensation

8.0 Environmental Management Recommendations

9.0 Conclusions

10.0 References

Appendices

The above-noted components and sections are a minimum. Subsections to the above sections maybe required based on the scope and complexity of the EIS. Further details regarding the required content for the above report components and sections provided below.

2.6.5 Report Content

2.6.5.1 Title Page & Pre-Report Body Components

Title Page - The EIS Title Page should provide basic information for the EIS report including the following:

- Project name and study type (EIS)
- Any relevant File Reference numbers
- The proponent's company name, address, and primary contact name
- The consultant's company name, address, and primary contact name
- The City of London department to which the report is being submitted
- The date of report submission

Executive Summary- The Executive Summary for the EIS report should provide a brief summary of the report including the purpose of the EIS, the study area, study scoping information, field investigations completed, study findings, identification of significant natural heritage features, summary of potential impacts and net effects, and a summary of the environmental management recommendations. The Executive Summary should on average be 1-2 pages in length.

Authors' Signature Page - A page with the names, signatures and qualifications of the principal authors of the EIS report should be provided. The names, signatures and qualifications of the senior reviewers should also be provided.

Table of Contents - A Table of Contents with page references should be provided for the EIS report. Also included should be a List of Figures, List of Tables, and List of Appendices for the report.

2.6.5.2 Introduction

The Introduction of the EIS report may stand as one complete section or it may be separated into several sections, at the author's discretion. Regardless, the Introduction should include the following information:

Introductory Statement – The Introduction should state the purpose of the EIS report, identify the proponent. Since most EIS reports are supporting documents to a larger study or an application, the Introduction should reference the study that the EIS is providing supporting documentation to.

Background – The Introduction should provide some background regarding the project and any planning or studies for the subject lands that preceded the EIS.

Study Area – The study area for the EIS should be clearly identified with the address (or other municipal reference numbers), the area of the subject lands, and identification of any pertinent reference points (i.e. watercourses, major streets or roads, railways, etc.). A Study Area Figure delineating the study area

boundaries and showing local streets/roads, watercourses, buildings/structures over a recent aerial photograph base must be included in the Introduction. A secondary figure (in the Appendices), should also delineate the natural heritage features from Map 5 of ***The London Plan***.

Policy Context – The policy context for the EIS should be identified in the Introduction. This should include the trigger for the EIS and the relevant policies in ***The London Plan*** that apply to the project/applications. Any relevant federal and or provincial legislation and policies should also be identified.

EIS Scope – A subsection or paragraph should be provided in the Introduction that summarizes the EIS scoping process and some of the key aspects of the study scope. The final ESSC should be referenced and a copies should be provided in the Appendices of the report.

Agencies, First Nations and Stakeholders Consultation – Consultation with government agencies, conservation authorities, First Nations Communities, and stakeholders should be identified and referenced as part of the Introduction. Any relevant correspondence and consultation documentation should be provided in the Appendices.

2.6.5.3 Physical Environment

The physical environment is key to the atural heritage features on the landscape and on a particular project site because of the direct interrelationship between the physical and natural environment. The description of the physical environment is, therefore, an important part of the EIS report. The physical environment section of the EIS should include information on:

Soils and geology – Soils and the underlying geology of the study area and surrounding landscape should be described in sufficient detail as to provide context for the ecological communities and ecosystems of the study area and adjacent lands. If a soils or geotechnical investigation has been undertaken for the project, its findings should be summarized in this section. The Canadian System of Soil Classification (1978) should be used to classify and describe the study area soils. Dreimanis (1964a; 1964b) “Pleistocene geology of the St. Thomas area (west half & east half respectively)” should be referenced for local geology.

Surface water and drainage – The surface water and drainage patterns within and adjacent to a study area determine the extent and characteristics of aquatic habitat features, wetlands and terrestrial vegetation communities. The watershed, sub watershed, surface water features (water bodies and watercourses) and drainage patterns for the study area and adjacent lands should be described in this section of the EIS report.

A Surface Water & Drainage Figure showing all watercourses, water bodies, wetlands, and drainage patterns should be provided for the study area, as applicable. If a surface water or storm water management investigation has been completed for the project the findings with regard to existing conditions should be summarized in this section of the report.

Hydrogeology – The hydrogeology of a study area and adjacent lands is often an important determinant of the area’s aquatic, wetland and terrestrial features. The existing hydrogeology for the study area should be described in this section, particularly as it relates to natural heritage features that depend on groundwater discharge and the depth of the shallow water table. If a hydrogeological study has been conducted for the project the findings for existing conditions should be summarized in this section of the report.

2.6.5.4 Natural Environment

The existing condition for the natural environment section of the EIS should be divided into three (3) sections: Aquatic habitat and species, Wetlands, and Terrestrial habitat and species. Each of these

sections may be further subdivided depending on the complexity of the study area features and the investigations required by the ESSC.

For each discipline within each section or subsection of the Natural Environment section the following should be included:

Background Information – a summary of information obtained from the background review and information requests should be summarized in order to provide a baseline understanding of the features. Previous studies and reports should be referenced and any data or information of particular interest to the study should be highlighted.

Methods – the methods used for the investigations for each discipline should be detailed with reference to standard protocols used. The City of London's **Data Collection Standards** found in **Appendix B** provide the recommended protocols for ecological investigations. The date and time of investigations should be provided, as well as any variance with standard protocols.

Results and Discussion – the results of field investigations should be presented in an organized manner by feature or area of the study area. Summary tables with metrics relevant to the discipline should be used wherever possible. For large data sets, spreadsheets should be used but should be presented in the **Appendices**.

The following provides an outline of the main disciplines and the possible sub disciplines. For the main disciplines, if the feature is not present the heading should be kept with a single sentence stating that no features are present within the study area or adjacent lands (i.e. No aquatic habitat is present within the study area or adjacent lands). For sub disciplines, only those for which investigations were conducted should be included.

Aquatic Habitat and Species

- Fish and Fish Habitat
- Benthic Invertebrates

Wetlands

- PSWs
- Wetlands
- Unevaluated Wetlands

Terrestrial Habitat and Species

- Vegetation Communities & Plant Species
- Breeding Birds
- Raptors and other Birds
- Bat Habitat & Bats
- Amphibians
- Reptiles
- Butterflies & Dragonflies/ Damselflies
- Mammals

At a minimum the following **Figures** should be included in the Natural Environment section:

- Field Investigations – showing the locations of the field investigations completed;
- Aquatic Habitat – showing watercourses, spawning habitat, habitat characteristics, barriers to fish passage, etc.; and,
- Vegetation Communities – showing the delineation of Ecological Land Classification (ELC; Lee *et al.*, 1998) communities.

Other figures may include:

- Breeding Bird and Raptor Habitat – showing suitable habitat, nest locations, etc.
- Amphibian and Reptile Habitat – showing breeding areas, hibernacula, etc.

2.6.5.5 Evaluation of Significance

The Evaluation of Significance section of the EIS should identify previously evaluated and recognized or identified features and species by jurisdiction: federal, provincial and municipal. For those features or species not previously evaluated or identified, this section should present the evaluation and recommended designation. The following lists some of the potential features or categories that may apply for each jurisdiction:

- **Federal**
  - *Fish Habitat as defined under the Fisheries Act*
  - *Species at Risk (SAR) as listed under the Species at Risk Act*
- **Provincial**
  - *Provincially Significant Wetlands (PSWs)* – for wetland evaluations the Ontario Wetland Evaluation System (OWES) should be used by a certified wetland evaluator. Once completed the wetland evaluation should be submitted to the MNRF. A summary of the evaluation should be included in this section of the EIS, and a copy of the evaluation should be provided in the Appendices.
  - *Areas of Natural and Scientific Interest (ANSIs)* – as identified by the Province of Ontario.
  - *Significant Woodlands* – see the City of London's Woodland Evaluation Guidelines in **Section 3.1.1**
  - *Significant Wildlife Habitat* – for habitats not already evaluated, the proponent's ecologist should complete a Significant Wildlife Habitat Assessment in accordance with the MNRF's Significant Wildlife Habitat Technical Guide (2000) and Criteria Schedules for Ecoregion 7E (2015)
  - *Significant Valleylands* – valleylands not already identified or evaluated should be evaluated in accordance with criteria outlined in the MNRF's Natural Heritage Reference Manual (2010)
  - *Species at Risk (SAR) as listed under the Endangered Species Act*
- **City of London**
  - *Significant Woodlands – See **Section 3.1.1** for the City's Woodland Evaluation Guidelines*
  - *Woodlands (non-significant)*
  - *ESAs - See **Section 3.1.2** for the City's Guidelines for the Evaluation of Environmentally Significant Areas*
  - *Valleylands*
  - *Wetlands*
  - *Unevaluated Wetlands*
  - *Potential ESAs*
  - *Upland Corridors*

Further details regarding the evaluation of significance is provided in **Section 3**.

2.6.5.6 Proposed Development or Works

In this section of the EIS report the proposed development or project works should be summarized in a manner that describes all aspects and stages of the project that may affect natural heritage features and their functions. The EIS should be based on, at a minimum, the Preliminary Design for the project. This enables the recommendations from the EIS to be incorporated into the Detailed Design for the project.

It is expected that the Preliminary Design presented in the EIS is a product of an iterative process wherein the design has taken into consideration avoidance and mitigation recommendations provided by the proponent's ecologists for the project. Documentation of this iterative process should be provided where applicable.

The following information should be included in the description of the proposed development or works:

- A description of the project layout and design
- Changes to surface water drainage and site grading which may include predevelopment, post-development and interim variations when works are adjacent to natural areas
- An outline of project staging and timing
- Details regarding construction, including any proposed de-watering plans that depict preferred zones where discharge should be directed
- Proposed protection measures, including erosion and sediment control (ESC) measures in accordance with the City of London's Design Specifications & Requirements Manual (2018)
- Any details regarding post-construction operations or maintenance

The proposed layout and design should be shown on a Figure as an overlay with the Natural Heritage Features and ELC communities delineated.

Further Preliminary Design and Detailed Design drawings and supporting documentation can be provided in the Appendices.

2.6.5.7 Impact and Net Effects Assessment

The Impact and Net Effects Assessment section of the report is critical in determining whether a project will meet the test of "no net negative impact" or "Net Environmental Benefit". The following should be documented in this section of the EIS and may each form a subsection in the Impact and Nets Effects Assessment section:

Existing Impacts – The report should identify any impacts from previous or existing land uses or activities that have affected the Natural Heritage Features of the study area. This provides a baseline for comparison with potential project related impacts.

Direct Impacts – The potential direct impacts of a project should be identified and described based on the proposed development plan. A figure showing the proposed project overlaid on the Natural Heritage Features for the study area should be provided with an indication of any areas where direct impacts are anticipated.

Indirect Impacts – Many indirect impacts are associated with the construction stage of land development or an infrastructure project. Generally, these impacts are temporary in nature and preventable through proper construction practices, site inspections, and other standard mitigation measures.

For each of the above categories of impact, the source of the impact, the feature that may be affected, possible avoidance, mitigation or compensation measures, and the resulting net effects should be described in as much detail as possible. A summary of the impact assessment and net effects should be provided in a Net Effects Assessment Table. **Appendix C** provides a table template for the assessment of net effects, to be used in any EIS submitted to the City of London.

Net environmental impacts are considered to be those impacts that remain or are residual after avoidance, standard mitigation and compensation measures have been implemented. The following criteria should be applied during the assignment of net effects.

No Net Effect – Indicates no measurable impact to the identified Natural Heritage Features and functions.

Low Net Effect – Indicates loss of habitat possessing limited potential habitat value, and/or loss of a portion of habitat, which will not result in long-term impact to the remaining habitat and/or reduction in associated key ecological functions.

Medium Net Effects – Indicates loss of habitat possessing moderate potential habitat value, and/or loss of a portion of habitat that may result in long-term impacts to the remaining habitat, and/or loss of associated key ecological functions.

High Net Effects – Indicates loss of habitat possessing significant potential habitat value, and/or loss of a portion of habitat that may result in long-term and potentially critical impacts to the remaining habitat, and/or significant loss of associated key ecological functions.

In addition to the Net Effects Assessment, where feasible, the proponent should have consideration for effects of development that may increase or decrease in magnitude with a changing climate (e.g., increased flooding, drought, invasive species range shifts, etc.) as well as the development's contributions to greenhouse gas emissions. Any tools available from the City of London to assess climate change impacts should be used as part of the impact assessment process.

2.6.5.8 Avoidance, Mitigation & Compensation

While the Impact and Net Effects Assessment identifies avoidance, mitigation, and compensation measures that should be implemented, each of these will require development into detailed recommendations. This section of the EIS report should carry forward the avoidance, mitigation and compensation measures identified in the previous section and elaborate on each.

Avoidance – As noted in the Proposed Development (**Section 2.6.5.6**) avoidance of potential impacts should be considered through collaboration between the project planners, engineers and ecologists such that the plan and design presented in the EIS is the best alternative to avoid impacts. Consequently, this section may refer to the iterative process described in the Proposed Development Section, or it may proposed additional avoidance measures for consideration.

Mitigation – Mitigation measures may take various forms and may apply to both direct or long-term impacts or to indirect impacts that may occur only during the construction phase of the project. Each of these measure should be developed and described in this section of the report.

The most important mitigation measure that will apply to all NHF is the implementation of ecological buffers. The development of ecological buffers must follow the guidance provided in **Section 5** of these Environmental Management Guidelines. In this section the application of the guidelines to the project and site-specific rationale should be provided in as much detail as possible.

Compensation – Where compensation is required for a project, the details of the compensation must be described in this section. The development of compensation plans must follow the guidelines provided in **Section 6** of these Environmental Management Guidelines.

2.6.5.9 Environmental Management Recommendations

The Environmental Management Recommendations section is the primary deliverable of the EIS. The environmental management recommendations must be clearly articulated and must be specific enough to be translated into Conditions of Draft Approval, Development Agreement and/or Subdivision Agreement for a project. The recommendations should be organized by project phase, from planning & design, through construction, to post-construction and post-development. Depending on the size and complexity of the project, the environmental management recommendations may form an Environmental Management Plan (EMP).

The following are typical components of an EMP:

- Natural Heritage Protection Areas
- Ecological Buffers
- Restoration, Enhancement and Compensation Measures/Areas
- Construction Mitigation and Monitoring Plan

- Post-Construction Monitoring
- Post-Development Monitoring

Environmental management recommendations identified during Preliminary Design that should appear on the contract drawings must be explicitly stated. Text should provide direction to include the complete EIS with the tender documents for later project stages. In instances where a detailed Construction Monitoring Plan is anticipated, the EIS should include a draft field inspection form template in the Appendices.

To effectively develop a post construction monitoring program, baseline conditions must be established through the EIS process. Assessing the success of the avoidance, mitigation and compensation will be determined based on various metrics such as survivorship thresholds. Contingency measure must also be included should the proposed recomendations fail to meet the success threshold of 70% survivorship.

Section 7.2 outlines the specific requirements of the EMP.

2.6.5.10 Conclusions

The Conclusions section of the EIS report should provide the following elements:

Summary of Key Findings – A brief summary of the key findings of the EIS report should be provided to indicate the Natural Heritage Features within the study area.

Key Recommendations – Either a summary of key recommendations should be provided, or a reference to the Environmental Management Recommendations section of the report must be made. Where applicable, direction regarding the implementation of the recommendations must be stated.

Conclusion Statement – A clear statement of the conclusions of the EIS must be made with the recognition that the objective of any EIS is the demonstration of no Negative Impact, or a Net Environmental Benefit (positive impact). The conclusions should also state whether the project meets the intent and requirements of the environmental policies of ***The London Plan***, the *Provincial Policy Statement* and any other relevant legislation or policies. A summary of the rationale for the conclusion statement must be provided to support the statement.

2.6.5.11 References, Appendices, and Figures

References – All relevant references used in the preparation of, or cited in the EIS report should be listed in a References section. References should be in alphabetical order by author. Each reference should indicate author(s), year of publication, title, and publisher. For journal articles the journal name, volume, and pages should be provided. For websites, the full reference https address should be provided.

Appendices – Supporting documentation as referenced in each section of the report should be provided in the Appendices section and separated by appendix title pages. The order of appendices should follow the order of reference in the sections of the report. Appendices should include the following:

- Environmental Study Scoping Checklist
- Resumes of the study's authors and field staff
- Aquatic habitat field sheets and sketches
- Aquatic species list and life history information
- ELC data sheets including soil characterization
- Plant species list by ELC community type with rarity rankings
- Bird species list by survey location with rarity rankings
- Amphibian survey data sheets and species list

- Significant Wildlife Habitat data sheets
- Significant Wildlife Habitat Assessment
- SAR Screening & Habitat Assessment
- Photographs

Figures – All figures for the EIS report should be imbedded in the body of the report and should be presented on the first full page following the first reference in the text to the figure. All figures should be sequentially numbered and have the following:

- A recent colour aerial photograph base
- The study area boundary
- Roads/streets (labelled), utility corridors, and other infrastructure
- Watercourses and natural heritage features boundaries
- North arrow
- A scale
- A Legend will all symbols and shading labelled

3. Evaluation of Significance and Ecological Function

The City's NHS is a system of natural heritage features and areas and linkages intended to provide connectivity at the regional or site level and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of native species, and ecosystems (***The London Plan*** – Policy 1298_). This section outlines guidelines for the evaluation of significance and ecological function of the following natural features and areas in relation to the City's NHS as outlined in ***The London Plan*** – Environmental Policies.

Evaluation of significance and ecological function will inform the protection of the NHS (***The London Plan*** 1303_) and may lead to features being included on City of London mapping (Map 5 in ***The London Plan***). Any updates in the policies and guidelines related to the evaluation of significance and ecological function of natural heritage features since the acceptance of this document must be complied with.

The *Provincial Policy Statement* defines several significant natural features and areas that are protected from development and/or site alteration within or adjacent to the feature. However, it is important to note that although there are recommended criteria for evaluation outlined in the *Provincial Policy Statement*, municipal approaches to evaluation that meet or exceed the same objective are also acceptable.

The Natural Heritage Reference Manual (MNRF, 2010a) outlines several factors to evaluate natural heritage features and areas (e.g., distribution, core/patch attributes, linkage/corridor attributes, etc.) to aid in the determination of ecological function within the NHS.

Initial identification of potential natural heritage features and areas should be conducted during the background review phase of an environmental study (as outlined in **Section 2.3**). The following sections provide an outline of the process and requirements for the determination of significance and ecological function for natural features and areas.

3.1 City of London

3.1.1 Woodlands

The objective of these guidelines is to provide a standardized and scientifically-based approach for the evaluation of woodlands that is consistent with ***The London Plan*** policies, the *PPS*, and the Natural Heritage Reference Manual. This section describes the required methods for evaluating the ecological significance of all unevaluated vegetation patches, woodlands and vegetation patches greater than 0.5 ha.

3.1.1.1 Policy and Context

Policies outlined in the *Provincial Policy Statement*, protect Significant Woodlands by ensuring development and site alteration are not permitted in Significant Woodlands south and east of the Canadian Shield, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological function. Also, development and site alteration are not permitted on adjacent lands to significant woodlands, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological function.

According to the *Provicial Policy Statement,* woodlands are defined as treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots, or forested areas and vary in their level of significance at the local, regional, and provincial levels.

According to the *Provincial Policy Statement,* woodlands are considered significant when an area is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario MNRF.

The London Plan has incorporated local considerations (MNRF, 2010a) and above the minimums under the authority provided in the *Provincial Policy Statement* to ensure the identification and effective evaluation of significance for woodland components of the NHS. The policy framework for the identification and evaluation of Significant Woodlands and Woodlands are outlined in depth in ***The London Plan*** – Significant Woodlands and Woodlands.

Most potential Woodlands are shown as Unevaluated Vegetation Patches on Map 5 – Natural Heritage and as ER Place Type on Map 1 – Place Types in ***The London Plan***. However, the absence of vegetation patches from the aforementioned mapping, does not mean that additional unevaluated vegetation patches do not exist within the landscape. Therefore, proponents must assess the lands to determine the presence of any additional Unevaluated Vegetation Patches and/or other vegetation patches larger than 0.5 ha.

Unevaluated Vegetation Patches are considered to have a woodland component, according the *Provincial Policy Statement* definition, if it contains “treed areas”.

According to the Ecological Land Classification System (ELC), a treed area is any community with a tree cover >10%. Application of the ELC keys identifies the following ELC Community Classes and Series as potential components of woodland patches:

- **FOREST** - deciduous forest (FOD), mixed forest (FOM) or coniferous forest (FOC);
- **SWAMP** - deciduous swamp (SWD), mixed swamp (SWM) or coniferous swamp (SWC);
- **BLUFF** - treed bluffs (BLT);
- **TALLGRASS SAVANNA and WOODLAND** - (TPS, TPW);
- **CULTURAL** - cultural woodland (CUW), cultural savanna (CUS) or cultural plantation (CUP); and
- In the **Middlesex Natural Heritage Study** (UTRCA, 2014), the presence of communities with shrub cover >25% may also qualify as woodland. These communities would include BLS, CUT, and SWT.

Other communities that contribute to the biological diversity and ecological function of woodlands include old fields (CUM), open prairies (TPO) and open wetland communities (MAM, MAS, SAF, OAO, FEO, and BOG) as defined by the ELC. While these communities will not comprise entire woodland patches, they are important components and contribute to the ecological significance of the vegetation patch. As such they are included in the evaluation of significance for applicable criteria. The following sections outline the criteria and measures for the evaluation of significance and ecological function for woodlands as defined above. Evaluation criteria have been outlined for the each of the considerations for significance presented in ***The London Plan***, utilizing the measures for ecological function of natural features and areas for a NHS (MNRF, 2010a).

Based on the above information, a vegetation patch is considered to have a woodland component within the City of London if tree cover is greater than 10% or shrub cover is greater than 25%. To determine if a vegetation patch meets this criteria, appropriate ecological inventory (as described in **Section 4.2**) and significant woodland evaluation (described in the following sections) methods must be utilized.

Consistent with London Plan policy a Woodland will be considered as a significant component of the Natural Heritage System based on the following evaluation scores:

- If one or more criteria meet the standard for High;
- If five or more criteria meet the standard for Medium.

3.1.1.2 Evaluation Criteria

The London Plan – **Criterion 1341_1.:** *The woodland contains natural features and ecological functions that are important to the environmental quality and integrity of the NHS. These include site protection (hydrology and erosion/ slope) and landscape integrity (richness, connectivity and distribution).*

Criterion 1.1. – Site Protection:

Ecological Function Measure

A) Presence of hydrological features within or contiguous with the patch.

This measure relates to *Hydrological and Related Values* as outlined in the Natural Heritage Reference Manual and the following concepts:

a) "Waterbodies, including wetlands, often represent a relatively small percentage of the total land area, yet they can be disproportionately more valuable than other areas."

b) "It is recommended that measures be taken to protect water features, wetlands and other areas of significant hydrological importance (e.g., headwaters, recharge areas, discharge areas) within natural heritage systems."

Further, this measure relates to other concepts developed for London Subwatershed Studies to recognize the following:

a) the linkage between protection of groundwater and vegetation on the surface;

b) the interface between aquatic and terrestrial systems which have high biodiversity and are the focus of important ecological functions; and,

c) the important hydrological functions of wetlands that complement and enhance those provided by woodlands.

For the purpose of this evaluation hydrological features include the following features and/or areas:

- Groundwater discharge and recharge areas;
- Headwaters and watercourses;
    - Flood plain regulated lands
    - River, stream, and ravine corridors outside of flood plain regulated lands
- Wetlands (evaluated and unevaluated);

Criterion Ranking:

☐ **HIGH –** One (1) or more hydrological features (as described above) located within or contiguous with the patch.

- □ **MEDIUM –** Within 50 m of a hydrological feature.
- □ **LOW –** No hydrological features present within, or contiguous with, the patch.

B) Erosion and Slope Protection

Soil erosion may adversely affect a feature by removing nutrient rich soils, destroying vegetation, and the deposition of eroded soil material (MNRF, 1997). As slopes increase, the erosion risk also increases; however, slopes less than 10% generally experience minimal erosion (MNRF, 1997; MNRF, 2010a).

This measure relates to the need *to protect runoff processes, ground stability, and aquatic habitat (erosion potential) for slopes > 10% (*MNR, Design Guidelines for Forest Management*).*

Slopes are mapped in the Slope Stability Mapping Project (UTRCA, 1996) and can also be determined using Geographic Information System (GIS) applications such as ArcMap in combination with up-to-date contour mapping.

Additionally, this measure requires knowledge of the soil textures and types as described in the ELC Manual (Lee *et al.* 1998) based on the Ontario Institute of Pedology (1985) and Canadian Soil Classification System (1998).

Criterion Ranking:

- □ **HIGH –** Patch present on steep slopes >25% of any soil type, OR on a remnant slope associated with other features such as moraines or remnant valley slopes no longer continuous with the river system OR on moderate to steep slopes >10% - 25% with erodible soils (silty loam, sandy loam and loam, fine to coarse sands).
- □ **MEDIUM –** Patch present on moderate to steep slopes > 10% - 25% with less erodible soils (heavy clay and clay, silty clay)
- □ **LOW –** Patch present on gentle slopes < 10% with any soil type.

Score for **Criterion 1.1** is based on the highest standard achieved for between the two measures.

Criterion 1.2 – Landscape Integrity (Richness, Connectivity and Distribution)

Ecological Function Measures

A) Landscape Richness

The density of landscape fragmentation, or patchiness, as measured by the total area of all patches per unit area of land. Based on the demonstration that *Native plant richness and flora quality are significantly related to local forest cover* (UTRCA, 1997; Bowles and Bergsma, 1999). Further, the Natural Heritage Reference Manual outlines the following concepts:

a) Clusters of areas that span a range of topographic, soil, and moisture conditions contain a wider variety of plant species/communities, and may support a greater diversity of ecological processes; and,

b) Where large core areas do not exist, groupings of habitat patches with potential for restoration should be included to maintain ecological function at the landscape scale.

For the purpose of this evaluation, local vegetation cover is defined as percent cover of vegetation (all habitat types) within a 2 km radius circle from patch centroid. Thresholds reflect cumulative frequency distribution of patches within London (Bergsma, 2004).

Criterion Ranking:

- □ **HIGH** > 10% local vegetation cover

- □ **MEDIUM** 7 – 10% local vegetation cover
- □ **LOW** < 7% local vegetation cover.

B) Landscape Connectivity (linkage and distance between patches not separated by permanent cultural barriers).

This measure relates to *Proximity, Connectedness,* and *Naturalness and Disturbance* outlined in the Natural Heritage Reference Manual and the following concepts:

a) Blocks of habitat that are arranged close together limit fragmentation and are usually better than those that are located farther apart; and,

b) Relatively undisturbed natural areas are generally more desirable than highly altered areas.

Criterion Ranking:

- □ **HIGH –** patches directly connected by:
  - i. waterways or riparian habitat (generally primary or secondary aquatic corridors and streams with bridges and/or underpasses: include Thames, Dingman, Medway, Stoney, Pottersburg, Kettle, Dodd, Sharon, Oxbow, Kelly, Stanton, Crumlin);
  - ii. Contiguous or semi-contiguous habitat.
- □ **MEDIUM –** patches indirectly connected by:
  - i. habitat gaps < 40 m;
  - ii. areas identified as Anti-fragmentation, Terrestrial Corridor, Big Picture Corridor (to enhance the viability of isolated woodlands by re-connection, buffering, expanding OR to infill disturbed areas or replace abandoned fields) (Riley & Mohr, 1994);
  - iii. abandoned rails, utility rights-of-way (hydro corridors, water/gas pipeline);
  - iv. Open space greenways and golf courses;
  - v. Active agriculture or pasture;
  - vi. Watercourses connected by culverts; and,
  - vii. First or second order streams that exhibit channelized morphology.
- □ **LOW –** patches not connected due to the presence of permanent cultural barriers:
  - i. major roads and highways with no culverts;
  - ii. urban or industrial development, large parking lots;
  - iii. infrastructure;
  - iv. dams, buried watercourses, channelized third or greater order watercourses; and,
  - v. very active recreational land-uses (campground, parks with major facilities – community centres, arenas).

C) Patch Distribution (isolation & arrangement of patches / patch clusters).

This measure relates to *Proximity, Connectedness,* Size, and *Distribution* outlined in the Natural Heritage Reference Manual and the following concepts:

a) Blocks of habitat that are arranged close together limit fragmentation and are usually better than those that are located farther apart; and,

b) Large patches of natural area are more valuable than smaller patches.

Following a review of the empirical evidence in the literature, Fahrig (2019) concluded that;

c) Several small patches of habitat (as a patch cluster) have a greater species richness than single, large patches of habitat.

Patch clusters are defined as patches within 250 m of each other that are not separated by major roads, highways, or urban development. The interaction or flow of organisms among patches appears to be influenced by the size of patches and the distance separating them.

Criterion Ranking:

- ☐ **HIGH –** patch clusters with total area > 40 ha OR identified as a Big Picture Meta Core (Carolinian Canada, 2000) as outlined in ***The London Plan* – 1418-1419**.
- ☐ **MEDIUM –** patch clusters with total area 20 – 40 ha.
- ☐ **LOW –** patch clusters with total area < 20 ha.

Score for criterion 1.2 based on the highest standard achieved for any one of the three standards.

The London Plan – **Criterion 1341_2.:** *The woodland provides important ecological functions and has an age, size, site quality, and diversity of biological communities and associated species that is uncommon for the planning area.*

Criterion 2.1 – Age and Site Quality

A) Community Successional Stage / Seral Age.

This measure relates to *Uncommon Characteristics of Woodlands* as described in Natural Heritage Reference Manual, and the concept that *Older woodlands are particularly valuable for several reasons, including their contributions to genetic, species, and ecosystem diversity*.

For the purpose of this evaluation, community age is determined based on definitions in the provincial ELC for Southern Ontario (Lee *et. al.*, 1998). Seral age reflects the composition of the plant community (especially trees) with respect to light tolerance and moisture conditions). Generally, mature or advanced seral stage community types are under-represented in the London Subwatershed (Bowles, 1995); Middlesex County (UTRCA, 2003) and Oxford County (UTRCA, 1997).

Criterion Ranking:

- ☐ **HIGH –** patch contains one (1) or more mature or older growth communities
- ☐ **MEDIUM –** patch contains one (1) or more mid-aged communities
- ☐ **LOW –** patch contains only pioneer to young communities

B) Mean Coefficient of Conservatism (MCC) of communities or whole patch

This measure relates to *Species Rarity* and *Uncommon Characteristics of Woodlands* as outlined in the Natural Heritage Reference Manual and the following concepts:

a) In general, habitats that contain rare species are more valuable than those that do not; and,

b) Woodlands that are uncommon in terms of species composition should be protected.

The MCC can provide useful information on the susceptibility of communities to adverse anthropogenic effects (Francis *et al.*, 2000; Catling, 2013). The MCC is based on the Floristic Quality Assessment System for Southern Ontario (Oldham *et al.*, 1995), analysis of distribution in the London Subwatershed

area (Bowles and Bergsma, 1999), results of the Middlesex Natural Heritage Study (UTRCA, 2014), and Oxford County Terrestrial Ecosystem Study (UTRCA, 1997).

Criterion Ranking:

- ☐ **HIGH –** one (1) or more vegetation community with an MCC ≥ 4.6; OR MCC of patch > 4.5
- ☐ **MEDIUM –** one (1) or more vegetation community with an MCC 4.2 – 4.5; OR MCC of patch ≥ 4.0 – 4.5
- ☐ **LOW –** all vegetation communities with an MCC < 4.2; OR MCC of patch < 4.0.

Criterion 2.2 – Size and Shape

A) Patch Size

This measure relates to *Size* as described in Natural Heritage Reference Manual**,** and the concept that *large patches of natural area are more valuable than smaller patches.*

Patch size is generally positively correlated with biodiversity and ecological function. Larger patches can result in greater biodiversity through a number of characteristics including, but not limited to, increased area of habitat (for "area-sensitive" species), greater diversity of habitat features, reduced forest edge/increased forest interior, and increased resiliency from human disturbance (MNRF, 2010a).

The following thresholds have been derived from a cumulative frequency curve distribution for vegetation patches within the City of London (Bergsma, 2004).

Criterion Ranking:

- ☐ **HIGH** Patch > 9.0 ha in size OR patch contains a woodland >4 ha.
- ☐ **MEDIUM** Patch 2.0 – 9.0 ha in size OR patch contains a woodland 2-4 ha.
- ☐ **LOW** Patch < 2.0 ha in size.

B) Patch Shape and Presence of Interior

This measure relates to *Shape* as described in Natural Heritage Reference Manual**,** and the following concepts:

a) The shape of natural heritage areas affects their value as wildlife habitat and their resilience to disturbance effects; and,

b) Round or block-shaped patches contain less edge per unit of area than long, narrow patches.

c) Patch shape influences the amount of edge and interior habitat, and thus can influence resilience, disturbance, and species-specific habitat requirements (as described above) (MNRF, 2010a). Edge habitat, specifically for woodlands, has increased across southern Ontario with increased fragmentation; and subsequently the area of forest interior has decreased.

As edge effects can extend into woodlands (Environment Canada, 2013), the interior area for a patch is calculated based on a 100 m distance from the interior of the edge habitat (MNRF, 2010a). Further evaluation of patch shape is based on analysis of subwatershed studies patches and calculation of perimeter to area ratios.

Criterion Ranking:

- ☐ **HIGH** Patch contains interior habitat that is more than 100 m from the edge OR has a Perimeter: Area ratio <1.5 m/m².
- ☐ **MEDIUM** Patch contains no interior habitat but has a Perimeter:Area ratio 1.5 – 3.0 m/m².
- ☐ **LOW** Patch contains no interior and has a Perimeter:Area ratio > 3.0 m/m²

C) Bird Species

This measure relates to *Species Diversity* and *Rarity* as described in Natural Heritage Reference Manual**,** and the following concepts:

a) Areas that contain a high diversity of plant and animal species are generally more important than areas that contain a lower diversity of species; and,

b) In general, habitats that contain rare species are more valuable than habitats that do not.

Birds are indicators of habitat quality and the degree of forest fragmentation. Evaluated based on the Significant Wildlife Habitat Ecoregion 7e Criteria Schedules (MNRF, 2015a) for "Habitat of Species of Conservation Concern, Special Concern and Rare Species", along with any additional "Regional Concern" species for the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region as outlined by the Avian Conservation Assessment Database (Partners in Flight, 2020).

Criterion Ranking:

- ☐ **HIGH** breeding habitat of three (3) or more species of conservation concern, special concern, rare bird species (MNRF, 2015a) or any other regional concern species (Partners in Flight, 2020) in the patch.
- ☐ **MEDIUM** breeding habitat of 1-2 species of conservation concern, special concern, and rare bird species (MNRF, 2015a) or any other regional concern species (Partners in Flight, 2020) in the patch.
- ☐ **LOW** no species of conservation concern, special concern, and rare bird species (MNRF, 2015a) or any other regional concern species (Partners in Flight, 2020) in the patch.

Score for criterion 2.2 based on the highest standard achieved for any one of the three standards

Criterion 2.3 Diversity of Communities, Landforms and Associated Species

A) ELC Community Diversity.

This measure relates to *Habitat Diversity*, *Complexity*, and *Uncommon Characteristics of Woodlands* as described in Natural Heritage Reference Manual, and the following concepts:

a) Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes;

b) Older woodlands are particularly valuable for several reasons, including their contributions to genetic, species, and ecosystem diversity; and,

c) Woodlands that are uncommon in terms of species composition, cover type, age, or structure should be protected.

Native plant species diversity is related mainly to the number of communities in the patch, also to patch area and landscape richness (UTRCA, 1997; MNRF, 2010a).

Applied at the patch level to all communities (including cultural) identified at the Community Series level in the City of London digital GIS layer. Thresholds derived from cumulative frequency distribution of London patches for a total of 23 community series categories (Bergsma, 2004).

Criterion Ranking:

- ☐ **HIGH** – Patch contains 6 or more Community Series

- ☐ **MEDIUM** – Patch contains 3-5 Community Series
- ☐ **LOW** – Patch contains 1-2 Community Series

B) Community and Topographic Diversity (variation and heterogeneity)

This measure relates to *Habitat Diversity* and *Complexity* as described in Natural Heritage Reference Manual, and the concept that *Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes.*

This is applied to all communities as defined by this study and based on ELC Community Tables (Lee et. al. 1998) and topographic feature description. The seven (7) topographic feature categories for the City of London are as follows: riverine, bottomland, terrace, valley slope, tableland, rolling upland, bluff.

Criterion Ranking:

- ☐ **HIGH** – Patch contains three (3) or more Ecosites in one (1) Community Series OR four (4) or more Vegetation Types OR three (3) or more topographic features (e.g. tableland, rolling upland, valley slope, terrace, bottomland).
- ☐ **MEDIUM** – Patch contains two (2) or more Ecosites in one Community Series OR by three (3) Vegetation Types OR two (2) topographic features, or one (1) Vegetation Type with inclusions or complexes.
- ☐ **LOW** – Patch relatively homogenous; one (1) Ecosite OR one (1) to two (2) Vegetation Types on one (1) topographic feature.

C) Diversity (species and individuals) and Critical Habitat Components for Amphibians

This measure relates to *Species Diversity* and *Rarity* as described in Natural Heritage Reference Manual**,** and the concept that *areas that contain a high diversity of plant and animal species are generally more important than areas that contain a lower diversity of species*.

Amphibians are indicators of healthy woodlands with well-functioning processes (MNRF, 2000a; MNRF, 2010a).

This measure is applied at the patch level based on the presence of amphibians and/or important habitat components including the following:

1) shallow water that remains wet for the breeding season (presence of vernal pools);
2) emergent and submergent aquatic vegetation (presence of aquatic ELC community types);
3) presence of instream logs and shoreline shrubs (fish habitat data);
4) closed canopy offering a shaded moist understory environment (presence of forest or treed swamp communities); and,
5) abundance of coarse woody debris (deadfall/logs, firm or decayed in the 10-24, 25-50 or >50 cm size classes).

Criterion Ranking:

- ☐ **HIGH** – three (3) or more species of amphibians present* in the patch, OR one (1) species of amphibian that is abundant* in one (1) or more communities; OR two (2) or more critical habitat components present in the patch.
- ☐ **MEDIUM** – 1-2 species of amphibians present in the patch; OR one (1) species of amphibian that is occasional* in one (1) or more communities; OR one (1) critical habitat components present in the patch.

- ☐ **LOW** – No species of amphibian present in the patch, OR no critical habitat components present in the patch.

** Abundance is based on call codes from the amphibian survey protocol as part of the Marsh Monitoring Program (Bird Studies Canada [BSC], 2009a). Presence is determined with a call code ≥1; occasional is defined as any species with a call code 2; abundant is defined as any species with a call code 3.*

D) Presence of Conifer Cover

This measure relates to *Representation* and *Habitat Diversity* and *Complexity* as described in Natural Heritage Reference Manual, and the following concepts:

a) The full range of natural features that occur in an area, including both rare and common features, should be protected as a fundamental step in NHS planning to preserve biodiversity at the species and community levels; and,

b) Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes.

Important for providing winter food and shelter for a variety of wildlife species (MNRF, 2000a; MNRF, 2010a). For this measure, conifer communities are based on ELC (Lee *et al.*, 1998) and include FOC, FOM, SWC, SWM, and CUP.

Criterion Ranking:

- ☐ **HIGH** – Patch contains one or more conifer communities that are > 4.0 ha in size.
- ☐ **MEDIUM** – Patch contains one or more conifer communities that are between 2.0 and 4.0 ha in size.
- ☐ **LOW** – Patch only contains conifer communities < 2.0 ha in size or no coniferous, mixed forest, swamp or plantation communities.

E) Fish Habitat Quality

This measure relates to *Hydrological and Related Values* and *Water Protection* as described in Natural Heritage Reference Manual**,** and the following concepts:

a) Waterbodies, including wetlands, often represent a relatively small percentage of the total land area, yet they can be disproportionately more valuable than other area; and,

b) Source water protection is important and natural hydrologic processes should be maintained.

The health of an aquatic habitat is determined by the health of the water body and surrounding land use practices. Both permanent and intermittent watercourses can provide critical habitat for many species**.**

Criterion Ranking:

- ☐ **HIGH** – Dissolved oxygen > 8.0 mg/L OR abundant instream woody debris and rocks and watercourse with a natural channel located within or contiguous with the patch.
- ☐ **MEDIUM –** Dissolved oxygen 5.0 – 8.0 mg/L OR moderate amount of instream woody debris and rocks and portions of channelized watercourses within or contiguous with the patch.
- ☐ **LOW** – **Dissolved** oxygen < 5.0 mg/L OR no instream woody debris and sparse structure and entire watercourse channelized within or contiguous with the patch.

***The London Plan* – Criterion 1341_4.**: *The Woodland provides significant habitat for endangered or threatened species.*

The presence of SAR habitat will add one HIGH score to the overall assessment

This measure relates to *Species Rarity* as described in the Natural Heritage Reference Manual, and the concept that in general*, habitats that contain rare species are more valuable than habitats that do not.*

Identification, evaluation, and listing of provincially endangered or threatened species is the responsibility of the MECP. Federally endangered or threatened species, as outlined in the *Species at Risk Act*, that are not covered under provincial legislation should be considered. Planning Authorities may wish to have assessments of the significant portions of the habitat of SAR reviewed by the MECP.

SAR habitat present or previously identified □ **YES** □ **NO**

Score for criterion 2.3 based on the highest standard achieved for any one of the five standards.

***The London Plan* – Criterion 1341_5.:** *The Woodland contains distinctive, unusual or high-quality natural communities or landforms.*

Criterion 5.1 – Distinctive, unusual or high-quality communities.

This criterion relates to *Habitat Complexity and Diversity*, *Species Diversity and Rarity*, and *Uncommon Characteristics of Woodlands* as described in the Natural Heritage Reference Manual, and the following concepts:

a) Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes;

b) Areas that contain a high diversity of plant and animal species are generally more important than areas that contain a lower diversity of species;

c) Areas that contain a high diversity of plant and animal species are generally more important than areas that contain a lower diversity of species;

d) Woodlands that are uncommon in terms of species composition, cover type, age or structure should be protected.

A) ELC Community SRANK

Conservation status ranks for the province (SRanks) are based on species' likelihood of becoming extirpated or extinct. This measure should be evaluated based on the most up-to-date conservation status rank as outlined by Natural Heritage Information Centre.

Criterion Ranking:

- □ **HIGH** – One (1) or more communities with an SRANK of S3/S4 or higher.
- □ **MEDIUM** – No communities with an SRANK higher than S4.
- □ **LOW** – No communities with an SRANK higher than S5.

B) Significant Wildlife Habitat

Significant Wildlife Habitat (SWH; including habitat for species of conservation concern and rare species) occurrences within the patch as determined through the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7e* (MNRF, 2015a). This criteria applies to any SWH that is not evaluated through any other criteria within these guidelines (e.g., Criteria 2.2c).

SWH habitat present or previously identified □ **YES** □ **NO**

The presence of SWH habitat will add one HIGH score to the overall assessment

C) Rare Plant Species Presence / Absence

This measure assesses the number of element occurrences of regionally uncommon or regionally rare vegetation (further outlined in the glossary) and the presence of S1-S3, SRank species (which are also identified as SWH) within a patch. Oldham (2017) identifies the regionally rare and regionally uncommon vascular plant species in Middlesex for this criterion.

Table 3.1: Rare Plant Species Presence / Absence

Type and Status of Species	HIGH	MED	LOW
Rare Plant (S1-S3)	1		
Regionally Rare plant	4	1-3	
Regionally Uncommon plant			1

D) Size and distribution of trees

Criterion Ranking:

- □ **HIGH** – trees > 50 cm dbh abundant in one or more communities within the patch
- □ **MEDIUM** – trees > 50 cm dbh rare or occasional in one or more communities within the patch
- □ **LOW** – trees > 50 cm dbh not present in any communities within the patch

E) Basal Area

This criterion aims to evaluate stand characteristics for total basal area, and basal area by tree species and size classes for each community. The post-logging provincial standard for tolerant hardwoods will be used as a measure of high-quality woodlands (MNRF, 2000a). It has been estimated that 45% (UTRCA, 2003) to 73% (Bowles, 2001) of forests in the City of London and surrounding area had basal areas lower than the recommended for optimal vegetation community resiliency and stability (MNRF, 2000a).

Criterion Ranking:

- □ **HIGH** – Average basal area of trees for any community in the patch ≥ 16m ²/ha for trees >25 cm DBH; OR > 24 m²/ha for trees > 10 cm DBH; OR all diameter class sizes are represented in the stand (saplings < 10 cm; polewood 10-24 cm; small sawlog 26-36; medium sawlog 38-48 cm; large sawlogs 50-60 cm; x-large or veteran trees > 62 cm.
- □ **MEDIUM** – Average basal area for any community in the patch 12 – 24 m²/ha of trees >10 cm DBH; OR missing one of polewood, small, medium, or large size classes.
- □ **LOW –** Average basal area for all communities in the patch < 12 m²/ha for trees > 10 cm DBH; OR missing two or more of polewood, small, medium, or large size classes.

Score for criterion 5.1 based on the highest standard achieved for any one of the five standards

NOTE: 5.1c and 5.1d will require field investigations to determine size, distribution, and basal areas of trees within a given vegetation.

Criterion 5.2 – Distinctive, Unusual or High-Quality Landforms

This criterion relates to *Habitat Complexity and Diversity* as described in Natural Heritage Reference Manual**,** and the following concepts:

a) Natural areas (or clusters of areas) that span a range of topographic, soil and moisture conditions tend to contain a wider variety of plant species and plant communities, and may also support a greater diversity of ecological processes;

A) Distinctive landform types.

As identified by the MNRF (Earth Science ANSI), landform-vegetation representational significance was derived from calculating the proportion of all patches, including core areas, which are present and protected on each of the five following major landform types:

1. **Beach Ridge** landform is unusual and rare in the City with portions identified as Earth Science ANSI and PSW/ESA.

2. **Sand Plain** landform has very little protected areas present. It is considered high quality for the aggregate extraction industry.

3. **Spillway** is the 2nd largest landform unit with the greatest proportion of protected areas and contains most of the ESA's. It is the most distinctive landform unit including the Thames River, Stoney Creek, Medway Valley and Dingman Creek.

4. **Till Plain** is the largest landform unit with the least amount of protected areas and the highest amount of vegetation. Most of the land is considered high quality agricultural.

5. **Till Moraine** is the 3rd largest landform unit with fair amount of protected land. It accounts for the patches that fall on the high landforms (Westminster Ponds – Pond Mills ESA / Meadowlily Woods).

Criterion Ranking:

- ☐ **HIGH** – Patch located on an Earth Science ANSI OR on the Beach Ridge or Sand Plain physiographic landform units.
- ☐ **MEDIUM** – Patch located on the Till Plain or Till Moraine physiographic landform unit.
- ☐ **LOW** – Patch is located on the Spillway physiographic landform unit.

Score for criterion 5.2 (based on the highest standard achieved).

3.1.2 Environmentally Significant Areas

As outlined in ***The London Plan***, ESAs are large areas that contain natural features and perform ecological functions that warrant their retention in a natural state. ESAs are often represented by a complex of wetlands, woodlands, SWH, or valleylands. It is important to note that the evaluation of features within ESAs (e.g., Wetlands, Valleylands, SWH) are further described in **Section 4.3**.

ESAs are inherently afforded protection based on their inclusion in the Green Space Place Type in ***The London Plan***; however, additional measures have been identified as necessary to ensure effective protection, management, and utilization.

Candidate areas that clearly satisfy two or more of the criteria will be considered for recognition as an ESA. These criteria apply to all potential and existing ESAs delineated on Map 5 of ***The London Plan***.

3.1.2.1 Policy and Context

The policy framework for the identification and evaluation of ESAs are outlined in depth in ***The London Plan*** – Policies 1367 to 1371. These policies provide the basis for the following guidelines and should be considered in conjunction with the Guidelines for Boundary Delineation of Vegetation Patches as outlined in **Section 4.2.**

The following interpretations of the application guidelines should be noted:

- These ESA guidelines are to be applied to Potential ESAs. Please refer to **Section 4.2** related to boundary delineation to determine whether Potential ESA(s) form part of an ESA patch. If a Potential ESA is not included in an ESA patch boundary, it must be assessed as a separate patch.
- The same feature cannot be used to satisfy more than one criterion for a given area. However, the feature should be listed under each of the criterion that it meets.
    - For example, if a community is identified as rare or uncommon, it would meet Criterion 1 listed above. If this community also contained high-quality, natural landform-vegetation communities representative of typical pre-settlement conditions, it would also meet Criterion 2 listed above. The community would be listed under both criteria but would only be applied towards the evaluation of significance for one of the criteria.
    - However, if there were other high-quality, natural landform-vegetation communities representative of typical pre-settlement conditions identified within the Potential ESA, Criterion 2 could also be applied towards the evaluation of significance.
- "Regional level" refers to the lands covered by the City of London Subwatershed Studies, including Oxbow Creek Subwatershed, Dingman Creek Subwatershed and the Central Area. For mapping of subwatersheds, refer to **City of London Subwatersheds** mapping and/or submit a **GIS Data Request** to the City of London – Geomatics Department.
- The term "County" refers to Middlesex County.
- Appropriate expertise, provided by a qualified professional may be required to apply certain elements of Criterion 1 (unusual landforms), Criterion 4 (significant hydrological processes), Criterion 5 (aspects of biodiversity), Criterion 6 (important wildlife habitat or linkage functions), and Criterion 7 (significant habitat). Each time a criterion is applied, the rationale, and source of expertise on which the application is based should be documented.
- The minimum data requirements that are required to apply certain measures of a criterion, such as diversity indices, are detailed in the guidelines outlined below, as well as the **Data Collection Standards** outlined in **Appendix B**. A standardized approach to data collection will enable more consistent application of these indices, and may be useful for long term planning.
- For documentation of rare community and species status, the most up-to-date resources and authorities will be utilized. Lists of rare and unusual communities and species will be considered open-ended, since data collected from other natural areas inventories will result in additions and deletions.
- For vegetation communities, the ELC for Southern Ontario (Lee *et al.*, 1998) will be the standard protocol used to differentiate natural vegetation communities within patches.
- The term "Area" in this document refers to patches or patch clusters (i.e., the combined area of contiguous patches), which are defined during boundary delineation (as outlined in **Section 4**).
- The focus of each criterion is to identify features of significance for protection.

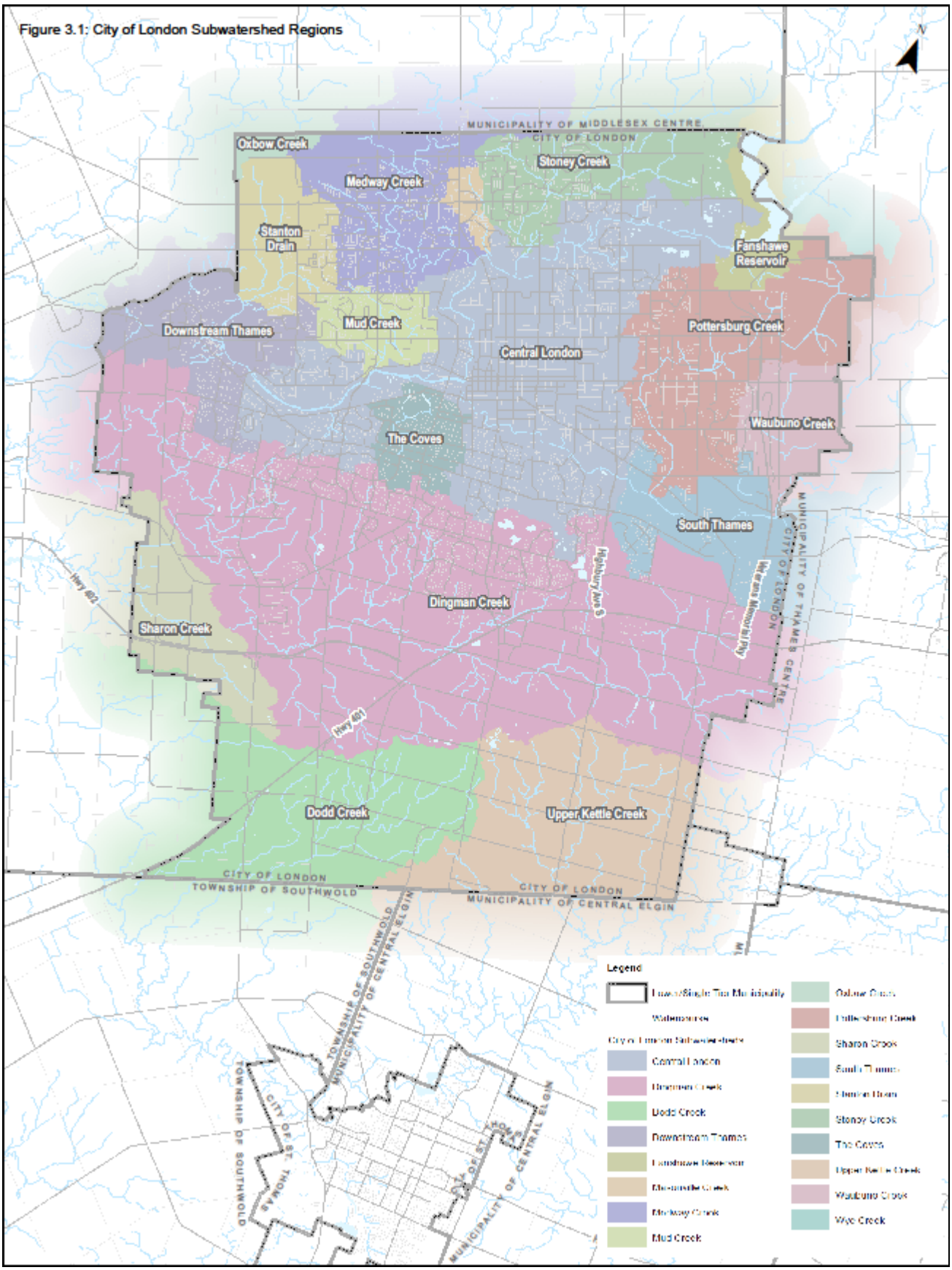
Figure 3.1: City of London Subwatershed Regions
N
MUNICIPALITY OF MIDDLESEX CENTRE
CITY OF LONDON
Oxbow Creek
Stoney Creek
Medway Creek
Stanton Drain
Fanshawe Reservoir
Downstream Thames
Mud Creek
Pottersburg Creek
Central London
Waubuno Creek
The Coves
South Thames
Dingman Creek
Sharon Creek
Highbury Ave S
Wharncliffe Rd S
MUNICIPALITY OF THAMES CENTRE
Hwy 402
Hwy 401
Dodd Creek
Upper Kettle Creek
CITY OF LONDON
TOWNSHIP OF SOUTHWOLD
CITY OF LONDON
MUNICIPALITY OF CENTRAL ELGIN
TOWNSHIP OF SOUTHWOLD
MUNICIPALITY OF CENTRAL ELGIN
CITY OF ST. THOMAS
Legend
Mud Creek
Wye Creek

The London Plan 1371_ - Criterion 1:

The area contains unusual landforms and/or rare to uncommon natural communities within the country, province or London subwatershed region.

Background: Identification of landforms that reflect geological processes or features instrumental in forming London's landscape or communities that have limited occurrence, abundance or range (distribution) is important for the maintenance of biodiversity including ecosystem, landscape, species and genetic diversity.

Application: Unusual Landforms

National level: Areas identified by recognized experts as geologically significant (e.g. Ontario Geological Survey)

Provincial level: Earth Science ANSIs

Regional level: Expert opinion (e.g. Dreimanis 1963, 1964) and data obtained through the Subwatershed Studies

Rare to Uncommon Natural Communities

National/Provincial level: Significance as interpreted from the Carolinian Zone community Subnational (Ontario) S-Ranks outlined in the **Natural Heritage Information Centre** (MNRF, 2020) or subsequent updates and/or amendments. Community identification can be determined through existing data and/or data obtained from the Subwatershed Studies.

A natural community is considered rare to uncommon if the S-Rank is between *S1* and *S3*.

Regional level: Presence of vegetation communities identified as rare to uncommon based on an analysis of the London Subwatershed Studies Life Science Inventories (Bowles *et al.*, 1994) or the best available data. This list will be open-ended to incorporate any new data collected from the London subwatershed region. It will include communities or "species assemblages" that have limited distribution and occurrence within the region (e.g. fens, older growth forests, boreal species assemblages), or that are at the limits of their distributional ranges (e.g. bogs), or that are remnants of original habitat (e.g. prairie and oak savannah).

Source References: Bogs, fens (Riley, 1989), or prairie/savannas (Riley and Bakowsky, 1993) may be identified through the presence of assemblages of indicator species. Older growth forests are evaluated in the context of the London subwatershed region, the top five percent of the oldest stage forests (climax and sub-climax) that are relatively undisturbed. Boreal indicator species will be defined by a specific list based on information obtained through the London Subwatershed Life Science Inventories (Bowles *et al*., 1994).

There may be special cases where rare to uncommon vegetation communities are described by the presence of Nationally, Provincially, or Regionally rare plant species, if they are abundant or dominant in one or more strata. In these situations, the presence of the rare plant would not be used to meet **Criterion 7** for rarity.

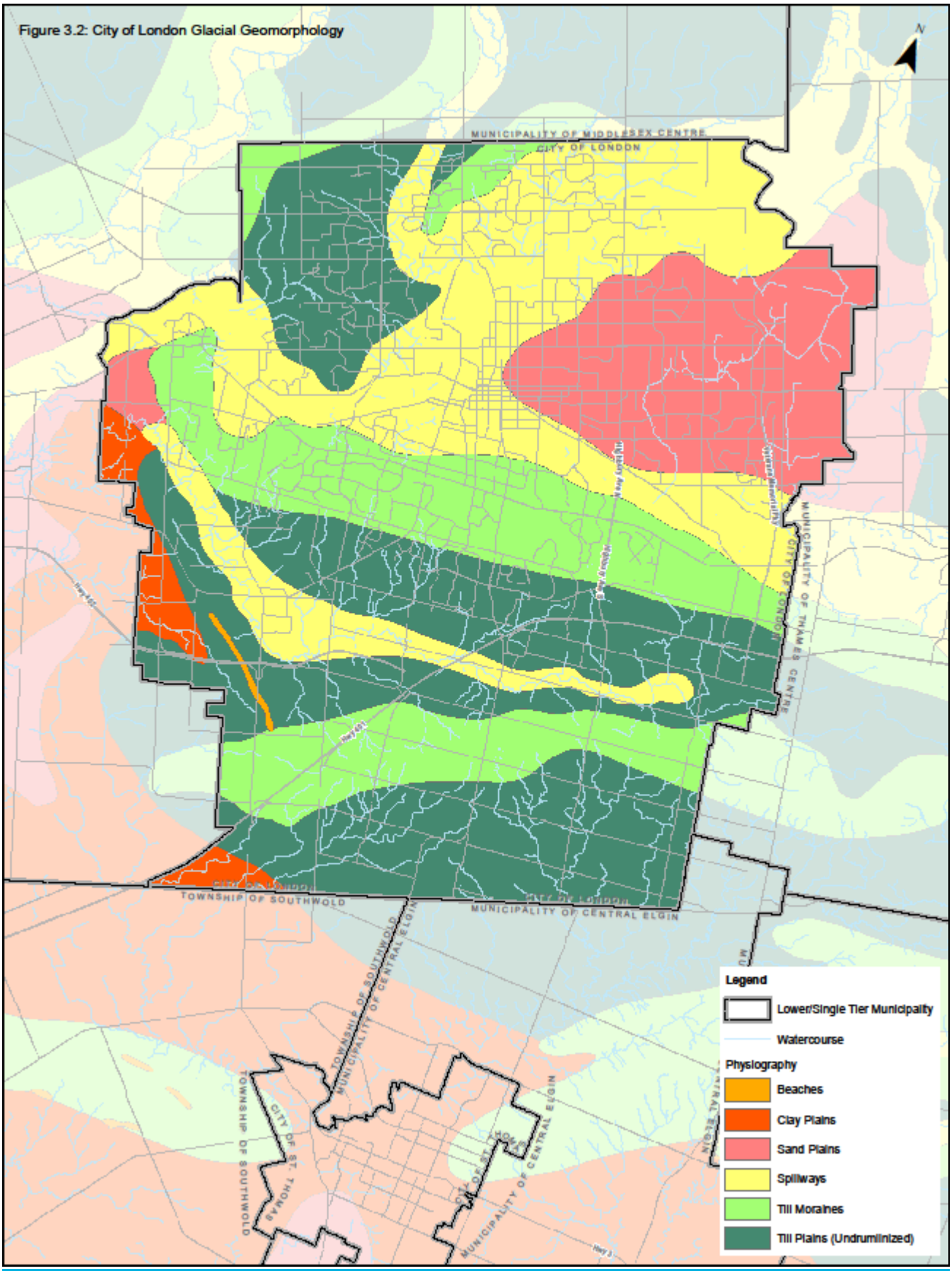
Figure 3.2: City of London Glacial Geomorphology
N
MUNICIPALITY OF MIDDLESEX CENTRE
CITY OF LONDON
MUNICIPALITY OF THAMES CENTRE
TOWNSHIP OF SOUTHWOLD
MUNICIPALITY OF CENTRAL ELGIN
CITY OF ST. THOMAS
Legend
Lower/Single Tier Municipality
Watercourse
Physiography
Beaches
Clay Plains
Sand Plains
Spillways
Till Moraines
Till Plains (Undrumlinized)

The London Plan 1371 - Criterion 2:

The area contains high-quality natural landform-vegetation communities that are representative of typical pre-settlement conditions of the dominant physiographic units within the London subwatershed region, and/or that have been classified as distinctive in the Province of Ontario.

Background: The focus of this criterion is to identify representative examples of the full range of landform-vegetation types that occur on each of the 5 dominant physiographic units within the London subwatershed region (Figure 3). By representing all landform-vegetation associations in a protected areas system a significant portion of the biodiversity of an area will be maintained (Crins, 1996). By capturing representative native vegetation in the NHS, examples of pre-European settlement landscapes are also protected.

This Criterion differs from Criterion 1 with the emphasis on representation, size, and quality. The landform-vegetation communities do not have to be rare as long as they are the best examples of their type.

The dominant physiographic units are represented by the five glacial geomorphological features based on the Ontario Geological Survey Map P.2715 (Chapman and Putnam, 1984).

The presence of disturbance indicators does not necessarily disqualify a site from meeting this criterion if other factors relevant to this criterion are satisfied or if it is the only representative example. Similarly, lack of disturbance does not necessarily qualify a site. Disturbance indicators are used as a relative measure to rank sites.

Application: Sites representing the same landform-vegetation types will be ranked in a relative manner to select the best examples. Priority should be given to designating the best examples, with respect to size and quality. In addition, similar landform-vegetation community types will be compared only within the same physiographic unit (e.g. till moraine; till plain; sand plain; spillway; beach ridge)

Distinctive and natural landform-vegetation communities are defined at Provincial or Regional levels:

Provincial level: Presence of Provincial ANSIs as identified in MNRF Land Information Ontario (LIO). Presence of PSWs as defined by the **OWES** (MNRF, 2014a).

Regional level: All wetlands within the City of London are protected in accordance with ***The London Plan***.

Presence of regionally significant ANSIs identified in LIO.

Presence of Ecosite vegetation community types (as outlined in ELC; Lee *et al.*, 1998) of high quality on distinctive topographic, landform, or cultural features, applied through existing data and data obtained from the Subwatershed Studies.

The following community types are examples, and thus not an exhaustive list:

- Moist-Fresh Black Maple Deciduous Forest Type on bottomland;
- Fresh Hemlock Coniferous Forest Type on valley slope;
- Fresh Sugar Maple-Beech Deciduous Forest Type on tableland; and
- Fresh Sugar Maple-Beech Deciduous Forest Type on valley slope.

Comments: Ecosite vegetation communities, as classified through ELC (Lee *et al.* 1998), can be

considered high-quality and thus applicable for this criterion based on the following:

- Rare vegetation communities as evaluated through the SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015a);
- Vegetation communities meeting the criteria for SWH as outline in ***The London Plan* – Policy 1354**; and,

  Vegetation communities with an SRank 1-3 as described by the Natural Heritage Information Centre.

The London Plan 1371 – Criterion 3:

The area, due to its large size, generally more than 40 hectares, provides habitat for species intolerant of disturbance or for species that require extensive blocks of suitable habitat.

Background: The focus of this criterion is to identify large contiguous blocks of natural habitat and/or combined "patches" or "patch clusters" that cover an extensive area.

The presence of large contiguous blocks of forested habitat are used as an indicator of forest-interior conditions which are required by certain forest-interior and area-sensitive species. The size, shape, and continuity of these forested areas are important factors for the identification of forest interior conditions

Large patches, or patch clusters are important for maintaining frequency of habitat across a landscape and genetic diversity of populations among interacting patches.

Application: This criterion can be met in any one (1) of three (3) ways:

1. The size of a patch is greater than 40 ha or the combined size of patches is greater than 40 ha and the patches are not interrupted by gaps wider than 20 m; or,
2. The Area either a) contains some interior forest habitat which is at least 100 m from all forest edges and is not interrupted by gaps wider than 20 m, OR b) there is confirmed presence of one or more "breeding birds" which are either forest-interior species or area-sensitive species.

Source References: Freemark and Collins (1992) and Sandilands (1997) for forest interior species; Magee (1996) updated from (Hounsell, 1989) for area-sensitive species.

Comments: For patches or patch clusters straddling the city boundary, the area determination should be based on the whole patch or patch cluster since this represents the ecological unit to which the criterion is applied.

The minimum size limit will result in the inclusion of only the largest Areas in the London subwatershed region, as determined through available data and data from the Subwatershed Studies. [Note: of 25 ESA's or Potential ESA's, 4 fell within the range of 150-500 ha and 2 were greater than 500 ha].

The London Plan 1371 - Criterion 4:

The area, due to its hydrologic characteristics, contributes significantly to the healthy maintenance (quality or quantity) of a natural system beyond its boundaries.

Background: The focus of this criterion is to identify natural areas that contribute significantly to the quantity and quality of groundwater and surface water resources in the region. Factors such as the magnitude of the area covered or volumes of water involved and the

importance of the resource should be used to assess the significance.

Landscape position and terrain setting should also be used to evaluate the significance of recharge areas.

Application: Presence of indicators of hydrological processes noted during Subwatershed Studies include but are not limited to:

- water storage;
- water release (discharge);
- wetlands;
- water quality improvement;
- first order stream/ headwater;
- groundwater recharge areas identified on subwatershed maps as high potential; and,
- water conveyance (i.e. floodplain and overland flow paths).

Comments: For wetlands, those that meet three or more of five key hydrologic functions as identified in the hydrology section of the **OWES** (MNRF, 2014a) would be considered significant by the City of London. [Rationale for the conditions was determined based upon a review of ten evaluated wetlands within the City of London].

For significant groundwater recharge, where large areas have been identified as high potential, it is not expected that the entire area identified would qualify for this criterion. To be considered for inclusion as part of an ESA, the recharge area must also be part of a vegetation patch as identified in the Subwatershed Studies or support naturally succeeding vegetation communities.

Permanent, non-channelized first-order streams containing Type I-II habitat (DFO, 1994) qualify for inclusion as part of the ESA.

Source References: Sources of information include but are not limited to wetland and hydrologic information presented by the Upper Thames River Conservation Authority and by the Subwatershed Studies Aquatic Resources Management Reports for Vision '96 Subwatersheds (Beak Consultants 1995).

The London Plan 1371 – Criterion 5:

The area has a high biodiversity of biological communities and/or associated plant and animal species within the context of the London subwatershed region.

Background: The focus of this criterion is to identify areas that demonstrate high variability and variety of plants, animals, and communities or habitats. The primary attributes of “biodiversity” include “compositional”, “structural”, and “functional” diversity.

Application: For vegetation communities and species in the London subwatershed region, biodiversity can be measured in relative terms (e.g., based on analysis of the patches surveyed, the top percentage of patches that support the highest number of community types, or native species of plants, birds, mammals, herpetofauna, etc.).

Source References: Subwatershed Studies Life Science Inventories (Bowles *et al.*, 1994)

For "native species", “Species-Area Curves” may also be used to measure diversity. Areas where the actual number of species exceeds the expected number are considered diverse. Only native species will be used in the calculation.

Habitat diversity may also be used as supporting evidence of diversity (e.g., for herpetofauna the presence of vernal pools, woodland-pond interface, downed woody debris).

Comments: Evaluation of biodiversity should consider the variability of data obtained through different levels of field efforts.

Vegetation community classification will be based on *An Ecological Land Classification for Southern Ontario* (Lee *et al.*, 1998).

The London Plan 1371_ – Criterion 6:

The area serves an important wildlife habitat or linkage function.

Background: The focus of this criterion is to identify significant “wildlife habitats” or "linkages" between significant natural features as identified in SWHTG Criteria Schedule for Ecoregion 7E. These habitats and linkages contribute to overall landscape richness and provides habitat for wildlife (MNRF, 2015a).

Application: Important wildlife habitat functions are outlined in depth in the SWHTG Criteria Schedule for Ecoregion 7E (MNRF, 2015a) and include the following general categories:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern; and,
- Animal Movement Corridors.

The site fulfills an external linkage or corridor function between two or more significant habitats. The value of a linkage or corridor will be based upon characteristics such as width, quality and length. Linkages may include, but are not limited to:

- early successional woodlands and plantations;
- water bodies, water courses and valley lands;
- riparian zones;
- steep slopes and ground water discharge areas;
- old fields;
- hydro and pipeline corridors;
- abandoned road and rail allowances; and,
- recreational greenway parks.

Source References: MNRF files and maps; Subwatershed Studies; other data obtained through site specific field investigations; MNRF (1997); Riley and Mohr (1994).

Comments: Linkages should connect significant habitat areas for native species that will benefit from the presence of this linkage. Linear habitats (such as fencerows) that may have intrinsic

habitat value, but do not connect larger protected areas, and those that are human imposed with no regard for the natural landscape system (such as channelized watercourses) should not be considered linkages (Harris and Scheck, 1991). Linkages and corridors, while also providing habitat or wildlife value, are important because they connect more substantive patches of habitat.

The London Plan 1371 – Criterion 7:

The Area provides significant habitat for rare, threatened, or endangered indigenous species of plants or animals that are rare within the country, province, or county.

Background: The focus of this criterion is to identify populations of rare, vulnerable, threatened or endangered species for protection. This criterion is focused on SAR and rare species not covered under significant wildlife habitat under Criterion 6 (e.g., species of conservation concern).

Application of this criterion is based on several factors, such as the number of rare species found, consideration of ecological distribution of the species (e.g. the only record of a species in Middlesex County), and other characteristics of the species (sensitivity, habitat needs, etc.).

Definitions of significant habitat are given under each of the categories of vascular plants and animals. The most current sources of rarity designations will be used. Lists of rare species are considered open- ended as new information will result in amendments over time. Data from the Subwatershed Studies Life Science Inventories were used to update Middlesex County status for plants.

Application: Plant Species

Habitat for plant species should be indicated by the presence of a population. The presence of a single specimen of a rare plant will not qualify an area under this criterion.

Federal SAR : COSEWIC Status reports

NHIC Global Ranks (GRANK) for Rare Vascular Plants (Oldham, 1994a) and Mosses (Oldham, 1994b).

- Species listed with a global rank of G1 to G3
- SAR listed under the *Species at Risk Act*

Rare Vascular Plants in Canada (Argus and Pryer, 1990), Database of Vascular Plants of Canada (VASCAN; Canadensys, 2020)

Provincial SAR: NHIC Provincial Rank (SRANK) for Rare Vascular Plants (Oldham, 2009; Oldham, 2017) and for Mosses (Oldham, 1994b).

- Species listed with a provincial rank of S1 to S3
- MECP designated SAR in Ontario

Atlas of the Rare Vascular Plants of Ontario (Oldham & Brinker, 2009; Oldham, 2017)
COSSARO Status reports

Middlesex County Rare Species: Status of the Vascular Plants for Ecoregion 7E (Oldham, 2017)

- Rare in SW Ontario

SWFLORA database for Subwatershed Life Science Inventories (Bowles *et al.* 1994)

- Rare in Middlesex County

Species recorded that have 1-4 records (stations) in Middlesex County. NOTE plant records collected from the Subwatershed Studies were used to update the rare status at the county level.

Animal Species

Habitat for animal species should be interpreted to mean areas where one (1) or more rare species are resident or breeding in the area, and/or making use of the area for a key component of their life cycle (e.g. territory, nesting, critical feeding grounds or wintering concentrations). Documentation of repeated (multi-year) use of an area by a species adds to the significance of the habitat. For breeding birds, the presence of suitable habitat for territory, nesting and feeding; for butterflies, the presence of suitable habitat including the host plants upon which they feed; for mammals, the presence of signs of active use of an area (e.g. dens, bedding areas, well-used trails, scat, etc.); for herpetofauna, the presence of suitable habitat for breeding (e.g. vernal pools, downed woody debris) and hibernating (presence of hibernacula).

Federal SAR: COSEWIC Status reports

NHIC Global Ranks (GRANK) for Amphibians and Reptiles, Mammals Birds, Butterflies and Fishes

- Species listed with a global rank of G1 to G3
- SAR listed under the *Species at Risk Act*

Provincial SAR: NHIC Provincial Rank (SRANK) for Amphibians and Reptiles, Mammals, Birds, Butterflies and Fishes

- Species listed with a provincial rank of S1 to S3
- MECP SAR in Ontario
- COSSARO Status reports

Middlesex County Rare Species: Southwestern Ontario regional status based on records in provincial atlases:

- mammals – e.g., Atlas of the Mammals of Ontario (Dobbyn, 1994)
- breeding birds – e.g., Avian Conservation Assessment Database (Partners in Flight, 2020), Atlas of the Breeding Birds of Ontario (OBBA) 2001-2005 (OBBA, 2007)
- butterflies – e.g., Ontario Butterfly Atlas (Toronto Entomologists' Association, 2018)
- herpetofauna – e.g., Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)

Middlesex County status of rarity is based upon the most recent existing county records:

- mammals - provincial mammal atlas and records from MNRF District office
- breeding birds - open ended lists from the provincial bird atlas (OBBA, 2007; Partners in Flight, 2020) and best available county information;
- butterflies - best available county information;
- herpetofauna - Status of amphibians and reptiles in Middlesex County (Ontario Nature, 2019)

Comments: Other non-vascular plant (e.g. Mosses) and faunal groups (e.g. Odonata) should be included where and when the information is available.

3.2 Other Natural Heritage Feature Evaluation within the City of London

The following sections provide guidelines for the evaluation of significance and ecological function for the following natural heritage features as specifically outlined in ***The London Plan***:

- Valleylands; and,
- Significant Wildlife Habitat.

Although other natural heritage features may require evaluation and subsequent protection (e.g., fish habitat, wetlands, etc.), the guidelines for evaluating those natural heritage features are outlined in the provincial, federal, or other technical documents. It is expected that all natural heritage features be evaluated in accordance with the appropriate and most up-to-date guidelines and/or policies.

3.2.1 Valleylands

Valleylands, as defined in the *Provincial Policy Statement*, refers to natural areas that occur in a valley or landform depression with standing or flowing water for a period of the year. Valleylands include features such as rivers, streams, other watercourses, and ravines. Valleylands provide many important ecological functions (e.g., wildlife habitat, water storage/transport), as well as linkages/connectivity between natural heritage features and areas within the NHS.

As outlined in ***The London Plan***, development and site alteration are not permitted within Significant Valleylands or their adjacent lands, with the exception of an EIS completed by a qualified professional demonstrating no negative impacts to the feature and/or ecological function.

The London Plan – Significant Valleylands and Valleylands provides considerations for the identification and determination of significance for valleylands based on the evaluation of landform-related functions and attributes, ecological features and restored ecological functions. Table 8-1 in the Natural Heritage Reference Manual outlines specific standards on the evaluation of function criteria for valleylands (e.g., surfacewater functions, distinctive landforms, habitat value, etc.). These criteria outlined in the Natural Heritage Reference Manual should be referenced when determining the significance of valleylands based on the considerations in ***The London Plan***.

Within the City of London, Significant Valleylands are designated as a natural feature/area within the Green Space Place Type, therefore Green Space Place Type policies outlined in ***The London Plan*** are also applicable. Pending evaluation, Valleylands are designated within the ER Place Type, therefore ER Place Type policies outlined in ***The London Plan*** are also applicable.

In consultation with the applicable Conservation Authority, the City of London may consider alterations to river or stream valleys and watercourses to enhance, rehabilitate, and/or restore the system (e.g., bank stabilization, riparian plantings, and barrier removal).

For more information related to the identification of Significant Valleylands and its application under the *Provincial Policy Statement*, refer to the Natural Heritage Reference Manual.

3.2.2 Significant Wildlife Habitat

The determination of Signficant Wildlife Habitat (SWH) should be assessed utilizing the process outlined in the Natural Heritage Reference Manual, specifically utilizing the *MNRF's Significant Wildlife Habitat Technical Guide*, in conjunction with the supplementary *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E*. ***The London Plan*** – Policies 1352 – 1354 provide further considerations for the

determination of significance for wildlife habitat within the City of London. With respect to Policy 1354_3, passive recreation opportunities include activities like hiking, photography and eco-tourism.

Within the City of London SWH is designated as a natural feature/area within the Green Space Place Type, therefore Green Space Place Type policies outlined in ***The London Plan*** are also applicable.

3.2.3 Wetlands

There are three (3) kinds of wetlands within the City of London; Provincially Significant Wetlands, Wetlands and Unevaluated Wetlands, all of which are protected per ***The London Plan***. Wetlands within the City of London are evaluated for significance using the Ontario Wetland Evaluation System (OWES) as outlined in the Natural Heritage Reference Manual. If a wetland is identified through Ecological Land Classification (ELC), it must be evaluated for significance by a qualified professional using the OWES system.

Wetlands evaluated for significance that do not meet the criteria for designation as a PSW per OWES, as confirmed by the MNRF, will be identified as 'Wetlands' within the City of London. As wetlands are evaluated, PSWs and other 'wetlands' will be added to Map 1 – Place Type and Map 5 – Natural Heritage in ***The London Plan***.

As outlined in ***The London Plan***, development and site alteration are not permitted within PSWs, Wetlands or Unevaluated Wetlands per Policies 1333_-1335_. This is with the exception of when an EIS has been completed by a qualified professional demonstrating no negative impacts to the feature and/or ecological functions and to the satifsation of the City and other relevant approval agencies. All wetlands (including PSWs) and their surrounding areas of interference require further consideration under the Conservation Authorities Act, as well as the Natural and Human-made Hazards Policies in ***The London Plan***.

For more information related to the evaluation of significant wetlands using the OWES, and its application under the Provincial Policy Statement, refer to the Natural Heritage Reference Manual (OMNRF, 2010a) as well as Ontario's Wetlands evaluation website: https://www.ontario.ca/page/wetlands-evaluation.

4. Boundary Delineation

The following section provides guidelines for delineating the ecological boundaries of the following Natural Heritage Features: Unevaluated Vegetation Patches, Woodlands, Significant Woodlands, ESAs, Wetlands, Valleylands and SWH.

It is important to note that these boundary guidelines are focused solely on ecological boundaries and are irrespective of property lines.

4.1 Policy and Context

1. To document and describe a repeatable process based strictly on ecological considerations, leading to credible mapping which can be used for planning, protection and monitoring;
2. To provide the basis for resolving variations between different scales and types of mapping; and,
3. To develop a common understanding and approach between planners, consultants, and the public regarding the ecological aspects of boundary delineation for natural features.

The following interpretations apply to these guidelines.

1. The term “vegetation patch” refers to an area that contains natural vegetation, along with associated features and functions. Vegetation patches are considered as one unit and can be comprised of multiple “natural heritage features” inside the patch (e.g., woodland, wetland, etc.). The initial boundary will be drawn at the interface between naturalized vegetation and the adjacent lands, generally conforming to the patch outline.

2. The ecological boundary is determined based on ecological principles, refined through the application of these guidelines, and are irrespective of property lines. Boundary delineation guidelines shall not be used to separate a vegetation patch into specific parts that can be treated individually as having lesser or greater significance and/or contribution to ecological function.
3. Application of these guidelines should be illustrated at a map scale of 1:10,000, using aerial photography and other tools as necessary. Further refinements will be made at a smaller scale (e.g., 1:5,000 or 1:2,000 scale), and may require field investigations. For the completion of an Environmental Study, boundaries must be geo-referenced to the best accuracy possible.
4. The diagrams and examples that form part of the conditions for boundary delineation provided below are intended to convey the intent of the guidelines. While not drawn to scale, these diagrams do depict the relative sizes and distances of the areas shown. A legend has been included to aid in the interpretation of the diagrams.
5. In the application of these guidelines, the most recent map sources, aerial photographs, and ecological background studies/documents should be used to verify and update background information.

4.2 Boundary Delineation of Vegetation Patches

In general, vegetation patches have been identified through subwatershed plans or other environmental studies and have been mapped in ***The London Plan*** on Map 1 – Place Types and Map 5 – Natural Heritage. Vegetation patches that have been evaluated for significance may fall under the Woodland category or the ESA as a whole vegetation patch, or have specific components (features, e.g., wetlands)

evaluated for significance.

As outlined in ***The London Plan***, vegetation patches that have been evaluated are included as Green Space Place Type on Map 1 – Place Types and mapped as the corresponding natural heritage feature (e.g., as Significant Woodlands and woodlands) on Map 5 – Natural Heritage. However, Unevaluated Vegetation Patches or other vegetation patches greater than 0.5 ha (identified through subwatershed plans or other environmental studies) should be delineated and assessed for significance (as outlined in **Section 3**). It is important to note that mapping in ***The London Plan*** is dynamic in nature, and not all potential vegetation patches or those identified for protection may be included in the mapping at a given time. It is the responsibility of the proponent to determine potential vegetation patches for evaluation as part of the planning process and development application.

LEGEND:

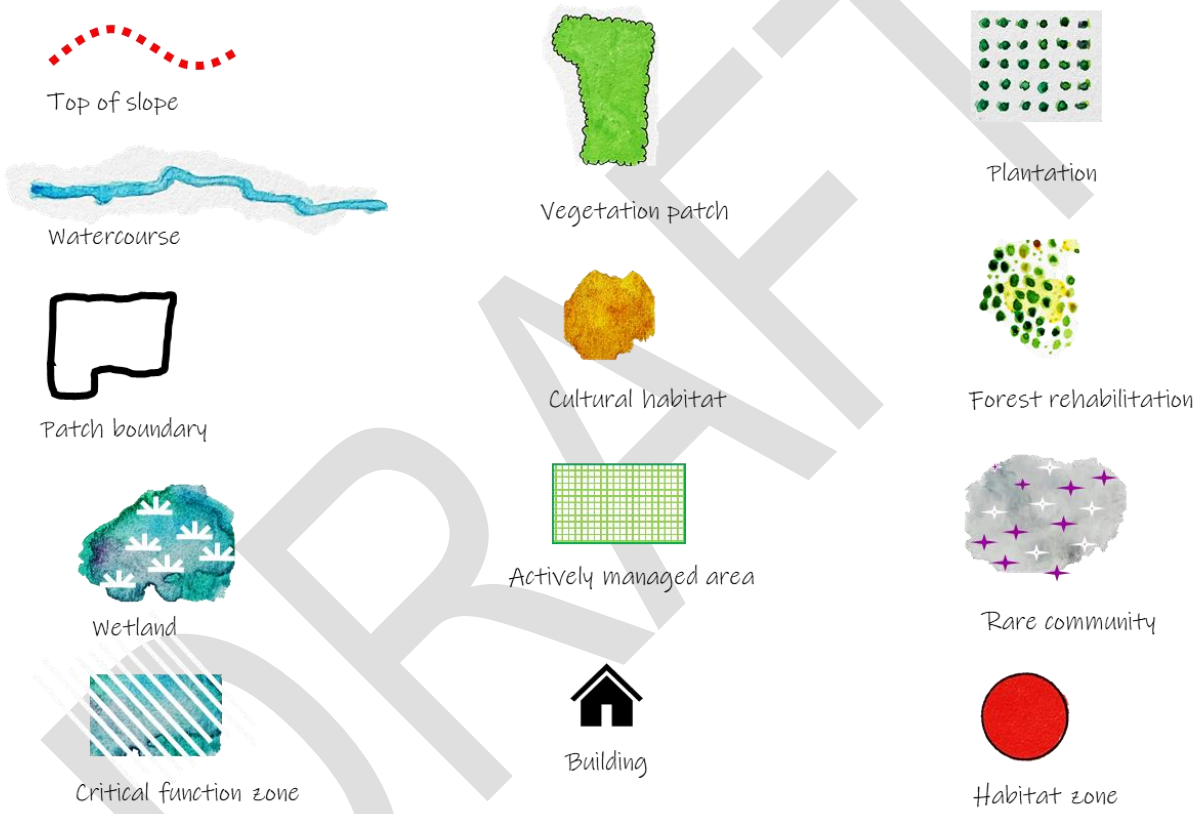

Figure 4.1: Guideline Legend

The following guidelines outline the process for determining the ecological boundary of a vegetation patch. Ecological boundary delineation of the following natural heritage features within the City of London is included:

1. Unevaluated Vegetation Patches;
2. Woodlands;
3. Significant Woodlands; and,
4. ESAs.

GUIDELINE 1: Species at Risk (SAR) habitat and Significant Wildlife Habitat (SWH) **must be included within the patch boundary**.

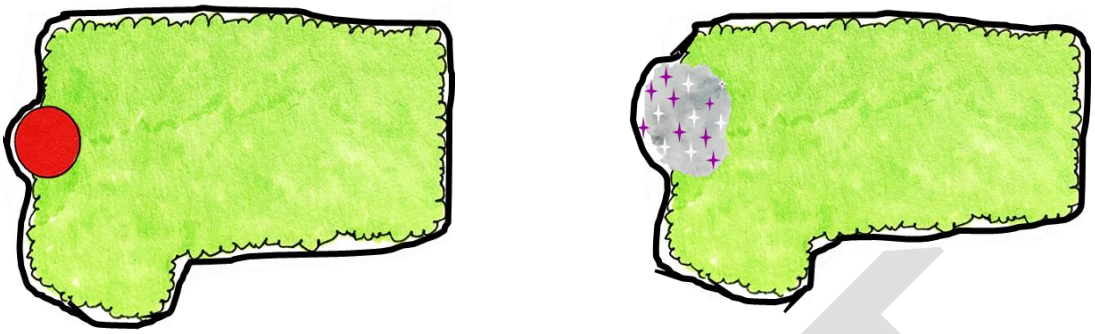

Figure 4.2: Guideline 1 Illustration

Conditions:

SAR habitat (including associated habitat zones) to be included within the patch boundary include habitat for Federal and Provincial SAR protected under the federal *Species at Risk Act* and provincial *Endangered Species Act*. For the City of London's policies related to SAR habitat, refer to ***The London Plan –*** Policies 1325-1327.

In addition to SAR habitat, all confirmed SWH is to be included as determined through ELC (Lee *et al.* 1998) and further assessed using the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF, 2015a) and the *Significant Wildlife Habitat Technical Guide* (MNRF, 2000b). For the City of London's policies related to SWH, refer to ***The London Plan*** – Policies 1352-1355.

Rationale:

SAR habitat and SWH are essential for maintaining critical life processes, biodiversity, and aiding in the protection and recovery of rare species/communities and SAR (MNRF, 2010a). Further, underrepresented or rare species and communities (i.e., SAR, SWH) are under pressure from habitat fragmentation and overall loss of habitat, therefore one important goal for ecological function when establishing/defining natural heritage features is to provide habitat to these rare species (MNRF, 2010a).

In regards to SAR habitat, a habitat zone is a feature or area used regularly for a key lifecycle requirement for a species or habitat that requires special protection. The vegetation in the habitat zone doesn't necessarily need to be of natural origins and could contain culturally influenced communities. The critical habitat of a plant species may extend to areas in the immediate vicinity of population that have similar soil, moisture, exposure, and community conditions.

Examples of habitat zones that may require special protection are:

- Old fields, hedgerows, and woodland edges that may be important habitat for American badger (*Taxidea taxus jacksoni*) maternal and other den sites, as well as migration corridors for the dispersal of young (Ontario American Badger Recovery Team, 2010); and,
- Sandy shorelines that provide critical nesting habitat for the Eastern Spiny Soft-shell Turtle (*Apalone spinifera*) often occuring along the Thames River.

GUIDELINE 2: Marshes, Thicket Swamps, or other Untreed Wetland communities and their associated Critical Function Zones (CFZs) contiguous with a patch **must be included within the patch boundary** (inset d of **Figure 4.3**).

To be included in the patch boundary, the wetland communities must be relatively undisturbed and dominated by native species that are obligate or facultative wetland species (coefficient of wetness value of -3 to -5; Oldham *et al.*, 1995) and meet at least one of the following criteria:

a) The wetland strengthens a linkage between natural areas by filling in a bay or connecting two or more patches;

b) The wetland is located above the top-of-slope of stream corridor or ravine;

c) The wetland connects a patch to a permanent, natural watercourse; or,

d) The wetland CRZ is included within the patch boundary.

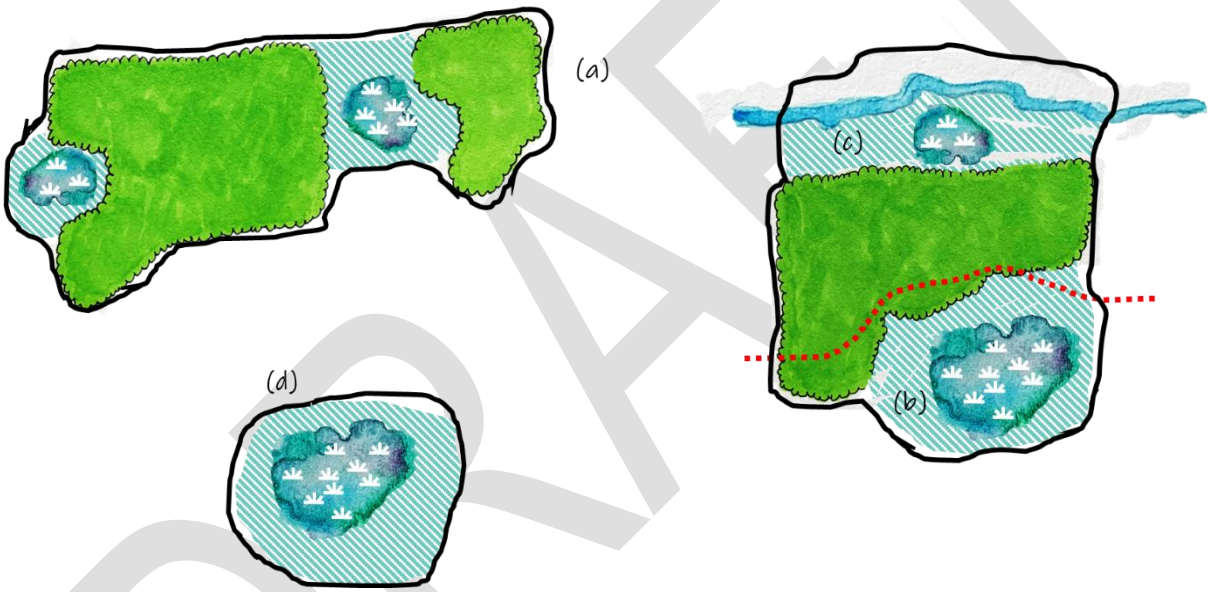

Figure 4.3: Guideline 2 Illustration

Conditions:

Although all wetlands are protected under the City of London's policies related to PSWs, Wetlands, and Unevaluated Wetlands (***The London Plan*** – Policies 1330-1336), marshes, thicket swamps, and other untreed wetlands (along with their associated CFZs) that meet the criteria above must be included within the overall vegetation patch boundary. All other wetlands greater than 0.2 ha including PSWs, Wetlands, and Unevaluated Wetlands and their associated CFZs that do not meet the above criteria are to be delineated as their own vegetation patch. CFZs include non-wetland areas within which biophysical functions or attributes directly related to the wetland occur (Environment Canada, 2013). Reference to Environment Canada (2013) can be made for more information on determining specific CFZs, however review of the most up-to-date documents on CFZs should be conducted.

Rationale:

Wetlands provide important habitat for plants, fish and wildlife. Wetlands also influence the quality and temperature of water flowing through them and some wetlands provide storage capacity to offset peak flows associated with storm events.

CFZs are natural areas that surrounds wetlands can provide a suite of benefits to wetland function and to the species dependent on the wetland. In many cases, these natural areas, although they extend beyond the limits of the wetland, are inherently part of the wetland ecosystem and provide habitat for critical life processes to wetland species (Environment Canada, 2013).

GUIDELINE 3: Projections of naturalized vegetation **less than thirty meters (30 m) wide that extend from the main body of the patch:**

a) **must** be included within the boundary if the projection includes a wooded ravine or valley with untreed or successional habitat below the top-of-slope; and

b) **must** be included within the boundary if the projection provides linkage within the landscape.

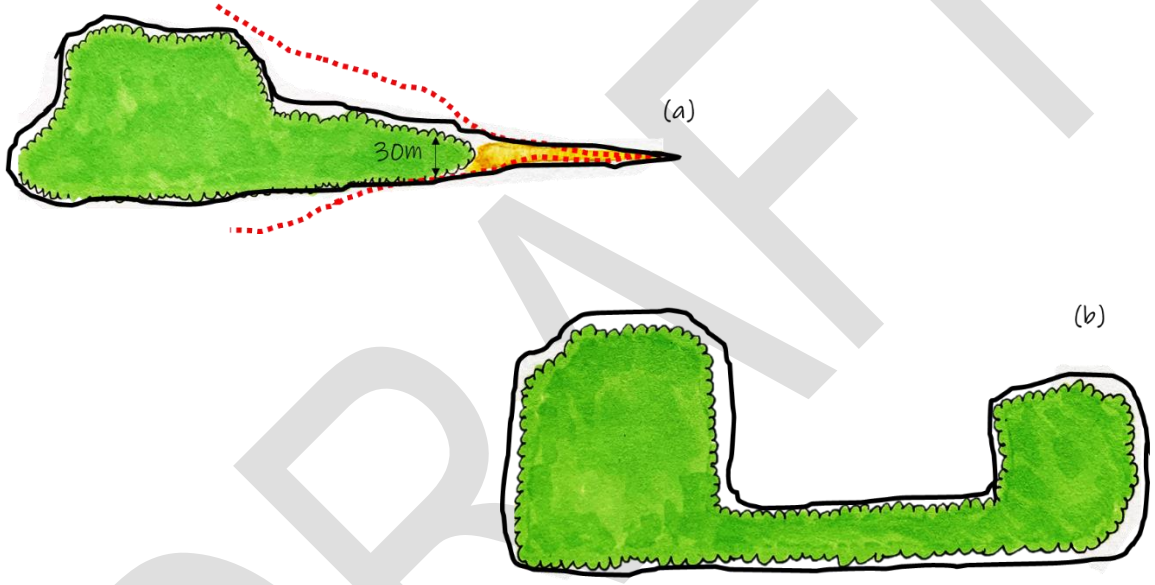

Figure 4.4: **Guideline 3 Illustration**

Rationale:

Ravine, valley, and upland corridors are important components of the NHS because they contain natural habitat, provide linkages, increase species richness and diversity, and facilitate movement and dispersion. Landscape connectivity (e.g., through linkages) is important in the maintenance of ecological function of patches and reduces landscape fragmentation that lead to smaller, more isolated features (MNRF, 2010a). For example, linkages can provide a dispersal route for species (i.e., connectivity) to complete different aspects of their life cycles, such as allowing reptiles and amphibians to travel between breeding and overwintering habitat (MNRF, 2010a).

GUIDELINE 4: All Watercourses **must be included within the patch boundary.**

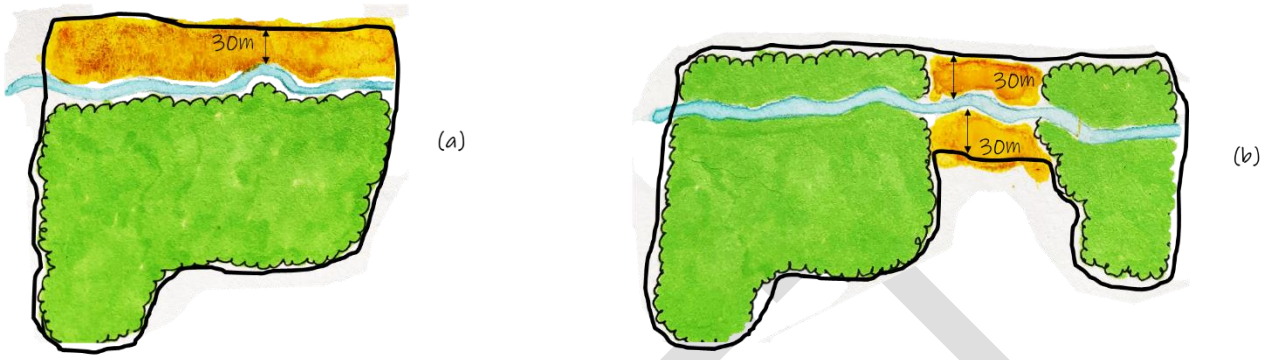

Figure 4.5: **Guideline 4 Illustration**

Figure 4.5 is an example of the inclusion of watercourses for defining vegetation patch boundaries, where a) depicts a watercourse at the edge of a vegetation patch and b) depicts a watercourse connecting two (2) patches.

Conditions:

The edges of the watercourse **must** be measured **from the high-water mark** and will include the following minimum corridor widths:

- 15 m on each side of small watercourses (valleylands);
- 30 m on each side of significant watercourses (***The London Plan*** – Policy 1350);
- 50 m on each side of coldwater streams; or,
- 100 m on the side(s) of large rivers (Thames River, Medway Creek, Stoney Creek, Dingman Creek) where the patch occurs (City of London, 2011).

The high-water mark is defined as the average **highest** level that a watercourse or waterbody rises to and remains at long enough to alter the riparian vegetation (DFO, 2007; DFO, 2019). In flowing watercourses, this is often referred to as the “active channel” or “bank-full level”, usually reflecting the 1:2 year flood level (DFO, 2007).

Rationale:

Watercourses act as important habitat providing wildlife resources and functions as well as contributing substantially to connectivity within and between significant natural areas. Riparian areas adjacent to watercourses are important for protecting the water quality and ecological health of aquatic habitats. First order, headwater streams are recognized as indicators of hydrological processes. These hydrologic processes are important for ecological function and should be protected within NHS (MNRF, 2010a).

A watercourse is generally defined according to several federal and provincial Acts and Regulations and typically consists of a distinct (somewhat to well-defined) channel in which water naturally flows at some time of the year [i.e., permanent, intermittent, or ephemeral flow as defined by MNRF’s Stream Permanency Handbook for South-Central Ontario (MNRF 2013)]. This includes anthropogenically created / maintained / altered features as well as natural features.

GUIDELINE 5: Satellite woodlands that are less than 2 ha and are located within 100 m of another woodland patch:

a) **must** be included within the boundary if the satellite contains Species at Risk or Significant Wildlife Habitat; and,

b) **must** be included within the boundary if they contribute to biological diversity and ecological function of the other patch and/or act as stepping stone linkages within the greater landscape

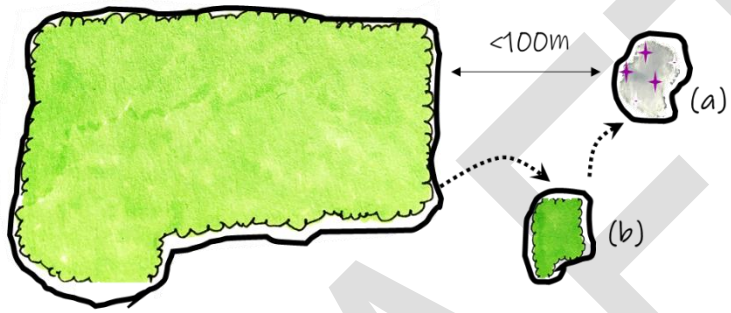

Figure 4.6: Guideline 5 Illustration

Conditions:

Contribution to biological diversity, ecological function, and connectivity may include, but is not limited to the following (MNRF 2010):

- the satellite supports native tree cover;
- the satellite is located adjacent to or contains a wetland;
- the satellite is located between two (2) larger patches that are within 250 metres of each other, where the land between the patches is absent of permanent barrier;
- the satellite meets the habitat needs of one or more species that are not met by the larger patch;
- the satellite contains a natural vegetation community type that is not already represented in the larger patch;
- the satellite supports or is dependent upon a surface- or ground-water connection that maintains fish or aquatic habitat in either patch; and,
- the satellite provides a temporary refuge that facilitates movement between habitats.

Rationale:

There is no evidence to support the principle that large contiguous patches contain more biodiversity than multiple small patches of the same total area (Fahrig, 2019). Woodlands ≥ 4 ha are important in Middlesex County, and have the potential to support habitat for disturbance sensitive species (UTRCA, 2014; NHRM, 2010). Smaller woodlands have the potential to deliver multiple ecological services at higher performance levels per unit area than larger woodlands (Valdés et al., 2020). Further, multiple

small, connected patches can support higher species richness, are more likely to contain wide-ranging taxa (e.g. predators), and have fewer extinctions compared to single large patches (Hammill & Clements 2020).

The presence of native conifer cover is considered important for providing wildlife shelter. Further, the importance of a woodland increases if it is located adjacent to a wetland or it contains a wetland, as wetlands can increase vegetation diversity, provide important wildlife habitat features, and contribute to hydrological functions (Hilditch, 1993; Riley and Mohr, 1994).

Small woodlands that are in close proximity to one another or interspersed amongst larger habitat patches, may have value for area-sensitive birds and species with low mobility (Riley & Mohr 1994). Further, small woodlands located between natural heritage features or areas can act as stepping stones for movement of species, thus functioning as a linkage (MNRF, 2010a)

Clusters of patches that collectively meet several of the habitat needs of one or more species are generally more valuable than clusters of patches that meet fewer habitat needs (MNRF, 2010a). Natural areas that consist of several patches containing a diversity of vegetation community types can sometimes provide better representation of the range of habitats than a single larger habitat patch (MNRF, 2010a; Fahrig, 2019).

GUIDELINE 6: Cultural meadows **must** be included if they meet one (1) of the following criteria:

a) a portion of meadow habitat surrounds a feature on one or more sides, and provides improved ecological function to the patch by its inclusion;

b) strengthen internal linkages in the patch by filling in "bays";

c) connect a patch to a watercourse; or

d) connect two or more patches (inset d of **Figure 4.7**); or

e) are below the top-of-stable-slope in a stream corridor or ravine.

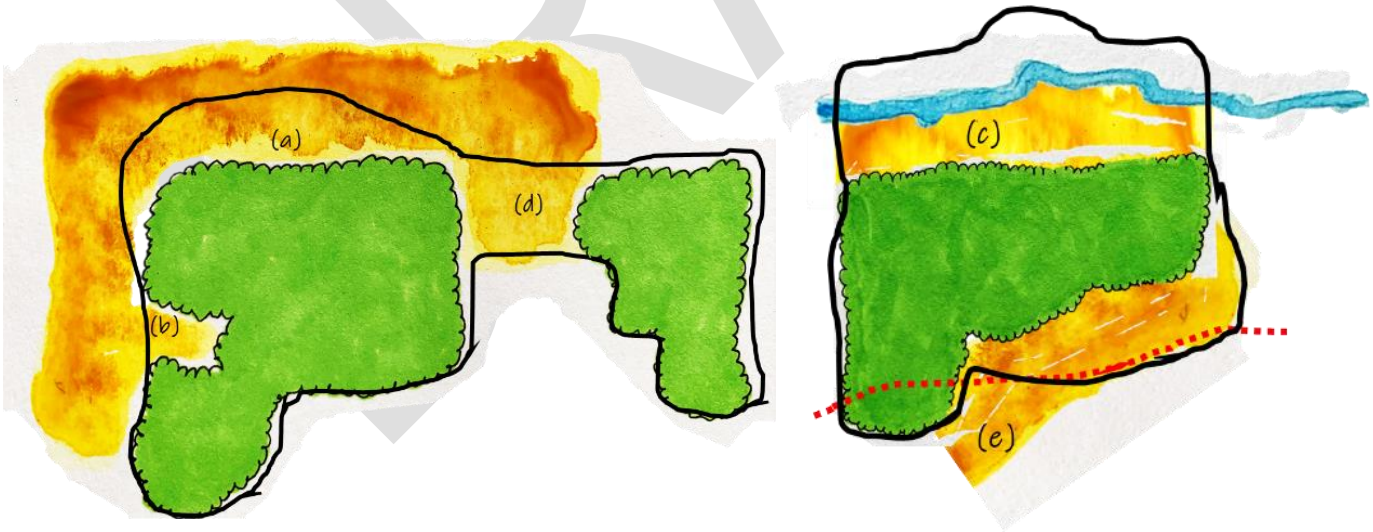

Figure 4.7: **Guideline 6 Illustration**

Condition:

A cultural habitat meeting any one of the above conditions is included in the vegetation patch boundary. However, it is not intended that the cultural habitat will occupy a large proportion of the total area of the patch being delineated.

Rationale:

Cultural habitats may act as significant supporting habitat to the patch, where the loss of such communities would result in loss of ecological integrity of the whole patch. The inclusion of cultural habitats may increase the biological diversity of the area if the other similar cultural habitat is not already present.

Cultural habitats may provide increased community and species diversity, important breeding and foraging wildlife habitat, landscape connections between naturalized areas, habitat for rare flora and fauna, and/or reduce negative effects from surrounding land-use. Cultural habitat adjacent to woodlands also has potential for rehabilitation and may contribute to a Net Environmental Benefit in ecosystem health. Although cultural habitats are not pristine or unaffected by human activity, they have the potential to contribute natural values. This contribution is especially prevalent agriculturally-dominated landscapes, which are common southern Ontario (Geomatics International, 1995; Milne and Bennet, 2007).

Criteria and guidelines for evaluating the ecological significance of cultural habitat areas are provided in the Geomatics (1995) report "Management options for old-field sites in southern Ontario". These criteria address a range of issues including rare and endangered species, wildlife habitat, site productivity, successional stage, soil characteristics, site history and the relationship of a particular site to the surrounding landscape.

GUIDELINE 7: Plantations contiguous with patches of natural vegetation **must** be included in the boundary if the plantation:

a) was originally established for the purposes of forest rehabilitation and/or has been managed towards a natural forest and/or has developed characteristics of a natural forest, such as natural regeneration of native species.

b) strengthens internal linkages or reduces edge to area ratios by filling in bays;

c) connects a patch to a permanent watercourse;

d) it connects two or more patches; or,

e) it is below the top-of-slope in a stream corridor or ravine.

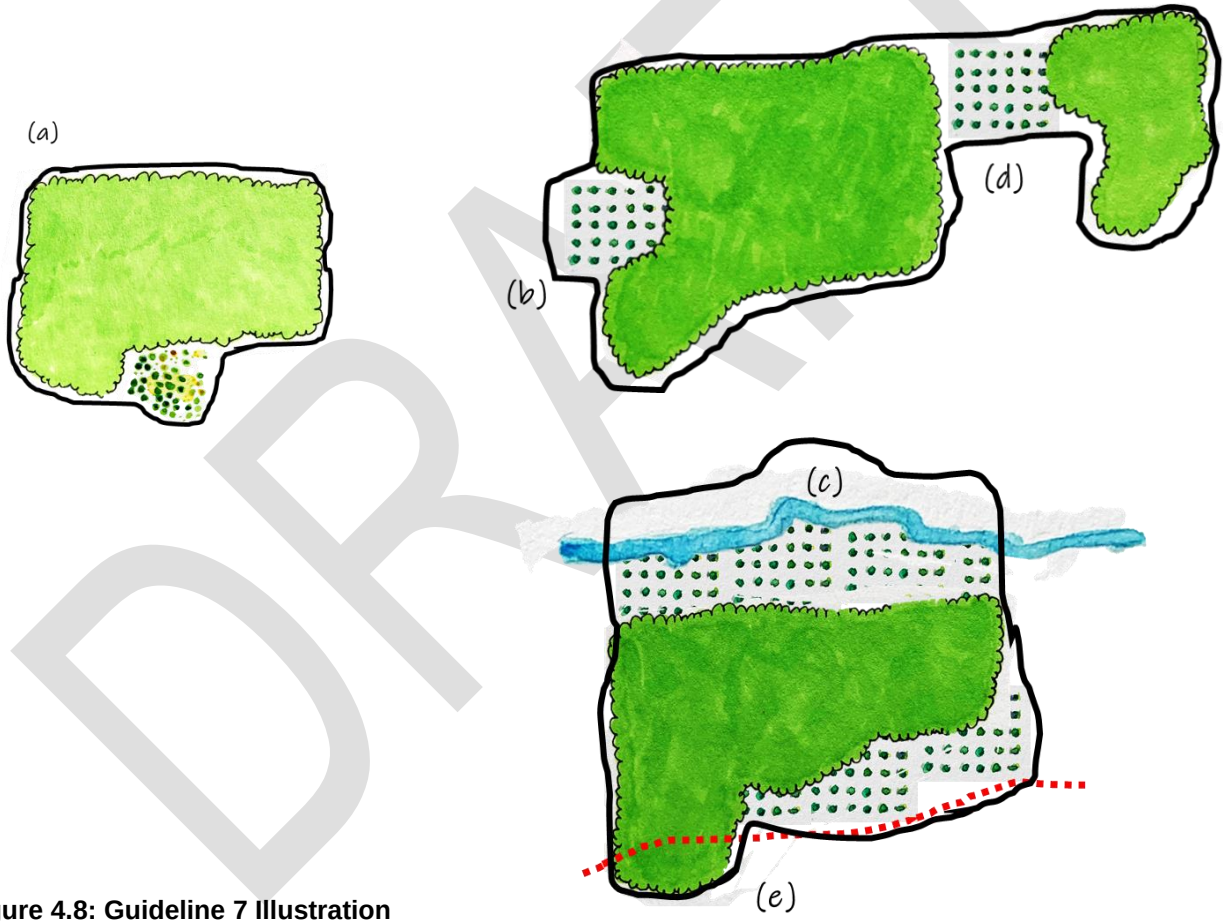

Figure 4.8: Guideline 7 Illustration

Example of the inclusion of plantations for defining vegetation patch boundaries where a) depicts a plantation providing protection for adverse effects, b) depicts a plantation filling in a 'bay', c) depicts a plantation connecting a vegetation patch to a watercourse, d) depicts a plantation connecting two (2) patches, and e) depicts a plantation below the top-of-slope of a stream corridor/ravine.

Rationale:

Cultural plantation communities may provide significant wildlife or supporting habitat for important wildlife processes (e.g., butterfly stopover areas, raptor nesting areas, etc.; MNRF, 2015a). Plantations form connections between naturalized areas, provide wildlife habitat, stabilize soils, and have the potential for regeneration to natural habitats.

GUIDELINE 8: Existing land uses within or adjacent to a patch are subject to the following boundary considerations:

a) Existing heavily managed or manicured features that are surrounded on at least three sides by a patch are included in the patch if they are less than one hectare (1 ha) in total area (**Figure 4.9**). Such features include, but are not limited to agricultural croplands, active pasture, golf courses, lawns, ornamental treed lots, gardens, nurseries, orchards, and Christmas tree plantations. Subsequent abandonment or rehabilitation of patches larger than one hectare (1 ha) may qualitfy such areas for inclusion in the patch.; and,

b) Existing residential building envelopes and institutional building envelopes surrounded on at least three sides by a patch are not affected by the protective designation. Building envelopes and access routes of existing structures within the patch must be determined on a site-specific basis.

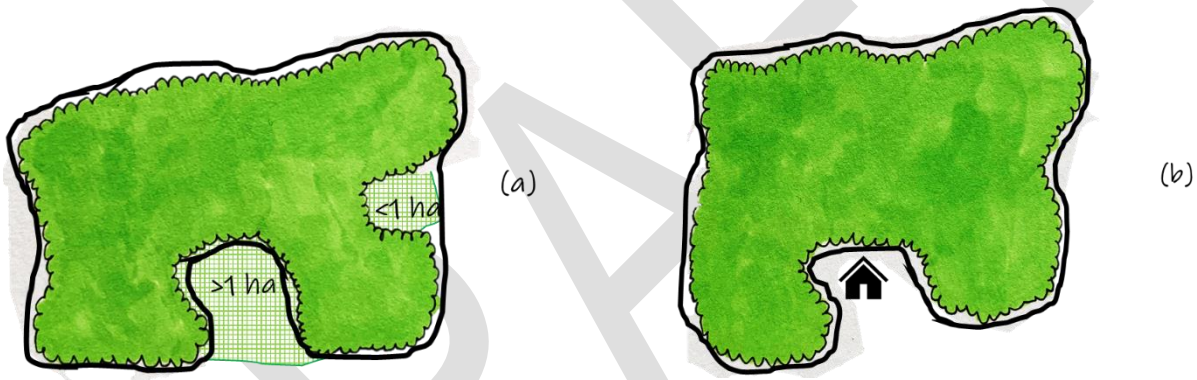

Figure 4.9: Guideline 8 Illustration

Rationale:

Existing heavily managed or manicured features (e.g., croplands, pastures, orchards, etc.) can provide a large number of ecological and environmental services. These services include providing wildlife habitat, carbon sequestration and climate change mitigation, protection from erosion, stormwater catchment, and protection from disturbance (Troy and Bagstad, 2009; FAO, 2013).

4.3 Boundary Delineation for other Natural Heritage Features within the City of London

The following sections outline the methods and requirements for delineating the ecological boundaries of standalone natural heritage features within the City of London. The boundaries delineated for natural heritage features do not include any additional setbacks, buffers, or adjacent lands.

4.3.1 Wetlands

The overarching policy framework for PSWs, Wetlands, and Unevaluated Wetlands are outlined in ***The London Plan*** – Policies 1330-1336. The first step in delineating wetland features is to define vegetation communities utilizing the ELC System (Lee *et al.*, 1998). Following the determination of vegetation communities, delineation of internal (e.g., boundary between different types of wetlands, boundary between wetland and upland communities) and external boundaries can be conducted using the OWES (MNRF, 2014a). The OWES outlines in-depth instructions on the delineation of internal and external boundaries and generally consists determining areas of gradual ecological change (i.e., transition areas, eco-tones) utilizing a combination of the following information:

- Transition (50% split) between wetland and upland plant community (percent cover);
- Topography such as elevation and slope; and,
- Soil substrate.

Wetland boundaries should be scaled to 1:10,000 for mapping purposes, with the width of the boundary line being scaled to cover the equivalent of 15 m in real world application (MNRF, 2014a). The wetland boundary delineation must be conducted by a qualified professional, usually conducted in conjunction with the applicable Conservation Authority, to determine the on-the-ground boundary for constraints mapping and site planning. All existing wetland boundaries of evaluated wetlands remain applicable until they are revised and changes to boundary delineation are approved by the MNRF.

Beyond the wetland community boundaries, the CFZ must also be included for constraints mapping and site planning. CFZs are non-wetland areas within which biophysical functions or attributes directly related to the wetland occur (Environment Canada, 2013). Effectively, the CFZ is a functional extension of the wetland into the upland. For example, this includes but is not limited to, upland grassland nesting habitat for waterfowl (that use the wetland to raise their broods), upland foraging, overwintering and nesting habitat for reptiles and amphibians. Foraging areas for frogs and dragonflies, or nesting habitat for birds that straddle the wetland-upland ecozone would also be considered part of the CFZ (e.g. Yellow Warbler). A groundwater recharge area that is important for the function of a wetland but located in the adjacent lands could also be considered part of the CFZ. It is important to note that CFZs do not replace a buffer for the wetland. For more in-depth information on determining CFZs, refer to Environment Canada (2013). However, a review of the most up-to-date documents related to CFZs should be conducted.

4.3.2 Valleylands

The overarching policy framework for the boundary delineation of Significant Valleylands and Valleylands are outlined in ***The London Plan*** – Significant Valleylands and Valleylands 1350. Valleylands are linear systems that extend throughout the landscape from headwaters to outlet locations and play an essential role in the NHS, such as providing connectivity (e.g., migration and dispersal corridors) (MNRF, 2010a). Although many valleylands occur along watercourses, other valleylands may not have a defined channel, specifically in areas of headwaters, seeps, and surface flow (MNRF, 2010a). It is important that valleyland boundary delineation be conducted by a qualified professional with expertise in hydrology and geomorphology.

Valleylands are areas with well-defined valley morphology (e.g. floodplains, meander belts, valley slopes) having an average width of 25m or more. Valleyland boundaries are defined on the basis of standard procedures such as those in the *Adaptive Management of Stream Corridors* in Ontario including *Natural Hazards Technical Guides and Understanding Natural Hazards* (MNRF, 2010a).

Section 3.2.1 describes the evaluation of valleylands.

4.3.3 Significant Wildlife Habitat

The overarching policy framework for the boundary delineation of Significant Wildlife Habitat (SWH) are outlined in ***The London Plan*** – Polices 1352-1355. The criteria for determination of SWH relies on information related to the landscape such as, but not limited to, vegetation community classification using ELC, wetland evaluation using the OWES, and habitat of endangered and threatened species (MNRF 2000b). SWH often occurs as a subset of or within other natural heritage features or areas. Boundary delineation may be based on the other natural heritage features or vegetation communities, however this may not be the case for all SWH (e.g., bat hibernacula). SWH boundaries should be determined in consultation with the City of London and other applicable agencies.

Determination and delineation of SWH should be conducted according to the MNRF's *Significant Wildlife Habitat Technical Guide*, in conjunction with the supplementary *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* and the above policies in ***The London Plan***. These documents provide further insight into specific SWH delineation (e.g., bat hibernacula plus 200 m radius for a development project). Further, delineation of SWH can be conducted using aerial mapping, observations from site investigations, and should be confirmed in the field by a qualified professional.

Section 3.2.2 describes the evaluation of SWH.

5. Buffer Determination

A buffer is required for the protection of a Natural Heritage Feature(s) and their ecological function(s) in accordance with ***The London Plan*** - Environmental Policies (1412_- 1416_). The following provides guidance for: i) the determination of a suitable site-specific buffer width and ii) the implementation and management of site-specific buffer enhancements.

This guidance section outlines a process which must be followed in order for an EIS (with determined buffers included in all contract drawings and applicable plans) to be accepted by the City of London and is best used by professionals who have experience in understanding the many interrelationships of ecological systems that may be present or affected by a development proposal. For further clarity, an example scenario in which site-specific buffers are determined are provided at the end of this chapter.

5.1 Definition of a Buffer

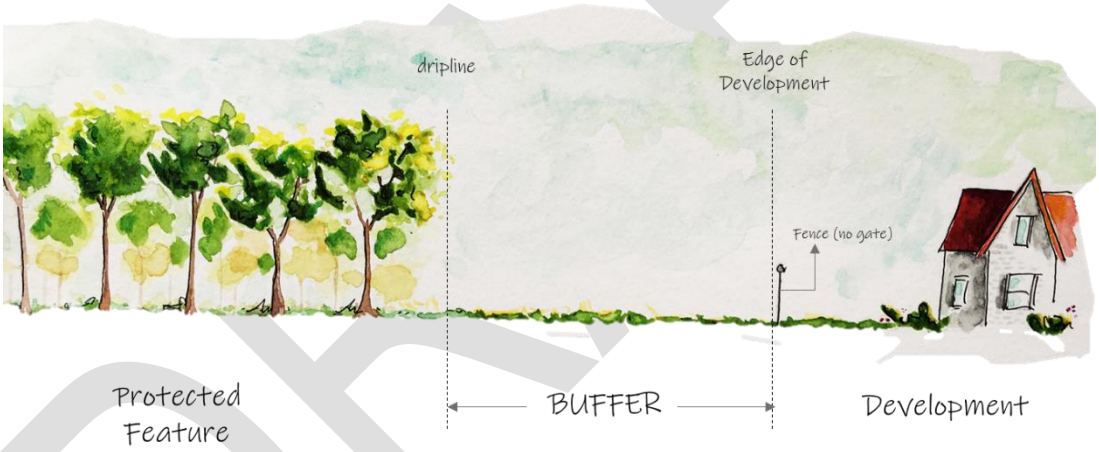

Figure 5.1: Illustration of a buffer implemented for the protection of a Natural Heritage Feature adjacent to a development.

Buffers are strips of land kept in a vegetated state that provide a physical separation between development and a natural heritage feature (MNRF, 2010a). Buffers are to be applied to protected Natural Heritage Features as defined per ***The London Plan*** Environmental Policies. The width of a buffer is determined based on the type of Natural Heritage Feature and functions as well as the potential impacts resulting from a proposed development. Buffers start at the boundary of a Natural Heritage Feature and extends outwards to the limits of development. In the case of wetlands, as described in **Section 4**, CFZs are included in the overall wetland boundary and therefore, the location of the buffer is to start at the external boundary of the CFZ. Buffers shall not be included within the limits of development. The implementation of and the width of buffers do not contribute to overall compensation goals, should they be required.

5.2 Approach

The process of determining a site-specific buffer width requires the consideration of information about the different systems and various needs of communities and individuals. The science of buffer effectiveness is ever evolving with some areas containing significant study (e.g., riparian buffers) while other areas are lacking (e.g., buffers to woodlands). Since the science is constantly changing, the process outlined below is intended to allow for flexibility and the inclusion of new scientific information as it becomes available. Even though there is flexibility, a site-specific buffer is expected to fall within a width range for the protection of a natural heritage feature. This range includes a required minimum width and a fixed maximum width and is further described in the sections below. Should proponents choose to apply the identified maximum buffer width for the protection of a natural heritage feature, the City will waive the requirement of an EIS as outlined in **Section 2**[1]. In certain cases, it may be possible that the City and the Proponent agree to a buffer width less than what is requiredin **Table 5.2**.

This approach is based on policies provided in ***The London Plan*** and the Provincial Policy Statement as well as the Natural Heritage Reference Manual, Oak Ridges Moraine Conservation Plan and Greenbelt Plan.

5.3 Buffer Determination Process

Table 5.1 outlines the general step-by-step approach to determine a site-specific buffer width for the protection of natural heritage feature(s) within the City of London.

Table 5.1: Summary of Overall Buffer Width Determination Process

Step 1: **Determine what is being protected and what are the impacts**	Collect the necessary information from the EIS and other associated studies to gain an understanding of the natural heritage feature(s) and function(s) that are being protected, and the impacts of the proposed development or infrastructure.
Step 2: **Apply the Minimum Buffer Widths**	Apply the minimum widths for the type(s) of natural heritage features that are being protected. Identified minimum buffer widths are to start at the delineated boundary of the natural heritage feature.
Step 3: **Develop the Site-specific Buffer Width**	Determine if the width should expand beyond the minimum and up to the maximum for the protection of natural heritage feature(s) and functions. Expanded buffer widths are to start at the same point as Step 2, the delineated boundary of the natural heritage feature(s).
Step 4: **Buffer Enhancement**	Enhancement of the site-specific buffer width area, the objective being to provide enhancement strategies targeting areas to minimize overall potential negative effects.

[1] *Studies such as Environmental Management Plans would still be required through the Draft Condition Plan for a proposed development. The proponent would also be required to implement buffer enhancements (i.e. plantings, restoration of habitat).*

5.3.1 Step 1 – Determine what is being protected and what are the impacts

5.3.1.1 What is being Protected?

Gaining an understanding the protected Natural Heritage Feature(s) and its function(s) is the first step in the overall process of determining a site-specific buffer width. It is the responsibility of the professional undertaking the buffer width determination process to complete a comprehensive background review and the appropriate field studies such that the various habitats, and the species that occupy those habitats, are well understood. It should be noted that multi-disciplinary investigations may be required to understand the features, their functions and the interactions with different components of the environment. These may include, but are not limited to, ecological surveys (vegetation surveys, wetland evaluations, breeding bird surveys, amphibian call surveys, reptile surveys, bat habitat surveys, SWH surveys, etc.), hydrological studies, hydrogeological studies, geotechnical investigations, etc.

Natural heritage features that are part of the City's NHS and are protected as per ***The London Plan*** include, but are not limited to:

- Significant Woodlands and Woodlands;
- ESAs;
- Fish Habitat;
- Habitat of Endangered and Threatened Species;
- PSWs and Wetlands;
- Significant Valleylands and Valleylands;
- SWH; and,
- ANSIs.

When determining what to protect, refer to **Section 2**.

5.3.1.2 What are the potential Development-derived Impacts?

Understanding the proposed development and the elements that may affect a natural heritage feature(s) and its function(s) is the responsibility of the professional undertaking the buffer width determination process. Buffer width is closely linked to the types of development adjacent to a Natural Heritage Feature. For example, most urban areas (especially residential areas) subject adjacent natural areas to vandalism, roaming pets and children, pesticide drift, and a host of other stresses (McWilliams *et al.*, 2012).

When determining the type of development and the potential effects of a proposed development, refer to Section 2.

5.3.2 Step 2 – Apply Minimum Buffer Widths

The ultimate width of the buffer will depend on the local conditions and sensitivities of the protected feature, the anticipated impacts associated with the change in adjacent land use, and the impacts that a buffer can, and cannot, reasonably be expected to mitigate (Beacon, 2012). As determined through a review of current literature, **Table 5.2** outlines the required minimum buffer widths that are necessary to maintain the natural physical and chemical characteristics of natural heritage features (MNRF, 2010a). Considering that as buffer widths increase, their effectiveness also tends to increase (Beacon, 2012) and depending on the sensitivities of the natural heritage features(s), these required minimum widths may not provide sufficient protection. Therefore, additional buffer width may be necessary to maintain the various biological components of natural heritage features (MNRF, 2010a), as outlined in **Section 5.3.3.**

If studies determine that development anywhere within the adjacent lands will have a negative impact on natural feature(s) and their function(s), buffers identified to mitigate these impacts could include the entire adjacent lands (MNRF, 2010a). Accordingly, the fixed maximum buffer widths in these guidelines are determined by the extent of the adjacent lands for natural heritage features (**Table 5.2**). In some cases, the adjacent lands may need to be expanded (MNRF, 2010a). This would be a unique circumstance where a) significant evidence (e.g. Recovery strategy, SWH Mitigation Support Tool) exists to support the use of buffers wider than the maximum, and b) there is room for a wider buffer within the development proposal. Should there not be the space to implement a wider buffer width, alternative mitigation would be required to achieve no negative impacts.

Table 5.2: Minimum / Maximum Buffer Widths

Natural Heritage Feature	Required Minimum and Fixed Maximum Buffer Width Range	Required Minimum Buffer Width Literature Citations	Maximum Buffer Width Literature Citations
Intermittent Fish Habitat	15 – 120m	Greenbelt Plan, 2017; ORMCP, 2017; UTRCA, 2017; LSPP, 2009	MNRF, 2010a; LSPP, 2009; Greenbelt Plan, 2017
Warm-water Fish Habitat	15 – 120m	Greenbelt Plan, 2017; ORMCP, 2017; UTRCA, 2017; MNRF, 2010a; LSPP, 2009; Greater Golden Horseshoe Area CAs, 2006	
Cool-water Fish Habitat	30 – 120m	Lind *et al.*, 2019; Oldén *et al,* 2019; Greenbelt Plan, 2017; ORMCP, 2017; UTRCA, 2017; Little *et al.*, 2015; Macfarlane *et al.*, 2015; Sweeney and Newbold, 2014; Teply *et al.*, 2014; Environment Canada, 2013; Grace and Zanoch, 2013; Hawkes and Gregory, 2012; MNRF, 2010a; LSPP, 2009; Greater Golden Horseshoe Area CAs, 2006	
Coldwater Fish Habitat	30 – 120m		
Large river systems (e.g. Thames River, Dingman Creek…)	30 – 120m		
Provincially Significant Wetlands, Unevaluated Wetlands and Wetlands	30 – 120m	Greenbelt Plan, 2017; ORMCP, 2017; UTRCA, 2017; Environment Canada, 2013; MNRF, 2010a, LSPP, 2009; GRCA, 2005; Kennedy *et al.*, 2003; Woodared and Rock, 1995; Matlack, 1993	
Woodlands	15m– 120m	Leuty, 2000; LSPP, 2009; Castelle et al, 1992; Castelle *et al.*, 1994	
Significant Woodlands	30 – 120m	Greenbelt Plan, 2017; ORMCP, 2017; LSPP, 2009; MNRF, 2010a	
Valleylands	15 – 120m	MNRF, 2010a; LSPP, 2009	

Natural Heritage Feature	Required Minimum and Fixed Maximum Buffer Width Range	Required Minimum Buffer Width Literature Citations	Maximum Buffer Width Literature Citations
Significant Valleylands	30 – 120m	ORMCP, 2017; LSPP, 2009	
Upland Corridors	5 – 120m	Vanneste *et al.*, 2020; LSPP, 2009	

Minimum buffers for Habitat for Endangered and Threatened Species, as well as SWH, will vary on a case-by-case basis as the minimum width will depend on the species identified and their lifecycle processes. Minimum buffers should be determined in consultation with the City of London and other applicable agencies.

5.3.3 Step 3 – Determination of Site-Specific Buffer Widths

For the most part, minimum buffers as outlined in **Section 5.3.2** should be sufficient for the protection of a Natural Heritage Feature(s) and its associated function(s). Depending on the sensitivity of the features and functions, as well as the proposed development, a wider than minimum buffer may be required. Refer to **Table 5.3** below to determine if a wider than minimum buffer is required.

As the impacts of adjacent development become better understood and more research is conducted on the ecology of various features, buffer requirements may change; therefore, current literature must be consulted to review the impacts relevant to the feature under consideration (MNRF, 2010a). Ideal sources include studies designed to determine the impacts of an anthropogenic activity on biological systems, and comprehensive reviews or meta-analyses related to natural resource management. Such studies can be located in peer-reviewed academic journals, statements and reports from reputable expert bodies, widely recognized standard textbooks written by experts in a field, or standard handbooks and reference guides. Consultation with the City of London Ecologist Planners is encouraged to identify appropriate sources.

Table 5.3: Criteria for the Determination of Greater Than Minimum Buffers

Criteria	Rationale	Literature
Landscape		
Connected within the Landscape	Higher than minimum buffer required for natural heritage features that are well-connected within the overall landscape.	Powney *et al.*, 2012
Population connectivity for the persistence and conservation of metapopulations is widely recognized. The more well-connected the population are, the greater the opportunity for dispersal, colonization and re-colonisation of habitat patches, thereby reducing the risk of extinction (Powney *et al.*, 2012). Natural Heritage Features that are considered well-connected are features where there are vegetated or natural corridors extending beyond its boundaries (e.g. strips of natural vegetation, hedgerows, and watercourses). In these cases, document any hedgerows or strips of natural vegetation including species composition, as well as overall canopy height and width.		

Criteria	Rationale	Literature
Features and Functions		
Presence of Significant Wildlife Habitat	Higher than minimum buffer may be required when significant wildlife habitat in accordance with criteria schedules for ecoregion 7e are present (MNRF, 2015a).	Environment Canada, 2013; MNRF, 2010a; MNRF, 2015a
The presence of significant wildlife habitat indicates specific conditions that are enabling that type of habitat to be present and therefore, a higher degree of protection may be required. Consultation with both the City of London as well as MNRF is required. This is considering that as buffer widths increase, their effectiveness also tends to increase (Beacon, 2012). Buffers for the protection of SWH must be based on evidence and include reference to: • Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF, 2015a) • COSEWIC Reports where applicable • COSSARO Reports where applicable • Environment Canada's *How much Habitat is Enough?* (Environment Canada, 2013) • Significant Wildlife Habitat Mitigation Support Tool (MNRF, 2014b) • Various independent academic journal articles		
Presence of Species at Risk	Higher than minimum buffer may be required when species considered Endangered or Threatened per the *Endangered Species Act* are present.	Environment Canada, 2013; various COSEWIC and COSSARO reports; MNRF, 2010a
The presence of an Endangered or Threatened species indicates specific conditions that are enabling that species to survive and therefore, a higher degree of protection may be required. If it is determined that a SAR is negatively affected by a proposed development, a permit in accordance with the *Endangered Species Act* may be required. In the case of any SAR, consultation with both the City of London as well as MECP is required. This is considering that as buffer widths increase, their effectiveness also tends to increase (Beacon, 2012). Buffers for the protection of Endangered and Threatened species must be based on evidence and include reference to: • Ontario government's SAR database • COSEWIC Reports • COSSARO Reports • Environment Canada's *How much Habitat is Enough?* • Various independent academic journal articles Note that any habitat or species information for Endangered and Threatened species is sensitive information and should not be identified in public documents (MNRF, 2010a).		
Edge Conditions		

<table>
<tr><th>Criteria</th><th>Rationale</th><th>Literature</th></tr>
<tr><td colspan="3">An edge is the border, or transition zone between a natural heritage feature and adjacent land. The condition of an edge contributes to the resistance and resilience of a natural heritage feature, where ecological structure, function and connectivity contribute to a feature's ability to resist and recover from anthropogenic disturbance.</td></tr>
<tr><td>Edge effective soil texture</td><td>Higher than minimum required in areas with soils that promote overland flow (e.g. clay).</td><td>Lee et al., 1998; Beacon, 2012</td></tr>
<tr><td colspan="3">Understanding the type of soils present will aid in understanding the drainage class and soil moisture regime. This understanding will help determine appropriate buffer plantings, as well as required width for flooding.

Soil profiles are to be determined through the digging of a soil pit using an auger or shovel and are to be dug at a depth of at least 60cm. Information to document include: depth of soil horizons indicating soil texture for each, presence of lenses, presence of water seepages, presence of mottles or gley, and depth of rooting zones. This method is outlined in the ELC guidelines (Lee et al., 1998).</td></tr>
<tr><td>Edge Vegetation</td><td>Higher than minimum buffer is required where edge vegetation is composed of greater than 60% native trees.</td><td>Leuty, 1999

Lauenroth and Gill, 2003

Gilman, 2003

International Society for Arboriculture</td></tr>
<tr><td colspan="3">Understanding the vegetation species assemblages will aid in determining the buffer width. Determining the edge species will help predict how wide the buffer needs to be to protect the root zones of those species at maturity. Document species along the immediate edge and to within 10m of the edge.

This guideline is to protect tree root systems, reduce risk of tree windfall damage, and to reduce the risk of having to remove trees within the feature through hazard tree removal requirements that are part of all developments adjacent to Natural Features.
A general guideline used by foresters who deal with stand management and edges of entire forests is to have a buffer width of at least 1 times the height of a tree, measured from the tree bole. This guideline is to protect tree root systems and reduce risk of tree windfall damage. The buffer should accommodate tree root systems when species are fully mature. The list below includes native tree species found in Middlesex County and their heights at full maturity. The buffer should be that of the tallest edge species at maturity.

The buffer would be determined by subtracting the measured dripline distance (measured from the bole) from the height outlined below.

E.g. Buffer for White Pine with a dripline of 8 metres would be 22 metres.

Tree Heights

20m* Green ash, bur oak, hop-hornbeam

25m Tamarack, Balsam poplar, cottonwood, trembling aspen, bitternut hickory, shagbark hickory, yellow birch, paper birch, American beech, tulip tree, sassafras, sycamore, red maple, sugar maple

30m White pine, eastern hemlock, black maple</td></tr>
</table>

Criteria	Rationale	Literature
35m White oak, red oak, white ash 50m Black walnut (when part of an FOD7-4 ELC Lowland Deciduous Forest Type community) *Tree heights taken from https://can-plant.ca/ecommerce/ * Measuring from the tree bole eliminates variability in individual tree dripline.		
Slope/Overland Flow	Higher than minimum buffer is required where slope is greater than 5%.	Mitchell & Crook, 1996; Singleton *et al.*, 1994
Understanding the slope and direction of flow aids in predicting areas that may receive more water than others, will help determine appropriate buffer plantings, as well as pre-construction conditions that need to remain the same post-construction. Measure slope using a geo-referencing tool or handheld clinometer. **Determination of slope and understanding of overland flow adjacent to and within the woodland.** Reduce erosion potential on slope (up to 90% of eroding sediments may be captured within a buffer according to Singleton et al, 1994). Buffer starting at physical top of slope where slope is less than 5% - 15 m buffer 5-15 % slope – 20 m buffer 16-30 % slope – 50 m buffer 31-45 % slope – 70 m buffer >45% slope – 90 m buffer		
Development Conditions		
Development Type	Higher than minimum buffer is required where the development type is residential, agricultural,	McWilliam *et al.*, 2012; Sawatzky and Fahrig, 2019; Environment Canada, 2013
Understanding the development type and its potential effects on a natural heritage feature The following has been adapted from Environment Canada's Recommended Buffer table in *How much Habitat is Enough.*		

Stressor	Suggested Buffer	Reference	Notes
Residential stormwater	15m, 23 to 30m on slopes greater than 12%	Woodard and Rock, 1995	Groundcover type is also very important
Human disturbance, landscaping (e.g. wood piles, composting)	19 to 38m	Matlack, 1993	Fencing may achieve same results in less width

Criteria	Rationale		Literature
Urban cats	190m	Haspel and Calhoon, 1991	Measured distance predation rates on wildlife extended into adjacent natural area
Residences	30-50m	McWilliam *et al.*, 2012	

5.3.4 Step 4 – Buffer Enhancement

Once a site-specific buffer width is determined following Steps 1 through 3 as outlined in **Sections 5.3.1, 5.3.2** and **5.3.3**, the final step in the buffer determination process is to plan and implement enhancement measures. This is with the understanding that buffers are to be kept in a vegetated state and that no part of a development is to occur within a buffer.

5.3.4.1 Enhancement Strategy

In most cases, the land set aside for the site-specific buffer may be comprised of nothing more than abandoned land with ruderal or meadow vegetation. It is the responsibility of the professional undertaking the buffer determination process to document and understand the edge conditions of an identified Natural Heritage Feature, including what occurs within the adjacent lands so that appropriate enhancement strategies can be applied. This is with the goal of reducing edge effects and improving habitat both of which ultimately build resiliency for the identified Natural Heritage Feature being protected.

When determining a buffer enhancement strategy for a site-specific buffer width, consider the following:

- Allocate a greater proportion of buffer enhancements in areas that reduce the total edge: area ratio of the feature (i.e. bays and projections).
- Allocate a greater proportion of buffer enhancements to areas with greater climatic or structural gradients. Consider the orientation of the patch to flows in the landscape (e.g. prevailing winds) and sources of encroachment, urban cats, wind-dispersed seeds, noise, light and chemical pollution.

Table 5.4 below outlines buffer enhancement measures that could be implemented for the reduction of negative edge effects and the improvement of habitat quality.

Table 5.4: Potential Buffer Enhancement Measures

Buffer Enhancement Measure	Enhancement Goal	
	Reduction of Negative Edge Effects	Improvement of Habitat
Native Plantings Plantings of native tree, shrub and herbaceous species within a site-specific buffer width increases the structural gradient and reduces increased exposure to light, moisture and wind conditions. Natural heritage features	✓	✓

Buffer Enhancement Measure	Enhancement Goal	
	Reduction of Negative Edge Effects	Improvement of Habitat
with a dense multi-layered edge structure are more likely to maintain interior conditions after experiencing anthropogenic disturbance (Fry and Sarlöv-Herlin, 1997; Powney et al., 2012). Increasing the structural gradient means having vegetation at various heights in various areas. This is especially important for natural heritage features with simple, open edges as well as features that are smaller in size with low connectivity. A multi-layered approach with respect to native plantings increases habitat suitability for resident species as well as landscape connectivity (Fry and Sarlöv-Herlin, 1997; Ministry of Forests Research Program, 1998). Recommended native plantings should: • consider species shifts resulting from warming temperatures due to climate change; • add complexity to both horizontal and vertical structure; • consider mosaics of different trees and shrub species; • promote the establishment of pollinator and foraging habitat; and • be appropriate to the species composition of the natural heritage feature as well as the soil composition and structure.		
Management of Invasive Plants Removal of invasive plants within buffer area and within 10m of the edge of the identified Natural Heritage Feature will improve overall species diversity. Priority species that must be removed include: common buckthorn, glossy buckthorn, common reed (Phragmites), Japanese knotweed, dog strangling vine, and giant hogweed (City of London, 2017). Those on the watch list should also be removed in accordance with the City of London Invasive Plant Management Strategy.	✓	✓
Other Structural Enhancements Creation of habitat including addition of woody debris piles, pits and mounds, bird and bat structures, reptile nesting areas and hibernacula. Dead wood is important habitat and food resources for many birds, insects and lower plant species and woody biomass should be retained.		✓

5.3.4.2 Prohibited Uses

Buffers are not to include any components of a proposed development and do not count towards compensation measures that may be required. Multi-use pathways, Low Impact Developments, amenities such as gazebos and other installations that do not provide environmental enhancement are not permitted in buffers. If a site specific buffer is equal to, or greater than 30m, a pathway can be placed within the outermost area of the buffer provided that the buffer remains naturalized.

6. Ecological Compensation

6.1 Policy and Context

In most cases, negative impacts can be avoided, minimized, and mitigated at a local-scale. However, under some circumstances, residual damage to biodiversity is unavoidable. After exhausting all options for avoidance, minimization and mitigation of impacts, portions of natural features may be removed under the condition that ecological compensation take place to ensure that there are "no negative impacts" as outlined in ***The London Plan*** and the *Provincial Policy Statement*. Ecological compensation is a tool that is required to achieve No Net Loss and Net Environmental Benefit through the compensation, restoration and enhancement of natural features and functions to compensate for those which will be removed or disturbed elsewhere (Brown *et al.*, 2013; Morrison-Saunders and Pope, 2013). No Net Loss and Net Environmental Benefit are outcomes of compensation for unavoidable losses of biodiversity and/or habitat which are considered neutral or positive, respectively (Bull and Brownlie, 2017). There is an important shift in compensation policies towards Net Environmental Benefit to improve outcomes of biodiversity offsetting (Bull and Brownlie, 2017; Maron *et al.*, 2018) and thus, the goal of compensation within City of London should be towards an outcome of Net Environmental Benefit (described in ***The London Plan*** as Net Environmental Benefit), where feasible.

As outlined in **Section 2.6**, the EIS process will assess potential impacts, identify initial mitigation measures, and determine ecological compensation, if required. Ecological compensation and the required monitoring (as outlined in **Section 7.2**) must be outlined in an approved EMP included in the EIS.

Should negative impacts from development or infrastructure leading to the removal or disturbance of a natural heritage feature be unavoidable as determined through the EIS process, ecological compensation (i.e., the replacement or enhancement of the natural heritage feature(s)) shall be implemented on a one-for-one (1:1) land-area basis at minimum, as defined in ***The London Plan***. Although many ecological compensation projects focus on the idea of No Net Loss, the circumstances under which No Net Loss of biodiversity is feasible are limited (Bekessy *et al.*, 2010; Gibbons *et al.*, 2015; Simmonds *et al.*, 2019). Notably, compensation ratios greater than 1:1 are often necessary to replace ecological structure and function (zu Ermgassen *et al.*, 2019). Accordingly, compensation projects will require long-term monitoring to assess progress towards No Net Loss or Net Environmental Benefit, and may require additional compensation actions to achieve ecological targets for the features affected by the proposed works.

Features created through the compensation process are to be included on Map 1 and Map 5 as Open Space in ***The London Plan,*** zoned appropriately as a Natural Heritage Feature and considered part of the NHS. Ecological compensation may only be used with non-provincially significant natural features which are not already protected by federal, provincial or municipal policies. These guidelines do not supersede other compensation policies such as municipal tree removal by-laws and/or Overall Benefit Permits issued under the *Endangered Species Act*. However, there may be cases where a portion of the impact to a feature or function is compensated through one mechanism while the remaining impact is compensated through a different mechanism. For example, compensation required through the *Endangered Species Act* may address impacts to one particular species but may not compensate for all of the structure and function that will be lost. In such cases, determining the additional compensation required can be accomplished through these Guidelines.

Ecological compensation may only be used for non-provincially significant natural features which are not already protected by federal, provincial or municipal policies. These guidelines do not supersede other compensation policies such as municipal tree removal by-laws and/or Overall Benefit Permits issued under the *Endangered Species Act*. However, there may be cases where a portion of the impact to a feature or function is compensated through one mechanism while the remaining impact is compensated through a different mechanism.

The following sections outline the recommended guidelines for the determination and implementation of ecological compensation measures.

6.2 Compensation Objectives

The following are objectives of ecological compensation:

- To restore, replace, and preferably, enhance ecological structure and function of the affected NHS by achieving No Net Loss, and where possible, achieve Net Environmental Benefit;
- That compensation is ecologically equivalent to and fully replaces the ecological structure and function to be lost;
- That compensation is implemented within the same subwatershed, and preferably in as close proximity to the original feature as possible to maintain ecological connectivity;
- Implementation of compensation should be completed promptly so that ecosystem functions are re-established as soon as possible after (or even before) losses occur;
- To ensure transparency and accountability throughout the process of planning, implementing, monitoring and evaluating the effectiveness of the compensation;
- To incorporate adaptive management and climate resiliency into compensation based on the scientific literature and the results of effectiveness monitoring; and,
- To ensure a replicable, standard approach, and consistent implementation among proponents.

Further, these guidelines do **not** apply to, or provide guidance on, the following:

- Watercourses and/or fish habitat;
- Buffers to natural heritage features, rather buffers must be applied (as described in **Section 5.3**) to the new or enhanced natural feature following compensation; or,
- Evaluation of ecological function (refer to **Section 3**).

Prior to the approval of an application containing proposed ecological compensation, the following must be demonstrated:

- Compliance with all applicable policies and legislation;
- That the proposed compensation achieves “no negative impacts” as outlined in the *Provincial Policy Statement*;
- That all efforts to avoid, minimize, and mitigate have been taken and why impacts are unavoidable;
- No Net Loss of area and Net Environmental Benefit;
- That the proposed ecological compensation is in close proximity to the original feature (preferred), or in an area that will provide a Net Environmental Benefit to the NHS to maximize connectivity and linkages; and,

- That a proposed ecological compensation plan is included within an EMP (as described in **Section 2.6.5.8** and **7.2**).

6.3 Compensation Plan

The ecological compensation plan will be reviewed by City staff and in consultation with applicable agencies where required. The compensation plan is to include the following:

- Rationale for ecological compensation (i.e., explanation of why residual impacts are unavoidable) and feasibility of compensation;
- Description of ecological structure and function of the natural heritage feature or portion to be removed or disturbed (as described in Section 3), including the proposed size of removal area;
- Rationale for the proposed compensation ratio (≥ 1:1 land-area basis) and the area of proposed compensation;
- Description of the proposed compensation location within as close proximity to the affected natural heritage feature as possible, within the same subwatershed (refer to Section 2.6.5.8);
- Construction schedule (e.g., phasing) and compensation timeline, preferably prior to removal of the original feature to minimize the time-lag between the loss and replacement of ecological structure, function and services;
- Proposed native species for planting, with consideration for climate change resiliency;
- Detailed design drawings;
- Effectiveness monitoring plan;
- Additional measures to be taken should evidence show that No Net Loss was not achieved through initial the initial compensation; and,
- Any other relevant details as required through agreements between the proponent and the approval authority based on site-specific/file-specific circumstances.

6.3.1 Determine Appropriate Compensation Measures

The ability to re-establish ecological structure and function is in part dependent on the type of ecosystem being restored. The functions of some ecosystem types such as cultural meadows and some marshes can be established relatively quickly since their rate of vegetation growth does not have a significant time-lag (Solymar, 2005; TRCA, 2018).The function of other features such as wetlands and woodlands take much longer to re-establish due to their long developmental periods (McLachlan and Bazely, 2003; MNRF, 2017a). As such, there is often a substantial time-lag between the removal of an established wetland or woodland feature and the time the compensated area is able to replace the ecological function and services provided by original feature. Based on the time-lag to establish wetland function, a 3:1 replacement ratio shall be targeted.

6.3.1.1 Wetlands

Following the evaluation of ecological function of wetland features utilizing **ELC** and **OWES** (as described in **Section 3**) and the quantification of the physical area of the proposed loss of natural heritage feature(s), the compensation plan can be drafted assuming the feature is not protected otherwise (e.g., PSW under the *Provincial Policy Statement*; critical habitat for SAR).

Wetland feature compensation measures are as follows:

1. Compensation ratios for wetland features must be 1:1 land-area basis at minimum, given sufficient rationale to demonstrate that this compensation ratio will achieve No Net Loss at a minimum.
2. Compensation for wetland features should aim to implement a compensation ratio of 3:1, which has been implemented in other jurisdictions (Noga and Adamowicz, 2014; Boulton and Bell, 2017;ECCC-CWS, 2017; LSRCA, 2017) to improve the likelihood of achieving No Net Loss, and preferably Net Environmental Benefit of wetland features and their associated functions within the City of London's NHS;
3. Compensation will consider the following:
    - Topography;
    - Wetland successional type;
    - Wildlife habitat;
    - Natural cover (including tree cover for treed wetlands);
    - Soil composition and processes;
    - Surface water contributions; and,
    - Groundwater processes and interaction.
4. The compensation plan should be determined on a feature-by-feature basis.

6.3.1.2 Woodlands

Woodland feature compensation guidelines are as follows:

1. Compensation ratios for woodland features must be 1:1 land-area basis at minimum. However, a higher compensation ratio (e.g., 2:1; Beacon, 2009; LSRCA, 2017) would improve the likelihood of achieving No Net Loss and Net Environmental Benefit within the City of London's NHS;
2. Determination of the compensation measures will consider the composition of the woodland attributing to ecological function, including, but not limited to, the following:
    - Topography;
    - Woodland successional type;
    - Wildlife habitat;
    - Natural cover (including tree cover);
    - Soil composition and processes; and,
    - Groundwater processes and interaction.
3. Compensation should be determined on a feature-by-feature basis; and,
4. A combination of compensatory mitigation measures may be considered on a case-by-case basis (i.e., available lands, sensitivity of the feature, etc.).

6.3.1.3 Other Features

Other features will be considered for compensation on a case by case basis based on the principles and objectives described above. In this case, a minimum compensation ratio of 1:1 land-area basis shall be implemented. The initial criteria for the approval of compensation must still be met through the EIS

process, along with the completion and approval of an ecological compensation plan. Additional compensatory mitigation may be required in accordance with ***The London Plan***.

6.4 Implementation

It is important to outline a clear implementation plan for each feature to maximize the likelihood of replacement or enhancement of ecological structure, function and services within the City of London's NHS.

6.4.1 Site Selection

Optimal site selection for ecological compensation can increase the likelihood of achieving No Net Loss or Net Environmental Benefit, specifically when targeting regional conservation goals and improving ecological connectivity (Koh *et al.*, 2014). Potential naturalization sites have been identified by the City of London (as outlined in ***The London Plan***) which provide the opportunity for restoration, enhancement, and expansion of the NHS. Potential naturalization sites may be found on Map 5 – Natural Heritage in ***The London Plan***, however not all sites are mapped and thus, consultation with the City of London is recommended. Further, not all sites are created equal and the employment of experts (e.g., ecologists, hydrogeologists, engineers, etc.) to determine the ideal site for ecological compensation is required.

The following should be considered in determining the proposed site for compensation within the City of London:

- Compensation must occur within the same subwatershed as the natural feature(s) being removed, and preferably in as close proximity as possible to the original feature to contribute to the local landscape;
- Compensation should occur on public lands, be eligible to be transferred to a public or non-profit agency, or established as a conservation easement to ensure the long-term protection of ecological function and services being compensated;
- Proposed sites must be able to support the size of the compensation, the associated buffer(s), as well as the function and services provided by the feature;
- Proposed sites for compensation of a feature should be outside of the current NHS to ensure No Net Loss, and preferably Net Environmental Benefit. Securing or purchasing land for compensation that is already identified as part of the NHS would result in a Net Loss to the overall area of the system.
- Compensation should be planned adjacent, or in close proximity, to the NHS to maximize connectivity and linkages. Further, the size, shape and structure of the proposed compensation should be conducive to the City of London's goals for the NHS. Newly restored ecosystems must also be situated to help ensure they are protected from the effects of adjacent land uses.
- If proposed sites for replacement or enhancement are not available within the Urban Growth Boundary, the City of London and any other applicable agencies will identify lands that are within the NHS but are in need of restoration or enhancement to compensate for permitted losses. However, this shall be the exception to the rule, given that this scenario would result in a Net Loss in the amount of land within the NHS. Alternatively, lands can be secured outside the City of London and preferably within the upper portion of the same watershed, helping to ensure that the City and downstream ecosystems will benefit from many of the ecosystem services in the long term. To ensure No Net Loss, lands secured for compensation must be at-risk of development and/or degradation. They should also be eligible to be transferred to a public or non-profit agency,

or established as a conservation easement to ensure the long-term protection of the ecological structure, function and services being compensated.

6.4.2 Replicating Ecosystem Structure & Function

Ecosystems are complex and dynamic systems. Regardless of the approach to determining the level of compensation required, attempts to replace lost ecosystem structure and functions will fall short in many instances, at least in the short term. Understanding this limitation, the Guideline establishes an approach that attempts to replicate, to the extent possible and without significant delay or time-lag, the same ecosystem structure, and associated level of ecosystem functions that are to be lost.

To ensure that ecosystem structure and function is replaced, or preferably improved, consultation on the compensation plan and design must be undertook with the City of London and any other applicable agencies. For robust examples of compensation project design and estimated costs, refer to **Appendix A** in **Guideline for Determining Ecosystem Compensation** (TRCA, 2018). Construction activities related to the implementation of compensation projects should refer to **Section B – Part 5 – Tree Planting and Protection Guidelines (TPP)** and **Part 6 – Parks and Open Spaces** in the City of London's **Standard Contract Documents for Municipal Construction** (City of London, 2020).

6.4.3 Plant Selection

Plant selection is critical in attempting to compensate for a loss of natural features. Thus, the rationale for plant selection, with consideration for the feature being replaced and the associated ecological functions and services, must be included in the ecological compensation plan. Plant selection will require a case-by-case assessment and consultation with the City of London and other applicable agencies. Further, consideration for climate change resiliency must be considered when determining plants to be selected to ensure that ecological function and services being replaced have longevity.

CanPlant (Dougan and Associates, 2020) is a resource for the most up-to-date database to ensure plants selected meet the environmental conditions of the proposed site. Plant considerations may include, but are not limited to, vegetation type (e.g., woody, herbaceous), species native to the Mixedwood Plains ecozone (preferably Ecoregion 7E), light and moisture requirements, soil requirements, tolderances (e.g., pH, drought, etc.), and natural habitat type.

6.4.4 Follow-up and Environmental Monitoring

Ecological compensation monitoring will determine whether compensation has achieved No Net Loss or Net Environmental Benefit of the replaced or enhanced ecological function(s). For example, if a wetland has a core function of water attenuation, monitoring should measure water attenuation in the compensated feature to ensure No Net Loss, and preferably Net Environmental Benefit. The results of monitoring must be provided to the City of London as outlined in **Section 7.2**, to allow for the implementation of adaptive management, and subsequently allowing for any necessary adjustments to compensation strategies moving forward.

7. Environmental Monitoring

7.1 Policy and Context

Monitoring is a requirement within the City of London (as outlined in ***The London Plan* 1436_4**) for approved development or infrastructure projects adjacent to natural heritage features. The monitoring plan and subsequent implementation is critical to ensuring that there is no cumulative loss of natural heritage features and their associated functions over time (MNRF, 2010a).

Consideration for monitoring early-on in the planning process is highly recommended to ensure appropriate resources are allocated for the completion and implementation of an approved monitoring plan. Monitoring plans must be approved by the City of London prior to the start of construction and are determined on a case-by-case basis considering the potential impacts of development and infrastructure, as well as the natural heritage features and functions identified (and evaluated) within or adjacent to the proposed development or infrastructure site. The detailed monitoring plan is to be based on the approved EMP (as described in **Section 2.6.5.9**) of an EIS.

Monitoring will enable planning agencies, through development and infrastructure agreements, to require subsequent changes to site conditions if the environmental effects are found to exceed predicted effects or targets, or if there are identifiable negative effects. Monitoring the environmental effects of development and infrastructure also provides well-documented, local examples of best management practices for particular types of development or infrastructure projects and particular types of features or functions. Monitoring may encompass a number of different measures as determined through the EIS process based on the potential impacts and mitigation measures that have been approved.

Common impacts and mitigation measures that may require monitoring include, but are not limited to, hydrogeological processes, spills and sediment releases, tree protection, natural heritage feature encroachment/delineation, natural heritage feature function, buffers, plant survivorship from restoration and/or compensation, along with any other monitoring that has been outlined in an approved monitoring plan.

The definition of clear goals and objectives, as well as robust information on the proposed mitigation measures and potential impacts, are critical in determining which aspects of the natural heritage features (and functions) require monitoring. This will aid in ensuring that the monitoring program will not only be effective, but efficient and streamlined (e.g., targeted monitoring).

7.2 Environmental Management Plan Requirements

As discussed in **Section 2.6.5.9** the primary deliverable of the EIS is the Environmental Management Recommendations section. Depending on the size and complexity of a project, the environmental management recommendations may form an EMP.

The typical components of an EMP include:

Natural Heritage Protection Areas – The Natural Heritage Features present within and adjacent to the study area represent areas where development is not permitted. These areas should be delineated on an EMP Figure to be included in this section of the EIS. Recommendations regarding Natural Heritage

Protection Areas must require that these areas are delineated on Site Plans and contract drawings with notes that identify the areas as “no development, and no entry” areas.

Ecological Buffers – Ecological buffers must be clearly delineated on the EMP Figure. Recommendations regarding ecological buffers must require that these areas are delineated on Site Plans and contract drawings with notes that identify the areas as “no development, and no entry” areas. Additionally, any management recommendations and planting recommendations for ecological buffers should be detailed such that the recommendations can be added to landscape drawings with clear specifications for seed mixtures, shrub and tree plantings and other measures.

Restoration, Enhancement and Compensation Measures / Areas – Areas that have been identified for restoration, enhancement or compensation should be identified on the EMP Figure. Similar to the ecological buffers, management recommendations and planting recommendations for restoration, enhancement and compensation areas should be detailed such that the recommendations can be added to landscape drawings with clear specifications for seed mixtures, shrub and tree plantings and other measures.

Construction Mitigation and Monitoring Plan – The requirements for mitigation measures during construction must be detailed in a Construction Monitoring Plan. This plan must provide standard construction mitigation measures and mitigation measures specific to the project and subject lands. Components that may be included in a Construction Mitigation and Monitoring Plan include:

- *Delineation and specifications for protection fencing* – protection fencing to be delineated along Natural Heritage Protection Areas, ecological buffers or for isolated/individual trees or features should be identified on the EMP, Site Plans and contract drawings.
- *Delineation and specifications for ESC fencing* - ESC fencing to be delineated along Natural Heritage Protection Areas, ecological buffers or for isolated/individuals trees or features must be identified on the EMP, Site Plans and contract drawings.
- *Delineation and specifications for wildlife exclusionary fencing* – Wildlife exclusionary fencing designed to prevent wildlife from entering the construction areas of a site should be identified on the EMP, Site Plans and contract drawings. * *Note that this and the above noted fencing types may be considered the same if the specifications for each are met.*
- *Species at Risk and Wildlife Handling Protocols* – During construction, SAR and other wildlife may enter the site putting them at risk of injury or mortality from construction equipment, vehicles or construction crews working on the site. The preparation of a Species at Risk and Wildlife Handling Protocol document can prevent or mitigate injury or mortality. This protocol document should be prepared specific to the project and the species present within the study area and adjacent lands.
- *Dewatering and temporary stormwater management* – Dewatering and temporary stormwater management measures may be required for a construction site. Mitigation measures for these measures should be detailed and specified on contract drawings for the project.
- *Dust suppression measures* – Dust suppression measures may be required for the construction works on the site. If required, dust suppression measures should be detailed and included in the specifications on contract drawings.
- *Construction Monitoring* – The monitoring of the above mitigation measures should be an integral part of the plan during construction. The frequency and details of the construction monitoring should be tailored to the specific project requirements as identified in the EMP. The environmental monitoring program should be specific to the EMP and should not be considered replication or replacement for regular site inspections for other purposes.

7.2.1 Environmental Management Plan Report Requirements

- **Goals** and **objectives** of the mitigation being monitored are clearly outlined to provide a baseline;
- A **timeline** of the monitoring requirements for each of the development stages (e.g., pre-, during, and post-construction) should be clearly outlined;
- **Mitigation measures** should be clearly defined (and geo-referenced), including the inclusion of measurable **thresholds** (as approved on a case-by-case basis as approved by the City of London through the EIS process) that may trigger remedial action;
- **Data collection methods**, which should be **standardized** to ensure the long-term sustainability of the monitoring program, need to be clearly defined and applicable to the goals and objectives;
    - To assess baseline conditions, monitoring should employ sampling methods that accurately assess ecological conditions as outlined in **Appendix B**.
- Clear **monitoring programs** designed around the following types of monitoring:
    - **Baseline** to outline the existing conditions of natural heritage features and functions in accordance with data collection standards;
    - **Compliance** with approved EIS requirements and applicable legislation; and,
    - **Performance and effectiveness** of measures being implemented to mitigate potential impacts from development.
- Processes or mechanisms for **data storage / transfer**, **quality assurance**, and **analysis of results** for initiating responses to threshold triggers;
- **Roles** and **Responsibilities,** along with the required qualifications, of those undertaking the monitoring program;
- An outline of the **reporting** structure required for the development or infrastructure as determined through an approved EIS;
    - All **monitoring data** must be shared with the City of London as a part of each **monitoring report.**
- **Contingency** measures or strategies should mitigation not be effective in ensuring 'no negative impacts' as described in the *Provincial Policy Statement*; and,
- **Amendments** may be necessary as the detailed design, proposed mitigation, or construction activities change throughout the planning process (following the approval of an EIS).
- Monitoring should be undertaken at the 1, 3, and 5-year points after construction and or planting is complete, in order to allow for early detection and correction of any planting or construction failures.
- Monitoring and maintenance will typically be the responsibility of those undertaking the compensation project. This responsibility will be confirmed and documented as part of the agreements outlined in **Section 6.3**. Monitoring reports will be written to document project results. Where projects are not functioning as designed and approved, investigations will be undertaken to understand why. Further, modifications may be required to ensure that the project is successful; the need for these can be stipulated in an agreement and assured through securities held by the public agencies (see also **Section 6.3**). Monitoring and maintenance often constitutes a learning process that can inform future compensation decisions and implementation plans.

City of London staff, with input from local conservation authorities and any other relevant review agencies, will use the details contained in **Appendix A** to guide the review of proposed compensation projects to facilitate appropriate and comprehensive ecological compensation. As per the usual plan review process, all comments from the TRT will be conveyed to the proponent by the City of London staff on the file.

7.2.2 Monitoring Timeline and Responsibilities

As development and infrastructure proposals, along with the subsequent implementation, can be highly dynamic, it is critical to define the roles and responsibilities of the monitoring component for the entirety of the project and into the post-development phase. It is the responsibility of the **proponent** to create a monitoring plan (to be approved through the EIS process) and to implement monitoring until the end of the Assumption Development Stage (i.e., the developer has satisfied all parts of the development or infrastructure agreement and the assumption has been granted) or once the proponent has fulfilled the requirements outlined in the EIS.

For each project, the proponent is required to articulate timelines and responsibilities of monitoring, including that for pre-, during-, and post-construction, compensation, and up until assumption. If the feature is being transferred into City of London ownership post-assumption, long-term monitoring will be conducted by the City of London. However, if the feature is retained as private ownership, long-term monitoring will be the responsibility of the proponent.

In general, the monitoring plan should be developed with consideration for the following general phases which are described in subsequent sections of these guidelines:

- **Pre-construction** – to be completed prior to the initiation of construction activities;
- **Construction** – to be conducted from initiation of construction activities until a specified build-out stage as determined in consultation with the City of London;
- **Post-construction** – to be conducted following construction monitoring until the end of the Assumption Development Stage;
    - **Post-development** – to be completed as determined in consultation with the City of London; and,
    - **Compensation** – to be initiated upon completion of compensation project and continued until requirements have been met within the Ecological Compensation Plan (as described in **Section 6.3**).

The City of London will require EIS monitoring reports throughout the process. The reporting timeline and structure will be otherwise determined through the approval of an EIS.

7.2.3 Pre-Construction Monitoring

Pre-construction monitoring will be approved as part of the EMP through the EIS process for development and infrastructure projects. These monitoring programs and activities should align with the recommendations provided in the EIS (see **Section 2.6.5.9**). Some examples of variables to be implemented monitored pre-construction (and thus through the entirety of the project or until monitoring is handed over to the City post-development) include, but are not limited to, the following:

- Surface and groundwater quantity, quality, and shifts in hydrologic dynamics (e.g., wetland, groundwater, surface water) that may be influenced by development or infrastructure activities, including ESC; and,
- Encroachment, buffer implementation, and boundary delineation of protected natural features and areas (e.g., Tree Protection Zones).

7.2.4 Construction Monitoring

Upon initiation of construction activities, construction monitoring should be initiated to assess changes to site conditions, as well as the implementation of mitigation measures (as outlined in the approved EMP). In general, the bulk of the monitoring during this phase will be focused on *compliance*. Compliance monitoring is implemented to ensure that the approved conditions of the EIS, along with those outlined in applicable legislation, are met during the construction phase. This step is critical to ensure that the natural heritage features, and their associated function(s), are protected and impacts are mitigated as outlined in the approved EIS. Some examples of compliance monitoring include the inspection of, but are not limited to, the following mitigation measures:

- ESC;
- Tree protection;
- Boundary delineation and setbacks;
- Buffer implementation;
- Area searches for wildlife;
- Water quality and quantity;
- Hydrogeological assessments in partnership with the applicable conservation authority; and,
- Timing windows.

Should the proposed development or infrastructure project be out of compliance with the approved EIS, immediate action should be taken to ensure the correct implementation of mitigation measures. It is recommended that activities that may subject the NHS to negative impacts (i.e., to ensure 'no negative impacts' under the *Provincial Policy Statement*) be halted until the deficiency has been addressed.

7.2.5 Post-Construction Monitoring

As outlined in **Section 2.6.5.9**, the development of a post-construction monitoring plan should be initiated well before construction starts. The baseline information/data with which the post-construction monitoring information/data will be compared should be collected (ideally) in the year or two years before the start of construction. The post-construction monitoring program should include the monitoring of the recommendations of the EMP (i.e. ecological buffers, enhancement, restoration and compensation areas specifications) as well as the monitoring of potential impacts to Natural Heritage Features. Monitoring of potential impacts should be simplified and repeatable to ensure replicability and program adherence.

In general, post-construction monitoring will take place at a build-out stage or after a percentage of the construction activities have been completed. The specific timeline for the transition from construction to post-construction monitoring will be determined as part of an approved EMP in consultation with the City of London. Post-construction monitoring should be undertaken at the 1, 3, and 5-year points after construction and or planting is complete, in order to allow for early detection and correction of any planting or construction failures.

The main focus of this phase of monitoring is evaluate the performance and effectiveness of the mitigation that is implemented in the construction stage and to inform adaptive management and shifts in management strategies. Post-construction monitoring is critical to understanding if the mitigation measures are effective and/or if potential impacts are greater or lesser in magnitude than predicted during the impact assessment. Post-construction monitoring will further inform the need for adaptive management or amendments to the monitoring plan based on the level of success of the mitigation

measures. Performance and effectiveness monitoring may be required based on mitigation measures for, but not limited to, the following:

- Hydrogeological processes;
- Spills and/or sediment releases;
- Tree protection;
- Natural heritage feature delineation and/or encroachment (including buffers);
- Plant survivorship for restoration/compensation; and,
- Other project specific monitoring requirements.

Post-construction monitoring requires the submittal of reports outlining seasonal changes in the existing conditions of the NHS, as well as to show changes year-over-year. In general, the report may include, but is not limited to, the following:

- General methodology and description (e.g., vegetation communities, taxa specific) of monitoring;
- Outline of thresholds and the associated contingencies in place should they be exceeded;
- All data collected (i.e., baseline, during construction, and up-to-date post construction);
- Analysis and comparison of data; and,
- A plan for the maintenance, and if necessary, implementation of additional mitigation measures.

Post-construction monitoring should take place until end of the Assumption Development Stage and will shift to the Post-development monitoring, as described in **Section 7.2.5.1**.

7.2.5.1 Post-Development Monitoring

Post-development monitoring is aimed at continuing to assess ecosystem resilience, to detect changes in the structure of natural heritage features, and to assess the long term efficacy of EIS recommendations (i.e., mitigation measures). The requirement for post-development monitoring, along with an outline of the roles and responsibilities, will be determined as part of an approved EMP (as outlined in **Section 2.6.5.9**) in consultation with the City of London. The results of post-development monitoring will be analyzed based on timelines in the EIS. The results of post-development monitoring inform if additional remedial works are necessary or if policy changes are needed.

7.2.5.2 Compensation Monitoring

As outlined in **Section 6.3**, ecological compensation may be permitted where it is not possible to avoid, minimize, or mitigate potential negative impacts from development or infrastructure. The aim of compensation monitoring is to determine whether the ecological compensation has achieved No Net Loss, or preferably Net Environmental Benefit, of the replaced or enhanced natural heritage features and their associated function(s). The proposed compensation monitoring plan must be approved prior to the implementation of compensation measures.

Compensation monitoring should be initiated upon completion of the compensation project (e.g., planting, restoration has been completed) to ensure that baseline data is captured. It is expected that monitoring will continue until the compensation goals have been achieved and the conditions approved through the EIS process (i.e., Ecological Compensation Plan) have been fulfilled (5-year timelines should be expected) **or** the lands have been transferred to the City of London and an agreement has been made to shift monitoring responsibilities. This close-out process for compensation monitoring must be approved in consultation with the City of London.

Although compensation monitoring plan details will vary on a case-by-case basis, the following are some general recommendations:

- Compensation monitoring should capture the baseline conditions and re-evaluate the efficacy of the compensation project at the 1, 3, and 5-year milestones. Should the compensation project not meet the goal of No Net Loss or Net Environmental Benefit at the 5-year milestone, compensation monitoring will be required at 5-year intervals until No Net Loss at minimum is achieved. This timeline may span pre-, during, and post-construction as it is recommended that compensation projects be initiated as early as possible to minimize lag time of replacing natural features and their function(s);
- Survivorship thresholds expectations should be set, with a 70% success rate being recommended as a baseline (NVCA, 2019);
- Monitoring data should be transferred to the City of London for storage and to inform future compensation strategies (e.g., lessons learned);
- Reporting should occur at each milestone to outline the succession and survivorship within the replaced or enhanced feature to assess the projects trajectory towards No Net Loss or Net Environmental Benefit. Where projects are not functioning as designed and approved (e.g. expected outcomes not observed, low survivorship of plantings), as defined through the Ecological Compensation Plan, and with consideration for the most up-to-date research, interventions and modifications to the project will be required to ensure that the project achieves, at minimum, No Net Loss; and,
- Contingency measures should be outlined for varying potential impacts, as well as based on survivorship.

City of London Development Services will provide direction on the success of the implementation of the EIS recommendations resulting in one of three outcomes; 1) do nothing, 2) remedial works identified, or, 3) policy changes identified.

8. Glossary of Terms

Adaptive management - "A planned and systematic process for continuously improving environmental management practices by learning about their outcomes. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project." (Canadian Environmental Assessment Agency, 2016).

Adjacent lands – Those lands within a set or specified distance of an individual component of the natural heritage system." Adjacent lands are defined as lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands will be in conformity with the distances identified in Table 13 or as recommended by the Province." (City of London, 2019).

Area-sensitive species - Are those that require a forest to be a given size (generally a relatively extensive habitat patch) to successfully reproduce or occur in higher densities (Sandilands, 1997; Environment Canada, 2007).

Areas of Natural and Scientific Interest (ANSI) - "Means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education." (MMAH, 2020)

Assumption Development Stage - (i.e., the developer has satisfied all parts of the development or infrastructure agreement and the assumption has been granted) or once the proponent has fulfilled the requirements outlined in the Environmental Impact Study.

Basal Area – "The basal area of a stand of trees is the sum of the cross-sectional surface areas of each live tree, measured at DBH, and reported on a per unit area basis. Basal area is a measure of tree density, and widely used in forestry, wildlife, and other natural resource management professions." (Bettinger *et al.*, 2016).

Baseline Conditions – "Baseline conditions may also be referred to as the environmental setting, existing conditions, and other similar terms. The baseline conditions are the physical, chemical, biological, social, economic, and cultural setting in which the proposed project is to be located, and where local impacts (both positive and negative) might be expected to occur. These conditions are the standard against which are compared projected future conditions from project alternatives. Their description and characterization are necessary for decision-makers, reviewers, and others who are unfamiliar with the project site and surrounding landscape." (Shepard, 2006).

Biodiversity - **"**The variability among organisms from all sources, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." (MNRF, 2010a).

> **Compositional diversity** - "Is the identity of and variety within an ecological system (Noss, 1990). It refers to the number of elements within a geographic area and includes landscape composition, species richness, and genetic diversity" (Bell *et al.*, 2016). Attributes of biophysical diversity include slope, aspect, moisture, substrate, microclimate which support a variety of aquatic, and wetland and terrestrial habitats.
>
> **Functional diversity** – "Functional diversity refers to those components of biodiversity that influence how an ecosystem operates or functions. The biological diversity, or biodiversity, of a habitat is much broader and includes all the species living in a site, all of the genotypic and

phenotypic variation within each species, and all the spatial and temporal variability in the communities and ecosystems that these species form. Functional diversity, which is a subset of this, is measured by the values and range in the values, for the species present in an ecosystem, of those organismal traits that influence one or more aspects of the functioning of an ecosystem. Functional diversity is of ecological importance because it, by definition, is the component of diversity that influences ecosystem dynamics, stability, productivity, nutrient balance, and other aspects of ecosystem functioning." (Tilman, 2001).

For example, two communities with the same number of species may differ with respect to the number of levels of energy transfer. Functional diversity is not easily measured, since ecologists do not yet understand all of the organism-process relationships in ecosystems.

Structural diversity - Is the physical organization of systems, from the pattern of patches or other elements in a landscape, to habitat complexity. "Structurally diverse habitats have a mix of vegetation types with different heights and forms. This variation in structure provides different types of important habitats for a variety of native species. Farms and ranches that have a mix of cultivated and uncultivated fields, woodlands, hedgerows, fencerows, shelterbelts, and aquatic and riparian areas provide greater structural diversity than operations that have only cultivated fields or native pastures." (BC Ministry of Agriculture, 2010).

Boreal species assemblages - Are defined by the presence of specific indicator species that attain their highest presence values in the boreal forest formation. In the London Subwatershed region these assemblages may be present as outliers in topographically favourable habitats (Larsen, 1980). Boreal outliers have significant historic and ecological importance. They reflect both past vulnerability of vegetation to climate change and future potential for the vegetation to adapt to climate change.

Breeding birds - Are species present during the breeding season (late May to early July), although visits outside of this window may be required (e.g., February-March for Great Horned Owls). Evidence of breeding is an important component of breeding bird surveys as described by the Ontario Breeding Bird Atlas (2007).

Buffers - Strips of land kept in a vegetated state that provide a physical separation between development and a natural heritage feature (MNRF, 2010a).

Canadian Shield – "[A]ncient core of the North American Continent.It is composed mainly of highly metamorphosed granite, with smaller areas of metamorphosed sedimentary and igneous rocks and some areas of relatively horizontal but still quite ancient sediment rocks. These rocks are generally quite resistant to weather and erosion, but have been subjected to intense and repeated glaciation" (Renwick 2009).

Carolinian Zone - "The Carolinian Zone is also known as ecological site region (ecoregion) 7E. It covers approximately 22,000 km^2 in extreme southern Ontario, extending northeast from the United States border to Toronto, and northwest to Grand Bend on Lake Huron. It is bounded by four major lakes (Huron, St. Clair, Erie and Ontario), and the St. Clair, Detroit and Niagara rivers. Climatically and biophysically it shares more with the "hot continental (broadleaved forests)" of the north-central United States than with the "warm continental (mixed deciduous-coniferous forests)" division farther north. It has been described as Canada's most endangered major ecosystem, and many of its flora and fauna are found nowhere else in the nation. This is largely because many southern species are at their northern limits here, and because most of their natural habitat has been lost to human uses over the past three centuries." (Jalava *et al.*, 2000).

Coefficient of Conservatism – Numeric value between 0 and 10 assigned to each plant species indicating the degree of faithfulness a plant displays to a specific habitat or set of environmental conditions. "Conservative" plant species, such as those that are found only in relatively pristine natural habitats like bogs or prairies, are assigned a high coefficient of conservatism; other plant species that

grow in a wide variety of habitats and can tolerate high levels of cultural disturbance are assigned low values. By compiling a plant species list for a natural area and looking up the coefficients of conservatism for each species listed, one can calculate a Floristic Quality Index, which can be used to compare the quality of natural areas. The NHIC has produced a list of native plants occurring in southern Ontario, and has assigned tentative coefficients of conservatism to each. (MNRF, 2010a).

Community - Is an assemblage of species or populations that live in a defined environment at a defined spatial-temporal scale, and interact with one another forming together a distinctive living system with its own composition, structure, environmental relations, development and function (Whittaker, 1975). A community may be described and classified using the *Ecological Land Classification for Southern Ontario* (Lee *et al*., 1998) or any other recognized system.

Complex - Pattern of two or more ecosites or vegetation types forming a mosaic that cannot be mapped at the level of resolution being employed. **Complexity** is the number of species in the ecosystem and their relative abundances. Ecological communities and ecosystems are good examples of complex systems. They comprise large numbers of interacting entities, on many scales of observation, and their dynamics are often non-linear (causes are not proportional to consequences) – this leads to unpredictability and even apparent randomness.

Compliance Monitoring – Entails monitoring of the changes to site conditions to ensure that the approved conditions of the EIS, along with those outlined in applicable legislation, are met during the construction phase.

Conservation Easement – "A conservation easement is an agreement a landowner signs with a qualified organization, such as ours. The easement places limits on land use to help conserve the property's features. With an easement, the landowner still owns the land and can continues to live on and use it, restrict public access to it, and sell, give or pass the property on to whomever they wish. An easement helps a landowner control future use and development on their land and enlists a conservation organization to help, even after the property changes hands. It is different than the more familiar rights-of-way or access easements that usually involve a narrow corridor across a property. A conservation easement restricts uses, development or practices which would damage the natural or cultural features of the property. As agreements, they are documents that can be tailored to meet individual needs, the land's unique natural and cultural values, and the goals of the conservation organization signing it. An easement is written up in a legal agreement that records the agreed restrictions and ensures that they can be defended" (Attridge, 1998).

Contingency Measures - Or strategies should mitigation not be effective in ensuring 'no negative impacts' as described in the *Provincial Policy Statement.*

Conversion - The complete loss of function where the ecosystem is changed through land use

Conservation Status Ranks – "Standard methods to evaluate species and plant communities and assign conservation status ranks" (MNRF, 2020).

> **Global Rank (GRank)** - "Conservation status of a species or plant community across its entire range" (MNRF, 2020).
>
> **National Rank (NRank)** - "Conservation status of a species or plant community within a particular country" (MNRF, 2020).
>
> **Subnational Rank (SRank)** – "Conservation status of a species or plant community within a particular province, territory or state" (MNRF, 2020).

Corridor (or Linkage) – "linear area intended to provide connectivity (at the regional or site level), supporting a complete range of community and ecosystem processes, enabling plants and smaller animals to move between core areas and other larger areas of habitat over a period of generations. The

terms are used interchangeably for planning purposes but may need to be distinguished for ecological or biological reasons" (MNRF, 2010a).

> **Ravine, valley, river and stream corridor** - Is defined as a landform depression, usually with water flowing through or standing in it for some period of the year. Ravine, valley and river corridors are generally distinguished from stream corridors by having a distinct valley landform. Ravine and valley corridors may be defined locally by considerations such as their natural features or functions, minimum setbacks from the crest of the slope, top of ravine or valley bank or top of projected stable slope (MMA, 1995).
>
> **Natural Corridor** - Includes hedgerows, streams, drainage features, plantations, valley and stream corridors, riparian zones, thickets, and woodlands. A corridor may be interrupted by some cultural features (such as bridges and culverts) which still allow movement of wildlife along the corridor.
>
> **Cultural Corridor** - Includes abandoned rail or roads, utility easements or right-of-ways, recreational greenway parks/open space, abandoned agricultural land.

COSEWIC – "The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to assess the status of wildlife SAR of extinction. Members are wildlife biology experts from academia, government, non-governmental organizations and the private sector responsible for designating wildlife species in danger of disappearing from Canada." (COSEWIC, 2019)

COSSARO – "An independent committee of experts considers which plants and animals should be listed as at risk. The Committee on the Status of Species at Risk in Ontario (COSSARO) consists of up to 12 members with expertise in scientific disciplines or Aboriginal Traditional Knowledge.

The Endangered Species Act gives the committee legal recognition and specific responsibilities:

- Maintaining criteria for assessing and classifying species
- Keeping a list of species that should be assessed and classified (or reclassified) in the future
- Assessing, reviewing and classifying species
- Submitting reports regarding the classification of species and providing advice to the Minister of the Environment, Conservation and Parks" (COSSARO, 2020).

Cover - The absolute area of ground covered, or the relative proportion of coverage that a particular plant species, vegetation layer or plant form represents.

Critical Function Zones – "The term Critical Function Zone (CFZ) describes non-wetland areas within which biophysical functions or attributes directly related to the wetland occur. This could, for example, be adjacent upland grassland nesting habitat for waterfowl (that use the wetland to raise their broods). The CFZ could also encompass upland nesting habitat for turtles that otherwise occupy the wetland, foraging areas for frogs and dragonflies, or nesting habitat for birds that straddle the wetland-upland ecozone (e.g., Yellow Warbler). Effectively, the CFZ is a functional extension of the wetland into the upland. It is not a buffer for the wetland" (Environment Canada, 2013).

Critical Root Zone - "mean[s] an area defined by a measured circle around a living Tree that is deemed to contain the portion of Tree roots that are essential for the Tree's structural integrity and capability to remain alive and upright, and shall be determined as described in Schedule C of City of London Tree By-law" (City of London, 2016b).

Cultural Barrier - (permanent) includes roads (primary collector, arterial, highway as identified on Schedule 'C'), buildings and railroads, unless connected by a culvert or bridge that allows movement of wildlife.

Cultural communities -Are communities originating or maintained by anthropogenic or culturally based disturbances, such as agricultural fields (croplands) and pastures (grazing), mowing, woodlot management or tree cutting, etc., often containing a large proportion of introduced species (Lee *et al.* 1998), but are undergoing natural succession. Generally tree cover is <60%. Cultural habitat includes, but is not limited to, old field meadow, old field thicket, cultural savannah and cultural woodland ecosites (Lee *et al.*, 1998).

Cultural savannahs and woodlands - Are areas where trees have been planted, or have resulted from first generation regeneration of a site originating or maintained by anthropogenic disturbances (Lee *et al.*, 1998). It does not include treed areas where the main stratum is dominated by native species and tree cover is >60%. Cultural savannahs are treed areas with 11-35% scattered or clumped tree cover and dominated by graminoids and forbs. Cultural woodlands have 36-60% scattered or clumped tree cover and dominated by graminoids and forbs.

Cumulative impacts/effects – "The sum of all individual effects occurring over space and time, including those that will occur in the foreseeable future." (MNRF, 2010a)

Degradation – Deterioration/depletion of resources, i.e., habitat destruction.

Development – "creation of a new lot, change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*, but does not include:

a) activities that create or maintain *infrastructure* authorized under an environmental assessment process;

b) works subject to the *Drainage Act*; or

c) for the purposes of policy 2.1.4(a), underground or surfacing mining of *minerals* or advance exploration on mining lands in *significant areas of mineral potential* in Ecoregion 5E, where advance exploration has the same meaning as under the *Mining Act*. Instead those matters shall be subject to policy 2.1.5(a)." (MMAH, 2020).

Direct impact – An activity that immediately generates an ecological response. Often associated with short-term impacts.

Distinctive areas - Are those that have been classified or identified by the Province of Ontario under other programs (e.g. PSWs; Provincially Significant ANSIs). PSWs are identified for their relative importance based on a numerical ranking of wetland values or functions. The highest scoring wetlands thus represent the most important areas for protection. ANSIs are identified primarily for their contribution to representation of the range of landform-vegetation features that occur within a site district.

Disturbance - Any action that will cause an **effect** or **stress**; can be natural (e.g. fire, flood) or human – generated (e.g. various forms of development activity or agricultural uses).

Drip Line - As the location on the ground beneath the theoretical line of the outer most branches of the trees at the edge of a woodland (City of London, 2018). Where an asymmetric tree canopy occurs, the drip line shall be the greatest of the drip line distances measured horizontally from the base of the trunk" (City of London, 2016b).

Ecological boundary – Is determined based on ecological principles, refined through the application of **Section 4** Boundary Delineation in these Environmental Management Guidelines, and are irrespective of property lines.

Ecological Buffers - "An area or band of permanent vegetation, preferably consisting of native species, located adjacent to a natural heritage feature and usually bordering lands that are subject to development or site alteration. The purpose of the buffer is to protect the feature and its functions by mitigating impacts of the proposed land use and allowing an area for edge phenomena to continue (e.g., allowing space for

edge trees and limbs to fall without damaging personal property, area for roots of edge trees to persist, area for cats to hunt without intruding into the feature). The buffer may also provide area for recreational trails and provides a physical separation from new development that will discourage encroachment." (MNRF, 2010a).

Fixed-width – Buffers designed specific to a site's condition considering the needs of the natural heritage feature and its collective components and their functions, existing and future land uses, and other needs such as recreational corridors and rights-of-way, geotechnical setbacks for natural hazards, and the extent of edge effects.

Site-specific – Buffers designed for an area plan, i.e., subdivision.

Ecological Compensation – **"**Ecological compensation is an example of a trade-off whereby loss of natural values is remedied or offset by a corresponding compensatory action on the same site or elsewhere, determined through the process of Environmental Impact Assessment" (Brown *et al.*, 2013). "Ecological compensation is a positive conservation action that is required to counter-balance ecological values lost in the context of development or resource use and is an intentional form of trade-off" (Morrison-Saunders and Pope, 2013).

Ecological function - Means the natural processes, products, or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions (MMAH, 2020).

Ecological integrity – "The condition of an ecosystem in which (a) the structure, composition and function are unimpaired by stresses from human activity, (b) natural ecological processes are intact and self-sustaining and (c) ecosystem evolution is occurring naturally. Ecological integrity includes hydrological integrity" (MNRF, 2010a).

1. The ability of a system to resist disturbance (resistance).
2. The ability of a system to recover or return to a balanced state when subject to some degree of perturbations and disturbance (resilience).
3. The ability to persist in the long-term with the minimum level of human maintenance.
4. The ability to maintain a structure of native flora and fauna.

Ecological Resilience – The way ecosystem is able to withstand and recover from stresses, i.e., invasive species and pollution (Ontario Biodiversity Council, 2020).

Edge Effects - The portion of an ecosystem near its perimeter, where influences of the surroundings prevent the development of interior environmental conditions. Edge effect refers to the distinctive species composition or abundance in this outer portion.

Residential development and Neotropical migrant birds - The number of houses surrounding a forest impacts its suitability for Neotropical migrants. Neotropical migrants consistently decrease in diversity and abundance as the level of adjacent development increase, regardless of forest size.

"Current planning regulations generally permit housing right up to forest edges. This practice may prevent protection of ecological features within the forest." Friesen, L., P.F.J. Eagles and R.J. Mackay. 1995. Conservation Biology 9(6):1408-1414.

Edge microclimate - Sun and wind are the overriding controls of the edge microclimate. They determine which plants survive and thrive as well as having a major impact on soil, insects and other animals. The ecological effects increase with the difference in vegetation height between adjacent ecosystems.

- South-facing edges are wider than north-facing edges.

- Windward edges are wider than leeward edges.
- The mantel plays an import role in determining forest edge width.
- New edges will be wider than older edges.

Edge width of a vegetation patch - The edge width extends from the perimeter of a patch towards the centre to the point where there is no significant change on proceeding towards the centre. Microclimate used as a measure of edge width will give minimum value. Other variables used to determine edge width may include plants and/or animals (mammals, birds, and insects) and measure cover, density, biomass, stratification, species richness, species composition etc.

Wind speed - Air velocity upwind of a forest is typically reduce for a distance of about 8h (8 times the height of the trees). Downwind the wind speed is reduce for 25h or more. Turbulence zones in these areas may be a source of erosion and dust. Wind penetration into a forest increase for about 1h on the upwind side, but the elevated wind speed on the downwind forest edge is only about 0.5 h.

The effects of edge aspect - Maximum light is experience in summer for N-facing edges and in spring and fall for S-facing edges.

Environmental factors - Affected by edge include light, evapotranspiration, temperature, temperature fluctuation, carbon dioxide levels and snow melt. Sand, silt, snow, seed and spiders accumulate at the forest edge because of the sudden drop in wind speed.

Range of different edge widths measured - (taken from Forman, R.T.T. 1995. Land mosaics: the ecology of landscapes and regions. Cambridge University Press and based on various sources)Insects:	meters to tens of meters
Vegetation:	meters to tens of meters
Human effects in suburban woods:	tens of meters
Microclimate:	tens of meters to hundreds of meters
Insectivorous birds:	tens of meters to hundreds of meters
Butterflies:	hundreds of meters
Small mammals:	hundreds of meters
Nest predators:	hundreds of meters
Large mammals:	thousands of meters

ELC Community Series - Is the lowest level of classification using ELC that can be identified through maps, air-photo interpretation and other remote sensing techniques. Community series are distinguished on the type of vegetation cover (open, shrub, or treed) and/or the plant form that characterizes the community (i.e., deciduous, coniferous, mixed; Lee *et al.*, 1998).

ELC Ecosite – "Part of an Ecosection having a relatively uniform parent material, soil, and hydrology, and a chronosequence of vegetation. It is a mappable, landscape unit integrating a consistent set of environmental factors and vegetation characteristics" (e.g., Dry-Forest Deciduous Forest Ecosite) (Lee *et al.*, 1998).

ELC Vegetation Type - Is the finest level of resolution in the ELC, identified through site and stand level research and inventory. Vegetation types are generated by grouping similar plant communities based on plant species composition and dominance, according to relative cover. The goal is to distill the natural diversity and variability of plant communities to a small number of relatively uniform vegetation units (Lee *et al.*, 1998).

Encroachment - Encroachment always occurs when residential developments are built next to natural areas. Encroachment may include dumping garden refuse in the natural area, creating access, management and manicuring, building structures or other activities. Encroachment is usually more pronounced where the backyards are not fenced, especially when the rear lot line is within the natural area.

Enhancement – where by the value of ecosystem functions are improved.

Exclusion fencing – Exclusion fencing is fencing installed between development, infrastructure, or construction areas and Natural Heritage Features, and is intended to prevent wildlife from entering those areas. Exclusion fencing "seeks to eliminate access to specific areas where activities that would harm animals are occurring (e.g., active aggregate operations, construction sites, and roads)" (MNRF, 2013a).

Fish Habitat – "as defined in the *Fisheries Act*, means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes" (MMAH, 2020).

> **Type I habitat** - is defined by the Policy for the Management of Fish Habitat (DFO, 1986), and by the Habitat Conservation and Protection Guidelines, first edition (DFO, 1994).

Forest - A terrestrial vegetation community with at least 60% tree cover of coniferous or deciduous trees.

Forest interior species - Are those that nest only within the interior of forests and rarely occur near the edge (Freemark and Collins, 1992).

Fragmentation – "[T]he degree to which natural habitat, once continuous, is divided into remnant isolated patches." (Ontario Road Ecology Group, 2010).

Groundwater Features – "Means water-related features in the earth's subsurface, including recharge/discharge areas, water tables, aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeologic investigations" (MMAH, 2020).

> **Discharge Areas** –"Discharge areas are usually located in valleys and lowlands. There the hydraulic gradients are directed upward toward the land surface. Discharging groundwater re-enters the surface-water regime as inflow to lakes or baseflow to streams, or to become evapotranspiration from wetlands" (Council of Canadian Academies 2009).
>
> **Recharge Areas** – "Recharge usually occurs in topographically higher areas of a groundwater basin. Water-table elevations tend to be a subdued reflection of surface topography, and the differences in watertable elevation provide the driving force that moves groundwater by gravitational flow from recharge areas toward discharge areas at lower elevations. In recharge areas, the hydraulic gradient at the water table is directed downward, and recharging waters enter the groundwater-flow system to begin their slow journey through the groundwater basin" (Council of Canadian Academies 2009).

Habitat zone requirements - Are defined as the significant portions of the species' habitat that are critical to their life history or lifecycle requirement (e.g. territory, nesting, critical feeding grounds or wintering concentrations), as defined by documented use. The significant portions of habitat will have variable dimensions, based on the requirements of individual species (MMA, 1995).

Hibernacula – (singular = hibernaculum) "Underground chamber whereby snakes are able to safety overwinter. Hibernaculum can be a built structure or naturally occurring, i.e., animal burrow or fissure in the bedrock" (Long Point Basin Land Trust, 2020).

High-Water Mark - Is defined as the average **highest** level that a watercourse or waterbody rises to and remains at long enough to alter the riparian vegetation (DFO, 2007; DFO, 2019).

Indicator Species – Species used which "offer an indication of the biological condition in an ecosystem" (MNRF 2011a).

Indirect impact - An activity that generates a response over time and space, often associated with long-term impacts.

Invasive - Tending to spread; especially tending to invade healthy natural communities.

Impact - A subset of disturbance or human generated action or activity which can directly (stress) or indirectly (response) affect the characteristics of an ecosystem.

Impaction - The accumulation of materials on surfaces (e.g., on surfaces). Impaction is typically higher at the forest edge (e.g., fog, mist aerosols, mineral nutrients, pesticides and toxins).

Interior Habitat - With respect to woodlands, interior habitat is usually determined as habitat 100 metres or more from the outer edge of the woodland. These interior habitats provide productive habitat for sensitive species that are sheltered from external influences and disturbance (MNRF, 2010a).

Landform - Is a topographic feature. The various slopes of the land surface resulting from a variety of actions such as deposition or sedimentation, erosion and movements of the earth crust.

Landscape matrix – "The most extensive and most connected landscape element type present, which plays the dominant role in landscape functioning." (MNRF, 2010a). A heterogeneous land area composed of a cluster of interacting ecosystems within which materials and energy are transferred as a result of various ecological processes.

Linkages - Are pathways, connections or relationships between natural heritage features and areas. They can be connections between surface and ground water that are important to maintain fish and aquatic habitat. Aquatic habitat can be linked by intermittent and permanent watercourses. Terrestrial linkages are areas linking woodlands, valley lands, wetlands, wildlife habitat and are described in terms of length, width and vegetation type. Linkages are naturally existing or restored native linear landscape connections between two or more significant areas. These connections are often referred to as wildlife corridors or dispersal corridors. They are defined by characteristics such as width (appropriate to the scale of the phenomenon being addressed), distance (a long corridor will need to be wider than a short one), quality (e.g. vegetative structure and distribution), species diversity, low non-native plant indices, etc.), type of corridor use (1. species in which individuals pass directly between two areas in discrete events of brief duration; or 2. species that need several days to several generations to pass through),importance within the landscape, as well as the functions being expected of the linkage. Corridor functions may include, but are not limited to avenues along which:

- wide-ranging animals can travel, migrate and meet mates;
- plants can propagate;
- genetic interchange can occur among native flora and fauna;
- populations can move in response to environmental changes and natural disasters;
- individuals can recolonize habitats from which populations have been locally extirpated (Beier and Loe 1992).

Low Impact Development (LID) – Approach to "land development that mimics the natural movement of water in order to manage stormwater (rainwater and urban runoff) close to where the rain falls. LID uses small, simple design techniques and landscape features that filter, infiltrate, store, evaporate, and detain rainwater and runoffs at the lot level." (City of Hamilton, 2020).

Mean Coefficient of Conservatism (MCC) - Is calculated from the conservatism coefficients of all native species in a patch. MCC aids in measuring the overall quality of a site. The conservative coefficient

describes the probability of finding a species in a particular habitat type or undisturbed habitat. Coefficients range from 0 (widespread) to 10 (found only in specialized habitats).

Mitigation – The prevention, modification, or alleviation of impacts or actions on the natural environment through actions that enhance beneficial effects.

Native species – Flora and fauna that originated and live in an area without any human intervention and are those determined by the Natural Heritage Information Centre.

Natural Heritage Features and Areas - "Means features and areas, including significant wetlands, significant coastal wetlands, other coastal wetlands in Ecoregions 5E, 6E and 7E, fish habitat, significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River), habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area" (MMAH, 2020). In the City of London, Natural Heritage Features are those features identified on Map 5 of *The London Plan.*

Natural Heritage System - "Means a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be use" (MMAH, 2020).

Natural landform-vegetation communities - Are areas of naturalized vegetation associated with landform types (e.g. ravine, floodplain, tableland). The communities should represent typical pre-settlement vegetation conditions. For example: Yellow Birch deciduous swamp type on floodplain; or fresh Hemlock coniferous forest type on steep slope/ravine.

Naturalized vegetation - Is defined as species that have established a reproducing population in an area. It excludes those non-native species that are considered aggressive weeds or those species with the potential to become serious weeds (e.g., species with a weediness value of -3 such as purple loosestrife, garlic mustard, glossy and common buckthorns, scots pine, Norway maple)(Oldham *et al.* 1995) or persistent exotic species, found in old fields, that are known to retard or modify succession, such as honeysuckle, Kentucky bluegrass, hawkweed, reed canary grass, quack grass and smooth brome grass (Hiebert, 1990 as cited in Geomatics, 1995).

Negative Impacts - "a) in regard to policy 1.6.6.4 and 1.6.6.5, potential risks to human health and safety and degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development. Negative impacts should be assessed through environmental studies including hydrogeological or water quality impact assessments, in accordance with provincial standards; b) in regard to policy 2.2, degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development or site alteration activities; c) in regard to fish habitat, any permanent alteration to, or destruction of fish habitat, except where, in conjunction with the appropriate authorities, it has been authorized under the *Fisheries Act*; and d) in regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities" (MMAH 2020).

Net effects - Those impacts that remain after mitigation has been implemented.

Non-native - Used to refer to a plant that did not originate naturally in an area. Usually refers to plants that have been introduced to southwestern Ontario since European settlement.

Non-point Source Agricultural Pollutants – "Runoff from all categories of agriculture leading to surface and groundwater pollution for which the pollutants have no clear point of entry into the water source." Alternatively, point source pollution arises from activities where pollutants are directly routed into the water source (e.g., drainage pipe). Examples of these pollutants include phosphorus, nitrogen, heavy metals, pathogens, sediment, pesticides, or salts (Ongley, 1996).

Old fields - Are defined as open sites where agricultural practices have been abandoned (Geomatics, 1995). These abandoned agricultural fields and pastures are generally dominated by forbs and grasses in their early stages of succession. It does not include native grasslands such as prairies (Geomatics, 1995). Old fields have <10% tree cover. An old field meadow has <25% cover of shrub species while an old field thicket has >25% shrubs.

Overall Benefit Permit – Issued under the *Endangered Species Act* in which "authorizes a person, company or organization to perform the activity, as long as an overall benefit to the species is realized" (MECP 2020). The person, company or organization must undertake "actions that contribute to improving the circumstances to the species" (MECP, 2020).

Patch clusters - Are several patches that may be connected as one Area if certain criteria for connectivity and distance are met (EPPAC, 1996).

Patches - Are areas of woody vegetation generally larger than 4 ha. A patch may be bisected by a utility corridor or road if the right-of-way (ROW) is less than 40 m.

Place Type (*The London Plan*) - "Traditionally, Planners have focused on land use when setting plans for geographic areas within a city – often referred to as a "land use designation". ***The London Plan*** takes a different approach by planning for the type of place that is envisioned – what this Plan refers to as a "place type". It seeks to plan highly-functional, connected, and desirable places. Most place types support a range of intensities and a mix of land uses" (City of London, 2019).

> **Environmental Review** - "779_In some cases, lands may contain natural heritage features and areas that have not been adequately assessed to determine whether they are significant and worthy of protection as part of the city's NHS. The Environmental Review Place Type will ensure that development which may negatively impact the value of these features does not occur until such time as the required environmental studies are completed. 780_ In addition to the components of the NHS which have been evaluated and shown as Green Space on Map 1 – Place Types in conformity with the policies of this Plan, additional lands are identified on Map 5 – Natural Heritage, that may contain significant natural features and areas and important ecological functions which should be protected until environmental studies have been completed, reviewed, and accepted by the City. These potential components of the NHS, shown within the Environmental Review Place Type on Map 1, will be protected from activities that would diminish their functions pending the completion, review and acceptance of a detailed environmental study" (City of London, 2019).
>
> **Green Space** - "757_ The Green Space Place Type is made up of a system of public parks and recreational areas, private open spaces, and our most cherished natural areas. It encompasses a linear corridor along the Thames River, which represents the natural heritage and recreational spine of our city. It also encompasses our hazard lands, including our valleylands and ravines, and the floodplains associated with our river system. 758_ The Green Space Place Type is comprised of public and private lands; flood plain lands; lands susceptible to erosion and unstable slopes; natural heritage features and areas recognized by City Council as having city-wide, regional, or provincial significance; lands that contribute to important ecological functions; and lands containing other natural physical features which are desirable for green space use or

preservation in a natural state. The components of the NHS that are included in the Green Space Place Type on Map 1 – Place Types, are identified or delineated on Map 5 - Natural Heritage. Hazard lands and natural resource lands that are included in the Green Space Place Type on Map 1 are identified or delineated on Map 6 – Hazards and Natural Resources" (City of London 2019).

Plantation - A coniferous or deciduous treed community in which the majority of trees have been planted**.** A plantation is defined as a woodland where the dominant trees have been planted by humans as opposed to naturally regenerated. It includes treed communities dominated by non-native species in the main stratum.

Pollinators – "Transfer pollen between flowers while visiting a plant for food. This process is known as pollination" (MECP, 2020). Bees are the most common pollinators with other pollinators including: butterflies, moths, wasps, flies, some beetles and hummingbirds" (MECP, 2020).

Potential Naturalization Areas (London Plan) - "Potential naturalization areas are defined as areas where the opportunity exists to enhance, restore, or where appropriate, expand the NHS. These areas may include lands suitable to create natural habitats such as wetland habitat, pollinator habitat, wildlife habitat, or to compensate for trees lost to development. Locations identified as being suitable for the application of a naturalization strategy are identified as potential naturalization areas on **Map 5**. Not all potential naturalization areas have been identified on **Map 5**" (City of London, 2019).

Prairie and Oak Savannah - Is defined as open or treed areas that are dominated by unique native species assemblages of open-grown oak trees (<60% tree cover) along with a complement assemblage of grasses, sedges and forbs characteristic of the Midwestern prairie biome. May include tallgrass prairie, tallgrass savannah or tallgrass woodland upland communities (Lee *et al.*, 1998).

Processes - There are physical, chemical and biological processes. Movement of surface and ground water and their associated chemical characteristics are examples of physical or hydrological processes. Nutrient cycles are chemical processes. Biological processes may include succession and decomposition.

Provincial Policy Statement, 2020 (PPS) – Provincial "policy providing direction on matters of provincial interest related to land use planning and development…[PPS] sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians." (MMAH, 2020).

Provincially Significant Wetland – wetlands that have been evaluated through OWES and have a total score of 600 points or more; or, 200 or more points in either the biological or special features component.

Public lands – as defined by the *Public Lands Act*, "includes lands heretofore designated as Crown lands, school lands and clergy lands." (Province of Ontario, 2020).

Relative Abundance - Is the proportion of coverage a particular plant species, vegetation layer or plant form represents:

- **Rare** - A plant species that is represented, in the area of interest, by only one to a few individuals.
- **Occasional** - Plants that are present as scattered individuals throughout a community or represented by one or more large clumps of many individuals. Most species will fall into this category.
- **Abundant** - A plant that is represented throughout the community by large numbers of individuals or clumps. Likely to be encountered anywhere in the community; usually forming >10% ground cover.
- **Dominant** - A plant with the greatest cover or biomass within a plant community and represented throughout the community by large numbers of individuals. Visually more abundant than other species in the same layer and forming >10% of the ground cover and >35% of the vegetation

cover in any one layer.

Restoration - A bringing back to a former condition, reconstruction of the original form. Used to refer to vegetation communities that have been removed.

Riparian habitat - Generally primary or secondary aquatic corridors and streams with bridges and/or underpasses: include Thames, Dingman, Medway, Stoney, Pottersburg, Kettle, Dodd, Sharon, Oxbow, Kelly, Stanton, and Crumlin.

Savannah – "A treed community with 11 to 35% cover of coniferous or deciduous trees" (Lee *et al.* 1998).

Satellite Woodlands - Are small treed or forested areas located within 100 m of a larger area of significant woodland. The satellite may be part of a Patch or Patch Cluster.

Seepage - The slow movement of water near the soil surface, often occurring above an impermeable subsoil layer or at the boundary between bedrock and unconsolidated material that is exposed at ground surface. Usually occurs downslope of the recharge area.

Setback - A land-use planning term, established through the use of zoning standards, outlining the prescribed minimum, fixed distance from a structure, feature, etc. (MNRF, 2010a; Beacon, 2012a). Within the City of London "setbacks shall apply from any lands identified as an ecological buffer" (City of London, 2019).

Significant - As defined by the *Provincial Policy Statement* means:

" a) in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario MNRF using evaluation procedures established by the Province, as amended from time to time; b) in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario MNRF; c) in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or NHS; d) in regard to mineral potential, an area identified as provincially significant through evaluation procedures developed by the Province, as amended from time to time, such as the Provincially Significant Mineral Potential Index; and e) in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest. Processes and criteria for determining cultural heritage value or interest are established by the Province under the authority of the Ontario Heritage Act. Criteria for determining significance for the resources identified in sections (c)-(d) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, Provincial Policy Statement, 2020 | 52 the significance of others can only be determined after evaluation" (MMAH, 2020).

Site Alteration – "Means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site" (MMAH, 2020).

Successional / Seral Age - The stage in a vegetation chronosequence or succession at a given site.

> **Climax communities** - Are self-perpetuating and composed of climax species. A successional stage with unevenly aged and multiple height classes (Strong *et al.*, 1990).
>
> **Early successional communities** - Have not undergone a series of natural thinning. Dominant plants are essentially growing as independent individuals, rather than as members of a phytosociological community. It is floristically similar to mid-successional stands, but is juvenile in structural development (Strong *et al.*, 1990).

Mid-Aged - A seral stage of a community that has undergone natural thinning and replacement as a result of species interaction; the community often contains examples of both early successional and late successional species. Mid-successional communities have undergone natural thinning as a result of species interaction, and may show evidence of invasion by climax species, but they are still dominated by seral species. They may include stands with an over mature understorey (Strong *et al.*, 1990).

Mature - A seral stage in which a community is dominated primarily by species that are replacing themselves and are likely to remain an important component of the community if it is not disturbed again. Significant remnants of early seral stages may still be present. **Mature Forests** are dominated primarily by species which are replacing themselves and are likely to remain an important component of the community if it is not disturbed again. Significant remains of early seral stages may still be present (Lee *et al.*, 1998).

Older Growth Forests are relatively old and relatively undisturbed by humans. The definition of older growth considers factors other than age, including forest type, forest structure, forest development and the historical and current patterns of human disturbance. Older growth forests are self-perpetuating communities composed primarily of late seral species which show uneven stand age distribution including large old trees without open-grown characteristics (Lee *et al.*, 1998).

Pioneer - A community that has invaded disturbed or newly created sites and represents the early stages of either primary or secondary succession. Pioneer communities have invaded disturbed or newly created sites, and represent the early stages of either primary or secondary succession (Strong *et al.*, 1990).

Sub-climax communities - Are successionally maturing communities dominated primarily by climax species, but significant remnants of earlier seral stages may be present (Strong *et al.*, 1990).

Young - A seral stage of a plant community that has not yet undergone a series of natural thinning and replacements. Plants are essentially growing as independent individuals rather than as members of a phytosociological community.

Specialized or Rare Vegetation List – List of species that can be grouped but not limited to the following:

Carolinian Tree/Shrub Species – Species that fall within the Carolinian Zone.

Rare Herbaceous Species includes those with an element ranking of S1-S3 (For a complete listing of Ontario's rare plant species consult NHIC at www.mnr.gov.on.ca/MNR/nhic/nhic.html).

Regionally Rare Plants - include species that are rare in SW Ontario based on SWFLORA database for the Subwatershed Life Science Inventories (Bowles *et al*., 1994), and Status of the Vascular Plants of Southwestern Ontario (Oldham, 1993). Species with 1-4 stations (records) in Middlesex County.

Species-area curve - Is a graphical relationship between habitat area and species richness (numbers). Both axes are commonly made logarithmic to arrive at a straight-line relationship between number of species and area.

Species assemblages - Are a narrower group of species than a "community" that share habitats.

Species Richness - Is the number of different species within a community (Pyron, 2010).

Species-at-Risk - Is used to describe species that are listed in one of the conservation categories of "endangered", "threatened" or "vulnerable"/ "special concern"

Endangered – Any native species that on the basis of the best available scientific evidence, is at risk of extinction or extirpation throughout all or a significant portion of its (Ontario) range; a species threatened with imminent extinction or extirpation (COSEWIC).

Threatened - Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a significant portion of its (Ontario) range (COSSARO); a species likely to become endangered if the limiting factors are not reversed (COSEWIC).

Special Concern / Vulnerable - Any native species that, on the basis of the best available scientific evidence, is a species of special concern (in Ontario), but is not a threatened or endangered (COSSARO); a SAR because of low or declining numbers, small range or because of characteristics that make it particularly sensitive to human activities or to natural events (COSEWIC). COSEWIC has replaced the category of "Vulnerable" with "Special Concern".

Stormwater Management – "Means the plans, public works and initiatives put in place to maintain quality and quantity of stormwater runoff to pre-development levels" (City of London, 2019).

Thicket Swamp - Is defined as a wooded wetland area occurring on organic or mineral substrates with a water table that seasonally drops below the substrate surface; dominated by small trees and shrubs where the tree cover is <25% and the small tree or tall shrub cover (shrubs defined by Soper and Hiemburger 1982) is >25% (Lee *et al.*, 1998).

Top-of-Slope - Is defined by the intersection of the top of a bank or valley slope with the table land.

Topographic Features – Physical features of an area, i.e., tableland, terrace (Lee *et al.*, 1998).

Feature – "In the ELC data management system, a unit that describes the topographic, landform or cultural position of an ecosite" (Lee *et al.*, 1998).

Tree Canopy – "An almost continuous layer of foliage formed by the crowns of the larger trees. Shades the layers of vegetation below" (CVC 2011).

Treed – "A community with tree cover of >10%" (Lee *et al.*, 1998).

Unevaluated Wetland – Wetlands that have not undergone the OWES evaluation process.

Urban development - Includes areas of the landscape that have been converted to other permanent uses such as buildings and lots, roads, parking areas. It would exclude areas of open space such as treed boulevards, parks, cemeteries, quarries, storm water management facilities and other natural vegetated areas.

Urban Growth Boundary - Means the boundary shown on Map 1 and Figure 1, beyond which urban uses will not be permitted. Generally, this map boundary separates the urban parts of our city from the rural parts of our city" (City of London, 2019).

Valleylands - "Means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year" (MMAH, 2020).

Vascular Plants – Have a "specialized vascular systems known as the xylen and phloem" (Leslie, 2018).

Vegetation Patch –Refers to an area that contains natural vegetation, along with associated features and functions. Vegetation patches are considered as one unit and can be comprised of multiple "natural heritage features" inside the patch (e.g., woodland, wetland, etc.).

Vernal Pool – Pool fed by either groundwater (e.g., springs), snowmelt, or surface water that may be important breeding sites for [various species], which are generally found within a woodland or in proximity to a woodland (MNRF, 2010b).

Watercourse - Is defined according to several federal and provincial Acts and Regulations and typically consists of a distinct (somewhat to well-defined) channel in which water naturally flows at some time of the year [i.e., permanent, intermittent, or ephemeral flow as defined by MNRF's Stream Permanency Handbook for South-Central Ontario (MNRF, 2013b)]. This includes anthropogenically created / maintained / altered features as well as natural features.

Watershed – "Means an area that is drained by a river and its tributaries" (City of London, 2019).

> **Subwatershed** - Is the "area drained by a stream or group of streams within the larger watershed. A subwatershed identifies streams, wetlands, forests, groundwater recharge, and other natural areas" (GRCA, 2020).

Wetland - "Means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens. Periodically soaked or wet lands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition" (MMAH, 2020).

In the City of London Wetlands are those that are evaluated for significance that do not meet the criteria for designation as a PSW per OWES, as confirmed by the MNRF.

> **Bog** - Is defined as an open or treed wetland area on deep (>40cm) peat almost entirely composed of Sphagnum species. The tree cover is less than 25%, scattered or clumped, and usually under 10 m in height. The wetland is dominated by graminoids and/or low ericaceous shrubs (Riley, 1994 from Lee *et al.*, 1998).
>
> **Fen -** Is defined as an open or treed wetland area on deep (>40cm) sedge and woody peat with a substantial component of brown moss. The tree cover is less than 25%, scattered or clumped. The wetland is dominated by graminoids and low non-ericaceous shrubs (Lee *et al.*, 1998). **Fens** may also include seepage marl areas with <40 cm peat, and/or the presence of fen indicator species.
>
> **Marsh** - Is defined as an open wetland area occurring on organic or mineral substrates with a water table that fluctuates seasonally or periodically at, near, or above the substrate surface; dominated by hydrophytic sedges, grasses, cattails, reeds, forbs or low shrubs with tree and tall shrub cover <25%; may include meadow marsh, shallow marsh, deep marsh or shrub marsh (Lee *et al.*, 1998).
>
> **Swamp** - A mineral-rich wetland community characterized by a cover of coniferous or deciduous trees.

Wetland Plant Species – "Species that are found in wetlands in Ontario. "Wetland plant species" range from those species that occur primarily in wetlands ("wetland indicators") to those species that occur in both wetlands and uplands" (MNRF, 2014a).

> **Emergent** - Herbaceous plants which rise out of the water (MNRF, 2014a).
>
> **Floating** - Rooted, vascular hydrophytes with leaves floating horizontally on or just above the water surface (MNRF, 2014a).
>
> **Submergent** - Rooted hydrophytes with leaves entirely under the water surface (MNRF, 2014a).

Wildlife Habitat - "Means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or nonmigratory species" (MMAH 2020).

Windbreak – A planting of trees or shrubs in rows to help reduce soil erosion and/or minimize snow drifting (LTVCA, 2020).

Woodland – "A treed community with 35 to 60% cover of coniferous or deciduous trees." (Lee *et al.*, 1998), 10% tree cover (as described in **Section 3.1.1.1** in these Environmental Management Guidelines) or 25% shrub cover (as described in **Section 3.1.1.1** in these Environmental Management Guidelines). In the *Provincial Policy Statement* woodland **"**means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels" (MMAH, 2020).

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Appendix A - Environmental Study Scoping Checklist

Application/Project Name: _____

Proponent: _____ **Date:** _____

Proposed Project Works: _____

Study Type: _____

Lead Consultant: _____

Key Contact: _____

Subconsultants: _____

Technical Review Team:

☐ Ecologist Planner: _____ ☐ MNRF: _____

☐ Planner for the File: _____ ☐ MECP: _____

☐ Conservation Authority: _____ Contact: _____

☐ EEPAC: _____ ☐ Other: _____

☐ Project Manager, Environmental Assessment:_____

☐ First Nation(s): _____

Study Area:

Location/Address: _____

Study Area Size (approximate ha): _____ ☐ Map (attached): _____

Subwatershed: _____ Tributary Fact Sheet: _____

Is the proposed location within the vicinity of the Thames River? ☐ Yes ☐ No

If Yes, initiate engagement with local First Nation communities. Consultation activity to be provided at Application Review stage.

Policy:

☐ Study must demonstrate how it conforms to the Provincial Policy Statement (2020)

☐ Study must demonstrate how it conforms to *The London Plan* (2016)

Map 1 Place Types:

☐ Green Space ☐ Environmental Review

Other Place Types: _____

Map 5 Natural Heritage System:

(Study Area delineated onto current aerial photographs, including a 5 – 10 km radius of Subject Area)

☐ Provincially Significant Wetland Name: _____

☐ Wetlands ☐ Unevaluated Wetlands*

☐ Area of Natural & Scientific Interest Name: _____

☐ Environmentally Significant Area Name: _____

☐ Potential ESAs ☐ Upland Corridors

☐ Significant Woodlands ☐ Woodlands

☐ Significant Valleylands ☐ Valleylands

☐ Unevaluated Vegetation Patches ☐ Potential Naturalization Areas

Patch No. _____

** ELC (air photo interpretation and/or previous studies) may identify potential wetlands not captured on Map 5.*

Map 6 Hazards and Natural Resources:

☐ Maximum Hazard Line ☐ Conservation Authority Regulation Limit - Project falls under *Conservation Authority Act* Section 28

Other Place Types: _____

Background/Supporting Studies:

_____

_____

_____

_____

_____

Required Field Investigations:

Aquatic:

☐ Aquatic Habitat Assessment: _____

☐ Fish Community (Collection): _____

☐ Spawning Surveys: _____

☐ Benthic Invertebrate Survey: _____

☐ Other: _____

Wetlands:

☐ Wetland Delineation: _____

☐ Wetland Evaluation (OWES): _____

☐ Other: _____

Terrestrial:

☐ Vegetation Communities (ELC): _____

☐ Botanical Inventories ☐ Winter ☐ Spring ☐ Summer ☐ Fall

☐ Bird Surveys (type & frequency): _____

☐ Raptor Surveys: _____ ☐ Shoreline Birds: _____

☐ Amphibian Surveys (type & frequency): _____

☐ Reptile Surveys:

- ☐ Turtle (type & frequency): _____
- ☐ Snake (type & frequency): _____
- ☐ Other (type & frequency): _____

☐ Bat Habitat & Acoustic Surveys: _____

☐ Mammal Surveys: _____

- ☐ Winter Wildlife Surveys: _____

☐ Butterflies (Lepidoptera): _____

☐ Dragonflies / Damselflies (Odonata): _____

☐ Species at Risk Specific Surveys: _____

☐ Species of Conservation Concern Surveys: _____

☐ Significant Wildlife Habitat Surveys: _____

☐ Indicator Species Surveys: _____

☐ Other field investigations: _____

Supporting Concurrent Studies/Investigations:

☐ Hydrogeological/Groundwater: _____

☐ Surface Water/Hydrology: _____

☐ Water Balance: _____

☐ Fluvial Geomorphological: _____

☐ Geotechnical: _____

☐ Other: _____

Evaluation of Significance:

Federal:

☐ Fish Habitat
☐ Species at Risk (*SARA*)
☐ Other Federal: _____

Provincial:

☐ Provincially Significant Wetlands
☐ Significant Valleylands
☐ Areas of Natural & Scientific Interest
☐ Species at Risk (*ESA*): _____
☐ Significant Woodlands
☐ Significant Wildlife Habitat Ecoregion 7E
☐

Municipal/London:

☐ Environmentally Significant Areas (ESAs)
☐ Significant Woodlands, Woodlands
☐ Significant Valleylands, Valleylands
☐ Wetlands, Significant Woodlands
☐ Other: _____

Impact Assessment:

☐ Impact Assessment Required
☐ Net Effects Table Required

Environmental Management Recommendations:

☐ Environmental Management Plan: _____
☐ Specifications & Conditions of Approval: _____
☐ Other: _____

Environmental Monitoring:

☐ Baseline Monitoring: _____
☐ Construction Monitoring: _____
☐ Post-Construction Monitoring: _____

Final Other Notes:

_____
_____
_____
_____
_____

Appendix B - Data Collection Standards

Understanding the features and functions of natural areas is considered central to the assessment of significance and to the evaluation of potential impacts of development and recommendations of environmental management strategies. The following sections provide insight into the methodologies and standards required for data collection for informing Environmental Studies within the City of London.

Background

The identification and evaluation of natural features and ecological functions form the basis for assessing the effects of a proposed development on an area and its adjacent lands. It is critical to obtain sufficient, accurate information on the existing conditions of natural heritage features and their functions to ensure an informed impact assessment for a proposed development or infrastructure project (MNRF, 2010a). Inventory protocols (as outlined below) provide a standard for effectively evaluating the existing abiotic and biotic elements of natural heritage features and provide strong field data to inform impact assessment, mitigation, and monitoring for proposed development or infrastructure projects. It may be necessary to use multiple assessment methodologies to capture all data (e.g., Marsh Monitoring auditory surveys and SWH visual assessment).

Further, the intention of Data Collection Standards is to ensure that all new information collected for various studies, including EIS, uses a similar approach and format so that it may be entered into regional databases and compared with existing information. The size of the study area should not affect the ability to make comparative evaluations. Watershed and sub-watershed studies establish a robust baseline of information from which comparative evaluations can be made.

For some natural heritage features and areas, the level of effort required to determine significance may be made at a landscape level (e.g., Significant Woodlands), without conducting a detailed site inventory. However, it is important to collect all levels of information required at the landscape, community, and species levels to address the potential for impacts. The specific elements required for the natural heritage inventory and analysis component of an EIS will vary depending on the size, type, location of the development, and the natural feature that may experience negative impacts. Important elements of study for any given EIS will be selected from a detailed list, however not all elements will need to be included in every EIS (e.g., scoped EIS; refer to **Section 2**).

Guidelines for Data Collection

An Environmental Study must be based on data that is considered current and collected using established protocols and standards, including 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, however over time conditions on site can change due to a variety of reasons (e.g., vegetation growth, disturbances, and shifts in vegetation community composition). These changes in conditions can affect the accuracy and applicability of the field data. The “shelf life” of field data can vary depending on the type of data, the site, or the surrounding conditions.

Where relatively current data (up to 5 years) is available for the site and it meets the City of London’s Data Collection Standards (outlined in this document), it may be applied to meet some of the requirements for three- or five-season inventory (as determined through consultation with the City of London). However, a minimum of two wildlife/ecological site visits will still be required to verify and document current/existing conditions. The timing of the site visits will be made to supplement information

gaps, confirm significant, rare and sensitive features, delineate ecological boundaries and environmentally sensitive zones, and to identify site specific impact, mitigation, and management requirements. Where there is older inventory information available (5 to 10 years) it must be confirmed through current inventory studies. The existing data (assuming it meets the City of London's Data Collection Standards) may be used to supplement current field studies and provide historical context and population, species, vegetation trends, and changes over time. The use of these data to supplement or replace the need for more current inventory will be evaluated on a case-by-case basis in consultation with the City of London.

It is recommended that reputable citizen science data sources be reviewed when conducting a background review to supplement data obtained by the consultant team.

Inventory Protocols

Multi-season inventories must be conducted during optimal sampling conditions and with sufficient sampling effort, such that data is of sufficient quality to assess the presence and significance of natural heritage features and functions. Optimal sampling conditions and the necessary sampling effort differ among taxa and should be determined based on species-specific protocol recommendations and/or estimates of detection probability. Sampling design will be determined during pre-consultation using the protocols included in these guidelines. Inventories are typically undertaken over the following seasons are described below and some of the inventory types that usually occur include:

1. **Early Spring (late March/early April)**
    - Amphibians
2. **Spring (late April - May)**
    - Amphibians, Reptiles, Vascular Plants, Vegetation Communities, Breeding Birds (May)
3. **Early Summer (June)**
    - Amphibians, Breeding Birds, Mammals, Vascular Plants, Vegetation Communities, Aquatic Communities and Habitat, Butterfly and Insect Monitoring
4. **Summer (early July/early August)**
    - Vegetation Communities, Significant Wildlife Habitat, Vascular Plants, Butterflies and Insects
5. **Fall (September-October)**
    - Migratory Birds Vascular Plants, Vegetation Communities Reptiles, Mammals, Butterflies and Insects
6. **Winter (November-February)**
    - Leaf off surveys, Winter wildlife surveys

An outline of the comprehensive inventory protocols for species occurring in the study area and adjacent lands must be conducted by qualified professionals in the appropriate seasons as described below. When applicable, MECP species-specific protocols should be used to document SAR. New and emerging techniques not listed below may be considered and/or required as determined in consultation with the City of London and other applicable agencies to ensure robust and accurate inventory results.

1. ***Vegetation Communities***A survey of vegetation community types should be undertaken during the main growing season, preferably over three different seasons, spring, summer and fall (generally during the period late May to early September). Community description should follow the Ecological Land Classification (ELC) for southern Ontario (Lee *et al.*, 1998) to Vegetation Community Type, or contain an equivalent or greater level of structural and floristic detail. The

report should present both a description of the communities and vegetation maps superimposed on an air photo or a base map of scale 1:5 000 that shows contours and water courses.

For each community type the following technical information should be included:

- A full list of vascular plant species present and an indication of their abundance.
- An assessment of soil type(s), drainage regime and moisture regime.
- An identification of the ELC Class, Series, Ecosite, Vegetation Type (Lee *et al.*, 1998).
- The element ranking for each ELC Vegetation Type (Bakowsky, 1997).
- An annotated assessment of community condition through the calculation of the Floristic Quality Index (Oldham *et al.*, 1995) or another current, equivalent community assessment method including the number of native species, number of non-native species, number of conservative species (conservatism coefficient >=7), mean conservatism coefficient of native species, and sum of weediness scores.
- A summary of tree species, with age and/or size class distribution, including basal area by size class.
- Other indications of community condition including amount of decayed coarse woody debris.

2. Vascular Plants

- A survey of vascular plants should be carried out during April-May for spring ephemerals, June-August to capture summer flowering periods and September-October to capture fall flower periods. Surveys should have regard to weather variability in a given year.
- Locations of globally, nationally, provincially and regionally rare vascular plant species should be mapped, and the extent of habitat for each species outlined. Recommendations should be made for additional protection of rare species.
- Nationally rare species as listed in the NHIC website; species with a global rank (G-rank) for G1 to G3 (Oldham and Brinker, 2009; NHIC website), or with a COSEWIC status of Endangered, Threatened, or Special Concern.
- Provincially rare species are those listed with a sub-national rank (S-rank) of S1 to S3 (NHIC website) and MNRF SAR in Ontario (Bowman, 1996) and COSSARO.
- Regional rarity status should be assessed using Oldham and Brinker (2009), Oldham (2017), or from the best available information.

3. ***Breeding birds -*** Breeding and migratory bird surveys should be conducted as follows:

- Main breeding season surveys as outlined by Cadman *et al.* (1998): a minimum of two surveys, at least a ten days apart, between May 24-July 10. The first survey should take place May 24 – June 17, and the second June 15 – July 10.
    - Surveys to occur 5:00 to 10:00 a.m. for breeding bird survey (Cadman *et al.*, 1998)
    - Time of day and weather conditions consistent with the Ontario Breeding Bird Atlas participant's guide (OBBA, 2001).
    - Line transects, point counts or a combination of both are acceptable so long as all areas receive coverage. (See Bibby *et al.*, 2000 for bird census techniques).
- Where habitat is suitable, dusk and night visits to survey for crepuscular (e.g., American Woodcock, Common Nighthawk) in accordance with standardized protocols as outlined in OBBA (2001).

- Nocturnal owl surveys usually consist of two surveys in the spring and should be conducted in accordance with the OBBA Standardized Owl Survey Protocol (OBBA, 2002).
- Where suitable, marsh breeding bird surveys should be conducted in accordance with Marsh Breeding Bird Program standard survey techniques (BSC, 2009b).
- Field data (such as breeding evidence, behaviours, SAR occurrences) should be collected and documented in accordance with standard protocols as above, included in mapping (i.e., aerial photography), and following standard terminology (e.g., codes, symbols; OBBA, 2001; Forest Breeding Bird Survey, 2008).

4. Herpetofauna

- Surveys for newts and mole salamanders, where required, should be conducted during seasonal migration (mid March – late April) and may include a combination of minnow traps, visual surveys (e.g., carefully flipping suitable cover, observing vernal pool egg masses), pitfall or funnel traps, or fine mesh dip nets may be required as outlined in McLaren *et al.* (1998). Consultation with local experts and the MNRF is recommended for determining the timing (as surveys are highly weather dependent to capture migration) and specific survey techniques to be used based on location, species, etc.
- Surveys to confirm presence of lungless salamanders should take place in spring or fall as outlined in the Joint EMAN / Parks Canada National Monitoring Protocol for Plethodontid Salamanders (Zorn *et al.*, 2004).
- Anuran surveys consist of documenting calls and should be conducted in accordance with the standardized Bird Studies Canada's Marsh Monitoring Program protocol for amphibians (BSC, 2009a). Surveys should be conducted as close to suitable breeding sites as possible (and preferably directly adjacent) and surveyors should record direction, distance, and call codes (BSC, 2009a).
- Observational surveys are required during the spring (between March-June) when amphibians are concentrated around suitable breeding habitat in wetlands and woodlands. (MNRF, 2000b)
- Turtle surveys may consist of nesting surveys (late May – early July) in suitable nesting habitat or along gravel shoulders of roads, as well as visual encounter surveys to detect basking turtles following Ministry of Natural Resources and Forestry protocol for Blanding's Turtle (MNRF, 2015b).
- Snake surveys may consist of the following techniques, as required:
    - Visual Encounter Surveys searches between late April and late June (Ministry of Natural Resources and Forestry Survey Protocol for Species at Risk Snakes; MNRF, 2016).
    - Hibernacula searches may be required and consist of visual encounter surveys to detect basking snakes during the first sunny, warm days in early spring.
    - Cover board surveys may be conducted where appropriate.
    - Wildlife Scientific Collector's Authorization (under the *Fish and Wildlife Conservation Act*), along with an associated Animal Care Protocol approved by the MNRF Wildlife Care Committee, and may be required for any surveys that require handling of snakes.
    - Queensnake (*Regina septemvittata*) surveys along the Thames River may be required and should be conducted in accordance with the standard Survey Protocol for Queensnake in Ontario (MNRF, 2015c).
- Resources for identification of herpetofauna egg and larval stages should be utilized (e.g., http://www.torontozoo.com/adoptapond/resources)

5. Mammals

- Bats, SAR Bats, and Bat Habitat (SWH): Criteria from the Significant Wildlife Habitat Technical Guide (2000) should be considered to determine bat related SWH. Further, the Survey Protocol for Species at Risk Bats within Treed Habitats (MNRF, 2017b) and Bat and Bat Habitats: Guideline for Wind Power Projects (MNRF, 2011b) documents provide additional information for surveying for bats and associated habitat.
    - Surveys may include bat cavity assessments, exit surveys to confirm presence, and bat acoustic monitoring to determine species composition, etc.
    - Correspondence with MNRF, MECP, and the City of London may be required to determine the design and amount of surveys required.
- Other mammals (e.g., deer, badgers, moles): Surveys may be required for other mammal-related SWH or SAR mammals with appropriate methodologies determined in consultation with the MNRF, MECP, and/or the City of London.
- Incidental mammal observations, including scat and tracks, should be recorded and included within reports. Identification resources are useful for determining mammal species present within a study area.
    - Mammal identification and Tracking Guide: https://www.forestsontario.ca/wp-content/uploads/2016/04/Mammal-Identification-and-Tracking-Guide.pdf

6. Non-target wildlife

All species incidentally observed or detected during fieldwork (e.g., Lepidoptera, Odonata, mammals, birds, herpetofauna) should be identified, recorded and integrated into report findings. As much information about the incidental wildlife should be recorded as possible including, but not limited to, species, age, photographic evidence, location, habitat, and behaviour. Incidental observations can provide insight into the environmental conditions of the site and potential SWH.

7. Aquatic communities and habitats survey:

A survey of aquatic communities and habitats should be completed at the most appropriate times for sampling various species over the course of a year and should be completed to supplement data obtained during the background review, if necessary. The scope (i.e., level of detail) and need should be determined based on agency requirements and presence of current (i.e., within the last five years) data appropriate for the particular level of study. Technical data requirements will be determined in consultation with the City of London and may include, but is not limited to the following:

Fish Community Inventory

- Fish community inventories might not be necessary if current, appropriate data are available and obtained through consultation with DFO, MNRF, MECP, CA or the City of London
- In the event that fish community inventories are required, they should be scoped with the appropriate regulatory agency (e.g., DFO, MNRF, MECP, CA, or The City of London) based on project requirements
- Assuming fish community inventories are required, presence / absence surveys should be conducted using sampling gear appropriate to the water features, time of year, and (if appropriate) species / type of fish targeted (e.g., seine, minnow traps and electrofishing)

- Dependent upon project / agency requirements, detailed data and analysis might be required, but are atypical and would be identified through consultation with the appropriate regulatory agency. Data gathering and analysis might consist of the following:
    - Index of Biotic Integrity (IBI; Steedman, 1988)
    - Ontario Stream Assessment Protocol (MNRF, 2017c)

Benthic Survey

- Often a component of detailed water quality assessments associated with specific project types such as assimilative capacity studies
- Typically includes qualitative and quantitative sampling of benthic macroinvertebrates
- Scope and specific data analysis tools should be determined on a project specific basis with appropriate regulatory agencies
- For example: Ontario Benthos Biomonitoring Network Protocol Manual (Jones *et al.*, 2007)

Habitat Assessment and Stream Analysis

- Target Habitat Suitability Index (HSI) are habitat models developed for specific target species.
- Water chemistry (e.g., dissolved oxygen, temperature, pH, conductivity)
- Watercourse morphology (e.g., bankfull width, depth, stream order)
- Substrate composition
- Riparian (i.e., within 30 m of the bank or as per mandated project-specific protocol) and in-water cover
- Surrounding land uses (i.e., beyond the immediate riparian area)

8. Significant Wildlife Habitat (SWH):

- All potential SWH criteria should be surveyed using current accepted methodologies;
- SWH surveys should be consistent with the current Significant Wildlife Habitat Technical Guide (MNRF, 2000b), Significant Wildlife Habitat Mitigation Support Tool (MNRF, 2014b), and the most current Ministry SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015a);
- SWH surveys should be consistent with additional considerations outlined in ***The London Plan* – Policy 1327**; and,

9. Regionally Rare Species

Documentation of regionally rare species should include presence absence, population size, habitat, and any other pertinent information (e.g., nesting areas, dens, etc.) and be included in mapping as appropriate population size, condition, and the significance of the site for all regionally rare species. Regional status for Middlesex County should be assessed based on the best available information including, but not limited to:

Ontario Breeding Bird Atlas. (2001). *Ontario Breeding Bird Atlas Guide for Participants.* Guelph, Ontario.

Ontario Breeding Bird Atlas. (2002). *Ontario Breeding Bird Atlas - Standardized Owl Surveys.* Guelph: Bird Studies Canada, Federation of Ontario Naturalists, Canadian Wildlife Service, Ontario Field Ornithologists, and Ministry of Natural Resources and Forestry.

Ontario Breeding Bird Atlas. (2007). *The Atlas of the Breeding Birds of Ontario, 2001-2005.* (M. D. Cadman, D. A. Sutherland, G. G. Beck, D. Lepage, & A. R. Couturier, Eds.) Toronto, Ontario,

- Mammals (Dobbyn, 1994)
- Breeding birds (OBBA, 2007; current atlas updates; Partners in Flight, 2020)
- Butterflies (Holmes *et al.*, 1991; Toronto Entomologists' Association, 2018)
- Damselflies and Dragonflies
- Herpetofauna (Oldham and Weller, 2000; Oldham, 2003; Ontario Nature, 2019)
- Vegetation (Oldham, 2017)

10. Species at Risk

If potential suitable habitat for SAR (as listed in *O. Reg. 230/08: SPECIES AT RISK IN ONTARIO LIST*) is encountered and is not covered in the above inventory protocols, MECP species-specific protocols (https://www.ontario.ca/page/species-risk-guides-and-resources) should be used in consultation with the MECP and the City of London (through scoping). Targeted surveys may be required, as determined through the scoping process in consultation with the City of London and the MECP, based on the presence of suitable habitat, confirmed sightings, along with the potential impacts associated with a given development or infrastructure project.

Appendix C - Net Effects Table Template

SOURCE OF IMPACT	POTENTIAL AREAS AFFECTED & POTENTIAL EFFECTS	AVOIDANCE, MITIGATION, COMPENSATION	NET EFFECTS & RATIONALE
1.0 Existing Impacts:			
1.1 Loss of gravel from the roadway shoulder	*Cultural meadow (CUM) –* *Increased surface water runoff to the cultural meadow causing flooding, thus, reducing the viability of the habitat for various species using the habitat.*	*Regrade the roadway shoulder replace gravel and enhance with hydroseeding of a native seed mix to stabilize edge and encourage infiltration.*	*(+) NET POSITIVE EFFECT* *Regrading the roadway shoulder will reduce surface runoff and promote infiltration and minimize flooding into the cultural meadow.*
1.2 Invasive weed (buckthorn) growth in forest understorey –	*Deciduous forest (FOD) -* *Reduced plant species diversity due to competition from invasive weeds*	*Prepare and implement an Invasive Weed Management Plan to selectively remove buckthorn*	*(+) NET POSITIVE EFFECT* *Removal of invasive plants allows for native plants to colonize and increase diversity*
1.3 …			
2.0 Direct Impacts:			
Planning & Engineering Design			
2.1 Housing development lots encroaching on forest community	*Deciduous forest (FOD) -* *Removal of native vegetation within a small portion of deciduous forest along edge of the study area resulting in loss of habitat for forest birds and other wildlife.*	*1) Re-design development plan to avoid loss of forest; and establish a buffer with native plantings* *2) Compensate for loss of forest habitat by filling in bays and other areas adjacent to the forest, increasing core habitat; and establish a buffer with native plantings.* *3) PProposed rear lot fencing to include no gates.*	*1)(+) NET POSITIVE EFFECT* *The planting of native plant species within the buffer will provide additional wildlife habitat* *2) NO NET EFFECT, OR (+) NET POSITIVE EFFECT* *Compensation may only provide equal habitat or it may provide a net environmental benefit.*

SOURCE OF IMPACT	POTENTIAL AREAS AFFECTED & POTENTIAL EFFECTS	AVOIDANCE, MITIGATION, COMPENSATION	NET EFFECTS & RATIONALE
2.2 Widening of an existing roadway (additional lanes & services)	*Cultural meadow (CUM) –* *Loss of breeding and foraging habitat for Bobolink*	*Consult with MECP to determine permitting requirements.* *Identify and secure additional lands to provide for compensation of habitat loss. Plant compensation areas with native meadow seed mix. Develop plan for long-term management.*	*(+) NET POSITIVE EFFECT* *The planting of native plant species within the buffer will provide additional wildlife habitat*
2.3 …			
Construction			
2.4 Construction vehicle traffic	*Wildlife from adjacent wetland, meadow marsh (MAM) and open aquatic (OAO) habitat –* *Injury or mortality to wildlife*	*Avoid injury and mortality by preparing and implementing a Wildlife Handling Protocol, providing wildlife posters for construction trailer, and training construction crews.*	*NO NET EFFECT* *Potential impacts to wildlife can be avoided with appropriate protocols and training.*
2.5 …			
3.0 Indirect Impacts:			
Planning & Engineering Design			
3.1 Development plan increase in imperious surfaces; Stormwater management system	*Moist deciduous forest (FOD) and skunk cabbage population –* *Reduction in groundwater discharge due to loss of infiltration.* *Die-back and reduction of groundwater dependent skunk cabbage population.*	*Re-design development plan to reduce impervious surfaces.* *Provide greater infiltration through use of best management practises, infiltration trenches, etc.*	*NO NET EFFECT* *Potential impacts to groundwater dependent plant populations (i.e. skunk cabbage) can be mitigated through the use of appropriate stormwater management measures.*
3.2 …			

SOURCE OF IMPACT	POTENTIAL AREAS AFFECTED & POTENTIAL EFFECTS	AVOIDANCE, MITIGATION, COMPENSATION	NET EFFECTS & RATIONALE
Construction			
3.3 Construction related runoff	*Adjacent watercourse and swamp thicket (SWT) –* *Sedimentation in watercourse covering spawning habitat and or fish eggs. Habitat loss and/or reduction of fish population.*	*Installation of sediment control fencing.* *Regular monitoring of fencing and other protection measures.*	*NO NET EFFECT* *Proper installation of sediment control fencing can prevent deposition of fill and sedimentation. No changes to site drainage.*
3.4 …			

Notes:

Examples of direct and indirect impacts are italicized. These are only examples and do not provide the full extent of potential impacts. Each project will require consideration of project and site-specific potential impacts.

- Effects are defined as:
    - ***No Net Effect*** – Indicates no measurable impact to the identified ecological features.
    - ***(-) Low Net Effect*** – Indicates loss of habitat possessing limited potential habitat value, and/or loss of a portion of habitat, which will not result in long-term impact to the remaining habitat and/or reduction in associated key ecological functions.
    - ***(-) Medium Net Effects*** – Indicates loss of habitat possessing moderate potential habitat value, and/or loss of a portion of habitat that may result in long-term impacts to the remaining habitat, and/or loss of associated key ecological functions.
    - ***(-) High Net Effects*** – Indicates loss of habitat possessing significant potential habitat value, and/or loss of a portion of habitat that may result in long-term and potentially critical impacts to the remaining habitat, and/or significant loss of associated key ecological functions.
    - ***(+) Net Positive Effects*** – indicates a benefit to the habitat/ecological feature

Appendix E – External Resource Group and First Nation Comment Response Table

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
Reviewer Affiliation	Reviewer (F. Last name)	ID	EMG Section	Page	Type of Comment 1 - Policy 2 - Format 3 -Science 4 - Process	Comment and Suggested Action	Responder Affiliation	Responder (F. Last name)	Response 1 - Incorporated 2 - Not Incorporated 3 - Not Applicable	Response Comment
COTTFN	**F. Burch**	TOR1	ToR 3.2	4	3	Taking into consideration the stress that development may be putting on the ecosystem as a whole, acknowledging the impacts of site development / alterations beyond the City limits. Creating larger buffer zones to reduce the impacts to natural heritage sites.	AECOM	N. DeCarlo	1	Triggers for FN consultation updated to include effects to the Thames river causing impacts downstream to FN communities. Further, general minimum buffers have been increased along with the implementation of and encouragement for larger maximum buffers.
EEPAC	**Working Group**	TOR1	ToR 3.1	3	1	Other secondary source literature should include information relevant to strategies for mitigation, restoration and monitoring (both compliance and effectiveness monitoring)	AECOM	N. DeCarlo	1	Compensation/offsetting and compliance and effectiveness monitoring sections have been added to the document. Reference to technical documents has been made (e.g., TRCA Ecosystem Compensation Protocol).
EEPAC						**HIGH PRIORITY COMMENTS**				
EEPAC	**Working Group**	1	All sections	N/A	3	The working group recommends that a supplementary document be included as an appendix to the EMGs which lists secondary sources that are relevant to the revision of the EMGs. These sources may include but are not limited to peer-reviewed scientific studies, municipal studies (e.g. subwatershed studies by the City), comparable documents from other municipalities, sources of ecological data including citizen science databases.	AECOM	N. DeCarlo	1	Relevant sources were provided throughout and included Appendix B - Data Collection Standards
EEPAC	**Working Group**	2	All sections	N/A	1	The EMGs should be reviewed (but not necessarily rewritten) at minimum every 5 years. The frequency of this review should reflect changing conditions due to the effects of climate change (e.g. weather patterns, species shifts, species stress, greater predominance of invasive species, etc.). More regular updating will enable the document to remain consistent with current science and best practices adopted in the province and other comparable municipalities.	AECOM	N. DeCarlo	1	Specific wording has been included to ensure that proponents do not only look at the referenced materials. The text recommends that proponents review the most up-to-date science and policy throughout the process using the EMGs as guidance. The future review and revision of the EMGs is outlined in the London Plan and Provincial Policy Statement. A specific number of years for review has not been included in this process. However, it is recognized that this is an important process and consideration. The frequent review and revision will be included as a recommendation to the City of London.
EEPAC	**Working Group**	3	2	44	4	Recommend considering the development of a separate, more detailed guideline section for monitoring that includes specific monitoring protocols for various taxa (e.g. time(s) of year, time(s) of day), what to look for, how to look), based on current best practices. This would standardize the monitoring rather than leaving to the discretion of individuals +/or companies hired/engaged by the city, which results in data collection practices that may not be comparable with future/past studies, thus making interpretation of results and assessment of pre/post monitoring difficult. The preamble of the 2007 EMG acknowledges that, "The practice of environmental management requires a systematic approach which follows a predictable and traceable pattern. ...use of a consistent template...", which supports the above recommendation.	AECOM	N. DeCarlo	1	More specifics on ecological monitoring protocols have been added in-text and to Appendix B - Data Collection Standards, along with increased reference to supporting documents that outline appropriate monitoring protocols (e.g., MNRF species-specific protocols). However, there is room for flexibility as being extremely prescriptive on timing, protocols, etc. may cause proponents to miss timing windows as they may shift based on the weather (e.g., snake emergence). The goal for this section is to outline in general and ensure that the proponents refer to standard protocols along with consultation with experts in taxa-specific fields to ensure appropriate monitoring is being conducted.
EEPAC	**Working Group**	4	2	N/A	1	Data collected through pre- and post- construction monitoring should be retained by the city and made available for subsequent review upon request.	AECOM	N. DeCarlo	1	Although the specifics on the repository are still unclear (e.g., public availability), data transfer to the City has been incorporated into Section 7 - Monitoring.
EEPAC	**Working Group**	5	All sections	N/A	3	The EMGs must take a landscape approach to area analyses. Ecosystems rarely stand alone and species frequently cross between areas. If the City is seeking to boost connectivity and work against fragmentation, consideration should be made towards assessing how development or other activities might affect the links to other areas and how there may be greater knock on effects within the City and beyond.	AECOM	N. DeCarlo	1	More attention has been given to taking a landscape approach. Review of appropriate/applicable background studies (including links to other adjacent/nearby development) has been included in Section 2 and to be outlined in the Environmental Study Scoping Checklist (ESSC)
EEPAC	**Working Group**	6	All sections	N/A	3	For reviewing ecological features and functions of sites, there needs to be a section which identifies and defines the system that the site/feature of study fits within (e.g. single water feature within a subwatershed) including relationships with other features outside the direct scope of the study, and the impact of development on the system. If data is deficient, this should be explicitly acknowledged.	AECOM	N. DeCarlo	1	A specific section has not been incorporated, however the evaluation of significance and function has consideration for connectivity and contributions to the overall Natural Heritage System.
EEPAC	**Working Group**	7	All sections	N/A	2,3	Somewhere in the EMGs, definitions should be included for environmental and/or ecological features and functions. This will clarify ambiguity in current language.	AECOM	N. DeCarlo	1	Ecological function is defined based on the Provincial Policy Statement in the document. Although this is a subjective definition, more specific information and references on evaluating function have been provided in Section 3 -Evaluation of Significance and Ecological Function.
EEPAC	**Working Group**	8	2	44	3,4	Where appropriate, pre- and post- development monitoring and ecological inventories should span across 5 seasons, including during wintertime. Certain ecological functions of a site may be evident in wintertime but not at other times of the year (e.g. providing habitat for overwintering species of mammals or raptors) and are thus not captured by standard 3-season inventory. However, 5-season inventory may not be necessary in all cases, so the frequency of monitoring should be decided on a site-by-site basis (Merrick Sharpe, North-South Environmental Inc., pers. comm. Nov 11 2019). We therefore recommend this section be revised to indicate that number of site visits be determined based on characteristics of a given site and appropriate number of site visits determined and justified accordingly, along with the type of inventories to be done and standardized protocols to be followed (e.g. follow Migratory Bird Survey, Breeding Bird Survey, Frog and Amphibian Survey protocols from Bird Studies Canada due to presence of birds and amphibians at initial site visit, respectively).	AECOM	N. DeCarlo	1	Number of site visits has not been prescribed as the frequency will be determined on a case-by-case basis in consultation with the City of London. The Data Collection Standards have been updated based on updated policy, science, and standardized protocols.
EEPAC	**Working Group**	9	2	N/A	1	Data collection standards for ecological inventory require more specificity regarding protocols and methodologies. Where available, additional sources of local data should be considered, such as citizen science databases, consultation with local nature groups (e.g. data on species present, which might not necessarily be found during short-term monitoring). See secondary sources sheet for suggestions of citizen science databases and other resources.	AECOM	N. DeCarlo	1	Additional resources for monitoring protocols have been added to the EMGs. Reference to citizen science databases and consultation with local nature groups have also been included within the text.

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
Reviewer Affiliation	Reviewer (F. Last name)	ID	EMG Section	Page	Type of Comment 1 - Policy 2 - Format 3 -Science 4 - Process	Comment and Suggested Action	Responder Affiliation	Responder (F. Last name)	Response 1 - Incorporated 2 - Not Incorporated 3 - Not Applicable	Response Comment
EEPAC	Working Group	10	44	2	4	"Inventory Protocol" generally lacks detail/specificity. Suggested edit (in bold): 2) Spring (May) Target Species - Frogs, migratory birds, **spring ephemeral flora.** Special time requirements - warm spring evenings using road-side survey for frogs **Special time requirements - 5:00 to 10:00 a.m. for migrating and breeding bird survey; dusk and night visits for twilight and nocturnal species (e.g. American Woodcock, Common Nighthawk, owls)** 3) Early Summer (June) Target Species - Breeding Birds, spring ephemeral flora, forestry, vegetation community, fish habitat, **butterflies/caterpillars, other insect monitoring** Special time requirements - 5:00 to 10:00 a.m. for breeding bird survey **Special time requirements - dusk and night visits for twilight and nocturnal species (e.g. American Woodcock, Common Nighthawk, owls)** 4) Summer (mid-July / early August) Target Species - ELC field data collection, wildlife habitat, summer flora, wetland species, prairie species, butterflies Special time requirements - none **Note: If collecting bird breeding data, bird surveys including species counts (and ages i.e. adult/juvenile) should still be completed between dawn and ~10:00 am.**	AECOM	N. DeCarlo	1	Breeding bird survey timing, butterflies, insect monitoring, crepuscular, and nocturnal species have been included as edits.
EEPAC	Working Group	11	6	144	3	This is not true in 2019. Delete the statement "Many of the alien species that grow in southern Ontario do not pose a threat to natural area". Please refer UTRCA, Ontario Invasive Plants Council	AECOM	N. DeCarlo	3	This section has been removed from the EMGs so this comment is no longer applicable.
EEPAC	Working Group	12	5	N/A	3	EMG section 5 on buffers should be updated to reflect current science. For best practices within Ontario recommended by this group, see Beacon 2012 document (in secondary sources sheet).	AECOM	N. DeCarlo	1	A new methodology for determining buffer widths, along with updated science and best practices, has been integrated into the new Section 5.
EEPAC	Working Group	13	2	N/A	3	Monitoring of water courses should include BioMAP (Bioassessment of Water Quality) methodology and protocol that was developed by Ronald W. Griffiths, Ph.D. at the Centre for Environmental Training Niagara College, Glendale Campus Niagara-on-Lake, Ontario. If BioMAP is not used for monitoring aquatic habitat, an acceptable alternative is using current protocols of Ontario Benthos Biodiversity Network (OBBN).	AECOM	N. DeCarlo	1	The aquatic communities and habitat surveys section has been updated by AECOM's senior fisheries biologist. The use of BioMap was not selected, however standard protocols such as OSAP, OBBN have been included
EEPAC	Working Group					**LOWER PRIORITY COMMENTS ORDERED BY EMG SECTION/SUBTOPIC**	AECOM			
EEPAC	Working Group	14	N/A	N/A	2	May be helpful to incorporate a functional flow chart at the beginning of the EMGs document showing process for following each section of the document	AECOM	N. DeCarlo	2	Flow charts not included given the case-by-case nature of site specifics. Review revised version and reassess if flowcharts would improve the document in Phase 2.
EEPAC	Working Group	15	1	N/A	4	Specific wording is needed to address the following: How are EIS reviewed upon completion? e.g. Is there a checklist? What happens if an EIS report does not comply with the checklist? Can an EIS be deemed inadequate and provisionally sent back for revisions?	AECOM	N. DeCarlo	1	Specific wording provided in Section 2.6.3 - EIS Process.
EEPAC	Working Group	16	1	N/A	4	Provisions should be made for EISs and other studies to make reference to climate change and/or make it a prominent factor when analyzing development projects or when creating Conservation Management Plans. Already we see that the City now looks to build structures with the once-in-250-year storms as the new norm, when before they would consider the 100 year storm. It is perhaps something about which the City should be mindful in other areas and should expect developers to consider when putting together reports(i.e. regarding biodiversity, species disease, etc.).	AECOM	N. DeCarlo	1	Although no policy mechanisms for this exist, wording has been added in to encourage proponents to consider climate change in impact assessment, as well as for determining ecological compensation plans/strategies.
EEPAC	Working Group	17	1	2	4	2.5 - send copy to EEPAC chair so that a working group can be established earlier in the process	AECOM	N. DeCarlo	3	Section 2.2 - Environmental Study Scoping outlines a clear process and inclusion of EEPAC early on.
EEPAC	Working Group	18	1	2	4	update name - is it still Technical Review Advisory Team?	AECOM	N. DeCarlo	1	"Technical Review Advisory Team" has been amended to "Technical Review Team" (TRT).
EEPAC	Working Group	19	1	3	1	Background and Framework paragraph -update to most recent PPS, also there should be no development within significant areas, also is there still something called a DAR?	AECOM	N. DeCarlo	1	Reference to the most recent PPS is now included; According to the PPS, development and site alteration is not permitted in "significant wetlands in Ecoregions 5E, 6E, 7E" and "significant coastal wetlands". The remainder of significant features have conditions (e.g., in accordance with provincial/federal requirements for SAR, unless no negative impacts to natural features or ecological function); "DAR" has been removed.
EEPAC	Working Group	20	1	3	1	purpose should also include compensation	AECOM	N. DeCarlo	3	Section completely reworked, but compensation is outlined in Section 2 (in relation to the Environmental Study) and Section 6 in-depth.
EEPAC	Working Group	21	1	3	2	change 'natural areas"' to 'components of the City's Natural Heritage System'(and where this term, NHS appears, it should be leading caps for each word)	AECOM	N. DeCarlo	2	Natural features and areas was the terminology used to align with LP text. NHS is capitalized throughout. There is wording outlining that natural features and areas are components of the NHS.
EEPAC	Working Group	22	1	3	1,2	Update to include London Plan policy # and in the last paragraph, line 6 should read "...ecological features and functions with respect…"	AECOM	N. DeCarlo	1	Policy numbers have been included.
EEPAC	Working Group	23	1	4	1	update Table A to current policies in London Plan. Also it should be noted that these distances should also trigger an SLSR	AECOM	N. DeCarlo	1	Table has been updated based on the LP and clarification has been made that it also triggers an SLSR
EEPAC	Working Group	24	1	5	3	The City completed 13 Sub-watershed studies in 1995. BioMAP monitoring was used to establish ecological/environmental baseline conditions for open watercourses within these 13 sub-watershed studies. This monitoring was undertaken in 1993-1995 and from approximately 2000 until 2015. These data must be included along with current data collected, in all EIS where a watercourse may be affected.	AECOM	N. DeCarlo	1	Review of appropriate/applicable background studies has been included in Section 2 and to be outlined in the Environmental Study Scoping Checklist (ESSC)
EEPAC	Working Group	25	1	5	4	section C SLSR - I am not aware Guidelines exist for the preparation of an SLSR. Are there?	AECOM	N. DeCarlo	1	Section 2.4 - SLSRs outlines this process (and links to the Environmental Study Scoping Checklist)
EEPAC	Working Group	26	1	5	4	the city often does not push to have qualifications included	AECOM	N. DeCarlo	1	Section 2 outlines that resumes for field staff, authours, etc. must be included for review.
EEPAC	Working Group	27	1	6	4	pre consultation MUST or SHALL occur. Also, update DART to whatever it is called now	AECOM	N. DeCarlo	1	A more robust description of what must occur during pre-consultation has been added as Section 2.1.
EEPAC	Working Group	28	1	6	4	I am not aware of any time a residents group or Nature London has been invited to participate. This seems to be a good idea that should be retained and acted on	AECOM	N. DeCarlo	1	Language has been retained. Further, reference to consultation with such groups has been made in the data collection standards section.
EEPAC	Working Group	29	1	7	4	also refers to getting data from Nature London. A good idea that should be used going forward.	AECOM	N. DeCarlo	1	Language has been retained. Further, reference to consultation with such groups has been made in the data collection standards section.
EEPAC	Working Group	30	1	7	4	dated should be defined. Is it more than 5 years old?10 years?	AECOM	N. DeCarlo	1	Under data collection, it is outlined that the City considers field data up to 5 years old "current"
EEPAC	Working Group	31	1	7	2	maps - All maps should be one scale or similar maps must be the same scale to make comparisons between maps easier.	AECOM	N. DeCarlo	1	All mapping should be scaled as appropriate based on the updated Draft EMGs and the ESSC. In some instances, maps may require different scales.

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
Reviewer Affiliation	Reviewer (F. Last name)	ID	EMG Section	Page	Type of Comment 1 - Policy 2 - Format 3 -Science 4 - Process	Comment and Suggested Action	Responder Affiliation	Responder (F. Last name)	Response 1 - Incorporated 2 - Not Incorporated 3 - Not Applicable	Response Comment
EEPAC	Working Group	32	1	7	4	A figure showing the environmental management units/areas. Is this always done? If not why not? Certainly do not always get a clear picture of the existing conditions nor "how the functions/area may be measured and impacts quantified or qualified (e.g. change in area, predictions through modeling theories), nor the sensitivity of the area to potential development impacts.	AECOM	N. DeCarlo	1	The requirement remains the same within the EMGs. It is expected that proponents will provide a figure that outlines existing conditions including what is listed in the EMGs. Some additional clarification has been made within text including reference to the evaluation of significance and function. Further, terminology has been adjusted (environmental management unit no longer used) and figure requirements will be determined through the scoping process and use of the ESSC.
EEPAC	Working Group	33	1	8	4	Review of Issues Summary Checklist. Chair of EEPAC should get even if no EEPAC rep was able to attend the scoping meeting	AECOM	N. DeCarlo	3	Section re-worked. Section 2.2 outlines the process for the Environmental Study Scoping Checklist and the TRT
EEPAC	Working Group	34	1	8	4	Terms of Reference for Site Issues. EEPAC should be included in the process	AECOM	N. DeCarlo	1	The TRT reviews the ESSC which acts as the ToR. See Section 2.2.
EEPAC	Working Group	35	1	9	4	I have never seen this sheet used. Is it? If so, is it effective. For ex, how do you know analytical methods have been appropriately documented? Should it be used and if so, does it need updating.	AECOM	N. DeCarlo	1	ESSC is the updated Issues Summary Checklist
EEPAC	Working Group	36	1	10	4	Site visit - include EEPAC representative	AECOM	N. DeCarlo	1	TRT members are identified to attend site visits within the EMGs (Section 2.2.2)
EEPAC	Working Group	37	1	10	1	Scoped Site EIS must include a monitoring plan	AECOM	N. DeCarlo	1	Section 2.6.9 outlines the need for an Environmental Management Plan, this is also described in-depth in Section 7
EEPAC	Working Group	38	1	10	3,4	Scoped Site EIS - If adopt the findings of McWilliams re encroachment and the approach in Beacon re buffers, there will need to be more work done on determining buffers and Critical Function Zones	AECOM	N. DeCarlo	1	Buffer width determination and boundary delineation methods have been revised to include CFZs and to ensure effective buffers with strict minimums.
EEPAC	Working Group	39	1	11	4	last line first paragraph. Not sure this is ever done as the Environmental Management Plan is created well after this step in the approval process. It should be done at this step as the development should work around the constraints not the other way around	AECOM	N. DeCarlo	1	Proposed development description is outlined in the updated Section 2. Although detailed design is not finalized at this stage, it is expected that proponents will outline design features to meet environmental management objectives. This may be revised later in the process, however objectives should still be met with new design.
EEPAC	Working Group	40	1	11	4	second para, re grade changes. Not aware this is done at this stage. Nor are changes in drainage patterns shown to my knowledge.	AECOM	N. DeCarlo	3	This section has been reworked/updated and the description of the proposed development is outlined in Section 2.6.5
EEPAC	Working Group	41	1	12	2	first para, change 'environment' to 'ecological features and functions'	AECOM	N. DeCarlo	1	Section revised, ecological features and functions addressed.
EEPAC	Working Group	42	1	12	2	under purpose. Direct and indirect impacts must be shown. Only some like AECOM, do this regularly	AECOM	N. DeCarlo	1	Section updated for assessing direct and indirect impacts. Further, reference to the Natural Heritage Reference Manual (NHRM) impact and mitigation (Appendix C - Table C-1) has been made to provide more robust direction on impact assessment.
EEPAC	Working Group	43	1	12	4	Pre development conditions needs more. Existing subsurface is only based on if it is a recharge area or not on one of the London Plan maps.	AECOM	N. DeCarlo	1	Pre-development existing conditions will be determined through an SLSR or through the EIS process (following the data inventory standards and as determined through consultation and scoping).
EEPAC	Working Group	44	1	12	1	ID of Existing Impacts - Given the OP and London Plan say enhance, this should be given greater emphasis in the new EMG	AECOM	N. DeCarlo	3	Although the goal of enhancing the NHS is not applicable in the identification of impacts, this idea has been integrated within the updated EMGs (specifically when referring to the new compensation section).
EEPAC	Working Group	45	1	12	4	The six items listed at the bottom are good, however, it is rarely actually done by consultants who prepare an Disincline in EMG and make it a requirement of submission	AECOM	N. DeCarlo	3	This section has been reworked and includes an outline of the Impact and Net Effects Assessment (including a net effects table template in Appendix C).
EEPAC	Working Group	46	1	13-14	4	In 2013, EEPAC prepared an update to this page to make it more user friendly. I am not aware of how this current page is actually used and if not, why not?	AECOM	N. DeCarlo	2	To ensure defensibility, the summary of impacts and mitigation table in the NHRM has replaced these pages.
EEPAC	Working Group	47	1	13-14	4	more important would be how the proponent will avoid, mitigate or compensate for these impacts. Too often when included in an EIS, the claimed impacts are low. There is never a clear reason for this conclusion, nor is there any way to repair damage when the consultant gets it wrong.	AECOM	N. DeCarlo	1	Agreed - the NHRM table (referenced above) outlines mitigation strategies along with potential impacts. Further, the compensation section outlines how to go about compensation (after following the mitigation hierarchy - avoid, minimize, mitigate, compensate).
EEPAC	Working Group	48	1	15	4	Net Effects Assessment Table must be a required for each EIS.A sample in the new EMG would help (also the table on p. 21 should be included in the example).Rarely get a rationale for the conclusions of the net impact n analysis. It is usually just a statement (particularly for buffers).The city should make all EISs include a Table AND a) thru d) on this page. As well, there should be an e) which requires long term impacts, not just "post construction" which is an undefined time period, as well as cumulative impacts. The definition of negative impacts from the PPS must be included in the new Guideline(see page 30-32 Ottawa's 2015 EIS Guideline for an excellent example of content)	AECOM	N. DeCarlo	1	This section has been reworked and includes an outline of the Impact and Net Effects Assessment (including a net effects table template).
EEPAC	Working Group	49	1	16	2	Not sure where this fits. Is it relevant in light of OPA 438?	AECOM	N. DeCarlo	1	This has been omitted in the updated EMGs
EEPAC	Working Group	50	1	17	2,4	never seen this used. Is there something better? Better science? Impacts will vary with type of feature depending on flora and fauna affected	AECOM	N. DeCarlo	1	This has been omitted in the updated EMGs
EEPAC	Working Group	51	1	18-19	2	This is pretty boilerplate. See it in all of AECOMs. This should be SOP by now. If not, it should be included as such. As well as Clean Equipment protocol. Should also add some limit on how long and how far from a feature soils can be left uncovered. Or that there should be a protocol to cover soil piles if heavy rains are forecasted. Also, the use of nitrate heavy grass seeding should be prohibited	AECOM	N. DeCarlo	1	Agreed - these should be SOP and have been omitted. Reference to the robust NHRM table has been made to outline mitigation strategies for potential impacts.
EEPAC	Working Group	52	1	20	2	Interesting, but how does it get translated into a monitoring program and what happens when things happen, like gates appearing on fences? If this page is retained, it needs to be incorporated into a requirement of the EIS that the proponent must include how it will avoid or mitigate these specific impacts. There should be clear criteria in the new EMGs for Environmental Management Plans or a separate Guideline	AECOM	N. DeCarlo	1	This table has been omitted, however additional information has been added Environmental Management and Monitoring Plan section, as well as more guidelines in the new Section 7 - Monitoring. As this is determined on a case-by-case basis, the determination and approval process remains the same.
EEPAC	Working Group	53	1	21	4	Including this or an up-to-date version in the EIS with the Net Effects Assessment Table should be required as it will give everyone reviewing the table a common vocabulary. Right now, when impacts are listed in a Net Effects Assessment Table, the rationale seems to either be missing or is superficial	AECOM	N. DeCarlo	1	This section has been reworked and includes an outline of the Impact and Net Effects Assessment (including a net effects table template).
EEPAC	Working Group	54	1	21	3	elimination of habitat (loss of open meadow where Meadowlarks breed for example) should be a high net effect. As should be the loss of any flora or fauna that is regionally rare or rarer. Not sure if this is meant to include a sub population like false rue or breeding pair habitat or cutting down the only shrub in that location. Need to define terms such as rare, unusual, uncommon	AECOM	N. DeCarlo	1	Examples of rare and unusual/uncommon habitat have been included.
EEPAC	Working Group	55	1	22	4	first full paragraph refers to detailed explanation. This has never been the practice. It should change if this section is to have any meaning.	AECOM	N. DeCarlo	1	This section has been re-worked/worded.
EEPAC	Working Group	56	1	22	4	other than trail development which seems to be in Woodland Management Plans (which are rare), none of the mitigation measures have been implemented. The examples are good, the follow thru needs to be part of development agreements.	AECOM	N. DeCarlo	3	These examples have been omitted from the update EMGs. The implementation of mitigation measures is mentioned in this section and addressed through Section 7 - Monitoring.

Appendix E - External Resource Group Comment Response Table

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EEPAC	Working Group	57	1	22	4	last line of the page. This has never been done to the best of my knowledge. This is an implementation issue that the City should address in its development and subdivision agreements	AECOM	N. DeCarlo	1	This has been omitted from this section and addressed in Section 7 - Monitoring.
EEPAC	Working Group	58	1	23	4,2	First paragraph and bullets can be deleted. The intent was to have monitoring until assumption. Why has it defaulted to three years? Monitoring needs to specify who does, for how long (which may vary by type of development and the component of the NHS) and who pays. EIS should propose appropriate thresholds or benchmarks for monitoring purposes; Identify who will be responsible for monitoring, and the reporting structure required to ensure that results are acted upon as needed; and outline contingency plans if an impact is detected or if the proposed thresholds are not met (which means there should be holdbacks in case the mitigation measures fail during the monitoring period).Monitoring should include performance monitoring. That means what should be required are targeted, site-specific parameters that can be measured and linked to site-specific changes.	AECOM	N. DeCarlo	1	Addressed in Section 7 - Monitoring (outline of timelines, scheduling, roles/responsibilities, compliance and effectiveness/performance monitoring)
EEPAC	Working Group	59	1	24	2,4	Second "purpose" box - never seen this happen. Means the EIS was not accepted. But the quality of an EIS is irrelevant in planning processes. Simply submitting one meets the city's requirements. If retain this section, need to provide examples of unacceptable impacts. Is it from the table showing no, low, med and high impacts?	AECOM	N. DeCarlo	1	The rejection of an EIS is outlined in Section 2.6.3 - EIS Process. Based on comments from the TRT, agencies, the City may reject an EIS. Unacceptable impacts will likely vary on a case-by-case basis and thus will be assessed through the EIS process.
EEPAC	Working Group	60	1	25	4	First paragraph - Maps must always be at the same scale. Somehow this doesn't get demanded	AECOM	N. DeCarlo	1	All mapping should be scaled as appropriate based on the updated Draft EMGs and the ESSC. In some instances, maps may require different scales.
EEPAC	Working Group	61	1	25	4	City Ecologist sign off on mitigation measures shall be required. A full description of proposed mitigation measures, including recommendations for timing windows or other specifications for implementation, for all potential negative impacts; For each negative impact, an indication of whether there will be any residual impact following implementation of the recommended mitigation measure(s); A description of proposed restoration or enhancement plans to compensate for impacts that cannot be avoided or minimised; Maps and/or drawings (if relevant) depicting the location, extent, and design details of proposed mitigation measures (e.g., sediment and erosion control plan)	AECOM	N. DeCarlo	1	This information is covered throughout Section 2 (e.g., mitigation measures, review of the draft EIS, data collection standards, Environmental Management and Monitoring Plan), Section 6 - Compensation, Section 7 - Monitoring.
EEPAC	Working Group	62	1	25	4	Peer review should be a possibility for any development, not just large scale ones. Not sure why this should be at the City's cost given there is a problem with the proponent's work. I have seen a Peer Review once in the last 7-10 years	AECOM	N. DeCarlo	1	In general, the City has the option to require amendments, addenda, or to fully reject an EIS that is not acceptable. The purpose of this peer-review mechanism is not to correct the 'poor' work of a proponent, rather to allow the City the option for a second qualified consultant to come and assess particularly sensitive sites or large scale developments with more uncertainty and greater potential impacts to ensure 'no negative impacts', etc. This is under the discretion of the City of London.
EEPAC	Working Group	63	1	26	2,4	Is this form even used? Who signs off if it is in use? Do the subwatershed study targets get used?	AECOM	N. DeCarlo	3	This form has been omitted from the updated EMGs.
EEPAC	Working Group	64	1	27	2	EIS must include the findings of other reports. The other reports are part of the package and are required to be submitted in order for a filing to be considered complete	AECOM	N. DeCarlo	1	This has been addressed in Section 2 and through the scoping process. As the required studies are noted in the ESSC checklist (in the appendices)
EEPAC	Working Group	65	1	27	1,4	Development conditions are important. From what I have seen in reports from Development Services, there are references to implementing recommendations of the EIS. However, the EIS is often "incomplete" as it recommends the preparation of an Environmental Management Plan. Does that become a condition of development? Should it be part of an h-2 holding provision? Guelph also requires from time to time, an EIR (Environmental Implementation Report).It includes items such as how the conditions of approval have been met, how the protection of features and their functions have been protected, etc. (Guelph, Guidelines for the Preparation of an EIS, 2017)	AECOM	N. DeCarlo	2	Environmental Management Plans are described in Section 2 and Section 7 outlines monitoring requirements. A review of phasing and conditions based on the EMP are not included as part of the EMG update.
EEPAC	Working Group	66	1	28	2	See Appendix 6, Ottawa 2015 EIS Guidelines for a possible replacement	AECOM	N. DeCarlo	1	Appendix 6 reviewed. An updated checklist - now called the ESSC is included in Appendix A.
EEPAC	Working Group	67	1	29	2,4	If the development is adjacent to the City boundary, maps and photos must show the features that are on the other side of the border	AECOM	N. DeCarlo	1	Updated ESSC - Study area is delineated onto current aerial photography including a 5-10 km radius for Map 5
EEPAC	Working Group	68	1	30	3	Add to 1.2.5, sensitive flora, Coefficients of conservatism greater than or equal to 6, add to 1.2.6 Partners In Flight, 1.2.6 how is rare defined - regionally rare?	AECOM	N. DeCarlo	3	The checklist has been reworked into the updated ESSC
EEPAC	Working Group	69	1	31	1	1.2.7 update to Significant Wildlife Habitat for Ecoregion 7E	AECOM	N. DeCarlo	1	Addressed
EEPAC	Working Group	70	1	32	1	Update PPS reference.2.1.2 in the current PPS has more on connections and linkages. This should mean an EIS looks beyond the subject lands. How else can you do ecosystem planning?	AECOM	N. DeCarlo	3	The checklist has been reworked into the updated ESSC
EEPAC	Working Group	71	1	32	2	not sure 1.3 needs to be in a scoping list	AECOM	N. DeCarlo	1	Addressed in updated ESSC
EEPAC	Working Group	72	1	33	1	update to London Plan language.1.4 use endangered, threatened and special concern. Include Federal and Provincial	AECOM	N. DeCarlo	1	Reference to SAR made in ESSC with applicable legislation referenced.
EEPAC	Working Group	73	1	34	2	3.2 add hydro period , delete 3.4 (never used)	AECOM	N. DeCarlo	1	ESSC reworked/updated and includes hydrological, geomorph, etc. studies
EEPAC	Working Group	74	1	36	2	update definitions of the categories of species at risk (endangered, threatened, species of concern)	AECOM	N. DeCarlo	1	Addressed
EEPAC	Working Group	75	1	37	1	If retain, this needs to be updated to reflect current policies. For example, an EA in London now requires an EIS as part of the submission of an ESR.	AECOM	N. DeCarlo	3	This has been moved to a new section outlining "When an EIS is not required"
EEPAC	Working Group	76	1	37	2	Is there still a Subdivision Requirements Manual? If so, it is likely no longer in the Planning Department, but rather in Development Services	AECOM	N. DeCarlo	3	This has been omitted from the updated Draft EMGs
EEPAC	Working Group	77	1	38	4	update submission requirements and room #s. Some paper copies should continue to be required as reports with maps are easier to review in hard copy than on line.	AECOM	N. DeCarlo	2	This has been omitted from the updated Draft EMGs - Digital copies are preferred.
EEPAC	Working Group	78	1	38	4	all maps used should be to the same scale, rarely get Terms of Reference in the EIS, sometimes do not get CVs with qualifications, particularly certification in ELC	AECOM	N. DeCarlo	1	All mapping should be scaled as appropriate based on the updated Draft EMGs and the ESSC. In some instances, maps may require different scales. The ESSC has now replaced the ToR and will be required for EISs, CVs are to be included for all field staff, authors, etc.
EEPAC	Working Group	79	1	39-40	3	Appendix D re Edge effect. Should this be revised and included in restoration and monitoring? Only appears on page 13 and page 125 in Guideline 5.0.Edge effects are rarely discussed when new edge is created. Rare is an EIS that requires some form of mitigation	AECOM	N. DeCarlo	1	Agreed - this has been addressed in Section 5 - Buffers, and in Section 3 - Evaluation of Significance and Function.
EEPAC	Working Group	80	1	41	2	A flow chart could be helpful. See page 11 of City of Ottawa EIS Guideline (2015) for an example. Something should be included about EEPAC's review as being part of the process. Guelph's EAC is included in its Guideline document	AECOM	N. DeCarlo	2	Flow charts have not been included, but can be revisited during Phase 2 if their addition would provide clarity to the process.
EEPAC	Working Group	81	1	N/A	4	currently, no update is required when a subdivision proceeds in phases or there is a delay after draft approval. The EIS should be revisited when there are phases or delays. This is Ottawa's approach (see page 14 of Ottawa's 2015 EIS Guideline	AECOM	N. DeCarlo	3	Scope of EIS shall be for the entire site, with addendums on subsequent phases as the development progresses. Delay would need to be defined; there could be an opportunity to pair the EIS review with the renewal of draft approval.

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EEPAC	Working Group	82	1	N/A	4	currently, there is little done to analyze function, the focus is on features. In Ottawa, The EIS must specifically discuss the nature and extent of the ecological functions provided by the site, in relationship to the surrounding area. The EIS must include: a description of ecological functions provided by the site and identification of any functions that have contributed to the area being identified as significant; An assessment of the significance of the function, using quantitative information if possible, and relating this to the quality and integrity of the area; and, an assessment of the sensitivity of the function to the type of development proposed	AECOM	N. DeCarlo	1	Wording within Section 2 has been amended to include a focus on ecological function. Further, updates to Section 3 - Evaluation of Significance and Function outlines the importance of assessing function.
EEPAC	Working Group	83	2	N/A	3	Data Collection Standards for the Ecological Inventory needs to be based on detailed evaluations of the subject areas/sites and its' existing conditions that will be undertaken in accordance with specific field investigations/inventories and studies such as Environmental Impact, geotechnical, hydrogeological, as well as the state of art methodologies and environmental protocols that will be employed and reference in this ToR.	AECOM	N. DeCarlo	1	Data collection standards have been updated; the potential need for additional studies (e.g., geotechnical, hydrogeological) has been referenced, specifically requiring consultation with experts in those respective fields.
EEPAC	Working Group	84	2.3		1	Assessment of Development Impact (direct and indirect impact) needs to be assessed by presenting of viable alternatives where the identified impact will be defined in specific details (potential evaluated short and long term impacts), as well as all considerations of protections measures, mitigation or compensation and monitoring will be presented together with the estimated costs of these options.	AECOM	N. DeCarlo	1	The updated/reworked section does require the definition of specific details on potential impacts, as well as approved mitigation measures (following the mitigation hierarchy) and monitoring (including the EMP)
EEPAC	Working Group	85	2	42	4	are the baseline data from the subwatershed studies ever used? It would help if they were given the date of the work would show changes on the landscape.	AECOM	N. DeCarlo	1	The review of other studies/documents/etc. have been included and should be reviewed. Other studies will also be explored through the scoping process.
EEPAC	Working Group	86	2	43	4	unlikely there are sites where data is now less than three years old. Where data is over 10 years old, data collection shall be required. Not sure though of the scientific basis for the time periods (e.g. 3 years, etc.).Guelph considers data older than 5 years as "limited in its accuracy."	AECOM	N. DeCarlo	1	Data is considered current if it is less than 5 years old.
EEPAC	Working Group	87	2	44	3	We cannot find the "North-South Environmental Inc., 2003" reference. We contacted Merrick Sharpe, owner of North-South Environmental Inc. and he was unable to determine what this reference might be without a full citation. Therefore, we recommend either removing this section entirely or providing the full citation.	AECOM	N. DeCarlo	1	This reference has been removed.
EEPAC	Working Group	88	2	44	2,4	Natural Heritage Reference Manual (2010) and Ecoregion 7E SWH criteria should be used as the basis for drafting a new section on data collection.	AECOM	N. DeCarlo	1	These documents have been reviewed and integrated throughout the EMGs.
EEPAC	Working Group	89	2	44	3	Early Summer (June) guidelines for birds should also appear in the Spring (May) guidelines. Spring section should include specific guidelines for birds and other relevant species. Rationale: spring migrants relying on stopover sites in London and area (i.e. critical habitat) will already be passing through, and early breeding species will have breeding activity. Spring ephemerals may bloom as early as March and June is too late for easy detection in some years, especially when considering climate change.	AECOM	N. DeCarlo	1	Breeding/migratory birds have been added to Spring (May) guidelines. Spring ephemerals have been added to Spring (May). It is also the responsibility of the proponent to assess early emergence of species based on variable weather from year to year and to be approved through pre-consultation.
EEPAC	Working Group	90	2	44	4	The 2007 EMG indicates that "the Significant Wildlife Technical Guide (OMNR, 2000) is the standard reference guideline for conducting field investigations for specific natural features." If the reference is to the "Significant Wildlife Habitat Technical Guide (OMNR, 2000), https://docs.ontario.ca/documents/3620/significant-wildlife-habitat-technical-guide.pdf", then the EMG should be updated to clearly reflect this. However, this document does not provide guidelines on conducting wildlife inventories, leaving the EMG without detailed guidelines in this regard.	AECOM	N. DeCarlo	1	Reference to the SWHTG has been made with the appropriate reference. Specific detail on conducting wildlife inventories and the associated protocols included in the data collection standards.
EEPAC	Working Group	91	2	44	3	Regarding the point beginning with "Spring (May) target species...", the reader should be directed to the Marsh Monitoring Protocol provided in full here: https://www.bsc-eoc.org/download/mmpqualplan.pdf and summarized here: https://www.birdscanada.org/volunteer/glmmp/?targetpg=glmmpfrog.	AECOM	N. DeCarlo	1	This reference has been integrated into the herpetofauna survey section.
EEPAC	Working Group	92	2	45	4	vii, ix, x are rarely if ever included. They should. Make the list of technical information a shall rather than a should	AECOM	N. DeCarlo	3	Data collection standards has been reworked/updated.
EEPAC	Working Group	93	2	45	3	There is no mention of non-vascular plants. Some effort should be made to include survey of non-vascular plants such as mosses, fungi, and lichens, because they are a vital part of the vegetation community and are frequently used as indicator species. Other provinces have such guidelines, e.g."BC Inventory and Survey Methods for Rare Plants and Lichens"	AECOM	N. DeCarlo	2	Non-vascular plants mentioned in evaluation of significance and function for ESAs, as well as indicator species in the ESSC. However, specific surveys for non-vascular plants were not incorporated into the data collection standards.
EEPAC	Working Group	94	2	46-47	3,4	Current timing is inadequate and misses early spring. Migratory bird data can be found at:https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html	AECOM	N. DeCarlo	1	Updated based on previous EEPAC comment/recommendation.
EEPAC	Working Group	95	2	46	3	There is a broken link referenced in this sentence: "Priority birds species for each municipality should be determined from Couturier, 1999, Bird Studies Canada website bsc-eoc.org." Refer instead to the Ontario Breeding Bird Atlas. A list of priority birds for each municipality exists at this address: https://www.bsc-eoc.org/dataentry/codes.jsp?page=region if you select the reference sheet "Region Checklist and Migration/Breeding Dates" and select "London" as the atlas region. Since this checklist is difficult to find, it may be included as a separate table within the EMG.	AECOM	N. DeCarlo	1	Replacement references for regionally rare bird species (e.g., PIF) have been included.
EEPAC	Working Group	96	2	46	3	Cadman et al., 1987 atlas has been digitized and updated (data from 2001-2005), available here: https://www.birdsontario.org/atlas/secondatlas.jsp?lang=en	AECOM	N. DeCarlo	1	Reference has been updated.
EEPAC	Working Group	97	2	46	3	include species with a Conservation Coefficient of 6 or greater and their location, for birds use the most recent Ontario Bird Atlas and Partners in Flight. Consider using vegetation sampling protocol from U of Toronto (http://forestry.utoronto.ca/vsp/)Reference should include the most current edition of The Southern Ontario Vascular Plant Species List. Current version is 3rd edition (2013) and includes S Rank	AECOM	N. DeCarlo	1	This section has been revised and includes updated references
EEPAC	Working Group	98	2	46	3	Oldham (1996) can be replaced with the most recent edition: Oldham, M.J. & Brinker, S.R. (2009). Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario.	AECOM	N. DeCarlo	1	Reference has been updated.
EEPAC	Working Group	99	2	46	3	The NHIC website writes that they use standardized methods "developed by the international NatureServe network of conservation data centres" to assign global, national and subnational ranks. Thus, the NatureServe network should also be cited on this page (https://www.natureserve.org/conservation-tools/conservation-status-assessment).	AECOM	N. DeCarlo	2	To keep the document streamlined and concise, the methodology of how NHIC determines the ranks was excluded. The proponent will find this when they use the NHIC website.
EEPAC	Working Group	100	2	46	3	The long-form reference states that the most recent report from COSEWIC is from 1996; however, the most recent edition is really from 2018, found here: https://wildlife-species.canada.ca/species-risk-registry/sar/assessment/wildlife_species_assessed_e.cfm	AECOM	N. DeCarlo	1	This reference was omitted, reference is made to the COSEWIC and COSSARO lists, however the year is not included as they are updated frequently. It is stated throughout that the most up-to-date resources must be used (as the literature will become outdated as it has in this version).

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External Resource and First Nation Comments							AECOM Response			
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EEPAC	Working Group	101	2	46	2	In regards to the following sentence "Provincially rare species are those listed with a sub-national rank (S-rank) of S1 to S3 in Oldham (1996, Natural Heritage Information Centre (NHIC)website and MNR species at risk in Ontario (Bowman, 1996) and COSSARO," NHIC should be defined above, not here. Subnational ranks are also from NatureServe, so should be cited here (link above). Oldham & Brinker (2009) can be cited here as well. The long form citation list suggests that the most recent COSARRO report is from 1996. It is actually from 2007, found here: https://www.ontario.ca/laws/regulation/080230	AECOM	N. DeCarlo	1	Updated. As NHIC is part of NatureServe and provides information for Ontario, we will continue to reference NHIC (based on familiarity, consolidation of data searches, efficiency, etc.).
EEPAC	Working Group	102	2	46	4	Lists of the species observed, reported or expected to occur on or adjacent to the site, presented in tabular format (usually as an appendix) with notes on the species' relative abundance at the site, its residency status (i.e., is it present year-round, seasonally or only periodically; does it live on the property, forage there or use it as part of a movement corridor) and the evidence supporting its inclusion on the list (e.g., sighting, tracks, previous report);	AECOM	N. DeCarlo	1	Addressed under Non-Target Wildlife in the Data Collection Standards appendix
EEPAC	Working Group	103	2	46	3,4	Guelph's 2017 Guideline, Appendix F:Wildlife Survey Guidance includes a wide variety of fauna and flora. This appendix would be beneficial to the new Guideline	AECOM	N. DeCarlo	2	This document was reviewed for the updated Data Collection Standards
EEPAC	Working Group	104	2	46	3	Weller (1994) appears to be the most recent summary of Ontario herpetofauna, but another citation can be added: Oldham, M.J. (2003). Conservation Status of Ontario Amphibians. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario.	AECOM	N. DeCarlo	1	Reference has been included.
EEPAC	Working Group	105	2	46	3	Holmes et al., 1991 can be replaced by the online Ontario Butterfly Atlas (2019) found here: http://www.ontarioinsects.org/atlas_online.htm	AECOM	N. DeCarlo	1	Reference has been updated.
EEPAC	Working Group	106	2	47	3	In regards to information under the subheading "Breeding Bird Survey", readers should also be directed to breeding bird survey guidelines provided by the Ontario Breeding Bird Atlas (found here: https://www.birdsontario.org/download/atlas_feb03.pdf).	AECOM	N. DeCarlo	1	Reference has been added.
EEPAC	Working Group	107	2	47	3	Existing protocols for water chemistry are inadequate. For example, no mention of testing for heavy metals. Should have an inventory of possible tests for water quality, with lists of justification for each of the tests i.e. factors that may trigger the requirement for certain tests. Could possibly include bare minimum (tests that are always required) and supplemental	AECOM	N. DeCarlo	1	Specifics on what should be included have been updated for aquatic ecosystems, however based on the variability in features, development activities, impacts, etc. These assessments are still to be determined on a case-by-case basis through the scoping exercise.
EEPAC	Working Group	108	2	47	3	"base flow (water velocity, stream order, water depth, stream width and bankfull width)" This should also explicitly mention measurement of discharge volume	AECOM	N. DeCarlo	2	The data collection standards have been reworked, however what would need to be measured will be on a case-by-case basis in consultation with the City of London, therefore the section does not prescribe specific characteristics to be measured (as this may vary among sites).
EEPAC	Working Group	109	2	48	3	Under the heading "Fisheries Inventory", readers should also be referred to standardized protocols for Fish Community Sampling provided by the Ontario Stream Assessment Protocol: https://s3-ca-central-1.amazonaws.com/trcaca/app/uploads/2019/06/05112225/osap-master-version-10-july1-accessibility-compliant_editfootnoteS1M4.pdf	AECOM	N. DeCarlo	1	OSAP has been added as a potential requirement, on a case-by-case basis.
EEPAC	Working Group	110	2	48	3,4	Rarely see aquatic habitat work done even when a water course exists. Even subwatershed study information is ignored. So the issue is not the content but whether or not such assessments are still required.	AECOM	N. DeCarlo	1	Language in this section outlines that aquatic assessments should be conducted as required through scoping, agency requirements, and at a level appropriate for feature, development activities, impacts, etc.
EEPAC	Working Group	111	2	48	3	Under the heading "Benthic Survey", readers should also be referred to standardized protocols for Benthic Macroinvertebrate Assessments provided in the Ontario Stream Assessment Protocol: https://s3-ca-central-1.amazonaws.com/trcaca/app/uploads/2019/06/05112225/osap-master-version-10-july1-accessibility-compliant_editfootnoteS1M4.pdf	AECOM	N. DeCarlo	1	OSAP referenced in-text (which utilized OBBN methodologies).
EEPAC	Working Group	112	2	48	4	Under the heading "Habitat Assessment and Stream Analysis," the EMG recommends measuring dissolved oxygen, temperature, pH, conductivity, water colour and transparency. Here, conductivity should be replaced with specific conductivity, which is measured on all standard YSI water chemistry probes and takes into account the temperature-dependence of conductivity. Probes which measure dissolved oxygen, temperature and pH also generally measure oxidation-reduction potential (ORP). ORP can reflect the antimicrobial potential of the water, so is a useful indicator of water quality that should be mentioned here. The EMG should also recommend that readers record the presence/absence of algal blooms, as such algal blooms may suggest eutrophication in the aquatic system. Water chemistry analysis of major ions/anions can indicate the cause of eutrophication (e.g., elevated nitrogen and/or phosphorous) so should be collected as part of Habitat Assessment and Stream Analysis. The Minnesota Pollution Control Agency provides separate guidelines for water chemistry analysis for lakes, rivers and streams, and wetlands: https://www.pca.state.mn.us/water/water-monitoring-standard-operating-procedures	AECOM	N. DeCarlo	2	Habitat assessment and stream analysis has been updated based on industry standards and by a Senior Fisheries Biologist. Prescribing specific water quality testing is considered out of scope for these guidelines and may be required as determined through the scoping process on a case-by-case basis in consultation with the City of London.
EEPAC	Working Group	113	3	N/A	1	Guidelines Document for ESA Identification, Evaluation and Boundary Delineation will be required to include all applicable and viable information that in detailed will identified all ecological/environmental functions and featured of the subject ESA and adjacent areas and environmental/ecological relations to the existing subwatershed studies and environmental criteria established in this sub watershed. Also all applicable specific field investigations/inventories and studies such as Environmental Impact, geotechnical, hydrogeological, as well as the state of art methodologies and environmental protocols studies shall be included.	AECOM	N. DeCarlo	1	Information has been updated, where applicable. Identification of ecological function has been added to Section 3.
EEPAC	Working Group	114	3	51-54	2	turn into an Appendix if still seen as needed. Otherwise, delete	AECOM	N. DeCarlo	1	Much of this has been omitted or integrated into other sections, where applicable.
EEPAC	Working Group	115	3	55	2	2.1 and 2.2 are likely not necessary anymore	AECOM	N. DeCarlo	1	This has been omitted from the updated EMGs.
EEPAC	Working Group	116	3	56	2	#8 should be revised. No need to reference the pre ELC material	AECOM	N. DeCarlo	1	Revised to solely ELC.
EEPAC	Working Group	117	3	57	2	if retain, make into a colour map. Perhaps use Map 5 of the London Plan?	AECOM	N. DeCarlo	1	Colour mapping provided.
EEPAC	Working Group	118	3	58	2	not sure this needs to be retained. If so, use colour	AECOM	N. DeCarlo	1	Colour mapping provided.
EEPAC	Working Group	119	3	59-76	3	is there a need to update references included in the glossaries and at the end? Otherwise, the criteria in general have been agreed to and there is no dispute that they have been workable	AECOM	N. DeCarlo	1	Glossaries and references will be consolidated for the final draft.
EEPAC	Working Group	120	3	67	2,3	Is the OWES reference still current? Add to the application section, flood attenuations, retention and other modifications of nutrients and other chemicals in surface water, long term storage of atmospheric carbon dioxide, erosion control and groundwater recharge	AECOM	N. DeCarlo	1	This reference has been updated, to revisit adding these other variables however flood attenuation is likely covered under "water storage", groundwater recharge is already included, nutrient retention and modifications, as well as erosion control is likely covered under "water quality improvements". We can consider long-term carbon storage.
EEPAC	Working Group	121	3	70	3	update this Criterion to include Significant Wildlife Habitat for Ecoregion 7E	AECOM	N. DeCarlo	1	Reference has been added.
EEPAC	Working Group	122	3	71	2,3	update DFO references that conclude the page. Another possible reference is AQUATIC ECOSYSTEM CLASSIFICATION FORTHE GREAT LAKES WATERSHED IN ONTARIO (2004)	AECOM	N. DeCarlo	3	Relevant fisheries and aquatic references have been added throughout.
EEPAC	Working Group	123	3	72	4	Update rare plant list reference to : Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp.	AECOM	N. DeCarlo	1	Reference has been updated.

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EEPAC	Working Group	124	3	72-73	3	update references. For example, there is an Nrank. Include in the reference list Significant Wildlife Habitat Technical Guide, October 2000, OMNR, in particular, Appendix M, Locations of known rare vegetation communities in Ontario	AECOM	N. DeCarlo	2	Rare vegetation communities have been addressed in Criterion 6. Refer to SWH Criteria Schedules for 7E (which provides sources to find up-to-date lists and locations of rare vegetation communities)
EEPAC	Working Group	125	3	74	2	replace Glossary with page 48-49 of 2014 PPS or most current version	AECOM	N. DeCarlo	3	Not applicable based on rework.
EEPAC	Working Group	126	3	75	3	update reference list. Some may be found on EEPAC's list	AECOM	N. DeCarlo	1	References have been updated.
EEPAC	Working Group	127	3	77	3	4.2 - not sure Review Areas are still used (see also Guideline 3).Not sure the other planning considerations mention here have ever been defined. Not sure why it says 'should' rather than must. See also 'should' in 3b, 5b and 8b-f	AECOM	N. DeCarlo	1	Review Areas has been updated within the document. Planning considerations have been clarified. As these guidelines have passed OMB, 'should' have been left in.
EEPAC	Working Group	128	3	78-	2	if figures are used in the new version, update using software	AECOM	N. DeCarlo	1	Figures have been updated.
EEPAC	Working Group	129	3	79	3	Beacon's buffer document refers to Critical Function Zones. This should be added to Guideline 1.	AECOM	N. DeCarlo	1	CFZs have been incorporated into Guideline 2 as they are wetland-specific based on the current literature (ECCC-CWS, 2013 - How much habitat is enough?).
EEPAC	Working Group	130	3	79	3	Revisions to Guideline 1 - Habitat zones must be included, in their entirety, within the patch boundary. Habitat zones which contribute to the successful evaluation of a patch as part of the Natural Heritage System, must be included in their entirety. Conditions: Habitat zones are requirements for - species at risk, - nationally, provincially, regionally, or locally rare species, - forest-interior or area-sensitive species - Conservation Priority bird species for Middlesex	AECOM	N. DeCarlo	1	This guideline has been updated and there have been examples incorporated for context (e.g., badger dens, vernal pools). Rare vegetation communities are covered in Guideline 4. The other recommended habitat zones are covered in the evaluation of significance and function (rare species, conservation priority species), etc.
EEPAC	Working Group	131	3	79	3	Revision to Guideline 2 - Rare to uncommon communities, locally, provincially, or nationally, must be included within the boundary. Rationale - Vegetation communities are important whether they are locally, provincially, or nationally rare or uncommon.	AECOM	N. DeCarlo	1	"Vegetation communities may be identified as rare to uncommon because of their limited distribution and occurrence within the country, province, or region."
EEPAC	Working Group	132	3	80	3	Revision to Guideline 3 - Projections of naturalized vegetation less than thirty metres (30 m) wide that extend from the main body of the patch: a) must be included within the boundary if the projection includes a wooded ravine or valley with untreed or successional habitat. Below the top-of-slope. b) should be included within the boundary if the projection provides strengthens linkage with another patch less than 100 m away, or between two portions of the same patch **or with a watercourse or wetland feature less than 100 m away** **c)must be included in the boundary if the projection lies below the maximum hazard line** **(EEPAC recommends that a graphic depicting scenario c) be added)** **d)must be included in the boundary if the projection is proximal to a Potential Naturalization Area or Potential Upland Corridor** **e) must be included in the boundary if the projection is located within a Carolinian Canada Big Picture Meta-Corridor** **(• The change in b) from 85 to 100 makes it consistent with woodland distances in Guideline #3 and #5.Scenario c) Applies the existing connection width requirements intuitively to the case where the watercourse is not immediately adjacent to the patch)**	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures will be updated for each of these criteria.
EEPAC	Working Group	133	3	81	3	Guideline 4 - Watercourses: a) must be included within the boundary if the watercourse forms the boundary of the patch; and b) must be included within the boundary if the watercourse connects two or more patches within 85**100 metres or connects between two portions of the same patch** c) must be included within the boundary if the watercourse is i) a small watercourse and is within 30 m of the patch ii) a coldwater stream and is within 50 m of the patch iii) a larger river and within 100 m of the patch (EEPAC recommends that a graphic depicting scenario c) be added)	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures have been updated for each of these criteria.
EEPAC	Working Group	134	3	82	3	5b - how is it determined that a satellite woodland contributes to diversity and ecological function? What are the data that would support or reject the hypothesis? There is certainly research supporting the retention of small woodlands, so this Guideline should be revised to say satellite woodlands must be included. Reference -Small patches make critical contributions to biodiversity conservation, David Lindenmayer, https://www.pnas.org/content/116/3/717 https://phys.org/news/2018-12-small-isolated-habitat-patches-crucial.html	AECOM	N. DeCarlo	3	The "Conditions" section outlines examples of contribution to ecological function. Further ecological significance and function can be determined on a case-by-case basis using a number of sources (e.g., NHRM) and the Section on evaluation of significance and function. These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures will be updated for each of these criteria.
EEPAC	Working Group	135	3	82	3	Satellite woodlands that are small less than 2 ha and have a round to square shape, and are located within 100 m of a larger woodland patch: a) must be included within the boundary if the satellite contains rare species or significant communities b)should **must** be included within the boundary if they contribute to biological diversity and ecological function of the larger patch. **c) must be included within the boundary if they strengthen linkages to a permanent watercourse** **d) should be included within the boundary if they strengthen linkages between larger patches** **e) should be included within the boundary if they contain a watercourse or wetland feature** **f) must be included within the boundary if they are below the maximum hazard line** **g) must be included within the boundary if they are within a Carolinian Canada Big Picture Meta-Corridor** **(• All satellite woodlands within 100 m provide some form of benefit to the larger woodland, to connectivity and to the Natural Heritage system overall. Biodiversity is key to the long term integrity of all flora and fauna. Areas contributing to biodiversity must be preserved.)**	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures have been updated for each of these criteria.

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
Reviewer Affiliation	Reviewer (F. Last name)	ID	EMG Section	Page	Type of Comment 1 - Policy 2 - Format 3 -Science 4 - Process	Comment and Suggested Action	Responder Affiliation	Responder (F. Last name)	Response 1 - Incorporated 2 - Not Incorporated 3 - Not Applicable	Response Comment
EEPAC	Working Group	136	3	83	3	Guideline 6 - Marshes, Thicket Swamps or other Untreed Wetland communities contiguous with a patch and greater than 0.2 ha in size that are relatively undisturbed and dominated by native species that are obligate or facultative wetland species (with a coefficient of wetness values of -3 to -5) must be included within the boundary if: a) the wetland is contiguous with the patch should be included in the boundary if: b) the wetland strengthens a linkage between natural areas by filling in a bay or connecting two or more patches; or c) the wetland is located above the top-of-slope of a stream corridor or ravine; or d) the wetland strengthens a linkage between connects a patch to and a permanent natural watercourse. (The lengthy qualifiers of the wetland are unnecessary. Wetland communities of all sizes and vegetative qualities provide important diversity and habitat and if they are contiguous with a vegetation patch, they must be included within the boundary.)	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures have been updated for each of these criteria.
EEPAC	Working Group	137	3	84	3	Add to Guideline 7:f) contribute to biological diversity and ecological function of the larger patch; or g) by their size and shape will, through natural succession, add to the amount of forest interior within the patch; or h) are below the maximum hazard line; or i) are proximal to identified Potential Naturalization Areas or Potential Upland Corridors; or j) are within a Carolinian Canada Big Picture Meta-Corridor	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures have been updated for each of these criteria.
EEPAC	Working Group	138	3	85	3	Plantations, including Christmas tree plantations, and abandoned orchards contiguous with patches of natural vegetation must be included in the boundary if the plantation or orchard: a) was originally established for the purposes of forest rehabilitation and/or has been managed towards a natural forest and/or has developed characteristics of a natural forest, such as natural regeneration of native species. A plantation should must be included in the boundary if it: b) minimizes edge effects to natural heritage features by providing a buffer between the feature and the surrounding land use; or c) strengthens internal linkages or reduces edge to area ratios by filling in bays; or d) connects a patch to a permanent watercourse; or e) it connects two or more patches; or f) it is below the top-of-slope in a stream corridor or ravine or is below the maximum hazard line g) is proximal to a Potential Naturalization Area or Potential Upland Corridor h) is located within a Carolinian Canada Big Picture Meta-Corridor i) by their size and shape will, through natural succession, add to the amount of forest interior within the patch • EEPAC's experience is that any "should" condition rarely gets followed. The only way to accomplish greater protection is to change "should" to "must". • The max hazard line is a current terminology and any plantation within any kind of hazard area is best included for both hazard protection and ecological protection. • It is not sensible to remove a plantation in an area already identified for rehabilitation plantings that would provide strong ecological benefit and/or linkage function. • The science behind Carolinian Canada's landscape level connectivity map is well accepted. There is strong ecological benefit for retaining and creating treed areas within these connective corridors. • The value of an existing plantation is not dependent on the proportion of the patch area it happens to occupy. Conifer plantations are accepted to be highly valuable wildlife cover and food sources.	AECOM	N. DeCarlo	3	These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures will be updated for each of these criteria.
EEPAC	Working Group	139	3	85	3	A Plantation must be included if it meets one of the criteria shown in 8b to 8f.'Should' is too vague.	AECOM	N. DeCarlo	1	Should has been updated to must where applicable through the Draft EMGs.
EEPAC	Working Group	140	3	86	3	9b.Not sure what the word is before active pasture9c (which is labeled 9b) what is the definition of heavily managed??Why is the limit on size 1 ha? What happens if the amount of "managed" area has been expanded?	AECOM	N. DeCarlo	1	Word "ntried" removed, the one ha is for actively managed islands, whereas larger islands that are abandoned/rehabilitated may be included. These guidelines/criteria have been revised based on the London Plan, other policy (e.g., PPS), and pertinent scientific/technical documents (e.g., NHRM). Additional updates to these criteria are not being included at this time based on the underlying policy and the OMB defense of the guidelines. Figures will be updated for each of these criteria.
EEPAC	Working Group	141	3	86	3	Guideline 10 needs a drawing. The house at 1582 Commissioners Road W adjacent to Warbler Woods is a good example. Envelope needs to be reviewed. Need to distinguish between "envelopes" with buildings separately from those without.10a is vague. What are site specific considerations?	AECOM	N. DeCarlo	1	Envelope language has been removed. Figures for each guideline have been provided.
EEPAC	Working Group	142	3	86	3	an additional Guideline - Vegetation communities in areas of identified ground water recharge or watercourse headwater must be included in the boundary.(Groundwater recharge and headwater areas are important for water quality and quantity.)	AECOM	N. DeCarlo	2	Covered in Criterion 1.1.
EEPAC	Working Group	143	3	87	3	habitat zone requirements can be updated .A good source is Categorizing and Protecting Habitat under the Endangered Species Act, (Ontario 2012).	AECOM	N. DeCarlo	2	This source has been considered and protection of habitat zones has been included.
EEPAC	Working Group	144	3	87-89	2,3	update references. See EEPAC list	AECOM	N. DeCarlo	1	Glossary updated.
EEPAC	Working Group	145	3	89	2	there is no section 4.0 - renumber if retain	AECOM	N. DeCarlo	1	Sections reworked/renumbered during compilation.
EEPAC	Working Group	146	3	91	2	consider deleting. Is Review Area used? What was the science behind making parts optional? This section seems inconsistent with the rest of the Guideline and is rife with subjective comments.	AECOM	N. DeCarlo	1	We have kept this in the document, however wording has been updated to remove subjectivity.

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EEPAC	Working Group	147	3	92	2	is this still needed? For example, an EMS was not in SWAP. They aren't in Secondary Plans either. The last Secondary Plan EEPAC reviewed came with a Subject Lands Status Report, not an EIS.	AECOM	N. DeCarlo	3	This section is solely based around the planning process for the determination/listing of new ESAs.
EEPAC	Working Group	148	4	95	1	the only change is updating references and technical amendments to update references to the current London Plan from the previous OP, the current PPS, etc.).This Guideline has been adjudicated at the OMB and the courts. It should not be opened up again.	AECOM	N. DeCarlo	1	Technical and policy updates have been incorporated throughout this section where possible.
EEPAC	Working Group	149	5		3	Guidelines for Determining Setbacks and Ecological Buffers shall include all applicable and viable information that in all required details will identified all ecological/environmental functions and featured of the subject ESA and adjacent areas and environmental/ecological relations to the existing subwatershed studies and environmental criteria established in this sub watershed. Also shall determine all required measures to protect and maintain the existing level of protection of the existing environmental/ecological functions and features and be supported by ecological and environmental monitoring.	AECOM	N. DeCarlo	1	All evaluation of significance and function, along with all other background information required to inform the determination and implementation of buffers has been addressed prior to this, as well as a new section on monitoring. Flow charts throughout address the process.
EEPAC	Working Group	150	5	117	3	Beacon 2012 should be used to update this Guideline	AECOM	N. DeCarlo	1	Beacon 2012 was used throughout this section to inform updates.
EEPAC	Working Group	151	5	118	3	While these terms are often used interchangeably, setbacks and buffers are not the same thing. A setback is the separation distance required between a natural feature (or hazard) and a project area, to prevent impacts from occurring to either the feature or the project. It is sometimes referred to as the development limit. Buffers are areas of natural vegetation that serve to attenuate and otherwise reduce impacts on the natural feature and its functions. They may occupy part or all of a given setback distance, or may extend beyond the setback if the adjacent land use allows (e.g., passive park features, golf course roughs, undeveloped portions of private properties).	AECOM	N. DeCarlo	1	No longer used interchangeably. Setback vs buffer will be defined in the glossary.
EEPAC	Working Group	152	5	121	4	is this process still in use? Standardized? What is a management unit? Undefined!	AECOM	N. DeCarlo	1	This has been omitted.
EEPAC	Working Group	153	5	124	3	Add here or page 126 under encroachment: McWilliam's work, e.g. Barriers to the effective planning and management of residential encroachment within urban forest edges: A Southern Ontario, Canada Case Study, Wendy McWilliam ,Robert Brown, Paul Eagles , Mark Seasons, published in 2013 in Urban Forestry & Urban Greening(See EEPAC list of sources for other publications)	AECOM	N. DeCarlo	1	McWilliam et al. (and associated literature) have been reviewed and incorporated into the new buffer section. Specifically referring to encroachment.
EEPAC	Working Group	154	5	127	2	is this helpful? Delete?	AECOM	N. DeCarlo	1	This table has been omitted
EEPAC	Working Group	155	5	128-129	3,4	not sure this is used or what the science behind it was. Use Beacon 2012 instead	AECOM	N. DeCarlo	1	This table has been omitted.
EEPAC	Working Group	156	6	131	3	2.1 - only native species must be used	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using Can Plant and be confirmed through the review process.
EEPAC	Working Group	157	6	132	3	2.2 - refer to London's Invasive Species Management Plan	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using CanPlant and be confirmed through the review process.
EEPAC	Working Group	158	6	131	2	EMG section 6 is well documents to avoid monoculture and select suitable plants. This section can be further improved. (a) Currently technology or concepts to explicitly deal with spatial heterogeneity is available, so landscape mosaic could be tailored to suite local niches, using precise data and modeling. Reference: Principles of Landscape Ecology , By: William R. Clark (Department of Ecology, Evolution, and Organismal Biology, Iowa State University) © 2010 Nature Education Citation: Clark, W. (2010) Principles of Landscape Ecology. Nature Education Knowledge 3(10):34; (b) Taking into consideration the complex nature of interaction among flora, fauna, microbes and changing environment, EMG -6 could be further refined to tackle future challenges. e.g. How native plants can be a growing ground for invasive pathogens Reference: 1. Peter Kotanen research at University of Toronto 2.Crous CJ, Burgess TI, Le Roux JJ, Richardson DM, Slippers B, Wingfield MJ. Ecological disequilibrium drives insect pest and pathogen accumulation in non-native trees. AoB Plants. 2016 Dec 23;9(1):plw081. doi: 10.1093/aobpla/plw081. [Epub ahead of print]. PMID: 28013250; PMCID: PMC5499825.	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using CanPlant and be confirmed through the review process.
EEPAC	Working Group	159	6	132	4	Update Planting Recommendation: List of woody plants: Due to climate change, taxonomic updates and more data about selected plants, some may not be suitable for London. Please revisit. There are current databases e.g.: http://www.torontozoo.com/adoptapond/urbanoutback/part53.html	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using CanPlant and be confirmed through the review process.
EEPAC	Working Group	160	6	132	4	For current plant taxonomy information: https://www.uoguelph.ca/foibis/ The list is also published as a book with additional information as the "Flora Ontario" by Newmaster and Ragupathy 2012, which can be ordered by contacting Dr Newmaster (snewmast@uoguelph.ca)	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using CanPlant and be confirmed through the review process.
EEPAC	Working Group	161	6	135	3	delete Manitoba Maple?	AECOM	N. DeCarlo	3	This section has been removed from the document, plant selection will be conducted using CanPlant and be confirmed through the review process.
Nature London	D. Wake	1	ToR General / Timeline	-	4	The Environmental Management Guidelines are but one of a series of documents required to implement the policies of the Official Plan. Although we are eager to see the guidelines updated soon, we wonder whether this is the right time to review them, given the ongoing appeals of the London Plan. This review process needs to include provisions for further refinement of the EMG following resolution of the appeal process.	AECOM	N. DeCarlo	1	Language has been incorporated to ensure the ease of updating the EMGs document as well as allowing for refinement at a later date (following the appeals process)
Urban League	J. Hanbuch	1	ToR	-	3	While butterflies are listed, all pollinators need to be considered as part of a study (native bee habitats in particular - 700 types in Canada, moths, beetles and wasps are all pollinators and need protection from pesticide drift in particular - this means widening buffer zones and protecting significant pollinator habitats) meadow biotopes must be included in the terms of reference	AECOM	N. DeCarlo	1	Pollinators have been considered for buffer design; Additional consideration for other insect studies has been included in the data collection standards. Species at Risk pollinators would be identified through the background review (e.g., bees). Meadows have little protection through policy however, meadows critical to ecological function will be identified through inclusion in vegetation patches for significant woodland/ESA evaluation and/or as critical function zones in wetland evaluation.
Urban League	J. Hanbuch	2		2	3	2.3 Assessment of Dev Impacts must begin to include smaller areas - current research indicates that small " stepping stone" environments significantly impact birds, insects and contribute to heat reduction in cities (see Fernandez,Wu and Simonetti 2018)	AECOM	N. DeCarlo	1	Stepping stone or satellite woodlands are considered for inclusion in significant woodland evaluation. Other size criteria are based on most up to date technical, scientific, and policy documents. The importance of small (satellite) woodlands is outlined in Guideline 7 for determining components for inclusion in vegetation patches.
Urban League	J. Hanbuch	3		13	3	LU7 - ALL loss of flora has significant impact on birds, insects (in particular pollinators) a pollinator policy needs to be developed by London (see Hamilton and Toronto) that serves as an additional resource to this policy	AECOM	N. DeCarlo	3	This table outlining impacts has been replaced with reference to more up-to-date documents (Natural Heritage Reference Manual Table; Significant Wildlife Habitat Mitigation Support Tool).

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
Reviewer Affiliation	Reviewer (F. Last name)	ID	EMG Section	Page	Type of Comment 1 - Policy 2 - Format 3 -Science 4 - Process	Comment and Suggested Action	Responder Affiliation	Responder (F. Last name)	Response 1 - Incorporated 2 - Not Incorporated 3 - Not Applicable	Response Comment
Urban League	J. Hanbuch	4		13	3	RO5- road salt damage has a starting minimum of 30 m - should be 50 m and include wind drift variables (see Harless 2012)	AECOM	N. DeCarlo	3	This table outlining impacts has been replaced with reference to more up-to-date documents (Natural Heritage Reference Manual Table; Significant Wildlife Habitat Mitigation Support Tool).
Urban League	J. Hanbuch	5		13	3	R10 - light /noise damage needs to be specific all species in SW not are 1.5 k from any road already -i.e. Herons need a minimum of 100 m to nest successfully , diversity of wetlands is significantly changed within 1000m of any roadwork (Findlay 2000) The Buffer Zone information is out of date - the new standards should be used. For example - edge microclimates on page 39 mentions sun is a factor but in the checklists this isn't mentioned. In the current research on buffer zones light needs to be measured. (Beacon 2012) Also, bats , insects and other nocturnal creatures are heavily affected by ALAN. No mention of how canopy protection mitigates these issues.	AECOM	N. DeCarlo	3	This table outlining impacts has been replaced with reference to more up-to-date documents (Natural Heritage Reference Manual Table; Significant Wildlife Habitat Mitigation Support Tool).
Urban League	J. Hanbuch	6		32	4	Aggregate resources come under human considerations - not sure why they are here - understand their economic benefit to sewer and water main companies with aggregate mining but why would we destroy natural areas for aggregate pits	AECOM	N. DeCarlo	3	Not applicable for the Draft EMGs.
Urban League	J. Hanbuch	7		43	3	As per the City of Ottawa's tree protection policy, drip line needs to be changed to Critical root zone (CRZ) or whichever is greater - conifers, for example have small canopies but a much greater CRZ - with die back only evident sometimes after 3-5 years . Maintenance of protected trees needs to be specifically outlined in the report if they are part of new development areas.	AECOM	N. DeCarlo	1	Drip line was maintained as the boundary for woodlands based on the majority of other municipalities polices, City of London Tree Protection By-law. Text has been added in that outlines the importance of implementing buffers from the dripline to protect CRZs.
Urban League	J. Hanbuch	8		overall	4	Development of better assessment format than checklists - more transparent - a decision tree model. See City of Barrie Environmental Impact Study reports 2017	AECOM	N. DeCarlo	2	The need for flowcharts will be revisited in Phase 2.
Urban League	J. Hanbuch	9		overall	4	Monitoring needs to be specifically laid out - responsibilities for monitoring, longer timelines for environmental impact assessments including post monitoring to assist with future decision making. A contingency plan for difficulties during monitoring needs to be developed.	AECOM	N. DeCarlo	1	New sections on monitoring, compensation has been drafted addressing this comment.
Urban League	J. Hanbuch	10		overall	4	Clear objectives for protection laid out at the front of the guideline , clear objectives for improving the environment (i.e. - improvement of corridors, increase in stepping stone areas)	AECOM	N. DeCarlo	1	Clear objectives for the City of London's NHS (from The London Plan) are outlined in the text and used to guide this document.
Urban League	J. Hanbuch	11		overall	4	City of Waterloo includes all areas (Woolwich county etc....) in their environmental impact planning - including maps so a picture emerges of the region - again this goes back to my earlier concern that London is siloing the impact of urban development.	AECOM	N. DeCarlo	3	I believe this is referring to the "Region of Waterloo" which is a regional (upper-tier) municipality, whereas the City of London is a single-tier municipality (situated within Middlesex County)
UTRCA	C. Creighton	1	All sections			We recommend that much of the background information be organized into Appendices in order to keep the main document concise with procedural steps.	AECOM	N. DeCarlo	1	This has been attempted throughout without compromising the readability and flow of the document.
UTRCA	C. Creighton	2	1			It appears that there is not much consideration of the TART members with respect to determining the advancement of the process. Some statements pertaining to the sign off from the TART rather than just the City of London is required.	AECOM	N. DeCarlo	1	The role of the TRT is outlined in the document including pre-consultation, site visit, ongoing consultation, etc..
UTRCA	C. Creighton	3	All sections			The focus should be on net gain, rather than on rehabilitation or avoidance. The document should include planting ratios and theory as to how to achieve a net gain (e.g. diversification, bulking up remaining features, connectivity and linkages, etc.).	AECOM	N. DeCarlo	1	The new compensation/offsetting section outlines encouragement for moving towards net environmental gain, however the current structure of the City of London's Policy focuses on No Net Loss for wetlands and no negative impacts. With regards to infrastructure, avoidance is prioritized.
UTRCA	C. Creighton	4	All sections			The focus of the analysis should be on the catchment boundaries for wetlands in order to determine the impacts of adjacent land uses rather than setting a prescribed distance.	AECOM	N. DeCarlo	2	The focus for wetlands has been shifted to Critical Function Zones (Env. Canada, 2013). However, considerations for hydrology, hydroG, geomorph, etc. have been included in Sections 2.1, 2.6.5, and the ESSC.
UTRCA	C. Creighton	5	All sections			Please incorporate more detail regarding the hydrogeological requirements / standards into the document especially with respect to protecting wetland features and their functions.	AECOM	N. DeCarlo	1	Considerations for hydrology, hydroG, geomorph, etc. have been included in Sections 2.1, 2.6.5, and the ESSC. However, the requirements will be determined on a case-by-case basis.
UTRCA	C. Creighton	6	All sections			Please include definitions for "adequate" or "reasonable" buffer; "reasonably expected"; 'thresholds", "compensations" as these terms are somewhat ambiguous and may be open to interpretation.	AECOM	N. DeCarlo	3	The buffer section has been completely revamped with an aim at removing ambiguity and providing a more standard methodology for determining buffer widths, while maintaining flexibility on a case-by-case basis.
UTRCA	C. Creighton	7	1	17		What is the science behind Table 1: Potential Impacts associated with different land uses?	AECOM	N. DeCarlo	1	This table has been omitted. Reference to defensible (NHRM, SWHMiST) impact assessment guidance documents has been made.
UTRCA	C. Creighton	8	ToR			Beacon noted that Sections 1, 2 & 5 provided a good process. Other than policy updates or references, will these Sections be revised?	AECOM	N. DeCarlo	1	Where possible, each of these sections have been reviewed beyond policy and reference updates, specifically Section 5 has been completely reworked.
UTRCA	C. Creighton	9	ToR			Will new Sections be created to deal with monitoring and ecological compensation (e.g. wetlands, woodlands)?	AECOM	N. DeCarlo	1	New sections on monitoring and compensation have been drafted addressing this comment.
UTRCA	C. Creighton	10	ToR			In the proposed revisions for the PPS (Draft 2019) climate change is referenced extensively. Consider including more references to climate change in the EMGs	AECOM	N. DeCarlo	1	Climate change has been incorporated as a consideration into the updated EMGs, however there is little policy support for implementation. Reference to the City of London's Draft Climate Emergency Action Plan and Evaluation Tool will be made.
UTRCA	C. Creighton	11	ToR			Recommend that when environmental studies (e.g. EIS, hydrogeo) that they be prepared for the entire site rather than a piecemeal/phase approach.	AECOM	N. DeCarlo	3	Altering the structure of the reporting processes for the City of London falls out of the scope of this update as the EMGs are a tool to implement policy.
UTRCA	C. Creighton	12	ToR			Scope of Work - consider expanding the document review to include documents dealing with monitoring and ecological compensation.	AECOM	N. DeCarlo	1	New sections on monitoring and compensation have been drafted addressing this comment.
UTRCA	C. Creighton	13	ToR			Timeline and Deliverables - the text is a bit confusing. Consider adding a table/figure that sets out the milestones and opportunities for commenting.	AECOM	N. DeCarlo	3	Addressed during the RFP process.
UTRCA	C. Creighton	14	All sections			Add page numbers and headers and footers. Have a cover and table of contents.	AECOM	N. DeCarlo	1	Incorporated.
UTRCA	C. Creighton	15	All sections			How do other technical studies e.g. hydrogeo and geotechnical fit into the process?	AECOM	N. DeCarlo	1	Although not the focus of these EMGs, the need for other technical studies (e.g., hydrogeology, geotech) are mentioned in Section 1 - Introduction and Section 2 - Guidelines for the Preparation and Review of Environmental Studies. This includes pre-consultation where the requirement for these related technical studies will be determined with the City of London and the applicable Conservation Authority.
UTRCA	C. Creighton	16	All sections			How will information in addendums be incorporated? As an appendix? Into the body of the report?	AECOM	N. DeCarlo	1	The SLSR/EIS process has been revised and outlined in Section 2.
UTRCA	C. Creighton	17	All sections			Consider having one glossary for the entire document.	AECOM	N. DeCarlo	1	The updated EMGs will have one glossary for the entire document.
UTRCA	C. Creighton	18	All sections			Should all EIS recommendations be listed as conditions of draft plan approval? What happens if the EIS is not finalized until the Design Studies stage?	AECOM	N. DeCarlo	1	Addressed in Section 2.6.5 - Report Content.
UTRCA	C. Creighton	19	All sections			How do you deal with a phased development? Recommend that technical reports be prepared for the entire site rather than on a piecemeal basis.	AECOM	N. DeCarlo	1	Scope of EIS shall be for the entire site, with addendums on subsequent phases as the development progresses.

Appendix E - External Resource Group Comment Response Table

External Resource and First Nation Comments							AECOM Response			
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UTRCA	C. Creighton	20	All sections			Approach regarding natural heritage - is it no negative impact? No net loss? Net benefit or gain?	AECOM	N. DeCarlo	1	The approach mirrors that of the London Plan, for which much of the policies are directly related to 'no negative impacts' as outlined in the PPS and net environmental gain. With regards to wetlands, The London Plan (Policy 1334) states that there should be 'no net loss' to feature or functions. Further, replacement ratios for compensation are at minimum 1:1, which aims for no net loss (on a land base area), with larger replacement ratios recommended in the new compensation section to encourage net gain.
UTRCA	C. Creighton	21	All sections			Update policy references - London Plan, PPS.	AECOM	N. DeCarlo	1	Policy references updated throughout.
UTRCA	C. Creighton	22	All sections			Is the EIS only assessing significant features? London Plan protects all wetlands.	AECOM	N. DeCarlo	1	The updated guidelines outlines the identification, delineation, and evaluation of the components of a natural heritage system, specifically based around the designations and protection requirements outlined in the LP and other applicable policy.
UTRCA	C. Creighton	23	All sections			Are any impacts on the natural heritage system considered to be acceptable?	AECOM	N. DeCarlo	1	In terms of natural heritage, negative impacts (and positive impacts) are considered on a case-by-case basis.
UTRCA	C. Creighton	24	All sections			Use consistent terminology to describe the natural heritage system.	AECOM	N. DeCarlo	1	Attempted to standardize terminology related to the NHS to avoid confusion throughout.
UTRCA	C. Creighton	25	All sections			Is a drainage corridor a watercourse? It sounds more like infrastructure than a natural feature.	AECOM	N. DeCarlo	1	Watercourse definition updated to cover the varying qualifying features depending on the legislation/application/etc.
UTRCA	C. Creighton	26	All sections			Table A - are the distances current?	AECOM	N. DeCarlo	1	This table has been updated in Section 2.1.4.
UTRCA	C. Creighton	27	All sections			Issue Summary checklist - the 2 box approach has always been a bit confusing. Simplify?	AECOM	N. DeCarlo	1	Addressed in new ESSC.
UTRCA	C. Creighton	28	All sections			Issue Summary checklist - how do you ensure that the applicant completes the list? Don't schedule the scoping meeting until the list has been completed?	AECOM	N. DeCarlo	1	Checklist updated to ESSC and scoping/checklist requirements outlined in Section 2.2.
UTRCA	C. Creighton	29	All sections			What if an agency does not agree with the waiving for the need of an EIS? What is the process?	AECOM	N. DeCarlo	2	In general, this occurs through policy or maximum buffer implementation. There is no process for this however waiving of the EIS is left solely to the City of London in consultation with TRT members - to be determined on a case-by-case basis.
UTRCA	C. Creighton	30	All sections			Site visit - has been very beneficial and should be strongly encouraged.	AECOM	N. DeCarlo	1	Section 2.2.2 outlines that site visits may be required as part of or following the scoping meeting.
UTRCA	C. Creighton	31	All sections			Scoped EIS - how are "adequate" buffers determined? Beacon Report speaks to variable sizes of the buffers in the 9 developments that were studied. Should there be an absolute minimum size? 10 m?	AECOM	N. DeCarlo	1	The buffer section has been completely revamped with an aim at removing ambiguity and providing a more standard methodology for determining buffer widths, while maintaining flexibility on a case-by-case basis. This updated section includes minimum buffers.
UTRCA	C. Creighton	32	All sections			Boundary Guidelines - available from the Planning Dept - consider including as an appendix.	AECOM	N. DeCarlo	1	Boundary delineation guidelines have been addressed within the Draft EMGs.
UTRCA	C. Creighton	33	All sections			Land Use Management - add salt - pools, driveways, sidewalks	AECOM	N. DeCarlo	3	Land use management revised throughout the Draft EMGs.
UTRCA	C. Creighton	34	All sections			What is a reasonable buffer? Beacon Report noted that in some developments there was no buffer.	AECOM	N. DeCarlo	1	The buffer section has been completely revamped with an aim at removing ambiguity and providing a more standard methodology for determining buffer widths, while maintaining flexibility on a case-by-case basis. This updated section includes minimum buffers.
UTRCA	C. Creighton	35	All sections			mitigation Measures - some of them - swm measures, pathways and trails should be located in the additional setback outside of the buffer.	AECOM	N. DeCarlo	1	The updated buffer section includes information on what land-uses cannot be used within the buffer. Mitigation measures tables have been removed and replaced with reference to the Natural Heritage Reference Manual and the SWH Mitigation Support Tool.
UTRCA	C. Creighton	36	All sections			Compensation - need a policy.	AECOM	N. DeCarlo	1	Section 6 - Compensation has been added to the EMGs.
UTRCA	C. Creighton	37	All sections			Woodlot vs woodland?	AECOM	N. DeCarlo	1	Woodland has been clearly defined within the updated EMGs.
UTRCA	C. Creighton	38	All sections			Monitoring - standard protocol - pre, during and post construction? Required for all new development?	AECOM	N. DeCarlo	1	Section 7 - Monitoring has been added to the EMGs to try and standardize monitoring protocol (with some flexibility for site variability, etc.).
UTRCA	C. Creighton	39	All sections			Mitigation measures - trail development - as long as it is located outside of the buffer in the additional setback.	AECOM	N. DeCarlo	1	The updated buffer section includes information on what land-uses cannot be used within the buffer. Mitigation measures tables have been removed and replaced with reference to the Natural Heritage Reference Manual and the SWH Mitigation Support Tool.
UTRCA	C. Creighton	40	All sections			N/A	N/A	N/A	N/A	No comment provided (referred to initial comment email).
UTRCA	C. Creighton	41	All sections			Issue Summary Checklist - update the references to natural hazards - riverine flooding hazard, riverine erosion hazard, wetlands, regulated area.	AECOM	N. DeCarlo	1	This has been addressed in the updated ESSC and Draft EMGs.
UTRCA	C. Creighton	42	All sections			Ecological Buffer Zone from a watercourse - 15-30 m - clarify that in the case of a warm water watercourse a 15 m buffer on each side of the bank is required and that 30 m on each side of the bank is required for a cold water watercourse.	AECOM	N. DeCarlo	1	Section 5.3.4.1 Minimum Buffer Widths outlines this. Further in boundary delineation. Further, additional corridor widths are outlined in Section 4.3 when considering the inclusion of a watercourse and its associated corridor width for inclusion within a vegetation patch .
UTRCA	C. Creighton	43	All sections			setback and buffer limits should be clearly marked on all plans including those used during construction and should be staked in the field	AECOM	N. DeCarlo	1	Addressed in Section 2.6.5 - Report Content as a recommendation for detailed design and in Section 5.
LDI	M. Wallace	1	1		4	**Comment:** Since the Guidelines were adopted in January 2007, at a provincial level, the Provincial Policy Statement, Technical Schedules, Conservation Authorities Act, and the Endangered Species Act have all changed. Locally the development application and review process has also been adjusted; and continues to evolve. Meanwhile the roles and responsibilities of provincial agencies and Conservation Authorities are being scrutinized with the changes forthcoming. Notwithstanding the obvious need to modernize the EMGs to reflect all the plan review changes, a more streamlined approach to the submission and review process is also sorely needed. Currently, an EIS report is submitted and reviewed by three formal entities in London; City, UTRCA, and EEPAC. Comments are provided by each with an expectation of a response to each, despite the same EMG document as reference. **Suggestion:** Comments associated with the City Official Plan and EMG document need to be vetted and circulated through one entity	AECOM	N. DeCarlo	1	The process of EIS review will remain unchanged.

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LDI	M. Wallace	2	1		4	**Comment:** The UTRCA also provides comment from their regulatory perspective related to hazard management (flooding, erosion, and wetland interference) along with their assigned role in source water protection. Their multiple roles create issues in the early stages of the planning process as the expectation of a sign off through the regulatory permit process requires more detail than is available at this early stage in the process. Their letter format also obscures comments requiring resolution before proceeding to the next phase and those that are recommendations to move through detailed design. **Suggestion:** The UTRCA planning comments should be guided in the EMG document.	AECOM	N. DeCarlo	1	The UTRCA role in plan review is outlined in UTRCA documents, and in Section 2 as part of the TRT. Additional outline of their role will not be included in the EMGs.
LDI	M. Wallace	3	1		1	**I would also like to highlight an issue for discussion and clarification through this process regarding the future City of London EMG. We believe a discussion of LPAT Case # PL170840 (December 24, 2019) should be included at some point during this review to better differentiate between natural heritage features and man-made features in the current future City of London EMG.**	AECOM	N. DeCarlo	3	This comment is out of scope for the updated EMGs.
LDI	M. Wallace	4	1		4	**Comment:** As part of the Planning Act, a complete application is needed following pre-consultation. Generally, this was, in part, to avoid "pre-approvals" before all agencies and departments have had the chance to comment. Yet, the EMG is written in such a way that features, sensitivities, and avoidance measures need to be approved before a report is submitted in the complete application queue. **Suggestion:** The EMG needs to be re-written to respect the complete application and appeal mechanisms associated with Planning Act.	AECOM	N. DeCarlo	1	Detailed guidelines for the application process have been outline in Section 2 of the EMGs.
LDI	M. Wallace	5	1		4	**Comment**: From a technical perspective, expectations have also evolved. Compared to the EIS's of 2007, additional disciplines (specifically hydrology and water balance) provide supporting documentation which is then incorporated into the EIS. This leads to numerous cross discipline comments in the EIS and supporting document review responses. Additionally, as the development proceeds from draft approval to detailed design to subdivision agreements, full EIS report addendums are expected. Documentation and tracking of comment incorporation for future file reference has become... cumbersome. **Suggestion:** Separate reports, for each phase of submission, would improve the review and documentation and oversight as well as allow the supporting technical disciplines to gather more detail and refinement to better inform the next phase of the planning process submission. Recommendations from the Draft Approval report can be brought forward to a design studies report and any adjustments to the plans through detail design can be addressed without revisions to the earlier EIS. Similarly, as the plan moves from design studies to subdivision agreements.	AECOM	N. DeCarlo	2	Scope of EIS shall be for the entire site, with addendums on subsequent phases as the development progresses. Alternate opportunities for phasing could be explored; further discussion may be required.
LDI	M. Wallace	6	1		4	**Comment:** Clarity is needed in determining when an Area Plan, Secondary Plan, and Subject Lands Status Report (SLSR) are needed. Each site should not have to undertake all these studies as seems to be the case in London. The above studies should be to implement substantial Official Plan amendments (i.e., Agriculture to Urban Uses) at a large land base scale or, in the instance of an SLSR, to implement a similarly large OPA when an Area Plan or Secondary Plan is not available nor imminent. An EIS, on the other hand, is a document that provides OPA refinements or adjustments and zoning amendment support. **Suggestion:** As discussed previously, if reports were treated as separate documents, a detailed design studies EIS report would then provide refinements as a result of detail design	AECOM	N. DeCarlo	1	Clarity on when SLSR, EIS, Scoped EIS are required (and when they are not) has been included within the updated EMGs. The checklist has been updated and acts as the ToR creating a more streamlined process.
LDI	M. Wallace	7	1		4	**Comment:** Scoping meetings are a requirement of the EIS process. These meetings are often difficult to organize, and meeting minutes are often months delayed with no formal signoff often occurring within the process. Furthermore, the reality of when landowners begin the process does not often correspond well with the very formal and iterative process suggested by the current EMG. As a result, full inventories are often complete prior to initiation or formalization of the minutes. Certainly, most sites now have a very standard set of requirements and as such, the scoping process often results in agreement on what was already underway. **Suggestion:** Create a more streamlined pre-consultation process. MTE has developed a one-page checklist for other jurisdictions that, when circulated with a graphic and covering letter, results in quick agreement from agencies. A similar approach could be implemented in London. Meetings would then only need to be called for circumstances when there is disagreement on the scope or approach. Meetings are more appropriate and effective after data and analysis has taken place.	AECOM	N. DeCarlo	1	AECOM has explored the use of a single-page checklist, however it has been decided to update the current issues summary checklist to make the process more streamlined, efficient, and effective. The formal pre-consultation meeting was retained as a way to effectively scope the EIS to ensure that unnecessary fieldwork, addendums, etc. are avoided.
LDI	M. Wallace	8	1		3	**Comment:** The level of detail for development submissions has markedly expanded to include hydrogeological investigations, Low Impact Development, feature-based water balance studies, to name a few. Our knowledge of potential impacts and mitigation with more and more sophisticated models and water management approaches has removed much of the uncertainty that was inherent in development applications when the first set of guidelines was released. **Suggestion:** Acknowledge the higher level of detail and understanding in the EMG.	AECOM	N. DeCarlo	1	Reference to the incorporation of and use of information from hydrogeological, geotechnical, etc. other studies has been included and are important for the impact assessment and mitigation. Although these studies are included, in-depth descriptions were not included to maintain the Natural Heritage focus of the EMGs.
LDI	M. Wallace	9	2,3,4,5		3	**Comment:** The guidelines within the EMG tend to lump any vegetation that is not lawn or in the agricultural cultivation as a single vegetative unit for evaluation. Within that unit, there can be sensitive, tolerant, and highly disturbed that get lost in the guideline format. Some habitat types are providing protection to more internal features or existing disturbances are impacting sensitive features or restricting a feature from being more important. Further, some impacted habitat (invasion, trails, garbage dumps, forts etc.) could be re-naturalized to improve conditions rather than protecting these circumstances and then expecting additional buffers to an already degraded site. Not only does the current process obscure these sensitivity differences within a feature but also between features. An old growth forest and buckthorn dominated thicket could both be labelled Significant Woodlands, yet they are very different features in their biological makeup and resiliency to adjacent land use changes. **Suggestion:** Some realistic guidelines are needed to help define the habitat types and sensitivities along with opportunities for improved natural heritage, perhaps even in lieu of additional setback.	AECOM	N. DeCarlo	1	Updated buffer, evaluation, and boundary delineation guidelines were included in the EMGs to better define natural heritage features and areas and to improve the science in determining buffer widths. These updates provide more focus on ecological function so that features can be defined and evaluated based on their role in the City of London's Natural Heritage System.

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External Resource and First Nation Comments							AECOM Response			
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LDI	**M. Wallace**	10	2,3,4		3	**Comment:** Sizes of features for evaluation that are not mapped should also be revisited. A 0.5 ha patch is very small and not ecologically significant on its own unless there are some highly unusual circumstances. It is our view this additional look was aimed at features that lay near more substantial habitat rather than any and all isolated unmaintained areas. This size of unmapped feature requiring study needs to be further developed and based on science. **Suggestion:** Revise the minimum size of patch size evaluation and location for unmapped features to be evaluated.	AECOM	N. DeCarlo	3	This would require an update to the policies in the London Plan and is thus out-of-scope for the updated EMGs.
LDI	**M. Wallace**	11	1,2,3,4		3,4	**Comment**: Guidelines for Woodland Evaluation, use extremely low cut-offs and filters in the scoring system to determine significance as discussed below. This scoring system was targeted towards large features already identified as potentially significant, and, from my perspective, likely designed to make them, or a vast majority, significant. To then apply this same scoring structure on unmapped features is contrary to the stated intent of the guidelines are technically unreasonable. For example, several mature trees close together within fallow lands scores a High for Significance (guideline 2.1a), making the entire fallow land a Significant Woodland with almost no trees. More absurdly, a small patch of land left fallow for a year that is an area with more than 10% cover scores High (guideline 1.2a) and as a result, this fallow land can be a Significant Woodland without any trees at all. Implications to wholesale changes to previously approved land use and installed infrastructure, based on an unintended use of the guideline document on unidentified features needs to be duly considered when compared to evaluation of sites with known and fully public natural heritage recognition. **Suggestion:** Ensure the EMG clearly states that other measures of significance will be used to assess unmapped features.	AECOM		2	As the Significant Woodland Evaluation Guidelines have passed through the OMB, changes to cutoffs and filters not directly supported through changes in policy were not incorporated. The evaluation of significance is outlined through policy in the London Plan and therefore other methods of evaluating significance for Significant Woodlands have not been incorporated. Clarity has been provided on evaluating significance and ecological function of different natural heritage features and areas (e.g., habitat of endangered and threatened species, etc.).
LDI	**M. Wallace**	12	5		3,4	**Comment:** The Buffer calculation model has always been an option for use as specifically noted in the guideline. "The model can be used to help gauge the range of buffer that needs to be considered" pg. 121. This model results in large buffers distances that are rarely translated into actual development setbacks, suggesting its utility is limited. The calculation itself, when broken down by component is only somewhat logical from a perspective of the actual site clearing for land development (i.e. erosion related to construction) and has very little bearing on end use. For example, in the model, lands that have 10% slope suggests a range of a 2-5m buffer, while a site with 11% slope is 5-10m with no explanation for the difference the 1% extra slope poses to a feature. Presumably the lower score is if land slopes away from the feature and larger if it slopes towards. However, post-development, most land runoff is directed to stormwater management systems and rear yard slopes are almost immaterial to the feature protection. Overall, the buffers are particularly focused on rear lot setbacks to keep people that back onto a feature, out. Yet, the City then often introduces trails through the features to provide access for the entire remainder of the City. For the record, we generally support trail systems through features in an urban setting to limit indiscriminate trails and to provide educational benefits as well as closer lot limits for the same reasons. Buffer research and its effectiveness has not been well researched and there are other practical supportable mechanisms which need to be considered and encouraged. Given that buffers themselves are not proven to be fully effective, we should be open to trying other methods as well. Public education and engagement can be extremely effective if taken seriously and managed appropriately. **Suggestion:** Remove the model and provide a more fulsome review of buffer effectiveness and more specifically, alternatives.	AECOM	N. DeCarlo	1	The buffer section of the EMGs has been reworked with updated scientific research and methodology for determining buffer widths. A compensation section has also been added to provide a standardized and streamlined approach to implementing compensation/offsetting.
LDI	**M. Wallace**	13	1,2		4	**Comment:** Guideline documents and evaluation tools have been developed to guide site sensitivity assessment. The PPS only affords absolute constraints to development from Provincially Significant Wetlands and Coastal Wetlands. To be consistent with the PPS, other components of the Natural Heritage System should not be assessed as absolute constraints as seems to be the current practice in London. The determination for a site sensitivity should be placed into the context of the jurisdiction within the much larger ecoregion to which provincial guidelines apply. For example, Eastern Wood Pewee is considered Special Concern in the Province because of population changes along the Canadian Shield southern boundary. They are fully secure in Southern Ontario and therefore, not sensitive to development activity. Their presence in London, therefore, should not be an impediment to development, or trail systems for that matter. There are several circumstances over the last several years where habitat discussions have escalated over a disagreement on site sensitivities particularly in relation to Significant Wildlife Habitat, as well as small wetland features not meeting OWES standards. There is no internal dispute resolution mechanism to address these differences. Instead, the disagreements are vetted in a public letter exchange. Replies are often not made public **Suggestion:** There needs to be some consideration for scientific dispute resolution.	AECOM	N. DeCarlo	3	The creation of an internal dispute mechanism is likely out-of-scope for the updated EMGs, however this will be considered for recommendation to future updates for the City of London policies/EMGs.
LDI	**M. Wallace**	14	1		4	**Comment:** Often, there is miscommunication in the report or misinterpretation of the intent of a recommendation. More open and clear communication between proponent and review agencies prior to written responses can be effective tools to avoid conflict. **Suggestion:** Incorporate a report review meeting process prior to release of review comments to try to pre-emptively and cooperatively resolve issues.	AECOM	N. DeCarlo	1, 2	As mentioned in LDI's comment regarding pre-consultation, often these meetings are difficult to schedule, etc. Language is included in the EMGs that any major concerns that the TART has should be forwarded to the City of London Planner as soon as possible to make the process more efficient. The EMGs also outline the importance of ongoing consultation to be able to address issues throughout the process effectively and cooperatively.
LDI	**M. Wallace**	15	1,5,6		3,4	**Comment:** Efforts to improve our Natural Heritage System need not always to be about expansion of habitat or interference/influence on development proposals. Instead, and particularly in or near an urban environment where substantial impacts already exist, the protection of our system can often be about natural heritage enhancements. **Suggestion:** The guideline needs to acknowledge enhancements can often be an important consideration in Natural Heritage System protection	AECOM	N. DeCarlo	1	Reference to sources outlining mitigation strategies (including restoration/enhancement options) and a new section outlining compensation options and guidelines have been included in the updated EMGs.

Appendix E - External Resource Group Comment Response Table

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LDI	**M. Wallace**	16	1		2,3	**Comment:** It seems the agency review perspective has generally migrated to more habitat as a singular natural heritage target. This can become counter productive as there are no ecological measures associated with a "more habitat" philosophy. And, the target can just keep moving higher. There needs to be a more definitive goal-oriented target, whereby a cost/benefit analysis is possible, and success can be quantified and measured. Are we targeting songbird nesting and woodlands? Or, do we want a diversified habitat that seeks biological richness? Or, do we want a system of trails and natural heritage integration for enjoyment and education? Once the goals are established, resolution of disagreement becomes achievable. Also, post development monitoring programs become purposeful and comparable. **Suggestion:** Set an overall natural heritage goal that development and natural heritage can strive for.	AECOM	N. DeCarlo	3	Natural heritage goals are set through the London Plan and the EMGs act as a tool to implement the policies (aimed to achieve the goals outlined in the London Plan).
LDI	**M. Wallace**	17	1		4	**Comments:** It is our experience, that the construction phase of a development is the phase which poses the greatest potential impact to adjacent natural heritage features. There needs to be more definitive guidelines related to the implementation of EIS recommendations and oversight of natural heritage protection and mitigation while the site is developed. **Suggestion:** Incorporate a reasonable construction phase audit program to detect and mitigate potential issues that may impact Natural Heritage.	AECOM	N. DeCarlo	3	Construction monitoring requirements have been revised in Section 7. A formal audit program would be useful but falls outside the scope of this update. Potential to include text to provide reasonable timelines for submitting monitoring results throughout the construction phase; further discussion may be required.
LDI	**M. Wallace**	18	1		2,3,4	**Comments:** Long term monitoring is becoming a request of development through draft plan conditions and site plan approvals. This makes sense in the instances when habitat creation is proposed. Monitoring would be used to ensure the created habitat is reaching its desired wildlife use outcome. However, there is not a clear framework to allow for the development of an effective monitoring program to simply measure adjacent impacts. The data needs to be comparable to control sites and to separate development related impacts from buffer naturalization efforts, adjacent landowner, public trails, annual population variations, and/or disease outbreaks. There also needs to be a clear understanding of the end use of the data to be collected. **Suggestion:** A more clear framework for the goals, objectives, data management, and expected adaptive management responsibilities is needed to help guidepost construction monitoring expectations.	AECOM	N. DeCarlo	1	Construction monitoring requirements have been revised in Section 7. Monitoring conducted throughout development (pre-, during and post-construction) would identify where impacts are occurring. Prompt notice and action to mitigate further damage should be occurring. Where impacts are due to external circumstances (adjacent impacts), enhanced measures for protection may be warranted, and further discussion may be required.