BEACON ENVIRONMENTAL

GUIDING SOLUTIONS IN THE NATURAL ENVIRONMENT

Environmental Study Report (ESR) for Unnamed Park 524 and 525 City of Mississauga

REPORT

Prepared For:

City of Mississauga
Community Services Department
Parks & Forestry Division

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1. Introduction

In March of 2018, the City of Mississauga initiated a process for development of 4.82 hectares (ha) (11.9 acres [ac]) of currently vacant park lands known as Unnamed Park 524 (P-524) and Park 525 (P-525) (referred to herein as the Park or the subject property). The future Park lands are located just west of Hurontario Street and north of Eglinton Avenue West. They consist of two parcels bisected by Cooksville Creek (i.e., P-524 to the east and P-525 to the west) (see **Map 1**). The Park lands include several cultural and natural features (i.e., wetlands, cultural treed areas, hedgerows and cultural meadows) that needed to be considered in the context of the proposed park development.

Although the Park lands being considered for development consist exclusively of the P-524 and P-525 lands, for the purposes of this this Environmental Study Report (ESR), the broader Study Area includes the Cooksville Creek corridor running between P-524 and P-525 and the parcel approved for Fire Station 120 at the southeast corner of P-525 (see **Map 1**) for the following reasons.

- Although no development is proposed within the creek corridor, inclusion of this segment of Cooksville Creek as part of the broader Study Area facilitated a more comprehensive assessment of the site-specific ecological and hydrologic functions, and allowed for constraints and opportunities to be assessed in a more wholistic manner; and
- The Fire Station 120 lands were already approved for development at the outset of this project. However, the site plan approval process for the Fire Station 120 lands provided background information relevant to this project and also committed the City to habitat compensation[1] that needed to be integrated in to the Park design. This Fire Station site and its developed condition also needed to be considered in terms of the stormwater management and overall design for the Park lands.

Due to the presence of natural areas including wetlands and their adjacency to Cooksville Creek corridor, development of the Park lands is subject to various City requirements and Conservation Authority regulations. These include the need for the proposed development to meet the established stormwater management (SWM) criteria for this area. The anticipated need for SWM and related infrastructure triggered the need for a municipal Class Environmental Assessment (EA) planning process, specifically a Schedule B EA. Therefore, a municipal Class B EA process was undertaken in conjunction with the City's planning process for this Park to inform the selection of the Preferred Park Design Concept.

This overall planning for and implementation of this project has been divided into five phases:

- Phase 1 – Pre-Design Phase (including various technical studies);
- Phase 2 – Design Development and Concept Plan;
- Phase 3 – Contract Documents and Tender Package;
- Phase 4 – Construction and Contract Administration; and
- Phase 5 – Post-Construction and Warranty.

[1] Through the Fire Station 120 site plan approval process, the City's Parks department committed to restoration of 0.4 ha of woodlands area within the City to compensate for the fire station site (originally intended as woodland habitat) and nine (9) retainable trees to be removed along Eglinton Ave. West to accommodate a new water / sanitary sewer line for the fire station. The City also committed to compensate for the small area (i.e., 88 m^2) (NSEI 2017) of wetland encroached upon to accommodate this water line.

This ESR provides the planning and technical documentation for the first two phases and is also intended to meet the reporting requirements for the Class B EA process. This ESR documents how a Preferred Concept for the Park (including the required amenities[2]) was developed. to be: compliant with the applicable policies and regulations; based on a good understanding of the existing conditions; and refined with input received from engagement and consultations (see **Appendices A through D**). This ESR also describes how the project considers and addresses climate change at a local scale.

Specifically, this ESR includes the following related to this project:

- The planning context (**Section 2**);
- A description and documentation of engagement of indigenous groups and consultations with the City, agencies and the community (**Section 3**);
- An overview of the historical and existing conditions based on a synthesis of background information and site-specific work undertaken as part of this project (**Section 4**);
- An assessment of the natural heritage constraints and opportunities for restoration and enhancement in the Study Area based on existing conditions (**Section 5**);
- A description of the alternatives put forward for park development, an evaluation of these alternatives, and the identification of the Preferred Concept (**Section 6**);
- An environmental impact assessment based on the Preferred Concept as well as recommendations for mitigating anticipated impacts and enhancing the Study Area from an ecological perspective (**Section 7**);
- A summary of compliance of the Preferred Concept and the related recommended mitigation measures with the applicable regulations and policies (**Section 8**);
- Next steps to be undertaken as part of the detailed design process to follow, including requirements for any permits and approvals (**Section 9**); and
- Appendices that provide details related to the engagement and consultation process, as well as supporting technical reports and information.

1.1 Project Goal and Purpose of Project Phases 1 and 2

The City's goal for this project is to "*design and construct an innovative, environmentally responsive, all season community park that effectively integrates park amenities, facilities, and infrastructure with the unique natural features of the site*".

The purpose of Phase 1 and 2 of the project, as documented in this ESR, is to provide both the planning and the technical context and rationale for the Preferred Concept (including how the SWM requirements have been met), as well as seek input from indigenous groups and the various stakeholders, and document how this input was considered and addressed. The Preferred Concept is to form the basis for the detailed designs to be used to direct implementation of the Park development.

[2] As per the Request for Proposal for this project (PRC000078), park amenities and facilities to be incorporated in to this Park included: flexible open lawn areas, a naturalized meadow, a basketball / multi-use court, two tennis courts, an informal sports field sized to accommodate one "major" soccer pitch, a children's play site, an outdoor fitness loop / exercise stations, a parking lot for up to 27 vehicles, a range of naturalized enhancement areas, storm water management that meets City and Conservation Authority requirements for quantity and quality control, a public art installation and a community garden.

1.2 Project Team

The City of Mississauga retained the MBTW Group (MBTW) to lead the Park development process in early 2018 with the support of a multi-disciplinary team. As part of this team, Beacon Environmental Limited (Beacon) was responsible for leading the municipal Class B EA process as well as the natural heritage and arboriculture work. This report has also benefitted from input from Beacon's Senior Hydrogeologist.

The project team (which was selected to address all requirements from the initial selection of a Preferred Concept to the development and implementation of the detailed design) also includes Engineers, Surveyors, Agronomists and public art consultants as shown in **Figure 1**. Team members that have contributed specifically to portions of this ESR include the Geotechnical Engineers (Soil Engineers Ltd.), Surface Water Engineers (MTE Consultants Ltd.) and Landscape Architects (MBTW).

1.3 Site Context

The subject property is located at the northeast corner of Eglinton Ave. West and Fairwind Drive with Cooksville Creek flowing diagonally through it, separating P- 524 to the east and P-525 to the west. The two park blocks are connected by an existing span bridge located near northern limit of the Study Area. P-525 is 3.72 hectares (ha) [9.2 acres (ac)] while P-524 is 1.09 ha (2.7 ac) (see **Map 1**). These park blocks exclude the floodplain an erosion hazard setback which was delineated with Credit Valley Conservation (CVC) as part of the planning process for the Pinnacle condominium and townhouse development in the lands east of P-524 between 2012 and 2015, and confirmed with CVC as part of the site plan approval process for the Fire Station 120 site over 2016 and 2017. The Park lands also exclude the Fire Station 120 lands at the southwestern end of P-525.

Within the subject property (and specifically in the P-525 lands) there are wetlands and treed areas (see **Section 4**) that needed to be considered through the planning process along with Cooksville Creek and its associated floodplain in the broader Study Area.

The lands surrounding the Study Area are entirely developed, primarily with a mix of low and medium density residential land uses. There are two schools in close proximity to the Park lands (i.e., St. Hilary Elementary School and Cooksville Creek Public School) as well as other municipal parks both upstream and south of the site (see **Figure 2**).

A medium density residential development (referred to herein as the Pinnacle site) was recently completed immediately adjacent to P-524 and east of Cooksville Creek. The fire station located just west of Cooksville Creek along Eglinton Avenue West and immediately adjacent to P-525 was recently approved and is in the process of being built.

In terms of zoning, the Park lands are designated as Open Space and Greenlands in the City (see **Figure 3**). Open Space and Greenlands zoning have specific and different permitted land uses, with Greenlands being the more restrictive of the two (see **Section 2.3.3**).

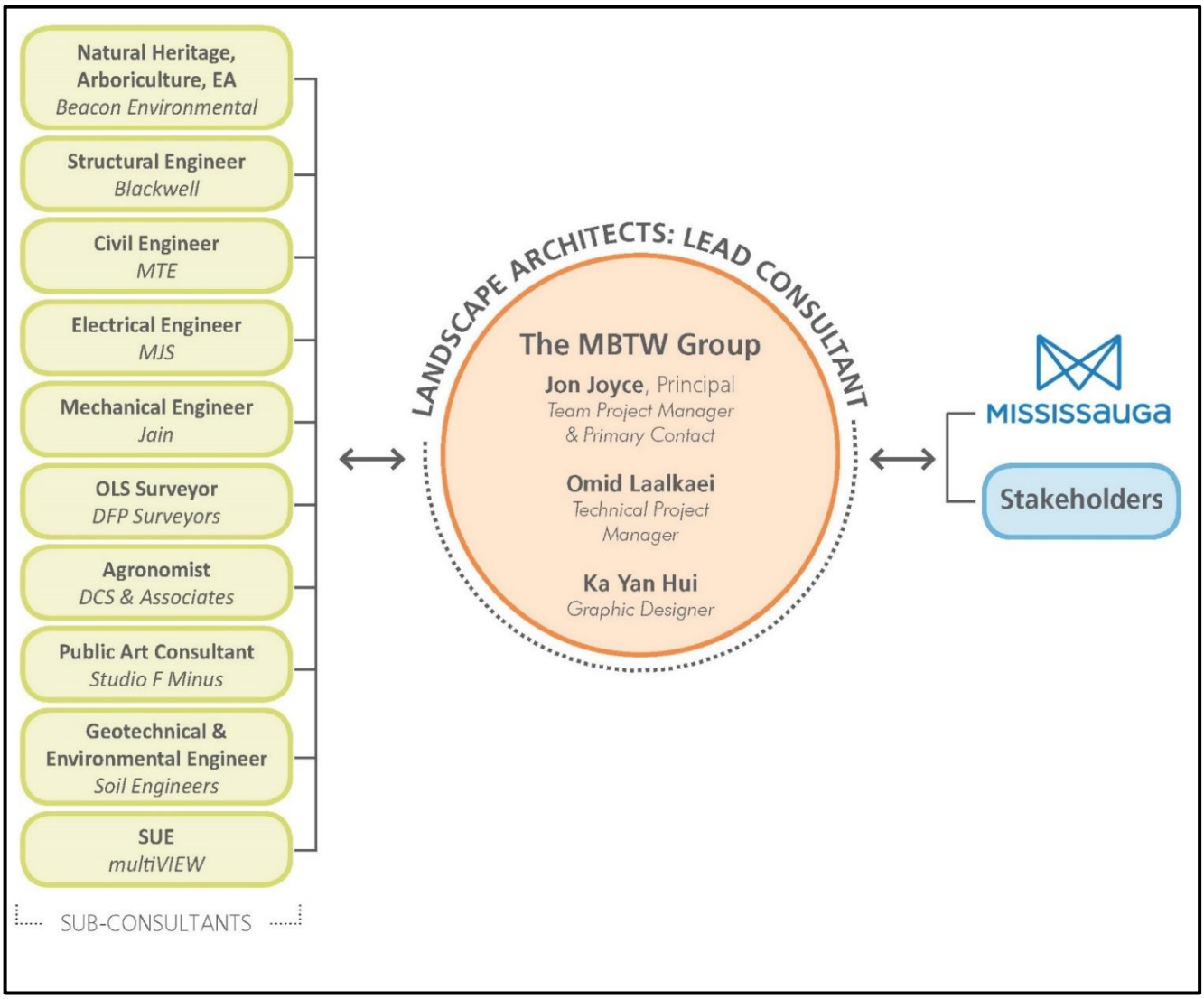


Figure 1. Illustration of project team composition and structure (courtesy of MBTW)

Figure 2. Site area context (courtesy of MBTW)

Legend: Light green shows the Greenlands zoning while the Open Space zoned lands are shown in darker green.

Figure 3. Site zoning (courtesy of MBTW)

1.4 Statement of Problems and Opportunities

For this project, the Preferred Concept for the Park will need to:

- Accommodate the required active and passive park amenities identified by the City (though a previous process);
- Include SWM that meets the City's and CVC's criteria for quantity and quality control;
- Ensure that development of the Park is undertaken in accordance with applicable policies and regulations as they relate to the natural areas in the Park as well as Cooksville Creek and its associated floodplain in the broader Study Area; and
- Consider and address any concerns expressed by indigenous groups, relevant agencies, the City Development Team, other stakeholders (including the local Councillors, Senior Management for Community and Corporate Services, accessibility and crime prevention committees) and the public.

The key challenge (or problem) will therefore be developing a concept that appropriately balances the City's need for an all-season community park that effectively integrates park amenities, facilities and infrastructure in a manner that respects the various constraints of the site and the applicable policies and regulations, while also considering and addressing the feedback provided.

As one of the last undeveloped areas identified for parklands in the City, and as lands that are located along a creek corridor and containing natural areas, this project also provides opportunities to:

- Meet City objectives for active and passive local amenities;
- Meet City objectives for local SWM quantity and quality control;
- Meet City, Regional, Provincial and Federal requirements for protection and enhancement of existing natural heritage features and areas; and
- Meet community expectations for providing a combination of active and passive public amenity areas that are accessible and safe.

1.5 Study Process and Timeline

The process and timeline for the overall project is illustrated in **Figure 4**.

As illustrated, key components of the process to date have included:

- Applicable policy and regulatory framework review;
- Pre-design investigations, including environmental and engineering studies;
- Review of options for park programming (including site servicing and infrastructure, stormwater management, and both active and passive park amenity areas);
- Review of options for habitat protection, compensation and enhancement;
- Indigenous engagement and presentation of two Preliminary Park Concepts (at the first Public Information Centre [PIC1] and two more refined Park concepts (at PIC2); and
- Identification of a Preferred Park Development Concept based on consideration of all of the elements above.

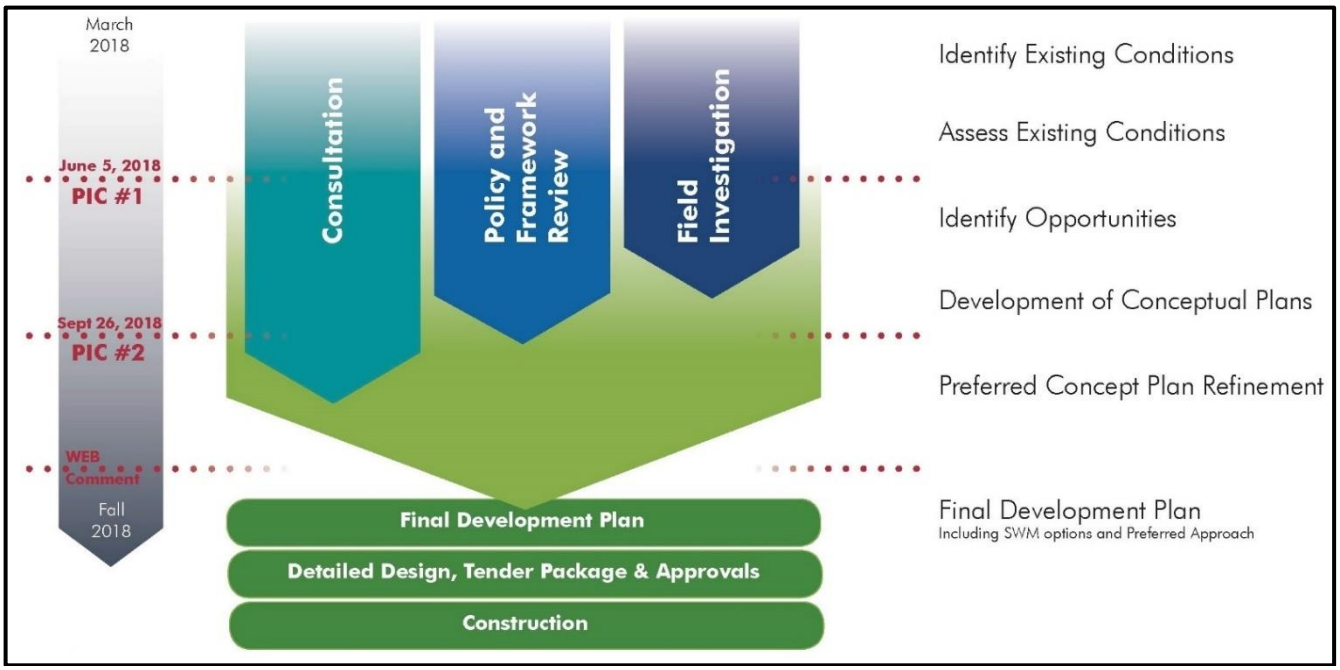


Figure 4. Generalized Project Process and Timeline (courtesy of MBTW)

Once the Preferred Concept is confirmed, development of the detailed designs and securing of the required approvals and permits for implementation can be undertaken. This can then be followed by the development of construction and tender documents, and the actual construction and contract administration of the park development.

Notably, the timeline for this project was extended by about a year due to the need for some additional site-specific hydrogeological data not anticipated at the outset. This work was undertaken between April and November 2019 (

2. Planning Context

This section includes an overview of key Federal, Provincial, Regional and local (i.e., City) environmental policies, legislation and regulations and their relevance to this project. These include:

- Federal Acts (**Section 2.1**):
  - *Fisheries Act;*
  - *Species at Risk Act* (SARA); and
  - *Migratory Bird Convention Act* (MBCA).
- Provincial Acts and policies (**Section 2.2**):
  - *Environmental Assessment Act;*
  - *Endangered Species Act* (ESA); and
  - Provincial Policy Statement (PPS).
- Regional and Local Regulations, Policies and Strategies (**Section 2.3**):

- CVC Regulations and Guidelines;
- Region of Peel Official Plan; and
- City of Mississauga;
    - Official Plan; and
    - Natural Heritage & Urban Forest Strategy (NH&UFS).

The following has been included to highlight key policy, regulatory and legislative requirements that may or do apply to the project including considerations specifically related to the Municipal Class B EA process. A review of compliance with applicable policies and regulations in relation to the Preferred Concept for the Park and related recommended mitigation measures is provided in **Section 8**.

Notably, the Study Area does not fall within either the Greenbelt Plan Area (or the related Niagara Escarpment Plan and Oak Ridges Moraine Conservation Plan areas) or the Lake Simcoe Protection Plan Area, and so the only Provincial Plan that applies is the PPS (2014). In addition, the *Canadian Environmental Assessment Act* does not apply to this project, but Ontario's *Environmental Assessment Act* does apply as this project has been determined to require a Schedule Class B EA process.

2.1 Federal Acts

2.1.1 Federal Fisheries Act

Fish habitat is protected under the Federal *Fisheries Act* (1985). In Ontario, the federal department of Fisheries and Oceans Canada (DFO) manages fish habitat and the Ontario Ministry of Natural Resources and Forestry (MNRF, formerly known as OMNR or MNR) manages fisheries.

Section 35 (1) of the Federal *Fisheries Act* precludes "*any work, undertaking or activity that results in serious harm to fish*" that is part of a commercial, recreational or aboriginal fishery. However, s. 35(2) provides that s. 35(1) does not apply where the work, undertaking or activity has been authorized by the Minister and is carried on in accordance with conditions established by the Minister.

The *Fisheries Act* defines "*serious harm*" to fish as "*the death of fish or any permanent alteration to, or destruction of, fish habitat*". The Fisheries Protection Policy Statement (2013) was prepared by the DFO to provide guidance on compliance with the *Fisheries Act*. Compliance with the provisions of s. 35 of the *Fisheries Act* with respect to particular water bodies is now made on a case-by-case basis through a self-assessment process to determine impacts to fish and fish habitat and to identify appropriate responses. Where development activities taking place in or near water may affect fisheries by adversely affecting fish or fish habitat, the Fisheries Protection Policy Statement (2013) recommends that proponents of these activities should:

- Understand the types of impacts their projects are likely to cause;
- Take measures to avoid and mitigate impacts to the extent possible; and
- Request authorization from the Minister and abide by the conditions of any such authorization, when it is not possible to avoid and mitigate impacts of projects that are likely to cause serious harm to fish.

As per the Fisheries Protection Policy Statement (2013), efforts should be made to avoid impacts first. When avoidance is not possible, then efforts should be made to mitigate impacts caused by the project

in question. Following these first two steps, residual impacts (if any) should be addressed by offsetting. Where applicable, proponents are required to submit an offsetting plan to demonstrate that the measures and standards above are adhered to. Proponents are also be required to demonstrate that the offsetting measures will maintain or improve the productivity of the fisheries in question.

Cooksville Creek, a warmwater fish habitat, runs through the Study Area. Any park development works that may seriously impact this fish habitat need to be screened through the self-assessment process to determine if authorization from the DFO is required. This ESR includes the results of a site-specific self-assessment process (see Section 5.3), assesses potential impacts and provides recommended mitigation measures related to fish habitat (see Section 7).

2.1.2 Species at Risk Act (SARA)

The Federal *Species at Risk Act* – SARA (2002) is intended to prevent federally endangered or threatened wildlife (including plants) from becoming extinct from the wild, and to help in the recovery of these species. SARA is also intended to help prevent species listed as special concern Federally from becoming endangered or threatened. To ensure the protection of Species at Risk (SAR), SARA contains prohibitions that make it an offence to kill, harm, harass, capture, take, possess, collect, buy, sell or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated. However, this legislation applies primarily to lands under Federal jurisdiction, and relies on Provincial laws to protect Federal SAR habitat. For lands not under Federal jurisdiction, SARA prohibitions apply only to aquatic species and migratory birds that are also listed in the *Migratory Birds Convention Act* (1994) (discussed in **Section 2.1.3**). For lands not under Federal jurisdiction, the intent of SARA is to protect critical habitat as much as possible through voluntary actions and stewardship measures.

No aquatic species listed Federally (or Provincially) as threatened or endangered have been documented in the Study Area. Therefore, the regulations of SARA (2002) only apply to works undertaken within the Park in relation to the *Migratory Birds Convention Act* (1994) discussed below.

2.1.3 Migratory Birds Convention Act

The Federal *Migratory Birds Convention Act* – MBCA (1994) protects the nests, eggs and young of most bird species from harassment, harm or destruction. Although there are no permitting requirements, proponents must comply with the legislation and may be fined if found to be in contravention of this Act.

Environment Canada considers the “general nesting period” of breeding birds in southern Ontario to be between late March and the end of August. This includes times at the beginning and end of the season when only a few species might be nesting. Therefore, to ensure compliance with the MBCA, vegetation clearing between March 16 or April 1 (depending on the geographic location) and August 31 is typically discouraged, particularly in natural or naturalized areas. However, strictly speaking, vegetation clearing within this window can occur as long as there are no nesting birds in the areas to be disturbed.

At Beacon, the general practice in southern Ontario is to encourage approved removal of natural vegetation and trees outside of natural areas in southern Ontario between September 1 and March 31, and to provide screenings for nesting birds in what are referred to as the ”shoulder seasons” from April

1 to May 15 and August 1 to August 31 if the preferred timing window cannot be accommodated. Screenings in natural areas between May 16 and July 31 are generally discouraged because it can be very difficult to detect all active nests in well-vegetated natural areas during the peak breeding season. However, screenings of individual trees or anthropogenic structures, and screenings of natural areas in some cases, can be done at any time of year, including between May 16 and July 31. Site-specific review and consultation are required to make this determination.

Regardless of the date, any nest and the habitat to support the nesting birds is protected under the MBCA whenever an active nest is present and it is the proponent's responsibility to comply with the Act.

In the Park lands it is anticipated that removal of trees and of portions of some natural and /or cultural habitats will be required to accommodate the development of the subject property as a Park, and therefore the MBCA will apply. Site-specific recommendations are included in this ESR (and in the Arborist Report) regarding compliance with the MBCA (see Section 7).

2.2 Provincial Acts and Policies

2.2.1 Environmental Assessment Act

Ontario's *Environmental Assessment Act* was passed in 1976. Depending on the individual project or Master Plan to be completed, there are different processes that municipalities must follow to meet Ontario's EA requirements.

Class EAs are prepared for approval by the Minister of Environment, Conservation and Parks (MECP) (formerly the Minister of the Environment and Climate Change). This Municipal Class EA guidance identifies the following five key principles as the basis for successful planning under the *Environmental Assessment Act*:

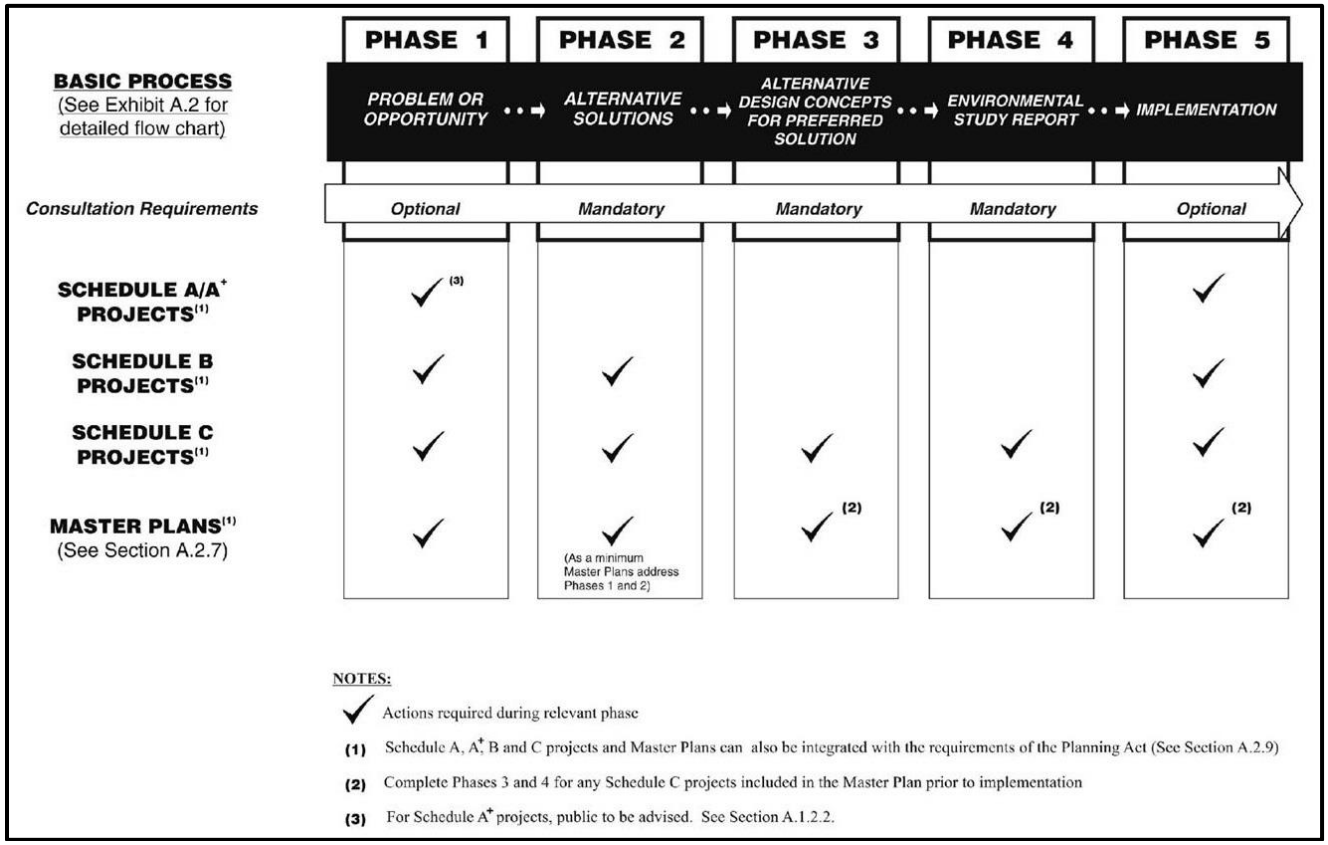
1. Consultation with affected parties early on, such that the planning process is a cooperative venture;
2. Consideration of a reasonable range of alternatives;
3. Identification and consideration of the effects of each alternative on all aspects of the environment;
4. Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and
5. Provision of clear and complete documentation of the planning process followed, to allow "traceability" of decision-making with respect to the project.

The five generic phases of the Class EA process are described as follows and illustrated in **Figure 5**:

- Phase 1: Identify the problem or deficiency;
- Phase 2: Identify alternative solutions to the problem, by taking into consideration the existing environment and establish the preferred solution, taking into account feedback from indigenous engagement and consultations with agencies, stakeholders and the public;
- Phase 3: Examine alternative methods of implementing the preferred solution, based on the existing conditions, input received, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects;

- Phase 4: Document in an ESR a summary of the rationale and the planning, design, and consultation process of the project as established throughout the above phases and make such documentation available for scrutiny by review agencies and the public; and
- Phase 5: Complete contract drawings and documents and proceed to construction and operation; monitor construction for adherence to environmental provisions and commitments.

As illustrated in **Figure 5**, not all of these steps are required for a Municipal Class B EA process and such a process can be integrated with other planning processes under the *Planning Act*.



Source: Municipal Class Environmental Assessment website at http://www.municipalclassea.ca/manual/page10.html

Figure 5. Key process components for Municipal Class Environmental Assessments

Although an ESR is not specifically required for this class of EA, a decision was made to provide an ESR to adhere to the principles of the Class EA process, meet the documentation requirements of the Class B EA process comprehensively in one report, and to satisfy the City's and the agencies planning requirements related to the development of the subject property into a City Park.

As of May 1, 2018, a new process for submitting streamlined EA notices and updates was established by the Province. This project has followed that process (see Section 2.2.1.1) in accordance with project Consultations Plan provided in Appendix A and the Notices of Study Commencement provided in Appendix B.

2.2.1.1 Municipal Class B Environmental Assessment (EA) Process

The Municipal Engineers Association's Class EA document classifies projects as Schedule A, B or C depending on their level of environmental impact and public concern.

- Schedule 'A' projects are generally routine maintenance and upgrade projects that are not expected to have substantial environmental impacts or need public input. Schedule 'A' projects are generally pre-approved without public consultation.
- Schedule 'B' projects have the potential for some environmental impact and require at least one phase of indigenous engagement and public consultation. Examples include projects proposing: stormwater ponds, river crossings, expansions of water or sewage plants beyond up to their rated capacity, new or expanded SWM outfalls and intakes. Schedule 'B' projects require completion of Phases 1 and 2 of the Class EA process.
- Schedule 'C' projects have the potential for substantial public and/or environmental impacts. Examples include projects proposing: storage tanks and tunnels with disinfection, anything involving chemical treatment, and expansion beyond a water or sewage plant's rated capacity. Schedule 'C' projects require completion of Phases 1 through 4 of the Class EA process, before proceeding to Phase 5 implementation.

Class B EA projects, such as this project, require consultation with the public and the relevant agencies to ensure that all stakeholders are notified at the outset of the project and that their concerns are adequately addressed before proceeding to detailed design. Although not required as part of the EA process for this project, the City undertook two rounds of consultations (see **Section 3**) to be consistent with its best practices related to park planning and community outreach (as per the project Consultations Plan in **Appendix A**).

In May 2018, the MECP was notified (along with other agencies, see **Appendix C1**) about the location, purpose and scope of this project. In response, the City received a letter from the MECP detailing the various EA requirements for this project (see **Appendix C2**) including 13 areas of interest to be considered through the planning process and through the project report. **Table 1** provides an overview of if and how these areas of interest are interest are addressed in this ESR.

Table 1. Areas of Interest Addressed in this Environmental Study Report (ESR)

Area of Interest (AOI)	How the AOI Has Been Addressed in this ESR	Relevant ESR Report Section(s)
Source Water Protection (SWP)	A basic screening was completed and is documented. No follow-up with the applicable SWP authority is required.	**Section 4.3.6** **Appendix C2**
Climate Change	Applicable documents were screened and MECP was consulted (see **Appendix C2**) to confirm a qualitative (not quantitative) assessment of potential impacts to and from climate change would be appropriate for a project of this scope and scale. Consideration of climate change has been included as part of the alternative options assessment and as part of the impact assessment.	**Section 4.3.1** **Section 6.3** **Section 7.1**
Planning and Policy	All potentially relevant policies and regulations have been considered and the Preferred Concept and associated mitigation recommendations have been screened for policy compliance.	**Section 2** **Section 8**

Area of Interest (AOI)	How the AOI Has Been Addressed in this ESR	Relevant ESR Report Section(s)
Air Quality, Dust and Noise	Consultation with the MECP confirmed that a full Air Quality Impact Assessment is not required for this project but that air quality, dust and noise impacts related to this project (and in particular to the construction phase) still need to be addressed (see **Appendix C2**). Air quality is discussed. Impacts and mitigation measures related to both noise and dust are also addressed in the ESR.	**Section 4.3.2** **Section 7**
Ecosystem Protection and Restoration	A comprehensive screening of natural heritage features and areas against applicable policies is provided in this ESR to confirm natural heritage constraints. The ESR also describes how various alternatives for balancing restoration opportunities with other park amenities were considered, and how the Preferred Concept includes a range of woodland, wetland and forest restoration.	**Section 5** **Section 6** **Section 7**
Surface Water (including Stormwater Management [SWM])	Cooksville Creek is characterized in this ESR, potential impacts to the creek are addressed in the impact assessment, and specific considerations related to SWM are also addressed. A SWM Plan and Functional Servicing Report (FSR) has been completed and provided under sperate cover (MTE 2019). Key findings and recommendations from this report are documented in this ESR.	**Section 4.3.5** **Section 4.4.4** **Section 7** **Appendix H**
Groundwater	A site-specific Hydrogeological Assessment has been completed and provided under sperate cover (BEL 2019). Key findings from this study are incorporated in this ESR, as is discussion of the potential for a Permit To Take Water (PTTW).	**Section 4.3.4** **Section 4.4.3** **Section 7** **Section 9**
Contaminated Soils and Excess Materials Management (including soils)	Phase One and preliminary Phase Two Environmental Site Assessments (ESAs) were completed for P-524 and P-525 (SEL 2018a,b; SEL 2019 b,c) and are provided under separate cover. A separate delineation, remediation and/or risk assessment report which supplements that initial Phase Two ESAs will be developed as deemed appropriate by the City. A detailed grading and soils management plan will be provided as part of the detailed design process to confirm the mitigation proposed, and if needed will incorporate recommendations of the delineation, remediation and/or risk assessment report.	**Section 4.4.2** **Section 7.2** **Appendix F**
Servicing and Facilities	Not applicable – this relates to facilities that release emissions or contaminants, provide potable water, or store / transport / dispose of waste.	
Mitigation and Monitoring	Mitigation measures for all anticipated impacts are identified in this ESR including recommendations for monitoring during construction and post-construction.	**Section 7**
Consultation	A Consultations Plan was developed and implemented for this project, as described in the ESR, and documentation of all related notices and correspondences is provided.	**Section 3** **Appendices A - D**

Area of Interest (AOI)	How the AOI Has Been Addressed in this ESR	Relevant ESR Report Section(s)
Class EA Process	A Notice of Study Commencement was issued at the end of May 2018 and liaison with MEPC has occurred to ensure that this project is adhering to the Class B EA requirements. This ESR has been written to address the various planning and technical requirements of EA process.	**Appendix B** **Appendix C** **Appendix D**

2.2.2 Provincial Endangered Species Act (ESA)

Ontario's *Endangered Species Act* (ESA) came into effect on June 30, 2008 and replaced the former 1971 Act. Under the ESA, species in Ontario can be identified as extirpated, endangered, threatened, or of special concern at the provincial level. However, the ESA only regulates the habitat of species that are endangered or threatened. Habitat for species of special concern is addressed under the significant wildlife habitat (SWH) policies under the Provincial Policy statement (PPS) discussed below.

Subsection 10(1)(a) of the Act states that: "*No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species".* However, under subsection 17(1) of the Act, the Minster may issue a permit that authorizes a person to engage in an activity that would otherwise be prohibited by subsection 9(1) or 10(1) of the Act provided the applicable legislative requirements of subsection 17(2) are satisfied. The ESA Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits (MNRF 2012a) is a document that provides guidance regarding permitting requirements under the Act. In addition, in July 2013, Ontario Regulation 176/13 (to amend O. Reg. 242/08) came into effect to simplify the process for addressing activities that can potentially damage or destroy the habitats of certain SAR (e.g., Butternut [*Juglans cinereal*], Barn Swallow [*Hirundo rustica*], and Eastern Meadowlark [*Sturnella magna*]). For these species, an Overall Benefit Permit is not needed if the Registry process as described in the regulation is followed, although habitat replacement, demonstration of habitat net gain and monitoring are still required.

Confirmation of habitat of Provincially endangered and threatened species is ultimately under MNRF's jurisdiction, and any proposed development or site alteration within such habitat may only be permitted in accordance with Provincial regulations and supporting documents.

A screening for Provincially endangered and threatened species was completed in the P-525 lands in 2016 (NSEI 2016) as part of the approval process for the Fire Station 120 development in the Study Area. Correspondence by the City with MNRF regarding both P-524 and P-525 confirmed that no additional screening for Provincially endangered and threatened species would be required as part of this project except for screening for Butternut trees as part of the vegetation assessments and tree inventory work (see Appendix C2).

2.2.3 Provincial Policy Statement

The PPS (2014) provides policy direction to municipalities and other planning authorities on matters of Provincial interest as they relate to land use planning and development.

Natural Heritage

The PPS (2014) outlines, among other things, the Ontario government's policies addressing natural features and areas. Section 2.1 identifies eight categories of natural features which are to be protected:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Significant wildlife habitat (SWH);
- Significant habitat of endangered and threatened species; and
- Fish habitat.

Each of these features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. In general, no development is permitted within a Provincially Significant Wetland (PSW) while development may be permitted within significant woodlands, significant valleylands, ANSIs and SWH if it can be demonstrated (typically through an Environmental Impact Study [EIS] or comparable study) "*that there will be no negative impacts on the natural features or their ecological functions*". Significant habitat of endangered or threatened species is regulated by MNRF and generally no development is permitted in such habitat although there are some species-specific regulations that provide exceptions (see **Section 2.2.2**). Fish habitat is governed by the DFO (see **Section 2.1.1**). The identification and regulation of the remaining features is the responsibility of the municipality or other planning authority.

The PPS (2014) also states that development and site alteration shall not be permitted on lands adjacent to the natural heritage features unless the ecological functions of the adjacent lands have been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions (also typically through an EIS or comparable study).

Public Recreational Lands

The PPS provides direction for appropriate land use planning as it relates to public and recreational spaces. Policy 1.5 of the PPS discusses the use of public spaces, recreation, parks, trails and open space. Section 1.5.1 promotes healthy, active communities by:

a) *Planning public streets, spaces and facilities to be safe, meet the needs of pedestrians, foster social interaction and facilitate active transportation and community connectivity;*
b) *Planning and providing for a full range and equitable distribution of publicly-accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and, where practical, water-based resources;*
c) *Providing opportunities for public access to shorelines; and*
d) *Recognizing provincial parks, conservation reserves, and other protected areas, and minimizing negative impacts on these areas*.

Natural Hazards

The PPS also includes policy direction regarding reducing the potential risk to Ontario's residents from natural or human-made hazards. Policies in section 3.1 of the PPS generally prohibit or restrict development in areas prone to flooding and erosion and are implemented with support from a *Technical Guide - Rivers and Streams: Erosion Hazard Limit* (MNRF 2002) which outlines standardized procedures for the delineation and management of riverine erosion hazards in the Province of Ontario based on two generalized landform systems through which watercourses flow: confined and unconfined valley systems.

This ESR characterizes the natural heritage features and natural hazards in the watershed (see Section 4.2) and the Study Area (see Section 4.4), and considers the need to appropriately balance natural hazard risk management and protection of the site-specific natural features and areas with the identified requirements for this public Park (see Section 6).

2.3 Regional and Local Regulations, Policies and Strategies

2.3.1 Credit Valley Conservation Regulations and Policies

CVC plays both a regulatory and advisory role in overseeing development applications.

- Under Section 28 of the *Conservation Authorities Act*, CVC regulates activities within and adjacent to wetlands, watercourses and hazard lands under Ontario Regulation 160/06 - *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. A permit must be obtained from CVC for development or site alteration within regulated areas.
- CVC also provides planning and technical advice to local and Regional municipalities to assist them in fulfilling their responsibilities regarding significant woodlands and other relevant policy areas (such as SWH) pursuant to the *Planning Act*. CVC participates in the review of *Planning Act* applications to ensure the applicant and planning authority are aware of the Section 28 regulations and requirements and assist in coordinating those applications to avoid any conflicts.

CVC policies are outlined in their *Watershed Planning and Regulation Policies* (CVC 2010). Key policies pertaining to CVC's plan review and regulatory role as it relates to the proposed Park are cited below.

CVC's guiding policies (Section 5.3.2) with respect to natural heritage are to: (a) encourage an ecological gain and where that is not feasible to promote no net loss of ecological and hydrologic functions, (b) promote decision-making based on a systems approach, and (c) recommend appropriately sized buffers.
Valleylands may be "defined"[3] or "undefined" (Section 5.3.3.1). For defined valleylands, both the Erosion Hazard Limit and the extent of the valleyland are defined by the top of stable slope. The top of stable slope is also generally coincident with the Riverine Erosion Hazard for defined valleylands (Section

[3] *"Defined valleylands are ones in which the physical presence of a valley corridor containing a river or stream channel, which may or may not contain flowing water, is visibly discernable (i.e. valley walls are clearly definable) from the surrounding landscape by either field investigations, aerial photography or map interpretation, and the valley slopes are greater than or equal to 2 metres in height"* (CVC 2010).

5.4.4, CVC 2010). For undefined valleylands, the extent of the valleyland is defined by the flood hazard limit or the regulatory floodplain.

CVC identifies significant woodlands (Section 5.3.3.4) in accordance with the appropriate planning policies and criteria and relies on the MNRF to confirm the boundaries of PSWs but is responsible for confirming the boundaries of other wetlands[4] with the affected planning authority.

As stated in Section 6.1, CVC will not support modifications to any components of the natural heritage system (including hazardous lands and buffers) to accommodate or facilitate development "*unless the modifications have been appropriately addressed through an environmental assessment, comprehensive environmental study or technical report, to the satisfaction of CVC*" (policy 6.1(j)) and may support such modifications where they include (policy 6.1(l)):

- "i) *infrastructure[5], including stormwater management facilities*";
- Development or site alteration associated with "ii) *passive or low intensity outdoor recreation and education*" or iv) "*conservation or restoration projects or management activities following sustainable management practices*"; and/or
- "vi) *modifications to components of the natural heritage system to implement the recommendations of an environmental assessment, comprehensive environmental study or technical report that has been completed to the satisfaction of CVC*".

CVC may also recommend buffers of 10 m from flood and erosion hazards and 10 m from other wetlands for proposals where new lots are being created (policy 6.2.1(b)).

As stated in Section 7 (CVC 2010), CVC regulates the limit of the hazardous land plus a 15 m allowance for watercourses and a 30 m allowance around other wetlands. Interference within a watercourse or wetland is generally not permitted by CVC unless proposed works:

> H*ave been addressed through an environmental assessment, comprehensive environmental study or technical report and it has been demonstrated that the interference is acceptable and, in the opinion of CVC, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected*.

Specific examples of potentially permitted activities under these policies include the same four listed in the bullets above under Section 6.

[4] *"Other Wetlands: means any wetland that that is not a provincially significant wetland"* (CVC 2010).

[5] *"Infrastructure includes: sewage and water systems, septage treatment systems, waste management systems, electric power generation and transmission, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities".*

SWM policies (Section 7.2.7) state that:

- Proposed drainage boundary diversions to facilitate development, unless minor, and SWM facilities within natural features and areas must be supported by an environmental study that demonstrates that "*the control of flooding, erosion, dynamic beaches, pollution or the conservation of land*[6] *are not affected*" (policy 7.2.7(a) and (c)); and
- Existing wetlands identified for protection cannot be used for SWM (policy 7.2.7(b)).

Parks, trails and recreational open space policies (Section 7.2.8, CVC 2010) state that:

> *a) CVC will not permit interference or development (1) associated with new active or major recreational uses within watercourses, wetlands, hazardous land and natural features and areas contributing to the conservation of land unless it has been demonstrated, to the satisfaction of CVC, that;*
>
> *i. There is no feasible alternative site outside of the hazardous land or natural features and areas contributing to the conservation of land;*
> *ii. The proposed development (1) is not within a watercourse or wetland;*
> *iii. buildings and structures, parking facilities and service infrastructure are located outside of hazardous land and development setbacks, as appropriate;*
> *iv. Unacceptable risks to life and property as a result of impacts to flood hazards, erosion hazards and dynamic beach hazards do not result;*
> *v. Natural features, ecological functions and hydrologic functions contributing to the conservation of land are not affected. Where unavoidable, adverse impacts must be minimized to the extent feasible and remedial and mitigation measures implemented;*
> *vi. The area of construction disturbance is minimized to the extent feasible;*
> *vii. The existing topography is maintained to the extent feasible;*
> *viii. The control of pollution is not affected and construction sustainable management practices are used; and*
> *ix. All other concerns related to the control of flooding, erosion, dynamic beaches, pollution or the conservation of land have been addressed.*
>
> *c) CVC may permit interference or development associated with new passive or low intensity recreational uses within watercourses, wetlands, hazardous land and natural features and areas contributing to the conservation of land where the proposal is consistent with CVC standards, and it has been demonstrated that the interference is acceptable and, in the opinion of CVC, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected.*
>
> *e) CVC will ensure that pedestrian bridges and/or footbridges are designed in accordance with CVC standards.*

CVC also specifies minimum 10 m setbacks from the top of stable slope and other wetlands identified for protection (policy 7.4(a)) and indicates that site grading may be setback a minimum of 6 m. Grading must be undertaken in accordance with CVC standards (as per Section 7.7, CVC 2010).

[6] *"Conservation of Land: means the protection, management or restoration of lands within the watershed ecosystem for the purpose of maintaining or enhancing the natural features and ecological functions and hydrologic functions, within the watershed"* (CVC 2010).

This ESR characterizes the natural heritage features and natural hazards in the watershed (see Section 4.2) and the Study Area (see Section 4.4), and describes how an appropriate balance has been achieved between protection of the NHS and accommodation of the required Park amenities (see Section 6) such that the control of flooding, erosion, dynamic beaches, pollution and the conservation of land will not be affected (see Section 7).

2.3.2 Region of Peel Official Plan

Peel Region's Official Plan (2016 Consolidation) contains policies aimed at protecting, maintaining, and restoring a Regional Greenlands System consisting of Core Areas, Natural Areas and Corridors (NACs), and Potential Natural Areas and Corridors (PNACs).

Core Areas represent those features and areas that are considered significant at the Provincial and Regional levels. They generally correspond with significant features and areas listed in the PPS and include Core Valleys and Stream Corridors. Policy 2.3.2.6 prohibits development and site alteration within the Core Areas of the Greenlands System in Peel except for conservation activities, essential infrastructure, passive recreation and minor development or site alteration. Even for these exceptions, it must be shown, to the greatest extent possible, that impacts to the Core Area feature are minimized and any impacts to the feature or its functions that cannot be avoided are mitigated through restoration or enhancement.

The Study Area does not include any lands identified as Core Areas in the Region's Greenlands mapping (Schedule A). The Region defers to the City with respect to the interpretation, protection, restoration, enhancement, proper management and stewardship of NACs and PNACs.

Natural heritage features and areas in the Study Area for this project are screened against the applicable Regional and City policies in Section 5.

2.3.3 City of Mississauga Official Plan

For this project, the Mississauga Official Plan (City of Mississauga 2018a) in effect at the time of writing this report was considered as the basis for the policy review. The Official Plan Natural System Schedule 3 identifies the portion of Cooksville Creek within and adjacent to the Study Area as a Natural Hazard and as a Significant Natural Area / Natural Green Space but does not identify any other portions of the Study Area as part of the Natural Heritage System (NHS) despite the presence of some treed areas and wetlands. In addition, the Official Plan Parks and Open Space Schedule 4 identifies both P-524 and P-525 as Public / Private Open Space and (as noted in **Section 1.2** and shown in **Figure 3**) the northern half of P-525 is zoned as City Greenlands (along with the creek corridor) while the remainder of the Park lands are zoned as Open Space. The specific policies are discussed in this section and an assessment of the features in the Study Area in accordance with the applicable policies is provided in **Section 5**.

Chapter 6 of the City's Official Plan provides policies pertaining to the natural environment. General policies (Section 6.1) include commitments to, among other things:

- Protect, enhance, restore and expand the NHS (policy 6.1.1a);
- Protect life and property from natural and human made hazards (policy 6.1.1c);

- Promote education and awareness for the protection and enhancement of the environment (policy 6.1.5); and
- Improve air quality (policy 6.1.6) and address climate change mitigation and adaptation (policy 6.1.7).

Section 6.3 of the Mississauga Official Plan contains policies pertaining to the protection of the Green System. The Green System is comprised of: 1) the Natural Heritage System, 2) the Urban Forest, 3) Natural Hazard Lands; and 4) Parks and Open Spaces. Each of these categories is relevant to this project and may overlap with one or more of the other three categories. Key policies from each are presented in the following subsections.

Natural Heritage System and Urban Forest

The City's Natural Heritage System (NHS) consists of: 1) Significant Natural Areas, 2) Natural Green Spaces, 3) Special Management Areas, 4) Residential Woodlands and 5) Linkages. The City's Urban Forest consists of the wooded portions of any of these five categories as well as trees outside of wooded natural areas of the NHS.

Significant Natural Areas include one or more of the following features:

- Provincially or regional significant life science ANSIs;
- Environmentally sensitive or significant areas (as inventoried and designated by the Conservation Authorities and/or Provincial government);
- Habitat of threatened species or endangered species;
- Fish habitat;
- SWH;
- Significant woodlands;
- Significant wetlands, including PSWs, coastal wetlands, and other wetlands greater than 0.5 hectares; and
- Significant valleylands, including the main branches, major tributaries and other tributaries and watercourse corridors draining directly to Lake Ontario including the Credit River, Etobicoke Creek, Mimico Creek and Sixteen Mile Creek.

The Study Area does not contain or occur adjacent to any ANSIs, environmentally sensitive or significant areas or significant wetlands. The Study Area may include habitat of threatened species or endangered species (i.e., Butternut, as noted in Section 2.2.2), fish habitat, SWH, significant woodlands and significant valleylands (as assessed in Section 5 of this ESR).

Policy 6.3.27 states:

> *Development and site alteration as permitted in accordance with the Greenlands designation within or adjacent to a Significant Natural Area will not be permitted unless all reasonable alternatives have been considered and any negative impacts minimized. Any negative impact that cannot be avoided will be mitigated through restoration and enhancement to the greatest extent possible. This will be demonstrated through a study in accordance with the requirements of the Environmental Assessment Act…*

Natural Green Spaces are areas that meet one or more of the following criteria:

- Woodlands greater than 0.5 hectares that do not qualify as significant woodland;
- Wetlands that do not qualify as significant wetland;
- Watercourses that do qualify as significant valleyland; and
- All natural areas greater than 0.5 hectares that have vegetation that is uncommon in the City.

Policy 6.3.32 states that development and site alteration will not be permitted within or adjacent to Natural Green Spaces unless it has been demonstrated through an EA or an EIS that (a) there will be no negative impact to the natural heritage features and their ecological functions and (b) development opportunities for their protection, restoration, enhancement and expansion have been identified.

As per policy 6.3.7 and 6.3.8, buffers are to be determined for NHS components on a site-specific basis as part of an EIS to the satisfaction of the City and the appropriate Conservation Authority.

Special Management Areas "*are lands adjacent to or near Significant Natural Areas or Natural Green Spaces and will be managed or restored to enhance and support the Significant Natural Area or Natural Green Space*" (policy 6.3.15).

Residential Woodlands are associated with existing residential areas (policy 6.3.17).

The Official Plan also states that: "*Mississauga will protect, enhance, restore and expand the Urban Forest*" (policy 6.3.42) through a variety of tools and approaches including strategic tree planting and maintenance on public lands and "*ensuring development and site alteration will not have negative impacts on the Urban Forest*". Policy 6.3.44 specifically states that:

> *Development and site alteration will demonstrate that there will be no negative impacts to the Urban Forest. An arborist report and tree inventory that demonstrates tree preservation and protection both pre and post construction, and where preservation of some trees is not feasible, identifies opportunities for replacement, will be prepared to the satisfaction of the City in compliance with the City's tree permit by-law*.

In general, the City "*will have regard for the maintenance of the long term ecological integrity of the Natural Heritage System in all decisions*" (policy 6.3.23) and is committed to using native and non-invasive species for plantings (policy 6.3.24c) and to working with the Conservation Authorities to encourage enhancement of natural areas and naturalize City-owned lands "*particularly where they abut or directly connect areas within the Natural Heritage System*" (policy 6.3.4).

The natural areas in the Study Area have been screened against the policies for Significant Natural Areas and Natural Areas in Section 5 of this ESR. Special Management Areas, Residential Woodlands and Linkages have not been identified in the Study Area, although the Cooksville Creek corridor may be considered an ecological and watershed linkage as discussed in Section 5. An arborist report and tree preservation plan has also been prepared (see Section 4.4.6) to address trees outside the NHS.

Natural Hazard Lands

Natural Hazard Lands are associated with valley and watercourse corridors and the Lake Ontario shoreline. These areas are prone to flooding and erosion and are generally unsuitable for development. Land uses in Natural Hazard Lands are limited to conservation, flood and/or erosion control, essential infrastructure and passive recreation.

Development and site alternation are not permitted within erosion hazard lands associated with valleylands and watercourses (policy 6.3.47). Proposed development adjacent to erosion hazard lands may need to be supported by slope stability and/or stream erosion studies (policy 6.3.48) as well as an Erosion and Sediment Control Study (policy 6.3.63).

With respect to floodplains, it is the policy of the City that lands subject to flooding are a danger to life and property and, as such, development is generally prohibited. However, it is recognized that some historic development has occurred within flood plains and may be subject to special floodplain policy consideration.

As per Policy 6.3.7 and 6.3.8, buffers are to be determined for Natural Hazard Lands on a site-specific basis as part of an EIS to the satisfaction of the City and appropriate Conservation Authority.

A revised regulatory floodline was approved for the Study Area as part of the Pinnacle development approvals in the adjacent lands (IBI Group 2011) and the erosion hazard limit was confirmed as part of the approval process for the Fire Station 120. These limits are discussed and illustrated in the ESR (see Section 5.2).

Parks and Open Spaces

The Official Plan Parks and Open Space Schedule 4 identifies both P-524 and P-525 as Public / Private Open Space. Applicable Official Plan policies are as follows:

> *6.3.66 Public parkland will be designed to allow access for a variety of complementary activities through interconnections of pathways, a multi-use recreational trail and the public parkland network; and to provide a safe and accessible environment through development of clear sightlines, openness and visible entrances that can be achieved by maximizing street frontages, where possible.*
>
> *6.3.76 Public parkland may incorporate components of the Natural Heritage System to provide opportunities for enjoyment, appreciation and protection of nature.*
>
> *6.3.77 Natural areas acquired by Mississauga will be designated in accordance with the policies of this Plan. Recreational activities will be restricted to protect the ecological viability of these areas.*
>
> *6.3.78 Where Public Open Space contains or abuts the Natural Heritage System, the policies for the Natural Heritage System will apply.*

6.3.79 The potential for Public Open Space areas to expand or connect the Natural Heritage System will be encouraged to ensure that sensitive areas, particularly woodlands, are maintained and enhanced.

Zoning

As noted in **Section 1.2** and shown in **Figure 3,** the northern half of P-525 is zoned as City Greenlands (along with the creek corridor) while the remainder of the park lands are zoned as Open Space. According to the City's Zoning By-law (City of Mississauga 2018b,c), Open Spaces can provide for a range of active and passive recreational opportunities (including athletic fields and SWM facilities), while permitted used in Greenlands are generally limited to flood control, SWM facilities, erosion management and natural heritage features and area conservation. Both Greenlands and Open Space zoning may include trails, related passive recreational uses (e.g., lookouts) and parking areas as long as they are "*constructed of a permeable type of material to minimize impacts on the natural environment*".

2.3.4 *Natural Heritage & Urban Forest Strategy*

The City finalized both a Natural Heritage & Urban Forest Strategy (NH&UFS) and an Urban Forest Management Plan (UFMP) in early 2014. These documents were intended to guide implementation of Official Plan policies related to natural heritage and the urban forest and include a vision, guiding principles, objectives and targets. The NH&UFS is the overarching document for both the natural heritage system and the urban forest that includes 26 strategies that address planning, management, engagement and partnerships, and monitoring. The UFMP is a more detailed and technical document focused on the operational, technical and tactical aspects of urban forest management that includes 30 actions related to the broader strategies identified in the NH&UFS.

Strategies relevant to this project include:

- STRATEGY #11: Enhance and expand the Natural Heritage System;
- STRATEGY #12: Maintain and improve Natural Heritage System connectivity;
- STRATEGY #13: Enhance and expand the Urban Forest;
- STRATEGY #16: Work with local conservation authorities to identify opportunities to support aquatic ecosystem objectives; and
- STRATEGY #18: Ensure effective implementation and enforcement of Natural Heritage System and Urban Forest policies, guidelines and by-laws on public and private projects.

3. Engagement and Consultations

Engagement and consultations for this project were undertaken to meet the City's planning requirements and meet the requirements for engagement under the Class EA process for Municipal Class B projects. The Class EA consultation process was dovetailed with the City's community consultations process to inform the development of a Preferred Concept for an all-season community park that (as per the project purpose, see **Section 1.5**) effectively integrates park amenities, facilities

and infrastructure in a manner that respects the natural features of the site while offering a communal outdoor space for gathering, exercise, recreation and leisure.

3.1 Consultations Plan and Process

A Consultations Plan was developed for this project (see **Appendix A**) that outlines the roles and responsibilities of the City and the Consulting Team, identifies the various groups to be targeted for engagement, describes the outreach tools to be used, and provides an overview of the anticipated consultations and documentation process. As per the Municipal Class B EA requirements (see MECP correspondence in **Appendix C2**), this plan includes a process for engaging with indigenous groups (referred to as First Nations groups in the Plan) potentially affected by and interested in this project.

3.1.1 Project Notifications and Engagement

As per the Plan, a Notice of Study Commencement which included a notice of the first Public Information Centre (PIC1) (see **Appendix B**) was finalized towards the end of May 2018. This Notice was:

- Filed with the Ministry of Environment, Conservation and Parks (MECP) in accordance with their new on-line process in May 2018 (by Beacon on behalf of the City);
- Published in the City's local newspaper and posted on the City project website;
- Sent via mail with a reply form (see **Appendix D2**) to the following indigenous groups:
    - Six Nations of the Grand River;
    - Haudenosaunee Confederacy;
    - Métis Nation of Ontario;
    - Mississaugas of the New Credit First Nation; and
    - Peel Aboriginal Network;
- Sent via email to the following agencies: MECP, Ministry of Transportation (MTO), DFO, MNRF (Aurora District) and CVC (see **Appendix C1**); and
- Delivered on May 22 and May 30, 2018 to a total of 1509 addresses within at least 120 m of the Study Area[7].

In addition, Notices of Study Commencement and requests for input were circulated to the families of children attending the two schools in the adjacent lands (i.e., St. Hilary Elementary School and Cooksville Creek Public School) via school mailouts in June 2018 prior to the end of the school year.

As part of the Phase 2 consultations, notice of the second Public Information Centre (PIC2) (see **Appendix B**) was finalized in early September 2018 and was:

- Published in the City's local newspaper and posted on the City project website;
- Sent via mail with a comment form to the following indigenous groups (see **Appendix D2**);
    - Six Nations of the Grand River;
    - Haudenosaunee Confederacy;

[7] The mail-out, via Canada Post, included residences adjacent to the subject lands and industrial/commercial properties located to the south of Eglinton Avenue West. The notice was delivered to all addresses located within a 120 m buffer surrounding the Park lands. The Notice was sent to addresses predominantly in Ward 5 but also some in Ward 4.

    - Métis Nation of Ontario;
    - Mississaugas of the New Credit First Nation; and
    - Peel Aboriginal Network;
- Sent via email to the following agencies (see **Appendix C1**): MECP, MNRF (Aurora District) and CVC (by Beacon on behalf of the City); and
- Delivered to more than 1500 addresses within at least 120 m of the Study Area.

3.1.2 Project Consultations and Engagement Process

As per the Consultations Plan, consultations and engagement were undertaken in two phases, as outlined below.

- Phase 1 (March to early June 2018)
    - Gathering input on the two Preliminary Conceptual Designs at:
        - PIC1 held June 4, 2018 at Cooksville Creek Public School;
        - A presentation to City staff (i.e., internal stakeholders) on July 3, 2018; and
        - A presentation to key CVC and City staff on July 18, 2018.

- Phase 2 (mid-June to October 2018)
    - Development of two refined Conceptual Designs based on:
        - Review of input from the Phase 1 consultations and engagement;
        - A site walk with key agency staff from CVC and City staff on June 14, 2018;
        - A follow-up meeting with the City Project Team on August 21, 2018; and
        - A meeting with key agency staff from CVC and City staff on August 24, 2018; and
    - Gathering of input on the two refined Conceptual Designs from:
        - PIC2 held September 26, 2018;
        - Liaison with various City staff, CVC and MECP over fall 2018; and
        - A follow-up meeting with key agency staff from CVC and City staff on December 18, 2018 to finalize the SWM and restoration approaches.

A presentation to the City Leadership Team, the Crime Prevention Through Environmental Design (CPTED) Advisory Committee and the Facility Accessibility Design Subcommittee (FADS) with the finalized Preferred Concept will be forthcoming early in 2019.

Both PICs were structured similarly to include a presentation by the Consulting Team, poster boards available for viewing, and a workshop component whereby attendees were asked to provide verbal and/or written feedback (on comment sheets provided) related to the two options for park design being presented. Copies of the presentation / poster board material and comment forms from both PIC1 and PIC2 are provided in **Appendix D**.

The project website has been updated by the City on an ongoing basis as needed.

In addition, there was further follow-up with various City staff (e.g., in the Forestry Branch, Engineering, Parks Planning), CVC and the MECP between October 2018 and December of 2019 regarding specific points of clarification with respect to finalizing the Preferred Concept as well as the draft ESR, as documented in **Appendix C2**.

3.2 Results of Consultations and Engagement

3.2.1 Engagement of Indigenous Groups

One response was received from the indigenous groups circulated Notices of Study Commencement and notices of PIC 1 and PIC 2 (see **Appendix D1** and **Appendix D2**).

Of the five groups circulated, one letter was received by the City via email from the Mississaugas of the Credit First Nation (MCFN) dated December 18, 2018 (included in **Appendix D3**). The MCFN correspondence stated that they have "*a low level of concern about the project*" based on the preliminary information provided. However, they requested:

- Copies of all environmental and archaeological reports for the project; and
- That, going forward, a Field Liaison Representative be on site whenever any fieldwork for environmental and/or archaeological assessments was being undertaken.

A response to this letter and these requests were provided to the MCFN by the City (see **Appendix D4**) along with an electronic copy of the Draft ESR which includes all environmental data for the Study Area and a copy of the archaeological report in the report appendices (see **Appendix E**).

In addition, it was agreed with the City that a MCFN Field Liaison Representative would be invited to attend all hydrogeological monitoring sampling events over 2019. This was coordinated as per the schedule provided in **Appendix D4**.

3.2.2 Phase 1 Consultations

All of the agencies circulated regarding this project responded to the initial outreach:

- The MECP provided a comprehensive letter summarizing both the consultation and reporting requirements to be addressed through this project under the Class B EA process (see **Table 1**), including indigenous outreach as described above;
- DFO indicated they do not review notifications for administrative processes but require proponents to complete a self-assessment process (which has been done for this project as documented in **Section 5.3**);
- MTO responded that the Study Area is outside their permit control area and therefore no further consultations with them were required;
- MNRF confirmed that the SAR screening undertaken in 2016 for the Fire Station 120 approvals was applicable to this project and that only screenings for endangered Butternut trees on site would be required as additional SAR-related work for this project; and
- CVC has confirmed its interest and role in this project and has maintained an active role from both a regulatory and an advisory perspective, including participation in three meetings with the City and Consulting Team, attendance at PICs and provision of input via telephone and email correspondences.

A more detailed summary of agency correspondences is provided in **Appendix C1** and key correspondences received from the various agencies via email are included in **Appendix C2**.

PIC1 was held on June 5, 2018 at Cooksville Creek Public School from 6:30 p.m. to 8:00 p.m. The goals of PIC1 were to provide the public with an overview of the project and work done to date, share preliminary information about the park's natural features and park program, and solicit input on the preliminary design program.

Approximately 30 people attended PIC1, which was jointly facilitated by the City and the Consulting Team (i.e., MBTW). City staff in attendance included representatives from Park Planning, Park Development and Park Operations as well as Forestry and Transportation and Works. Forestry staff set up an outreach booth at the event.

Introductory remarks were provided by the Ward 5 Councillor Carolyn Parrish followed by a project introduction by Jordan Wu, the City Project Lead. Jon Joyce from MBTW provided a 20-minute presentation providing an overview of the project. A preliminary map of natural features in the park was presented for context as well as the proposed programming (activities). Two preliminary park layouts (design studies A and B respectively) were presented as shown in **Figure 6** and **Figure 7** below based on concepts for organizing the different passive and active components of the park. These materials were also shown as project boards that were on display during the PIC (see **Appendix C3**).

The presentation was followed by an open question and answer session, and then small group sessions each facilitated by a Consultant Team member and at least one City staff. The pros and cons of Design Study A versus B were discussed at each table. Feedback was documented by table facilitators as well as on Comment Sheets completed by the participants. Each table was asked to report key elements of feedback to the broader group prior to completion of the session.

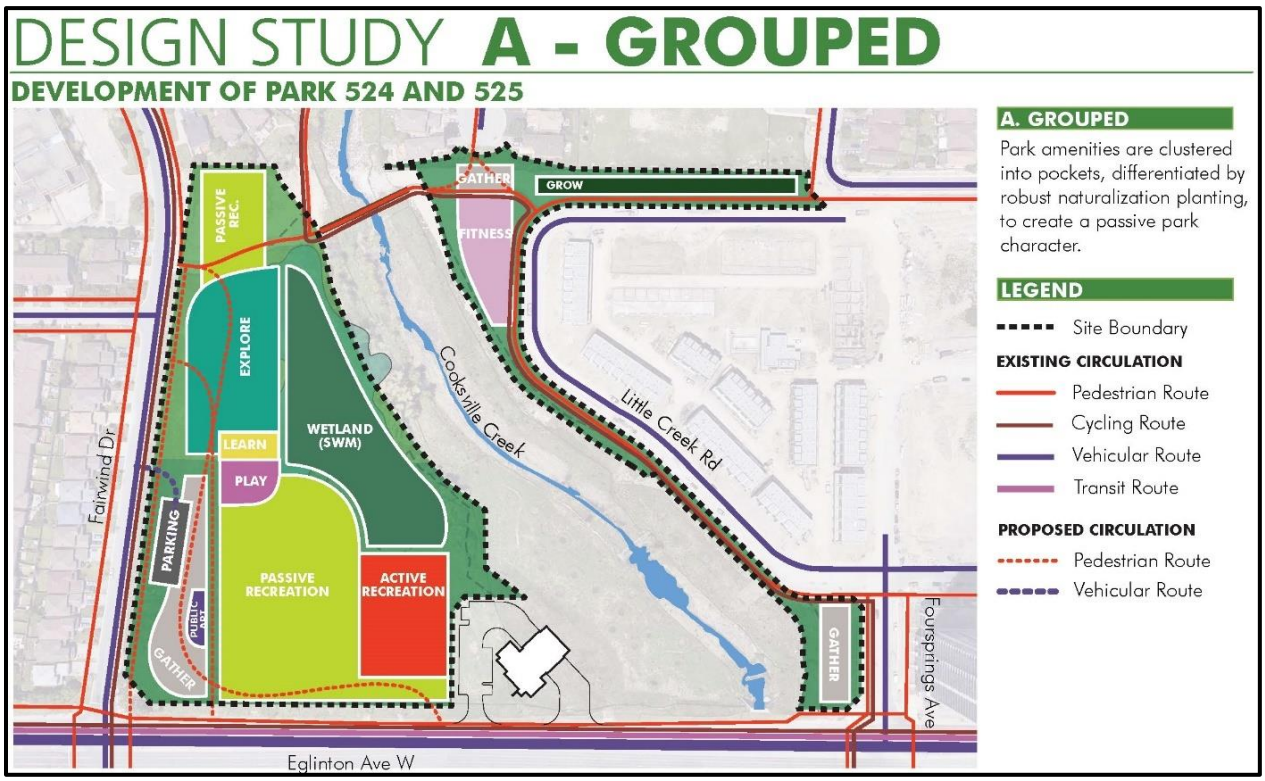


Figure 6. Alternative A1 – Design Study A, Grouped Concept

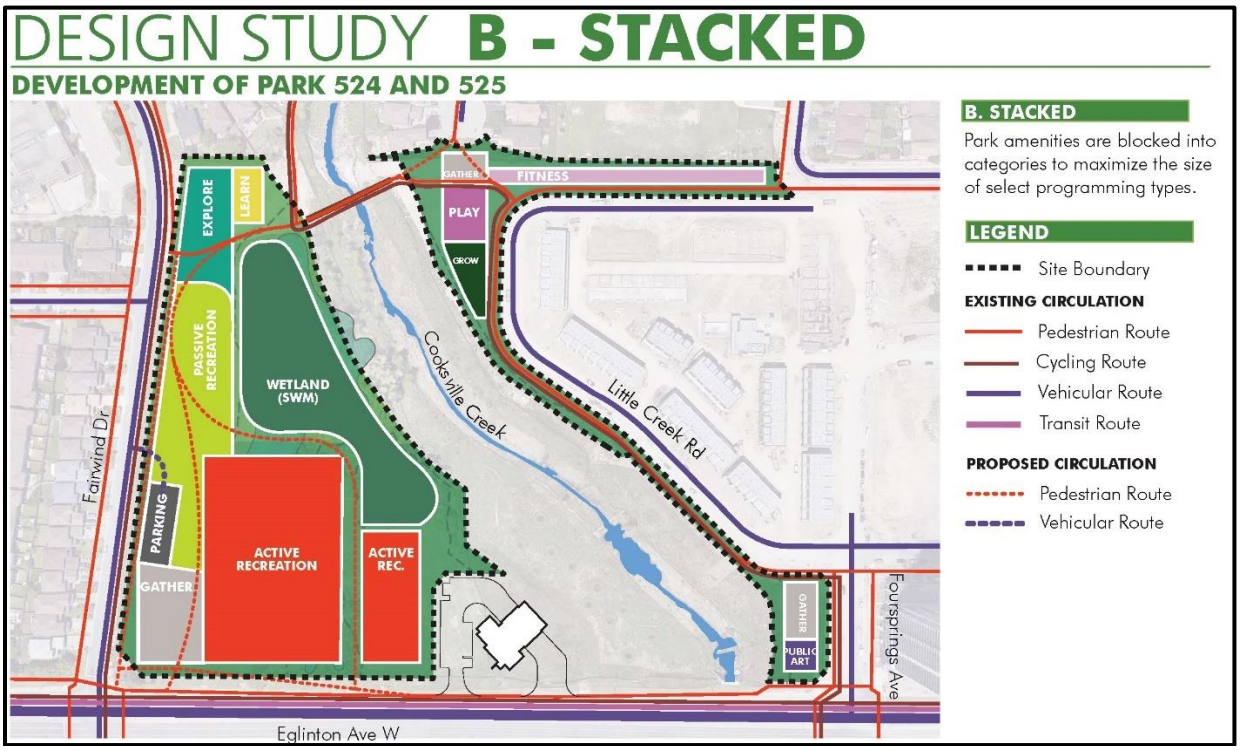


Figure 7. Alternative A2 – Design Study B, Stacked Concept

A comment sheet with three questions was provided to participants of PIC1 and also circulated to the families of children attending the two local schools. The questions were:

1. What do you think the priorities should be for the park?
2. What do you like or dislike about each of the Design Studies and why?
3. Is there anything else you would like the design team to consider?

In general, attendees expressed a strong preference for Concept A. Concept A's emphasis on passive rather than active recreation was especially important to attendees, many of whom perceived Concept A to be more relaxing and peaceful than Concept B. Attendees also supported Concept A as it provided more opportunity for preservation and appreciation of the natural environment as well as community gathering and socialization. While there was some demand for active recreation such as basketball courts and a water play site, there were also concerns over the limited year-round use of such amenities.

Representative examples of responses to these three questions are provided below. A complete record of all written feedback is provided in **Appendix C3**.

1. **What do you think the priorities should be for the park?**
   - *Leisure, recreation and natural environment.*
   - *We would like to have more walking area.*
   - *What I would like to see at the park is a splash pad.*
   - *My family would greatly enjoy the Active Recreation, so a basketball court is something my family would use on a regular basis. The leisure field would be*

nice to have the ability to set up volleyball or badminton. During winter months it would be nice to have a skating rink set up, for leisure skating.

- *Passive recreation (trails, natural areas), meeting/seating areas, play site with rubber matting.'*
- *Linking trails to broader network / other nearby open spaces north and south.*
- *Preservation of trees/nature.*
- *Exercise, leisure, recreation, play.*
- *I think that the park should be kept as natural as possible. The priority should be for walking trails and possibly gathering areas.*
- *Gathering, leisure, natural environment, 4-season use, play.*
- *Natural environment. Multi-cultural integration.*
- *Gathering, exercise, leisure, natural environment. Skating areas.*

2. What do you like about each of the design studies and why?

- *Design Study A - More passive recreation and it is good for condo residents.*
- *Design Study A - I would suggest more space for passive recreation. Design Study B – too much space for active recreation.*
- *I liked the option B because it gave more room for active recreation.*
- *I like A because it more passive and relaxing. B – don't like – too much active use.*
- *Prefer B – has more active recreation space; but need a good landscaping along Eglinton.*
- *A – preferred, not Plan B but no fitness on #525. B – No children's "play" sites here. No community gardens please.*
- *I like design study A because it has more trail areas for exploration.*
- *A – because active area is far away from main rd. and residential properties, would like more greenery, more trails, keep old trees.*
- *A – in general it has something for everyone. B – active area too big – normally it will be tennis or basketball – which is all but a few hours in a week.*
- *A – more nature good, less paved areas, keep existing wetland as much as possible. B – no soccer field or other sports field; noise, light and parking issue.*
- *B – too much active recreation, but more focused space. A – less lighting (impact to residences), less exercise space, more natural, preserve trees etc., trying to fit too much activities/uses.*

3. Is there anything else you would like the design team to consider?

- *More trails for leisure walking, facilities for dogs.*
- *Is there room for a splash pad?*
- *Regarding the project our concern is the traffic in the area is very busy with the park it will be even more.*
- *Wildlife impact: waterfowl, small mammals and predators in area like coyotes.*
- *Reconsider grow area.*

- *Wheelchair access, please consider seniors residences need quiet, peace and nice natural view.*
- *Need nice looking landscaping done along Eglinton, with trees and flowers.*
- *Provide some sitting areas like benches along the trails.*
- *Cycling route connection from Fairwind, street parking, maintain trees – attract birds.*

Following PIC1 and considering low attendance of young residents, letters introducing the project and with the three questions above were sent by Cooksville Creek Public School (424 school families) and by St-Hillary Catholic Elementary School (260 school families). This outreach yielded seven email responses including more than 20 unique feedback items, included in more detail in **Appendix C3**. Despite the relatively low number of respondents, combined with the input form PIC1, this was a useful exercise to capture input from this group. Similar to PIC 1, these respondents expressed support for trail connectivity and prioritization of the natural environment and passive over active recreation. Other suggestions included a spray pad, outdoor rink, volleyball court and leash free zone, among other amenities.

Follow-up discussions with the City Project Team and CVC in July 2018 considered the feedback provided in conjunction with the confirmed extent and type of wetlands in the future Park lands, as well as the treed features. Although the policy review and feature assessment had not yet been completed at that time, it was recognized that it would not be feasible to protect all the wetlands or the treed features in their current configuration in the P-525 lands and accommodate all of the amenities identified by the City as requirements. It was therefore agreed by CVC in principle that some of the smaller wetlands and treed areas could be removed as long as their removal was in accordance with the applicable policies and that features and/or trees removed were compensated elsewhere in the Study Area with the objective of achieving a net gain in terms of ecological benefits.

3.2.3 Phase 2 Consultations

In terms of agency consultations, neither DFO not MTO were circulated the PIC2 notice as per their initial feedback in relation to this project (as documented in **Appendix C1**). MECP, MNRF and CVC were all circulated notices for PIC2, and consultations with these three agencies on various issues and points of clarification were pursued during Phase 2, as documented in **Appendix C2**.

PIC2 was held on September 26, 2018 from 6:00pm to 9:00pm at St. Francis Xavier Secondary School at 50 Bristol Road West in Mississauga. The goals of PIC2 were to provide to the public with an overview and update of the project work done to date, share information about the park's natural areas and stormwater management requirements, to present two conceptual design options (i.e., Options 1 and 2 as shown in **Figure 8** and **Figure 9** below), and provide an opportunity for the attendees to comment on the two options.

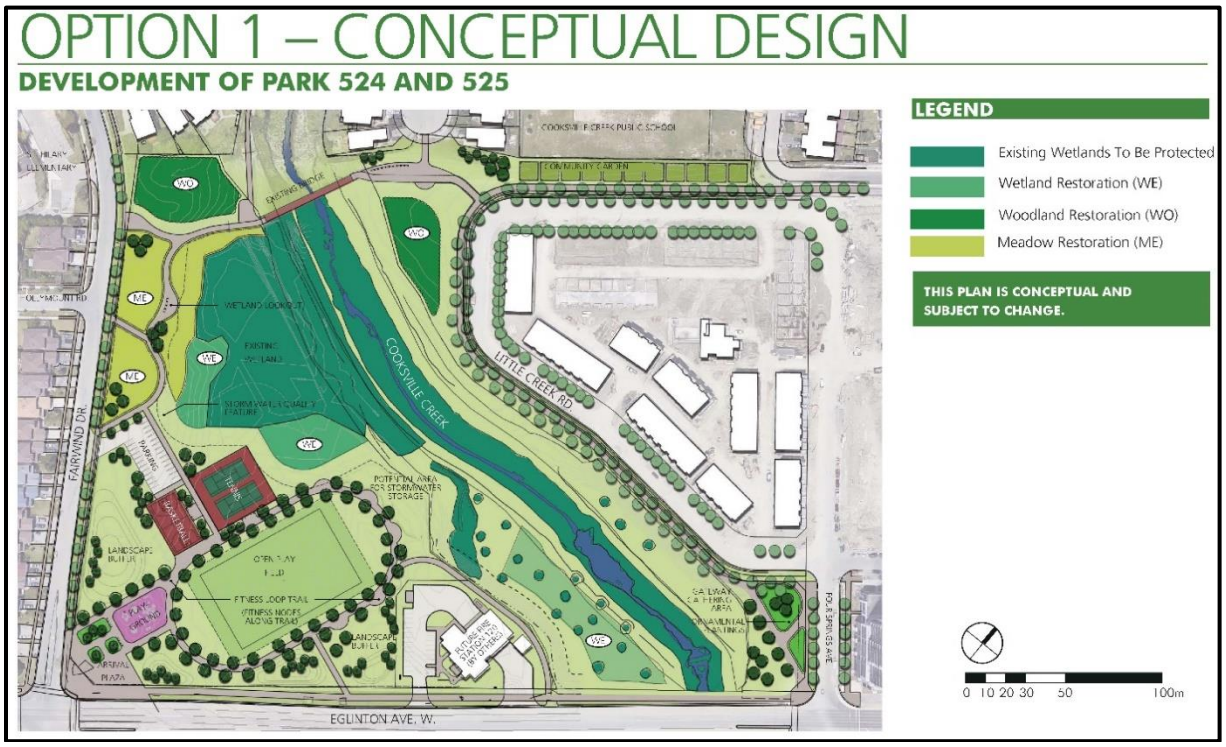


Figure 8. Alternative B1 – Option 1

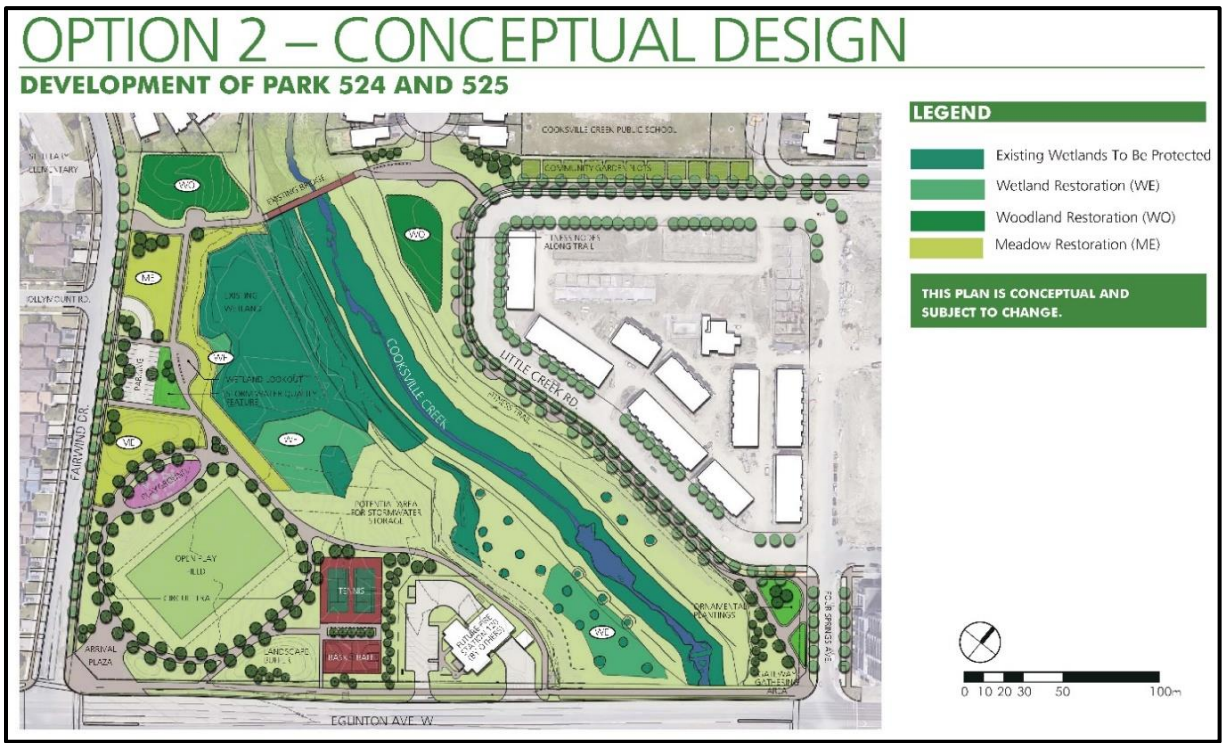


Figure 9. Alternative B2 – Option 2

Approximately 22 people attended PIC2, which was facilitated by the Consulting Team (i.e., MBTW) with support and attendance by City staff from Park Planning, Park Development and Park Operations as well as Forestry and Transportation and Works (stormwater management).

Introductory remarks were provided by the City Project Lead. MBTW provided a 20-minute presentation providing an overview of: the project findings to date, input received through the Phase 1 consultations (including Guiding Principles established as part of phase 1 consultations), and the two design options being presented. These materials were also shown as project boards on display during the PIC (see **Appendix C4**).

Guiding principles and park objectives developed based on Phase 1 input and presented at PIC2 were:

- Safe and inviting place for people of all ages (specifically older adults and youth);
- Quiet, relaxing, peaceful place to appreciate natural environment;
- Open and natural aesthetic with passive park character; and
- Meeting place for community gathering and socialization.

The presentation was followed by an open question and answer session, and then by small group sessions each facilitated by a Consultant Team member and at least one City staff present. The pros and cons of Option 1 versus Option 2 were discussed and documented. Feedback was documented by table facilitators as well as on Comment Sheets completed by the participants (see **Appendix C4**). Each table was asked to report key elements of feedback to the broader group prior to completion of the session.

A comment sheet with three questions was provided to participants of PIC2. The questions were:

1. What do you like about Option 1 and why?
2. What do you like about Option 2 and why?
3. What features (in either concept), do you think will provide the greatest positive impact to the success of the park?

Some of the general comments provided by participants related to both options included: demand for shaded areas, support for casual play areas, support for a connected trail network, desire for safe access points and strong support for natural areas protection and enhancement.

Representative feedback provided by PIC2 participants in relation to Option 1 included:

- Support for fitness stations and a desire to have them integrated with the natural environment;
- Support for landscape buffers / trees between street and play areas; and
- Support for parking close to active recreational areas.

Representative feedback provided by PIC2 participants in relation to Option 2 included:

- Preference for parking lot access to be aligned with the intersection of Hollymount Road;
- Support for the location and layout of courts in Option 2, and for multi-use sports courts;
- Preference for play away from the intersection of Fairwind Dr. and Eglinton Ave. West;
- Preference for lighting required for courts further from natural features; and
- Preference for basketball courts beside the Fire Station and away from the playground, roads and interpretive natural areas.

Additional, more general, feedback provided by PIC2 participants included:

- Support for a flexible open play area that is as large as possible;
- Support for trails adjacent to natural areas and for interpretive signs, particularly near the two local schools (i.e., at the north end of the Park);
- Strong support for preservation and enhancement of the woodlands and wetlands;
- Desire for at least one small gathering area within restoration areas;
- Support for location of the community gardens but concerns about their appearance and potential to attract unwanted wildlife;
- Preference for public art close to street intersections;
- Requests for a community ice rink in the winter; and
- Support for the proposed SWM approach and related educational signs.

Following PIC2, the design team analysed the feedback received to develop a list of Park Objectives. Each of the Park Objectives, acts as means to achieving the Guiding Principles, that had been generated from the feedback received following the first phase on consultations. These Park Objectives are as follows:

- Safe and inviting place for people of all ages (specifically older adults and youth);
    - Provide lighting of pathways and programed areas;
    - Maintain open views into the park to promote natural surveillance;
    - Establish landscape buffers between adjacent streets and play areas;
    - Provide separation between pedestrian, vehicular and bicycle traffic;
    - Maintain safe setbacks between program elements;
    - Provide lighting per corporate Policy 05-02-18; and
    - Lighting required for project include:
        - Lighting for parking lot; and
        - Lighting trails that serve as linkages connecting centres of activity such as parks, schools, public facilities, institutions, shopping centres and transportation routes;
- Quiet, relaxing, peaceful place to appreciate natural environment;
    - Develop fitness opportunities associated with natural features to promote wellbeing; and
    - Provide educational/ interpretative opportunities associated with natural and SWM features;
- Open and natural aesthetic with passive park character;
    - Preserve and enhance natural features;
    - Maintain views to natural features from key park nodes and entrances; and

    - Develop a curvilinear pathway network to define the park structure;
- Meeting place for community gathering and socialization;
    - Offer a variety of recreational opportunities for all ages, all abilities and all seasons;
    - Pair complementary uses and activities;
    - Animation of park interior to draw users into the park; and
    - Establish small scale community gathering areas with natural tree shade.

An overview of all comments made by PIC2 attendees is provided in **Appendix C4**.

Specific input on Options 1 and 2, and direction for the Preferred Concept was also provided by representatives from the relevant City departments and sections (i.e., Parks, Transportations and Works, and Forestry) and CVC. Key comments included:

- Preference for a large sized flexible open play field;
- Inclusion of a clear trail hierarchy (i.e., 3.5 m for multi-use pathways, 3 m for standard pathways);
- Need to consider Parks maintenance access points and routes;
- Open play field and walking loop around it should also function as a natural ice rink in the winter;
- Ecosource will be the partner for the community garden - sizing of this amenity should be verified with them;
- Need to accommodate the appropriate quantity and quality controls for SWM (as agreed to by the City and CVC Engineers), and to identify specific areas for these requirements in the Preferred Concept;
- All major park assets are to be located above 165.1 metres above sea level (masl) to take a precautionary approach to potential flooding;
- Boulevard trees are required along Fairwind Drive and Eglinton Avenue West;
- The pavement area associated with the paths/trail network should be limited to the required trail width except at roadway intersections;
- Compensation for wetlands to be removed should be more than 1:1 and could include restoration options in the Cooksville Creek corridor;
- Compensation for treed areas to be removed should be a combination of woodland creation / restoration and tree plantings, with a preference for habitat restoration;
- Typically, City Forestry require 3:1 compensation for all trees removed outside of protected natural areas that are in fair to good condition (i.e., not poor or dead condition), however in this case a reduced (e.g., 2:1) compensation ratio is acceptable as the overall compensation includes woodland and meadow restoration, resulting in a net gain in native ecological diversity and function; and
- All wetlands to be protected should have 10 m buffers that are naturalized and encroachments into these buffers, if required should be minimized and exclude impermeable surfaces as well as any SWM infrastructure requiring maintenance.

These comments were considered in conjunction with those from the community to arrive at the Preferred Concept.

4. Existing Conditions

4.1 Pre-European Settlement Context

Archaeological evidence suggests that Iroquoian and Algonquian, and later Ojibway, First Nations were attracted to and lived along Cooksville Creek and the greater Credit River valley for thousands of years prior to European contact.

Stage 1 and Stage 2 archaeological assessments were completed for the Study Area and adjacent lands to the east as part of the Pinnacle development project (see **Appendix E**, ASI 2012). This study documented a significant pre-European contact village site about 1 km northeast of the Study Area along Cooksville Creek dating back to about 1280 A.D. that included three longhouse structures and concludes that it is very likely that associated camps could have occurred in the Study Area itself, particularly in the areas within 300 m of the creek.

4.2 Post-European Settlement Context

European settlement of the Cooksville Creek watershed and greater Credit River watershed began with the first and second purchases of land by the British government in the early 1800s. Several small villages and homesteads were established in the 19th century to support the surrounding farms. Lakeview, Mineola, Cooksville and Dixie are some of the known settlement areas within the Cooksville watershed.

The earliest available historical records indicate that the Study Area was owned by George Winter in the mid to late 1800's, and that a homestead and orchard existed just outside the Study Area along Hurontario during this period (see **Appendix E**). The lands appear to have been largely cultivated and were occupied by the Winter family from about 1826 until the early 1900s. The Study Area appears to have been subject to agricultural land uses until the 1960's and 1970's, and then left vacant starting in the 1980's as residential development occurred in the surrounding lands (SEL 2018a,b).

The stage 1 and 2 archaeological assessments (ASI 2012) also documented a single storey residence and concrete kennel block in the south central portion of the property along Eglinton Ave. West as well as associated gardens, an asphalt driveway and stone foundations still present in 2017. These structures have since been demolished and clean fill material appears to have been imported in these locations, although a well, septic tank and septic bed remain (SEL 2018b).

4.3 Watershed Context

The most current studies that have assessed the Cooksville Creek watershed are the *Cooksville Creek Watershed Study and Impact Monitoring - Characterization Report (Draft)* (Aquafor Beech Ltd. 2011), which builds on the draft watershed report developed by CVC (CVC 2009), and the *Cooksville Creek Flood Evaluation Master Plan EA* (Aquafor Beech Ltd. 2012). The information contained in this section is primarily drawn from these reports.

The Cooksville Creek watershed is located entirely within the City of Mississauga, east of the Credit River, with a catchment area of approximately 33.9 km^2 (3,390 ha) discharging into Lake Ontario. The watershed has been significantly altered by urban development since the 1940s, and has changed from predominantly agricultural land uses adjacent to woodlands and natural creek corridors to predominantly residential and industrial/commercial land uses. Based on the most recent assessment, the watershed cover is 60% residential, 34% industrial/commercial and 6% open space (including some remnant natural areas) (Aquafor Beech Ltd. 2012). The Study Area contains one of the few remaining sections of the creek that is in an open, semi-natural form with wetlands in the immediately adjacent lands.

4.3.1 Climate Change

As part of its' commitment to meet established climate change targets, the Province of Ontario published a guide for considering climate change through the EA process[8] in 2018. The guide details how proponents are expected to:

1. Take into account during the assessment of alternative solutions and alternative designs:

    a. The project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
    b. Resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).

2. Include a discrete section in the Project File/ESR detailing how climate change was considered in the EA.

Based on discussions with the MECP (see **Appendix C2**) it was confirmed that for a project of this scope and scale that a qualitative assessment of how the project considered and addressed issues related to climate change would be appropriate.

For this project, climate change was considered as part of the development and assessment of alternatives (see **Section 6**) as well as through the impact assessment and identification of recommended mitigation measures (see **Section 7**). *Community Emissions Reduction Planning: A Guide for Municipalities* (2018) was reviewed as part of this process for suggestions that could be tailored to the project's size, context and anticipated environmental effects.

Key needs and opportunities related to the location of this project in a highly urbanized watershed located immediately adjacent to Cooksville Creek include the:

- Need to manage any new stormwater created by the park development so as not to contribute to increasing the flood risk for the middle and lower watershed, and opportunity to create flood storage and quality controls to improve local SWM controls;
- Need to replace any wetlands removed as part of the park development and opportunity to create additional wetlands to contribute to both local flood storage and water quality;

[8] Last accessed Nov. 24, 2018 at: <https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process>

- Need to replace trees removed as part of the park development and opportunity to maintain, and if possible, improve canopy cover from current conditions in order to optimize the air quality, carbon sequestration and cooling benefits provided by the trees;
- Need to incorporate a range of natural habitats and opportunity for those habitats and their soils to sequester carbon; and
- Opportunity to create a green public amenity space with passive and active recreation, reducing the need for the local community and schools to travel in vehicles for these amenities.

4.3.2 Air Quality

The City of Mississauga provides discussion of air quality on its website (see http://www.mississauga.ca/portal/residents/air-quality) including general information on primary sources of air pollutants and measures to improve air quality and reduce greenhouse gas emissions. No data on air quality specific to the Study Area or watershed was available from the City or CVC.

Potential impacts of the proposed Park development on air quality, and recommended measures for mitigating these impacts are provided in **Section 7**.

4.3.3 Geology and Soils

The Cooksville Creek subwatershed is approximately flanked to the north by Highway 401, to the south by the shoreline of Lake Ontario, and to the west by Hurontario Street. The watershed is characterized by relatively flat floodplains in highly erodible shale substrates along Cooksville Creek, which increases the susceptibility of areas along the creek to flooding, erosion and water quality issues (Aquafor Beech Ltd. 2012).

Overburden in the Cooksville Creek watershed is typically less than 10 m in thickness for most areas southwest of Eglinton Avenue (Aquafor Beech Ltd. 2011) and characterized by six stratigraphic units: Maple Formation, Halton Till, Iroquois Lake deposits, glaciolacustrine deposits, organic deposits and modern alluvium. The upper watershed (north of Eglinton Avenue West where the Study Area is located) is comprised of drumlinized till plains underlain by continuous Halton Till, whereas the middle watershed consists of mainly till plain and shale plain. The lower watershed (south of Dundas Street) is comprised of Iroquois Sand Plain with noted exposures of bedrock and Halton Till (Chapman 1984 and OGS 2007).

A description of the geology and soils of the Study Area is contained in **Sections 4.4.1 and 4.4.2**.

4.3.4 Groundwater

Groundwater Quantity

The groundwater regime in the Cooksville Creek watershed is heavily influenced by the urbanized land use context. As described in Aquafor Beech Ltd. (2011, 2012):

- The total amount of recharge is greatly reduced and uneven in the landscape due to extensive impervious surfaces and the anthropogenic consolidation of soils;

- Recharge occurs mainly in public open and natural spaces where pervious land exists; and
- Some additional recharge also occurs in lawns associated with residential and other land uses.

The groundwater regime in the Cooksville Creek watershed is also variable for different portions of the watershed due to the geological variability. Specifically:

- The upper watershed (i.e., north of Eglington Avenue West where the Study Area occurs) has a moderate recharge rate associated with the drumlinized Till plain underlain by continuous Halton Till;
- The middle watershed has a low recharge rate associated with Till Plains and shale plain; and
- The lower watershed has a high recharge associated with the Iroquois Sand Plain rate.

In general, reduced infiltration associated with urbanization reduces the baseflow in creeks, thereby negatively affecting the water quantity, quality and aquatic habitat.

Total discharge of groundwater in the watershed is reported to be approximately 87 litres per second, and greater than 85% of the groundwater discharge in the watershed is contributed by the middle and upper watershed. The large contribution by the middle and upper watershed may be due to the upgradient movement of deep groundwater and the passive dewatering in headwater areas of the east tributary (Aquafor Beech Ltd. 2012).

Groundwater Quality

Groundwater quality in the Cooksville Creek watershed is naturally high in mineral content (i.e., “hard”), including notably high concentrations of sulfate. High concentrations of sulfate in the area are thought to be related to the natural presence of pyrites (FeS_2) in the local shale substrates.

Groundwater quality has been impacted by the high level of urbanization throughout the Cooksville Creek watershed (Aquafor Beech Ltd. 2011). Groundwater contamination sources contributing to the watershed are interpreted to include road salt (sodium and chloride), spills, landfill leakage, contaminated sites, leakage from sanitary sewers and other human activities.

4.3.5 Surface Water

Cooksville Creek flows diagonally through the Study Area and flows for about 13 km before reaching Lake Ontario.

Most lands in the Cooksville Creek watershed changed land use from agricultural to residential and commercial/industrial uses between the 1940’s and 1990’s. As part of this transition, approximately 92% of Cooksville Creek was channelized through a variety of methods including gabion baskets, concrete, rip-rap, amour stone and grass lining (Aquafor Beech Ltd. 2011). In addition, many of these lands were developed without the benefits of SWM quantity or quality controls. Consequently, there are flood risks to some buildings in the lower and middle areas of the watershed.

This risk is recognized in the *Cooksville Creek Flood Evaluation Master Plan EA* (Aquafor Beech Ltd. 2012) which recommends a combination of traditional and innovative approaches to minimizing this risk. The recommendations from this report included flood storage in the upper watershed to reduce flows within Cooksville Creek to acceptable levels combined with implementation of source and conveyance control measures.

Water quality monitoring conducted by CVC (Aquafor Beech Ltd. 2011) found that water quality is better in the upper reaches of the watershed than in the lower portions, however the level of urbanization within the watershed is evident in the water quality throughout. Following storm events, nutrient loading of the creek significantly exceeded levels outlined by the Provincial Water Quality Objectives (PWQO). In addition, levels of *E. coli* were also significantly higher than the PWQO during times of base flow and during storm events, and chloride levels were also relatively high and demonstrated an increasing trend. Common issues associated with urbanization such as trash accumulation were also noted.

Benthic macroinvertebrates were sampled across multiple locations of the watershed by CVC in 2011. Macroinvertebrate species composition can be used as a bioindicator of stream quality as their taxa have varying levels of tolerance to pollution and disturbance. Surveys within the Cooksville Creek watershed demonstrated moderately to highly impacted levels of impairment. Results of the surveys suggested that poor water quality in combination with degraded habitat, particularly at key locations, were the primary contributors of impairment (Aquafor Beech Ltd. 2011).

4.3.6 Source Water Protection

The *Clean Water Act* (2006) was developed and passed to protect all existing and future sources of water in Ontario. To address the requirements of this act, Source Water Protection Areas (SPAs) have been identified across the Province. Within each SPA, drinking water intake areas as well as wellhead and vulnerable groundwater protection areas have been identified.

As required by the MECP (see **Appendix C2**), the Study Area was screened using the Province's on-line mapping tool[9] to assess the proximity of the Study Area to sources of drinking water and to screen for any delineated vulnerable areas related to municipal surface water intakes and wellheads within or in proximity to the Study Area. The screening tool revealed that:

- The Study Area falls within the Credit Valley SPA;
- There are no Wellhead Protection Areas or vulnerable groundwater scoring areas overlapping with or in proximity to the Study Area (also see SEL 2018a,b);
- The Study Area does not overlap with any surface water intake areas;
- The closest Intake Protection Zone 1 is in Lake Ontario more than 10 km (10,018 m) south of the Study Area;
- The closest Intake Protection Zone 2 extends from Lake Ontario upstream along Cooksville Creek until just north of Dundas Street almost 4 km (3,994 m) south of the Study Area; and
- The closest identified SPA area is an "Event Based Area" associated with Mary Fix Creek located about 1.4 km (1,380 m) to the southwest of the Study Area.

[9] Province of Ontario Source Protection Information Altas, last accessed Nov. 24, 2018 at: <https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?site=SourceWaterProtection&viewer=SWPViewer&locale=en-US>

Based on the results of this screening it has been confirmed that this project is not within an area that might present a threat to the quantity or quality of sources of drinking water, and therefore source water protection does not need to be addressed any further in this ESR or as part of this project.

4.3.7 Terrestrial and Aquatic Communities

Natural areas cover only 9.6% of the Cooksville Creek watershed. These areas consist of 2.2% natural forest, 0.2% wetland, 7.2% successional communities and 0.02% open water / aquatic communities. These remaining natural areas are highly fragmented and small units that support about 175 plant species and 80 wildlife species, including some species of conservation concern in the CVC watershed (Aquafor Beech Ltd. 2012).

The watershed is not generally inhabited by fish, except where Cooksvile Creek outlets to Lake Ontario. During CVC's 2011 field sampling, a mixture of both lake and river species at the mouth of the watershed was documented however no fish species were found upstream of the QEW. The absence of fish species in the upstream reaches of the watershed is thought to be related to the numerous fish barriers throughout the watershed, although relatively high water temperatures (i.e., more than 26ºC), elevated levels of chlorides and "flashy" storm conditions are also thought to contribute to the poor aquatic habitat conditions (Aquafor Beech Ltd. 2011, 2012).

4.4 Study Area Natural Environment Context

The description of the existing biophysical conditions in this section is based on a synthesis of background information supplemented by targeted field work. The available background information reviewed included watershed-scale studies, current and historical air photos, and site-specific studies completed for other development projects in the area, including the nearby Pinnacle development (just east of the P-524 lands) and the Fire Station 120 site (in the southeast corner of the P-525 lands).

The background review was supplemented by targeted studies undertaken by Beacon as well as others on the Consulting Team over 2018 to help inform the park development process. Studies completed by Beacon included: vegetation assessments, confirmation of the wetland boundaries, amphibian (i.e., calling frog) and breeding bird surveys, a scoped aquatic habitat assessment, and a tree inventory. The methods for and results of these surveys are described in the following sections and discussed along with the relevant findings from background sources.

Work undertaken by others to inform the existing conditions for project include:

- A preliminary geotechnical study (SEL 2019a);
- A hydrogeological assessment (BEL 2019);
- Phase One Environmental Site Assessments (ESAs) for P-524 and P-525 (SEL 2018a, b);
- Phase Two ESAs for P-524 and P-525 (SEL 2019b.c);
- A SWM and FSR for the adjacent Pinnacle lands including P-524 and the Cooksville Creek corridor (IBI 2011); and
- A SWM and FSR (MTE 2019).

These reports have been provided with the ESR under separate cover. However mapping of the sampling locations for the soils assessments (SEL 2019a,b), revised floodplain mapping (IBI 2011) and existing catchment areas on P-524 and P-525 (MTE 2019) in **Appendix F**, **Appendix G**, and **Appendix H** respectively for ease of reference.

4.4.1 Physiography and Topography

The Study Area is located on the drumlized Till Plains of the broader Peel Plain physiographic region (Chapman and Putnam 1984), which is drained by creeks and rivers that flow to Lake Ontario. Historical geotechnical reports for sites adjacent and to the east of the Study Area (SEL Ltd. 1985) interpret that that the area is situated on the Halton-Peel Till Plain, with the tills in the plain having been modified by lacustrine ponding of silt and clay materials.

The bedrock beneath the site overburden belongs to the Georgian Bay Formation (Terraprobe 2013). The Georgian Bay Formation is characterized by Ordovician blue and grey shales with limestone interbeds (Hewitt, 1972; OGS 2007). The Georgian Bay Formation is the lithostratigraphic equivalent of the Dundas-Meaford Shales, referred to in some historical work (SEL 1985).

As previously mentioned, the Study Area is bisected by Cooksville Creek and its associated floodplain. Topographic elevation ranges from approximately 164 masl along the base of the creek corridor to 166 masl with some steep slopes along the northern segment of Cooksville Creek in the Study Area and gentler slopes towards the creek in southern portion of the site.

Outside of the creek corridor, the site generally slopes downwards towards the creek and has some minor undulations, in part associated with previous soil disturbances and also slopes from Fairwind Drive eastwards towards the wetland areas, as shown on **Map 3**.

4.4.2 Soils

Overburden is approximately 2 m in thickness at the location of the Study Area where the Fire Station 120 is being built (Martech Group 2017) and was determined to range from approximately 1.3 metres below ground surface (mgbs) to greater than 8.1 mbgs directly north of the site and to extend on to the Dundas-Meaford shales at a shallow to moderate depth (SEL 1985). The large variability in overburden thickness is understood from previous work to be a product of buried bedrock valleys filled with glacial-fluvial sands.

The soils in the Study Area are generally “fine-grained” (Terraprobe 2013) and are dominated by silty clays (Martech Group 2017, SEL 2018a,b) known to have low hydraulic infiltration rates.

Stage 2 archaeological surveys in the Study Area documented that the soils were disturbed in several locations with debris and buried garbage (presumed from the former George Winter homestead along Hurontario St.) but that where topsoil was intact it was about 20 to 30 cm deep dark brown loamy clay over light brown subsoil (see **Appendix E**).

More recent site-specific soils investigations completed for this project (SEL 2019a) reported the following. Borehole and monitoring well locations are provided in **Appendix F**.

- Encountered topsoil in the Park lands was observed to range in thickness from approximately 15 cm to 30 cm, and was noted to contain appreciable amounts of roots and humus;
- Layers of loose 'earth fill' were encountered at seven of the eleven borehole locations beneath the topsoil, ranging in depth from approximately 0.7 mbgs to 2.1 mbgs;
- Firm to hard silty clay was reported in two boreholes beneath the topsoil layer or the 'earth fill' layer (where present);
- A heterogenous firm to hard silty clay till containing cobbles and boulders was reported in all boreholes beneath the topsoil layer or the 'earth fill' layer (where present), and was noted to contain wet sand and silt seams; and
- Shale bedrock was encountered below the overburden at depths ranging from 2.9 mbgs to 4.3 mbgs at two borehole locations, west and south of the large wetland in the P-525 lands, respectively.

As reported the Phase One ESA for the P-524 and P-525 lands (SEL 2018a,b), soil assessments completed in support of the Fire Station 120 development found evidence of levels of petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), in exceedance of provincial standards in the soil samples taken along Eglinton Avenue West. The contamination of the soils is understood to be related to an above-ground heating oil tank in the basement of a historic dwelling along Eglinton Avenue West. Impacted soils were removed for proper disposal and the excavation area was backfilled with clean soil in 2017 (Martech Group 2017).

Initial Phase Two ESA for the P-524 and P-525 lands (SEL 2019b,c) were completed as part of the due diligence process identified by the City. The findings of these reports will be addressed in a separate delineation, remediation and/or risk assessment report which supplements that initial Phase Two ESA as deemed appropriate.

4.4.3 Groundwater

The groundwater conditions in the Study Area have been assessed based on a review of the existing background supplemented by site-specific field assessments undertaken as part of soils assessments (SEL 2019a) and as part of site-specific hydrogeologic monitoring undertaken over 2019 (BEL 2019).

The details of the assessment work and the findings are provided in the Hydrogeological Assessment for the P-524 and P-525 lands provided under separate cover (BEL 2019). A summary of key findings is provided below.

- Topographic elevation ranges in the Study Area from approximately 164 masl along the base of the creek corridor to 166 masl with some steep slopes along the northern segment of Cooksville Creek in the Study Area and gentler slopes towards the creek in southern portion of the site. Outside of the creek corridor, the site is relatively flat but generally slopes downwards towards the creek and has some minor undulations, in part associated with previous soil disturbances and also slopes from Fairwind Drive eastwards towards the wetland areas.

- During reconnaissance of the Subject Property by a licenced Hydrogeologist (April 11, 2019) no obvious groundwater-dependent features were observed. The soil was saturated at surface to the west and south of Cooksville Creek and the wetland.

- Based on a search of the available MECP water well record database, no wells are recorded on the Subject Property. However, a record exists for the decommissioning of a well near the proposed Fire Station 120 parcel.

- More than 30 years ago, SEL (1985) tested 19 boreholes and two test pits in the lands just north and west of the Study Area. The western portion of the site encountered artesian conditions in aquifer sands ranging from 4.0 to 7.2 m below ground surface (mbgs).

- Dominion Soil Investigations Inc. (1987) drilled four boreholes in October 1987 between 3 and 5 m deep along the future extension of Fairwind Drive between Tagish Court and Eglinton Ave. immediately west of the Study Area. These assessments documented some groundwater in open boreholes during drilling, however all boreholes were dry to about 5.0 m following drilling and remained dry 10 days later.

- Both SEL (1985) and Dominion Soil Investigations Inc. (1987) reported bedrock depths ranging from approximately 1.6 mbgs to more than 8.1 mbgs, consistent with buried bedrock valleys. Although dry conditions were reported as deep as 6.6 mbgs, aquifer sands were observed at 6.3 mbgs.

- More recently, boreholes at the northern end of the Study Area, one on either side of the Cooksville Creek corridor in support of the pedestrian bridge across Cooksville Creek (Terraprobe 2013), documented stabilized groundwater levels at 6.4 mbgs in BHS1 west of the corridor and no groundwater to 5.3 mbgs in BHS2 east of the corridor in January 2011.

- Geotechnical and hydrogeological assessments of three boreholes (5.2 to 6.12 mbgs) in the Fire Station 120 lands just west of Cooksville Creek (Martech Group Inc. 2017) at the southern end of the Study Area documented groundwater levels were between 3.42 and 3.97 mbgs in April 2017.

- Geotechnical and soils assessments in the P-525 lands and the P-524 lands in support of this project (SEL 2019a, b, c) monitored water levels in three wells and documented groundwater levels were between 3.0 4.6 mbgs between January and March 2019 with some shallow groundwater in the silty clay till deposits found between 0.8 and 1.5 mbgs, and between 2.3 and 4.6 mbgs. Groundwater levels on March 26, 2019 were: BH/MW101 - 2.94 mbgs, BH/MW102 - 2.77 mbgs BH/MW103 - 1.81 mbgs (see **Appendix F** for well locations).

- Hydrogeological assessments on the P-524 and P-525 lands were based on three boreholes advanced to a maximum depth of 8.23 m and a staff gauge and a drive-point mini-piezometer installed in April 2019 and monitored until November 2019 (BEL 2019). The assessment also included an analysis of the hydraulic conductivity of the soils at the three deep monitoring wells and a feature-based water balance.

    - As summarized in Table 3, hydraulic conductivities ranged from approximately 9.47 x 10-6 cm/s to 1.53 x 10-5 cm/s in the locations sampled. These results are consistent with the very stiff to hard clayey silt to silty clay soil types encountered at those locations and are considered semi-pervious (Bear 1972).
    - Groundwater levels recorded across the P-525 and P-524 lands ranged from approximately 2.87 mbgs (close to the existing wetland) to 8.30 mbgs, equivalent to

approximately 157.83 to 162.96 masl. The shallow groundwater levels in the protected wetland area ranged from approximately 0.33 mbgs to 0.52 mbgs (i.e., 164.36 masl to 164.54 masl). Automated self-contained water level logger data analysed from April to November of 2019 reported variation in groundwater levels at locations MW19-2 and MW19-4 of approximately 1.94 m and 1.66 m respectively.

- Surface water elevations measured with staff gauge instrumentation within the protected wetland area during the monitoring period ranged from 164.5 masl to 164.15 masl, with an overall variation of approximately as 0.3 metres.

- Phase One and Phase Two ESAs completed for the P-524 and P-525 lands found that groundwater parameters tested in all samples did not find any contaminants in exceedance of the MECP Table 9 Standards (SEL 2019b,c).

Based on this information the hydrogeological assessment concluded that: (a) no connection was detected between groundwater and surface water within or close to the protected wetland. As such, the water within the wetland is understood to infiltrate downward as groundwater recharge, or on a subsurface path to the adjacent water course, and (b) soils were found to have very low permeability, and so infiltration rates are assumed to be very low, and the zone of influence (hyporheic zone) around the wetland is estimated to extend only a few metres around the wetland.

4.4.4 Surface Water

Field investigations were undertaken by an Aquatic Biologist from Beacon on June 14, 2018 to confirm surface water and aquatic conditions.

Cooksville Creek flows northwest to southeast across the Study Area and passes through a culvert beneath Eglington Avenue. Cooksville Creek is identified on MNRF mapping as a permanently flowing stream with a warm water thermal regime. The creek has been channelized across the Study Area, flowing over top of a combination of gabion stone and natural substrate. Flows were observed as being low by field staff in June and August of 2018.

General drainage under existing conditions (see **Appendix H**), is from the respective P-524 lands (east to west) and P-525 lands (west to east) towards the creek corridor.

Background information from the City also identified a surficial connection via culvert between the wetland in P-525 and the creek corridor (see **Map 3**).

4.4.5 Aquatic Habitat

The segment of Cooksville Creek within the Study Area is characterized by dense aquatic plant growth along both sides of the channel. As part of the cut and fill works in the floodplain approved and completed for the Pinnacle development (see **Appendix G**), a small on-line pond was created immediately upstream of the culvert beneath Eglington Ave. West. This area of ponding is characterized by low levels of flow and minimal riparian shading.

There are no records of fish in the portion of Cooksville Creek in the Study Area. Evidence of Terrestrial Chimney (or Digger) Crayfish (*Fallicambarus fodiens*) was however previously reported in one location

in the P-525 lands (NSEI 2017) and was also documented by Beacon in several locations in the P-525 lands over 2018 and 2019 (see **Map 4b**). Although they are technically considered "fish", these species are associated with wetlands and are therefore discussed in more detail in **Section 4.4.6** below.

4.4.6 Terrestrial Habitat (including Wetlands)

4.4.6.1 Vegetation Communities and Flora

Vegetation communities throughout the Study Area were assessed by Terrestrial Ecologists from Beacon on May 16, June 14 and August 1, 2018 in accordance with the Ecological Land Classification (ELC) system for southern Ontario (Lee *et al.,* 1998). The assessment built on and refined the ELC mapping completed in 2016 for parts of the Study Area in support of the Fire Station 120 development (NSEI 2016), and also included a survey of the plant species in the Study Area, including screening for Butternut, a Federally and Provincially endangered tree.

Areas outside of the creek corridor are dominated by cultural meadow / old field habitats that have established themselves on much of the land that was under agricultural cultivation prior to the 1980s. Other upland communities include cultural thicket and cultural woodland communities comprised of species historically planted as hedgerows (e.g., Silver Maple (*Acer saccharinum*), Scotch Pine (*Pinus sylvestris*)) and naturalized invasive trees and shrubs (e.g., Siberian Elm (*Ulmus pumila*) and Common Buckthorn (*Rhamnus cathartica*)).

Archaeological studies (ASI 2012) suggest the wetlands in the Study Area were present historically however, review of historical air photos dating back to the 1950s suggests that the wetlands outside the creek corridor started to develop after the 1980s. These wetlands include two small deciduous swamp communities contiguous with the adjacent meadow marsh and shallow marsh communities, and two small meadow marsh areas to the south including a drainage swale that has been mapped by CVC as wetland.

In addition to these wetlands, some wetlands were successfully created adjacent to the creek corridor as part of the Pinnacle development and floodplain restoration efforts, including wetlands 4d and 4e and what are referred to in this ESR as "wetland craters". These wetland craters consist of planted native species within shallow excavations and are visible on recent air photos as small circles.

The creek corridor is characterized by shallow marsh dominated by Narrow-leaved Cattail (*Typha angustifolia*).

Map 4a illustrates the vegetation communities and the created wetlands in the Study Area. An overview of these communities is provided in **Table 2** below.

Table 2. Summary of Vegetation Communities in the Study Area

Unit (s) (see Map 4a)	ELC* Vegetation Type (ELC Code) (area)	Vegetation Community Descriptions
1	Swamp Maple Mineral Deciduous Swamp (SWD3-3) (0.18 ha)	This wetland community is dominated by Freeman's Maple (*A. x freemanii*) and is immediately adjacent to the shallow marsh (units 3a and 3d). Some of the understory species in the shallow marsh are also likely present within unit 1 but at the time of assessment the understorey was inundated with water.
2	Willow Mineral Deciduous Swamp (SWD4-1) (0.05 ha)	This very small wetland polygon is dominated by hybrid Crack Willow (*Salix* x *fragilis*) and is immediately adjacent to shallow marsh (unit 3a), meadow marsh (units 4b and 4c) and cultural woodland (unit 5c) communities. Some of the understory species in the shallow marsh are also likely present within unit 2 but at the time of assessment the understorey was inundated with water.
3a, 3b, 3c, 3d	Cattail Mineral Shallow Marsh (MAS2-1) (1.05 ha)	Wetlands dominated by Narrow-leaved Cattail are the dominant wetland type in the Study Area and are characteristic of riparian areas associated with Cooksville Creek. These wetland units typically hold water for most of the year. Other species noted in this community include: Purple Loosestrife (*Lythrum salicaria*), Burdock (*Arctium minus*), Bindweed (*Convolvulus arvensis*), Prickly Lettuce (*Lactuca serriola*), Wild Mock-cucumber (*Echinocystis lobata*), Spiny Cocklebur (*Xanthium spinosum*) and Marsh Bedstraw (*Galium palustre*). Small inclusions of Crack Willow, Sandbar Willow (*S. interior)* and Red-osier Dogwood (*Cornus stolonifera*) were also noted along the creek corridor close to Eglinton Ave W. Some of the native species in the corridor such as Sandbar Willow are presumed to have been planted as part of recent restoration works associated with the Pinnacle development.
4a, 4b, 4c, 4d, 4e, 4f, 4g	Reed Canary Grass Mineral Meadow Marsh (MAM2-2) (0.39 ha)	This wetland polygon is dominated by the invasive exotic Reed Canary Grass (*Phalaris arundinacea*) and forms a transitional community between the wetter shallow marshes and adjacent upland cultural meadows, thickets and woodlands. Other species noted in unit 4 series include: Broad-leaved Cattail (*T. latifolia*), Bulrush (*Scirpus atrovirens*), Purple Loosestrife, Devil's Beggar's Ticks (*Bidens frondosa*), Lady's Thumb (*Polygonum persicaria*), White Goosefoot (*Chenopodium album* var. *album*), Prickly Lettuce and Panicled Aster (*Symphyotrichum lanceolatum* ssp. *lanceolatum*). Notably, units 4d and 4e are wetlands created as part of recent restoration works associated with the Pinnacle development and include planted species.
5a, 5b, 5c, 5d	Mineral Cultural Woodland (CUW1) (0.48 ha)	The three cultural woodland units in the Study Area appear to have succeeded from hedgerows. Dominant trees include Eastern Cottonwood (*Populus deltoides*), Green Ash (*Fraxinus pennsylvanica*) (dying or dead) and Scotch Pine (also largely in poor condition). Unit 5b contains an abundance of Siberian Elm, one of the few tree species with specimens in fair to good condition. The understoreys of all units are dominated by Common Buckthorn. Unit 5d is a narrow upland transition unit between

Unit (s) (see Map 4a)	ELC* Vegetation Type (ELC Code) (area)	Vegetation Community Descriptions
		the shallow marsh above the top of bank and the shallow marsh in the floodplain that was recently planted with Eastern White Pine (*P. strobus)*. Of the 74 trees in the three CUW units in P-525 (ELC units 5a, 5b and 5c), 36 are considered retainable based on condition.
6	Gray Dogwood Cultural Thicket (CUT1-4) (0.06 ha)	This thicket polygon is dominated by Red-osier Dogwood and includes an abundance of Common Buckthorn and a few Hawthorns (*Crataegus* spp.).
7a, 7b, 7c, 7d, 7e	Dry-Moist Old Field Meadow (CUM1-1) (4.86 ha)	The old field meadows in the Study Area have succeeded from the agricultural fields that were maintained until some time in the 1970s. These meadows are dominated by grasses and forbs such as Tall Goldenrod (*Solidago altissima*), Reed Canary Grass, Kentucky Blue Grass (*Poa pratensis*) and Creeping Thistle (*Circium canadensis*). Other herbaceous species documented in these units include: Canada Bluegrass (*P. compressa*), Common Milkweed (*Asclepias syriaca*), Cinquefoil (*Potentilla recta*), Common Yarrow (*Achillea millefolium var. millefolium*), New England Aster (*S. novae-angliae*), White Clover (*Trifolium repens*), Dock (*Rumex crispus*) and Black Medic (*Medicago lupulina*). In the portions of units 7e and 7b located within the floodplain, saplings recently planted as part of the recent restoration associated with the Pinnacle development include: Red Maple (*Acer rubrum*), Trembling Aspen (*P. tremuloides*), Eastern White Cedar (*Thuja occidentalis)* and Eastern White Pine. Shrubs documented (also possibly planted) include: Nannyberry (*Viburnum lentago*), Guelder-rose Viburnum (*V. opulus*) and Grey Dogwood (*C. racemosa*).
8a, 8b	Hedgerow (H) (0.09 ha)	Although all of the wooded communities in the Study Area appear to have originated from hedgerows, two wooded areas have retained the linear appearance of hedgerows. • H8a contains 21 trees greater than 10 cm diameter at breast height (dbh) (predominantly Silver Maple) 17 of which are considered retainable based on their condition. • H8b contains 38 trees greater than 10 cm dbh (predominantly Eastern Cottonwood, Green Ash and Scotch Pine) 18 of which are considered retainable based on their condition. Both hedgerows have a dense understorey of Common Buckthorn.

* ELC = the Ecological Land Classification system which is the standard used in southern Ontario (Lee *et al.,* 1998).

In addition to the ELC units described in **Table 2**, created wetland "mini-craters" that were part of the restoration works undertaken in the creek corridor as part of the Pinnacle development have been mapped (see **Map 4a**). These very small units include species that were both planted and have naturalized including: Common and Narrow-leaved Cattail, Purple Loosestrife, Crack Willow, Nannyberry and Fox Sedge (*Carex vulpinoidea*).

A total of 115 plant taxa were observed in the Study Area (**Appendix I1**) with approximately half (48%) being non-native plant species (i.e., as ranked by the Natural Heritage Information Centre). No Federal

or Provincial plant SAR were identified in the Study Area. All the native plant species are ranked provincially as S5 (i.e., secure), a designation which indicates the species is widespread and demonstrably secure in Ontario. Species composition was reflective of the variable and successional vegetation communities on site and includes a combination of naturally occurring species and species planted as part of recent (2013 and 2015) restoration efforts along the creek corridor (BEL 2012a).

At the regional and local levels, there is a list of significant plant species for the Region of Peel (Varga 2005) and local ranks are assigned to plant species within the City of Mississauga based on data collected through the City's ongoing Natural Areas Surveys (NAS) (e.g., City of Mississauga 2012). In addition, Credit Valley Conservation has a plant list for the watershed (CVC 2002b) that flags species that are rare in the Region or the watershed[10].

Four plant species that are considered rare in the Region of Peel (Varga 2005) and/or in the Credit Valley Watershed (CVC 2002b) were documented in the Study Area, however they are all considered either planted or exotic. These include:

- Marsh Hedge-nettle (*Stachys palustris*), which was recorded in shallow marsh (ELC unit 3), is a herbaceous wetland perennial listed as regionally rare and significant (Varga 2005; CVC 2002b). However, the provincial status of Marsh Hedge-nettle was recently updated from S5 to SE5 (MNRF 2018), meaning that the species is now considered exotic to Ontario. In the opinion of Beacon, this change in provincial rank renders the regional and local statuses inapplicable, as regional and local statuses only apply to species considered native to Ontario;
- White Spruce (*Picea glauca*), documented in the creek corridor, is considered regionally rare (Varga 2005). However, this species is considered of planted origin on this site and as such the rarity status is inapplicable;
- Freeman's Maple, documented in ELC unit 1, is considered rare within the City of Mississauga (City of Mississauga 2002). However, this species is considered of planted origin on this site and as such the rarity status is inapplicable; and
- Sandbar Willow is a wetland shrub recorded within and along the fringes ELC Unit 3 in the creek corridor. This species is considered regionally rare and significant (Varga 2005) and locally rare (CVC 2002b, City of Mississauga 2002). However, this species is considered of planted origin on this site and as such the rarity status is inapplicable.

Based on the information provided above, there are no naturally occurring plant species recorded within the Study Area that are rare in the Region or the watershed.

4.4.6.2 Breeding Birds

Breeding birds were surveyed on May 29 and June 18, 2018 by Beacon. The visits to the Study Area were between 6:45 am and 7:10 am, with low to moderate winds (0-3 Beaufort Scale), no precipitation, and temperatures within 5 ^{O}C of normal average temperature. The entire Study Area was walked such that all singing birds could be heard or observed and recorded. All birds heard and seen were recorded in the location observed on an aerial photograph of the site. The results of recent breeding bird surveys

[10] Rare in Peel = A species that occurs at fewer than 11 locations in Peel; Rare in Credit Watershed = A species that occurs at fewer than 11 locations in the watershed or fewer than 6 locations in the Region of Halton.

conducted in the Study Area in support of the Fire Station development (NSEI 2016) have been integrated with Beacon's findings.

During the 2018 breeding season, a total of 22 species of breeding birds were recorded in the Study Area with an additional five species observed foraging or flying over the site (**Appendix I2**). During the 2016 surveys (NSEI 2016), 17 species were observed breeding or probably breeding, and an additional three were noted foraging or flying over the site. The available data from the 2016 studies documented presence or absence rather than abundance. The species composition between 2016 and 2018 was very similar, with a slightly higher species richness recorded during the 2018 field season.

Variable habitat is available in the Study Area including cultural meadow and thicket, as well as wetland and treed features. Breeding activity was largely concentrated in the riparian corridor centrally situated in the Study Area and outside the proposed Park lands. Species documented include:

- Common species regularly found in disturbed urban areas including most abundantly: Red-winged Blackbird (*Agelaius phoeniceus*), American Robin (*Turdus migratorius*), American Goldfinch (*Spinus tristus)*, Song Sparrow (*Melospiza melodia*) and Common Grackle (*Quiscalus quiscula*);
- Other common generalist species such as Mourning Dove (*Xenaida macroura*), Chipping Sparrow (*Spizella passerina*) and Brown-headed Cowbird (*Molothrus ater*); and
- Birds more closely associated with particular vegetation communities including Common Yellowthroat (*Geothlyphis trichas*), Willow Flycatcher (*Empidonax traillii*) and Yellow Warbler (*Setophaga petechia*) typically found in moist riparian corridors or thicket communities (two pairs of each of these species were identified).

No Federal or Provincial bird SAR or species ranked as S1 through S3 (Critically Imperiled through Vulnerable) by the Province were identified as breeding in the Study Area. However, several Barn Swallows, a threatened aerial insectivore, were observed foraging in the area, likely due to the presence of water and wetlands. This species breeds in anthropogenic structures including barns which do not occur in the Study Area. This species can also breed under bridges and within some culverts. The pedestrian bridge at the northern end of the Study Area was scanned for nests but none were documented. The culvert at the southern end of the Study Area was not scanned. Neither the bridge nor the culvert will be altered in any way by the proposed park development.

The MNRF classifies birds that require larger tracts of suitable habitat in which to breed, or those that have a higher breeding success in larger areas of suitable habitat, as "area-sensitive" species. One area-sensitive species, a single Savannah Sparrow (*Passer sandwichensis*), was identified foraging in a manicured portion of the Study Area and may breed in the vicinity, however suitable meadow habitat for this species is not present in the Study Area.

The CVC (2002) has compiled a list of 110 species within the Credit River watershed that are listed as of Conservation Concern. These include species that are rare, habitat specialists or indicated as research priorities. Five species recorded during breeding bird surveys are identified as of Conservation Concern in the CVC watershed: Barn Swallow, Common Grackle, Killdeer (*Charadrius vociferus*), Savannah Sparrow and Gray Catbird (*Dumetella carolinensis*). As discussed, both the Barn Swallow and Savannah Sparrow records are not of breeding individuals, however Killdeer, Common Grackle and Gray Catbird were breeding. These three species are regularly encountered in both urban and urbanizing settings and are included in the CVC list based on potential data gaps in the Credit River watershed and minor population decreases from Long Point Observatory Records. In Beacon's

experience, these species remain common in southern Ontario and are generally secure in the CVC watershed, and are not of conservation concern.

4.4.6.3 Breeding Amphibians

Amphibian surveys were undertaken in the Study Area in the spring of 2018 to record the presence or absence of early, mid and late season breeding frogs and toads. Auditory surveys were undertaken from established monitoring points that captured potential breeding amphibian habitat (ponds, wetlands, etc.) (see **Map 2**) for three minutes for each station, as per the Marsh Monitoring Protocol (Bird Studies Canada 2009). Calling activity for each species detected was assigned a call code as follows:

- Call Code 1 - individuals of one species can be counted, calls not simultaneous;
- Call Code 2 - some calls of one species simultaneous, numbers can be reliably estimated; and
- Call Code 3 - full chorus, calls continuous and overlapping.

For call codes 1 and 2, the estimated number of calling individuals was recorded.

Survey details, including dates, times and weather conditions are summarized in **Table 3**. Although there are typically three surveys, during the second visit on May 14, 2018, field staff were charged by a Coyote (*Canis latrans*). Therefore, staff left the site before completing the second amphibian call survey and returned on May 22, 2018 to repeat the survey with modified station locations further from the presumed Coyote den location (ELC unit 5c; **Map 4a**). Therefore, Stations 1 and 2 were used during the first site visit, and Stations 3 and 4 used on the third and fourth visit.

The results of the nocturnal amphibian call surveys are summarized in **Table 4.** Only one species, American Toad (*Anaxyrus americanus*) was documented in the Study Area during the second visit. Prior to leaving the site, on May 14, 2018, Beacon staff recorded two American Toads with a call code of 1 in the Swamp Maple Mineral Deciduous Swamp (SWD3-3; **Map 4a**). An additional two American Toads were heard calling from Cooksville Creek in the southern portion of the subject property 10 minutes before the official start time of the survey and are therefore not included in **Table 4**.

Table 3. Amphibian Survey Details

	Survey 1	Survey 2	Survey 2	Survey 3
Date	April 24, 2018	May 14, 2018	May 22, 2018	June 18, 2018
Start Time	8:30 PM	8:30 PM	9:12 PM	9:30 PM
Temperature (°C)	9	22	15	27
Wind Speed (Beaufort)	1-2	2	1	2
Cloud Cover (%)	100	80	90	60
Precipitation	Drizzle	None	Drizzle	None

Table 4. Amphibian Survey Results

Location (see Map 2)	April 24, 2018	May 14, 2018	May 22, 2018	June 18, 2018
Station 1	No Calls	N/A	N/A	N/A
Station 2	No Calls	N/A	N/A	N/A
Station 3	N/A	N/A	No Calls	No Calls
Station 4	N/A	N/A	No Calls	No Calls

4.4.6.4 Incidental Wildlife

Wildlife species observed in the Study Area during field investigations were recorded as incidental observations. Wildlife observed during field investigations in 2018 include:

- Chimney (or Digger) Crayfish;
- Gray Squirrel (*Sciurus carolinensis)*;
- Eastern Chipmunk (*Tamius striatus*);
- Eastern Cottontail (*Sylvilagus floridanus*); and
- Coyote.

An Eastern Garter Snake (*Thamnophis sirtalis*) was also record during 2016 surveys (NSEI 2016).

The approximate location of the Coyote den identified incidentally on site during amphibian surveys on May 14, 2018 is shown on **Map 4b**.

Due to the dominance of residential development surrounding the Study Area, the associated wildlife is well adapted to suburban and urban environments. With the exception of Chimney Crayfish, these species are commonly observed in the rural and urbanizing landscapes of southern Ontario. None of these species are endangered, threatened or of special concern. Other common urban tolerant mammals likely to occur on or in the vicinity include White-tailed Deer (*Odocoileus virginianus*), Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*) and potentially Red Fox (*Vulpes vulpes*).

Terrestrial Chimney Crayfish

Chimney Crayfish are technically considered a fish but are a semi-terrestrial species native to southern Ontario at the northern end of their range. To the north and east, Chimney Crayfish are known to occur no further than Lake Simcoe (Guiasu *et al.,* 1996). This species is not well understood and is poorly studied but became a subject of particular interest in southern Ontario starting in 2015 when the MNRF included Terrestrial Crayfish as a type of significant wildlife habitat (SWH) in its Ecoregional criteria (MNRF 2015) and suggested the presence of a single Chimney Crayfish chimney in suitable habitat could be a confirmation of this type of SWH.

The limited available information indicates that this species lives in woodland ponds, wet meadows, marshes and drainage ditches. It is very rarely observed in these features as it is a burrowing species, spending most of its time underground and leaving its tunnel network only at night to feed (MNRF 2015). The principal food source for this species is believed to be vegetation, however animal matter is also

thought to be consumed by these crayfish (Thoma and Armitage 2008). Burrows are thought to have as many as four entrances and lead to a large terminal chamber below the water table. The entrances can be made conspicuous by the presence of relatively large “chimneys” made from wet pellets of excavated dirt that dry upon exposure to the air (see Photos 1 and 2).

Chimney Crayfish burrows have been documented in moist clay soils within or close to marsh and meadow wetlands and also in disturbed ploughed fields including in hard, dry ground where the water table is far below the surface and where the vegetation is primarily terrestrial (Guiasu *et al.,* 1996). Burrowing activity appears to be greatest in the spring and following periods of heavy rainfall (Hamr 2007).

Chimney crayfish are thought to live in colonies. Colonies may be represented by less than 10 chimneys, or by several hundred. The same burrows are not thought to be re-used by individuals every year and may even move over the course of a single season. Mark recapture studies conducted over an eight-year period demonstrated burrow migrations of anywhere from 0.5 m to 66 m (Thoma and Armitage 2008).

In the Study Area, individual chimneys or groups of up to three chimneys were identified in several locations within and adjacent to Meadow Marsh habitat (see **Map 4b**) on May 16, May 17 and June 14, 2018. Groups of up to three chimneys were also identified in several locations on the margins of Meadow Marsh habitat during supplemental surveys undertaken during hydrogeological monitoring on May 22, 2019 (see **Map 4b**).

Photo 1. A terrestrial crayfish chimney observed in P-525 within marsh wetland (May 17, 2018)

Photo 2. Three terrestrial crayfish chimneys observed in P-525 within marsh wetland (May 17, 2018)

4.4.7 Tree Inventory

All trees of at least 10 cm dbh in the portion of the Study Area that might be impacted by the proosed Park development were inventoried in June 2018. The tree inventory was scoped to the southern half of the P-525 lands, excluding the lands immediately adjacent to Eglinton Ave. West (as shown in **Map 2**). The lands immediately adjacent to Eglinton Ave. West were excluded because they had already been inventoried as part of the sewer main connection required for the Fire Station 120 development (UFI 2017). The works for installation of this sewer main were in progress on the day of the tree inventory (June 14, 2018).

The only trees greater than 10 cm dbh in the northern part of the P-525 lands are associated with the small swamp units (i.e., ELC units 1 and 2, **Map 4a**) and were not inventoried as no development is being proposed within or adjacent to these features. There are also a number of trees smaller than 10 cm dbh in P-524 and in the Cooksville Creek corridor which were planted between 2013 and 2016 as part of the streetscaping and restoration works associated with the Pinnacle development that were excluded from the inventory due to their size and location in the creek corridor which is also not being considered for any type of development.

In the P-525 lands inventoried, a total of 134 trees measuring at least 10 cm dbh were documented and tagged, including the trees associated with the hedgerows and cultural treed areas (see **Appendix J**, Drawing TP-1).

Of the 134 individual trees inventoried: 46 (34%) were Green Ash, 23 (16%) were Scotch Pine, 21 (16%) were Silver Maple, 14 (10%) were Eastern Cottonwoods, 8% were Siberian Elm, 5 (4%) were Norway Spruce (*P. abies*), and 4 (2%) were White Elm (*U. americana*). The remaining 13% were represented by two Hawthorns, one Russian Olive (*Elaegnus agustifolia*), one Honey Locust (*Gleditsia triacanthos*), one Black Walnut (*J. nigra*), one Apple tree (*Malus sp.*), one Blue Spruce (*P. pungens*), one Bur Oak (*Quercus macrocarpa*) and two Willow species.

No Provincially endangered or threatened tree species (such as Butternut) were documented, including screening for trees less than 10 cm dbh.

In terms of condition, 63 trees or 48% of the trees inventoried were either dead or in poor condition, with the remainder (71 trees or 52%) being in fair to good condition. These consisted of 40 of 46 Green Ash inventoried, 10 of 13 Eastern Cottonwoods and 7of 22 Scotch Pines. A total of 23% of the trees inventoried were in fair condition, predominantly Silver Maples and Siberian Elms. Of the 23% of trees inventoried in good condition, most were Scotch Pine and Norway Spruce. The complete Arborist Report is provided in **Appendix J**.

Notably, the species documented by Beacon in 2018 are generally consistent with other arborist reports completed within or immediately adjacent to the Study Area (IBI 2007, BEL 2012b, UFI 2017), none of which documented Butternut.

In addition to the trees documented by Beacon, the Arborist Report for the new watermain and sanitary line as part of the Fire Station 120 approvals documented 21 trees along the southern boundary of P-525. A total of eight trees between 10 and 30 cm dbh (one Manitoba Maple [*A. negundo*], one Eastern White Cedar, one Eastern Cottonwood, two Silver Maple, two Elms – likely Siberian, and a Sugar Maple) were removed to accommodate the installation of the new line. An additional seven (Ash trees that were either dying or dead) were recommended for removal due to poor condition. Six trees (i.e., three Silver

Maples and three Siberian Elms) were initially identified for retention but ultimately needed to be removed to accommodate the new water / sanitary line for the Fire Station 120 development.

The Beacon Arborist Report (2018, see **Appendix J**) and the UFI (2017) Arborist Report identified 71 and 14 retainable trees respectively, for a total of 85 trees potentially requiring compensation.

5. Natural Heritage Constraints Assessment

The City's Official Plan (August 1, 2018 consolidation) includes a Natural Heritage System (NHS) which is identified both through policies and mapping, as well as a broader Green System that includes components like public parks. Although the City's current NHS mapping (Schedule 3) does not identify any Significant Natural Areas or Natural Green Spaces in the Study Area outside of Cooksville Creek and the associated floodplain (which are identified as Natural Hazards), the policies prevail and need to be applied against the current findings of the site-specific studies undertaken for this project.

The following sections screen the future Park lands of P-524 and P-525 against the applicable natural heritage policies and regulations at the Provincial, Regional and local levels.

5.1 Significant Habitat of Endangered and Threatened Species

Significant habitat of Provincially threatened and endangered species is protected under Ontario's *Endangered Species Act* (2007). The Region and City have policies in their respective Official Plans that speak to the protection of significant habitat of Provincially threatened and endangered species, but it is ultimately MNRF that implements and enforces the requirements of this Act.

As part of the approvals for the proposed development of the Fire Station 120 site in the Study Area over 2015 and 2017, the City consulted with MNRF (Aurora District)[11] on the requirements related to addressing SAR plants and wildlife. The MNRF flagged five species of special concern and four Provincially endangered species (i.e., Butternut and the three species of bats listed at that time - Eastern Small-footed Myotis (*M. leibii*), Little Brown Myotis (*M. lucifugus*), Northern Myotis (*Myotis septentrionalis*) - to be the focus of surveys in the lands on the Fire Station 120 site, the adjacent P-525 site and on the eastern side of the Cooksville Creek corridor north of Eglinton Ave. West. In June of 2016, Tricoloured Bat (*Perimyotis subflavus*) was listed federally and provincially as an endangered SAR and was therefore also added to the list for screening.

In 2016, a comprehensive screening for plant and wildlife SAR was undertaken across P-525 and the Fire Station 120 property to address the potential SAR habitats and species flagged by the MNRF (NSEI 2016). This screening included targeted surveys for basking turtles, breeding birds (including scans for falcons and owls) and acoustic surveys for bats. The study concluded that the areas surveyed do not support habitat for any Provincial SAR, including Butternut, SAR bats or special concern species such as Snapping Turtle (*Chelydra serpentina*), Wood Thrush (*Hylocichla mustelina*) or Eastern Wood-pewee (*Contopus virens*).

[11] Letter: Request for Information for "Proposed Fire Station 120" at Fairwind Drive & Eglington Ave W. Prepared for Laila Gabiazon, City of Mississauga. Prepared by Catherine Wisniowski, MNRF Aurora District. Dated October 16, 2015.

Subsequent consultations between the City and MNRF over 2017 and 2018 (see **Appendix C2**) confirmed that the bird and bat surveys completed in 2016 (NSEI 2016) were considered sufficient to confirm that there is no suitable habitat for SAR birds or bats in the Study Area for this project, and that additional field work in 2018 should focus on screening the vegetation for SAR plants, and in particular Butternut. Beacon nevertheless completed breeding bird surveys in 2018 to determine the potential for locally rare species.

No Provincially endangered or threatened species of plants were documented in the Study Area by Beacon in 2018[12], or by previous vegetation and tree surveys in the Study Area over the past decade (IBI 2007, BEL 2012b, NSEI 2016, UFI 2017), thereby confirming the absence of habitat for Provincial SAR plants and wildlife in the Study Area under existing conditions.

As there is no confirmed habitat for Provincial SAR plants and wildlife in the Study Area, the applicable policies at the Regional and local levels do not apply and there are no related constraints identified for this project.

5.2 Significant Valleylands and Natural Hazards

"Valleylands" are defined in the PPS (2014) as "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". The PPS further defines "significant" in relation to valleylands as "*ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system*". Given these definitions, the portion of Cooksville Creek running through the Study Area meets the criteria for being a valleyland and could be considered significant under the Provincial policies and given the low level of natural cover in the watershed, including naturalized creek corridors (see **Section 4.3**), although not all reaches of the creek are natural.

The Region's Greenlands System is comprised of Core Areas, Natural Areas and Corridors, and Potential Natural Areas and Corridors (Region of Peel 2016). Most of Cooksville Creek, including the portion in the Study Area for this project, is not mapped as a Core Area on the Region's Schedule A. As stated in the Region's Official Plan, policies regarding the detailed interpretation of the location and extent of Core Areas are to be contained in the area municipal official plans (in this case, the City of Mississauga's Official Plan). Similarly, the evaluation and potential protection and stewardship of Natural Areas and Corridors and Potential Natural Areas and Corridors is to be achieved through the area municipal official plans. Therefore, this analysis defaults to the City's policies.

As noted above, the segment of Cooksville Creek in the Study Area meets the Provincial definition of "valleyland" which the City carried forward into its Official Plan (2018a). The City's Official Plan (2018a) considers valleylands "significant" where they are "*are associated with the main branches, major tributaries and other tributaries and watercourse corridors draining directly to Lake Ontario including the Credit River, Etobicoke Creek, Mimico Creek and Sixteen Mile Creek*" (policy 6.3.12(h), City of Mississauga 2018a). Therefore, according to the City's policies, Cooksville Creek corridor in the Study Area qualifies as a valleyland that is both a Significant Natural Area and a significant valleyland because it is a natural area in a well-defined depression that has water flowing through it for most or all of the

[12] In spring 2018, Beacon observed several Barn Swallows, a threatened bird, foraging but no suitable breeding habitat occurs in the P-524 or P-525 lands and the bridge and culvert in the Study Area which could be provide breeding habitat are not being altered in any way by the proposed park development.

year that drains directly to Lake Ontario. The City's Official Plan (2018) also considers the portion of Cooksville Creek running through the Study Area to be a natural hazard, as mapped in Schedule 3.

CVC regulates both valleylands and natural hazards. According to CVC's policies (CVC 2010), the valleylands in the Study Area would be considered "defined"[13]. For defined valleylands, both the Erosion Hazard Limit and the extent of the valleyland are defined by the top of stable slope. The top of stable slope is also generally coincident with the Riverine Erosion Hazard for defined valleylands.

On April 1, 2003, the Special Policy Area Study for the Cooksville Creek Floodplain was completed and subsequently approved by the City and the CVC (IBI Group 2008). As noted in the *Uptown Mississauga. Hurontario and Eglinton – Floodplain Management Study* (IBI Group 2008), the Special Policy Area Study identified a valley draw located immediately upstream of Eglinton Avenue West in the Study Area as a minor tributary valley affected by local backwaters from Cooksville Creek, and recommended filling of the valley draw subject to confirmation that this activity would have no significant impact on upstream and downstream flood water levels. This work was completed as part of the *Floodplain Management Study* (IBI Group 2008) which established the limits of proposed cut and fill, as well as revised regulatory floodlines, and was finalized in 2011 (see **Appendix G**).

Recent correspondences with CVC for this project confirmed that the current approved Regional Floodline for the Study Area is at 164.1 masl (see **Appendix C2**), which is more or less equivalent to the revised regulatory floodline finalized in 2011. **Map 3** illustrates the 164 masl limit for reference.

In addition, erosion hazard limits including a setback were established and confirmed with CVC along most of the creek in the Study Area as part of the approval process for Fire Station 120. As shown in **Map 3**, the floodplain limits and the associated erosion hazard limits (including setback) fall within or are coincident with the creek corridor block in the Study Area and outside of the future Park lands.

The City generally does not support development or site alteration in erosion hazard lands except for activities related to conservation, flood and/or erosion control, essential infrastructure and passive recreation (policy 6.3.26) and based on an appropriate study demonstrating no negative impacts. Similarly, as stated in Section 6.1 of CVC's policies (2010), they will not support modifications to hazardous lands to accommodate of facilitate development unless the modifications have been appropriately addressed through an environmental assessment and where modifications include: infrastructure (including SWM facilities), development associated with passive or low intensity outdoor recreation and education, conservation or restoration projects and/or modifications recommended through an environmental assessment that has been completed to the satisfaction of CVC.

This ESR has adopted the regulatory floodplain limits for this portion of Cooksville Creek as well as the erosion hazard limits (including setback) which have been approved by CVC as part of previous projects and recognizes these limits as natural heritage constraints, as shown in **Map 5**. However, as noted in the policies above, some limited encroachments into the identified erosion hazard and floodplain lands may be permitted as part of this public Park development in accordance with the applicable policies.

[13] *"Defined valleylands are ones in which the physical presence of a valley corridor containing a river or stream channel, which may or may not contain flowing water, is visibly discernable (i.e. valley walls are clearly definable) from the surrounding landscape by either field investigations, aerial photography or map interpretation, and the valley slopes are greater than or equal to 2 metres in height"* (CVC 2010).

5.3 Fish Habitat

Cooksville Creek is generally characterized as potentially supporting warnwater fish habitat and is therefore still considered "fish habitat" even if no fish occur in many of its reaches due to the numerous barriers to fish movement through the system. As discussed in **Section 4.4.5**, no fish have been documented in the reach within the Study Area.

Before undertaking any review, DFO requires proponents to visit the *Projects Near Water* website to determine whether the project requires a review by DFO using the self-assessment process. Generally, if the project cannot avoid serious harm to fish or is likely to contravene one of the prohibitions with respect to SAR aquatic species, the proponent must submit a request for review. DFO also typically does not get involved at the early planning stages of a project as they require specific details of the proposed works / development to determine if the works / development may result in serious harm to fish (see **Appendix C2**).

A self-assessment was completed for the Study Area by an Aquatic Ecologist at Beacon on Nov. 30, 2018. This review found that:

- There are no aquatic SAR in the Study Area (see **Section 4.4.5**);
- Cooksville Creek does provide potential warmwater fish habitat (i.e., no fish have been documented in this reach but fish could potentially be supported under existing conditions if barriers to movement upstream and/or downstream were removed), and is therefore a type of waterbody that could require DFO review. However, as there are no in-water works anticipated as part of the proposed development, a review may not be required; and
- Although no in-water works are proposed as part of the proposed park development, opportunities for wetland and woodland restoration within the creek corridor (and specifically within both the floodplain and erosion hazard limits as shown in **Map 3**) were considered as part of the alternative scenarios for this project and as part of the Preferred Concept (see **Section 6**). The proposed future restoration works in the floodplain and erosion hazard areas can only proceed without DFO review if:
    - No new temporary or permanent fill is placed below the high water mark[14];
    - Any obstruction to fish passage will respect timing windows;
    - Any in-water works will respect fisheries timing windows; and
    - Measures to avoid harm are implemented.

Based on the assessment of the existing surface water and aquatic habitat conditions (see **Sections 4.4.4 and 4.4.5**) and the Preferred Concept (see **Section 6**), it is anticipated that as part of the proposed future restoration works in the floodplain and erosion hazard setback:

- No new temporary or permanent fill will need to be placed below the high water mark (as the proposed wetland and woodland restoration areas are both outside of the high-water mark);
- Fish passage will not be obstructed as no fish occur in the Study Area reach, and no new obstructions are proposed;
- No in-water works are proposed and therefore the timing windows are not applicable; and

[14] Although not defined by the DFO, the Province of Ontario Bill 103 (2012) - an Act to create a right of passage along the shoreline of the Great Lakes - defines high water mark as "*the mark on the shore of a lake where the presence and action of water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation or other easily recognizable characteristics*".

- The restoration works in the creek corridor implemented as part of this project will include measures (such as erosion and sediment control fencing and regular inspection of this fencing) to ensure harm to the potential fish habitat in Cooksville Creek is avoided.

Given that no in-water works anticipated as part of the proposed development and that the proposed wetland restoration works in the creek floodplain in the Preferred Concept are to be undertaken by the City and/or its partners outside of the Park 524 and Park 525 development project, review from DFO is not expected to be required as part of this project.

5.4 Significant Woodlands and Other Wooded Areas

The PPS (MMAH 2014) specifically includes significant woodlands as a component of the NHS in Ecoregions 6E and 7E, and defines them as:

> *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*.

It further states that such areas are "to be identified using criteria established by the Ontario Ministry of Natural Resources". However, the MNRF has yet to release criteria for significant woodlands and therefore these features continue to be identified in accordance with the applicable municipal policies.

The Region's Greenlands System provides policy direction to includes woodlands as Core Areas, Natural Areas and Corridors (NACs), or Potential Natural Areas and Corridors (PNACs) depending on the criteria that they meet related to size, age, linkage function, proximity to other natural features and presence of significant species. However, as stated in the Region's Official Plan, policies regarding the detailed interpretation of the location and extent of Core Areas are to be contained in the area municipal official plans (in this case, the City of Mississauga's Official Plan). Similarly, the evaluation and potential protection and stewardship of Natural Areas and Corridors and Potential Natural Areas and Corridors is to be achieved through the area municipal official plan policies and mapping as long as they are consistent with the Region's policies. Therefore, this analysis defaults to the City's policies.

According the City's NHS policies (found in Chapter 6 of the Official Plan), woodlands may fall into the following categories generally aligned with the Region's:

1. *Significant woodlands (policy 6.3.12) considered Significant Natural Areas are woodlands meeting one or more of the following criteria:*
    a. *Woodlands, excluding cultural savannahs, greater than or equal to four hectares;*
    b. *Woodlands, excluding cultural woodlands and cultural savannahs, greater than or equal to two hectares and less than four hectares;*
    c. *Any woodland greater than 0.5 hectares that:*
        i. *Supports old growth trees (greater than or equal to 100 years old);*

ii. *Supports a significant linkage function as determined through an Environmental Impact Study approved by the City in consultation with the appropriate conservation authority;*
iii. *Is located within 100 metres of another Significant Natural Area supporting a significant ecological relationship between the two features;*
iv. *Is located within 30 metres of a watercourse or significant wetland; or*
v. *Supports significant species or communities; and*

2. *Woodlands (policy 6.3.14) considered Natural Green Spaces are woodlands "greater than 0.5 hectares that do not fulfill the requirements of a significant woodland".*

In the glossary to the City's Official Plan (Section 20) (as in the Region's definitions), a cultural woodland is are defined as "a *treed vegetation community originating from, or maintained by, anthropogenic influences and culturally-based disturbances; often containing a large proportion of non-native species and having 35 to 60 percent cover of coniferous or deciduous trees*", while a woodland is defined as an area greater than 0.5 ha that has:

a. *A tree crown cover of over 60 percent of the ground, determinable from aerial photography; or*
b. *A tree crown cover of over 25 percent of the ground, determinable from aerial photography, together with on-ground stem estimates of at least:*
   - *1 000 trees of any size per hectare, or*
   - *750 trees measuring over five centimetres in diameter at breast height (1.37 meters), per hectare, or*
   - *500 trees measuring over 12 centimetres in diameter at breast height (1.37 meters), per hectare, or*
   - *250 trees measuring over 20 centimetres in diameter at breast height (1.37 meters), per hectare (densities based on the Forestry Act) and,*
   - *Which have a minimum average width of 40 metres or more measured to crown edges.*

In addition, policy 6.3.13 states that:

> *When determining the size of a woodland, areas of cultural savannahs and cultural woodlands that are confirmed to have significant ecological value that contributes to the integrity and function of the woodland, will be included for the purpose of determining woodland size and included as a Significant Natural Area*.

The vegetation community mapping for the study area completed by Beacon on May 16, June 14 and August 1, 2018 using the ELC system (Lee *et al.,* 1998) identified four polygons of cultural woodland (units 5a, 5b, 5c and 5d) and two small units of swamp wetland (which are treed and therefore can also be considered woodlands) (units 1 and 2) (see **Map 4a** and **Section 4.3.7**). The only other treed features in the Study Area are two hedgerows (i.e., units 8a and 8b).

Irrespective of whether the feature is cultural or not, to be considered a "woodland" in accordance with the City's policy definition they must: (a) be at least 0.5 ha in size, (b) meet the established tree cover and/or density, and (c) have a minimum average width of at least 40 m as measured to the crown edges.

The screening for each treed/wooded feature based on analysis of its size, tree cover / density and average width is provided below.

- ELC unit 1 (Maple Mineral Deciduous Swamp) is assumed to meet the established tree cover and/or density but measures 0.177 ha in total and does not have an average minimum width of at least 40 m, and therefore does not qualify as "woodland" under the City's policies. It is, however, recognized as a wetland worthy of conservation.

- ELC unit 2 (Willow Mineral Deciduous Swamp) is assumed to meet the established tree cover and/or density but measures 0.053 ha in total and does not have an average minimum width of at least 40 m, and therefore does not qualify as "woodland" under the City's policies. It is, however, recognized as a wetland worthy of conservation.

- ELC unit 5a (Mineral Cultural Woodland) is assumed to meet the established tree cover and/or density but measures 0.038 ha in total and does not have an average minimum width of at least 40 m, and therefore does not qualify as "woodland" under the City's policies.

- ELC unit 5b (Mineral Cultural Woodland) is assumed to meet the established tree cover and/or density but measures 0.053 ha in total and does not have an average minimum width of at least 40 m, therefore does not qualify as "woodland" under the City's policies.

- ELC unit 5c (Mineral Cultural Woodland) is assumed to meet the established tree cover and/or density and has an average minimum width of about 44 m but only measures 0.372 ha in total therefore does not qualify as "woodland" under the City's policies.

- ELC unit 5d (Mineral Cultural Woodland) is a very narrow transitional strip of trees in the creek corridor, may not meet the established tree cover and/or density does not have an average minimum width of at least 40 m and only measures 0.022 ha in total therefore does not qualify as "woodland" under the City's policies.

In addition, the wooded polygons in the Study Area were considered in relation to each other. Wooded areas of units 1, 2 and 5c are touching or close enough to each other to be considered as a single wooded unit. When these three units are examined together, their total area reaches 0.604 ha (thereby exceeding the overall size threshold of 0.5 ha). However, in totalling and averaging the widths of these three units, the average is 27.7 m, well below the 40 m threshold. Therefore, even when considered together these three units do not meet the definition of "woodland" in the City or in the Region, and therefore there are no wooded features meting the criteria for significant woodlands in the Study Area.

Notably, based on the results of the tree inventory (see **Appendix J**), the three cultural woodland units (i.e., ELC units 5a, 5b and 5c) and the two hedgerows (i.e., ELC units 8a and 8b) have a high proportion of trees that are non-native and/or in poor condition. During these surveys it was also noted that Common Buckthorn, a highly invasive shrub, are abundant in the understoreys of these features.

Although the wooded features in the Study Area do not qualify as significant woodlands and contain a high proportion of non-native and invasive species, these treed areas are still recognized as part of the City's Urban Forest to be protected, enhanced, restored and expanded as appropriate (policy 6.3.42). The City's Urban Forest policies, which require a demonstration that there will be "*no negative impacts to the Urban Forest*" (policy 6.3.44) still apply. Therefore, the non-significant cultural woodlands and

hedgerows have been identified on **Map 5** as constraints because they cannot be removed without compensation that is acceptable to the City.

5.5 Significant Wetlands and Other Wetlands

The PPS (2014), Region of Peel Official Plan (2016) and City of Mississauga Official Plan (2018) all recognize significant wetlands as those identified by the MNRF as Provincially significant using the most current version of the Ontario Wetland Evaluation System (OWES). No such wetlands have been identified in the Study Area. However, the outer limits of the wetlands that do occur on the P-525 portion of the Study Area were staked and surveyed with CVC on June 14, 2018 (as shown on **Map 4a**).

Non-Provincially significant wetlands are also recognized as being able to provide ecological and hydrologic functions by the Region and City's Official Plans, as well as CVC's policies (2010). They are recognized as "Other Wetlands" by the City and CVC. According to the City's policy 6.3.12 (g) significant wetlands include *"other wetlands greater than 0.5 hectares".*

The vegetation community mapping for the study area completed by Beacon on May 16, June 14 and August 1, 2018 using the ELC system (Lee *et al.,* 1998) identified:

- Two small units of swamp wetlands (i.e., ELC units 1 [0.18 ha] and 2 [0.05 ha]) which overlap P-525 and the creek corridor;
- Four marsh units consisting of: a single unit (i.e., ELC unit 3a [0.31 ha]) in P-525 and three connected marsh units in the creek corridor (i.e., ELC units 3b [0.02 ha], 3c [0.63 ha] and 3d [0.09 ha]); and
- Eight smaller and somewhat fragmented meadow marsh units consisting of: a narrow unit bordering marsh unit 3a (i.e., ELC unit 4a [0.10 ha]) in P-525, three narrow connected meadow marsh units in P-525 (i.e., ELC units 4f [0.04 ha], 4g [0.02 ha] and 4h [0.04 ha]), two meadow marsh units in the creek corridor connected to the swamp units (i.e., ELC units 4b [0.03 ha] and 4c [0.10 ha]) and two small created meadow marsh units (i.e., ELC units 4d [0.03 ha] and 4e [0.03 ha]) as well as a series on created wetland "craters" in the creek corridor (a result of the habitat restoration works undertaken between 2013 and 2018 in the Cooksville Creek corridor as part of the Pinnacle development in the adjacent lands to the east (BEL 2012a)).

These units are shown in **Map 4a** and their composition described in **Section 4.3.7**.

In the Study Area, there is currently 1.66 ha of wetland in total with just under 1 ha of this (0.99 ha) occurring within the creek corridor and the remaining 0.67 ha occurring in the P-525 lands to the east of it. The wetlands in the Study Area include three separate areas of contiguous wetlands as follows:

1) The wetlands in the creek corridor (i.e., ELC units 3b, 3c, 3d, 4b, 4c, and parts of 1 and 2) and in the P-525 lands (i.e., ELC units 3a and 4a and parts of 1 and 2) = 1.51 ha together (0.95 ha in the creek corridor and 0.56 ha in the P-525 lands);
2) The created wetlands (i.e., ELC units 4d and 4e) = 0.06 ha (all in the creek corridor); and
3) The small meadow marsh pockets in the P-525 lands (i.e., ELC units 4f, 4g and 4h) = 0.10 ha.

Based on the City's policies, the wetlands described above in (1) qualify as significant other wetlands (and Significant Natural Areas), whereas the wetlands described in (2) and (3) above would be non-significant other wetlands (and Natural Green Spaces). The City generally does not allow development within a Significant Natural Area but may permit it through the EA process where all reasonable alternatives have been considered, negative impacts have been minimized and any negative impacts that cannot be avoided are mitigated through restoration and enhancement (policy 6.3.27). Similarly, proposed development or site alteration within a Natural Green Space is not permitted unless an EA or an EIS demonstrates that there will be no negative impact to the natural heritage features and their ecological functions, and opportunities for the feature's protection, restoration, enhancement and expansion have been identified (policy 6.3.32).

The City does not specify minimum buffers and directs for them to be determined on a site-specific basis (policies 6.3.7 and 6.3.8, City of Mississauga 2018a), whereas CVC recommends a minimum 10 m buffer to other wetlands (policy 6.2.1(b)(v), CVC 2010). Therefore, all the identified other wetlands are shown in **Map 5** as a constraint along with a 10 m buffer.

It is understood in the context of this Park development project that the significant other wetlands, and particularly those within the natural hazard lands of the creek corridor, are the highest priority for protection, but that the other wetlands also provide valued functions. Furthermore, it is understood that wetlands may only be proposed for removal as part of this project if it is demonstrated that there are no other alternatives and if their removal can be adequately compensated.

5.6 Significant Wildlife Habitat (SWH)

Significant wildlife habitat (SWH) is one of the natural heritage feature areas under the PPS (2014). "Wildlife habitat "is broadly defined in the PPS as "*areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations.* The definition further states that: "*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 non-migratory species*" and, as with valleylands, "significant" is defined as "*ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system*".

As with significant valleylands and significant woodlands, under the PPS development and site alteration is not permitted within or adjacent to SWH unless it has been demonstrated that there will be no negative impacts on the natural feature or its ecological functions (policies 2.1.5 and 2.1.6).

This natural heritage feature category is uniquely challenging to define because of the diversity of species, habitat functions, scales and landscape contexts which it potentially captures. To assist with identification of this category of features, the MNRF published the SWH Technical Guide (MNRF 2000) which provides Province-wide guidance and categories as well as additional technical guidance in the SWH Mitigation Support Tool (MNRF 2014). More recently, the Province also released Ecoregional-specific categories of SWH with specific criteria. For this project the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015) applies. This document includes 35 distinct types of SWH falling within four separate categories, each with specific guidance for identifying candidate and confirmed SWH.

In the absence of more region-specific guidance from the Province prior to 2015, the Region of Peel proactively undertook a technical study (NSEI *et al.,* 2009) to define both significant woodlands and SWH at the Regional scale. This resulted in the identification of 39 distinct SWH types and criteria and/or thresholds to identify them based on the original guidance in the SWH Technical Guide (MNRF 2000). Although many of these categories are similar to those identified by the Province for Ecoregion 7E (MNRF 2015), there are a number of differences both in terms of the categories as well as the criteria and thresholds. Figure 5 in the Region's Official Plan lists the criteria that are considered applicable in the Region based on the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (NSEI *et al.,* 2009) and acknowledges some of the complexity and challenges with implementation of this category in the following note:

> *The Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study (June 2009) provided a methodology for identifying and evaluating criteria and thresholds for the identification of significant wildlife habitat. Thresholds have been recommended for criteria where they could be based on sufficient data, available research and/or expert opinion to be considered defensible. Where this information did not exist, criteria were recommended without a threshold. Criteria that were not relevant or applicable to the Region of Peel or Town of Caledon are not included in Figure 5. It is recognized that thresholds identified in the Study may need to be developed, refined or revised through further study, including through the planning approval process as further detailed comprehensive or site specific studies are completed. As a result of the further potential for refinements or revisions, the thresholds have not been adopted as policy in the Region of Peel Official Plan.*

In the City of Mississauga's Official Plan (2018), as in the Region's Official Plan, the Province's general policies with respect to SWH are carried forward and SWH is defined as "*wildlife habitat that is ecologically important as defined in the Region of Peel Official Plan in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system*".

For this project, habitats in the Study Area were screened against both: (a) the Region's criteria (NSEI *et al.,* 2009) (see Table K1, **Appendix K**) and (b) the Province's guidance (MNRF 2000, MNRF 2014) and criteria for Ecoregion 7E (MNRF 2015) (see Table K2, **Appendix K**). The complete screening tables are provided in **Appendix K** and the results from these assessments are presented and discussed below.

As described in **Section 4.4.6**, the wildlife species and habitats supported in the Study Area are predominantly common species and habitats reflective of species and habitats that would be expected to occur in an urbanized context in southern Ontario. Based on the existing conditions (as described in **Section 4.4**), of the potentially applicable SWH categories for the Region of Peel (NSEI *et al.,* 2009) and Ecoregion 7E (MNRF 2015), two are considered applicable to the Study Area: bat maternity roost habitat (candidate) and Terrestrial Chimney Crayfish habitat, with the significance of the latter only identified by the Province.

Species of Conservation Concern

The Provincial criteria include a category called "special concern and rare wildlife species", but none of the species documented in the Study Area are of Provincial special concern or Provincially rare (i.e.,

naturally occurring species ranked as S1, S2 or S3 by the NHIC). Therefore, this category does not apply.

The Region's criteria go beyond the Provincial criteria to capture "species that are rare to uncommon in the Regional Municipality of Peel", which is appropriate for a regionally-based SWH document. However, none of the rare or uncommon species documented in the Study Area are considered triggers for SWH, as defined by the Province.

Potential Bat Maternity Roosts

Bat maternity roosts are an SWH category under both the Regional and the Provincial guidance. The Regional guidance lists six species and provides some preliminary thresholds but does not discuss suitable habitat types and also pre-dates the listing of four bat species as endangered in Ontario (discussed in **Section 5.1** above). Therefore, the more current Provincial guidance (MNRF 2015) is considered more appropriate.

With respect to bat maternity roosts for SWH bat species, very little suitable habitat is present in the Study Area. There are two small swamp units (0.23 ha together), three cultural woodland units dominated by Buckthorn, and two hedgerows (see **Section 4.4.7**). Only forested and swamp communities are considered suitable habitat for SWH bat maternity roosts according to the Province (MNRF 2015). None of the inventoried areas meet the criterion of >10/ha large diameter (>25cm dbh) wildlife trees. The dominant species inventoried include Green Ash, Siberian Elm and Scotch Pine with some Silver Maples. Nonetheless, the swamp units, which include some naturalized Freeman's Maple, may provide limited opportunities for roosting and are possible candidates for foraging given the proximity of these treed areas to the water in the nearby marshes and Cooksville Creek.

Bat habitat assessments were not undertaken by Beacon as previous field surveys conducted on the west side of the Study Area where the treed communities occur (NSEI 2016) were considered adequate. These studies resulted in one snag tree being identified and no evidence of SAR bats. Acoustic surveys in the southern cultural woodland (i.e., ELC unit 5b) from this snag in 2016 documented calls of Big Brown Bat (*Eptesicus fuscus*) and Silver-haired Bat (*Lasionycteris noctivagans*) (both listed as potential triggers for SWH, MNRF 2015) as well as Hoary Bat (*Lasiurus cinereus*) and Eastern Red Bat (*Lasiurus borealis*). Relatively low numbers of calls were documented (i.e., means of 9.6 per night for Big Brown Bat, 0.6 calls per night for Silver-haired Bat, 3.4 calls per night for Hoary Bat and 0.4 calls per night of Eastern Red Bat). Notably, the number of calls does not necessarily equate to the numbers of bats as a single bat may pass by an acoustic detector multiple times in a given night.

The specific presence or absence of at least 11 Big Brown or six Silver-Haired Bats, are the specific criteria for this category of SWH under the guidance for Ecoregion 7E (MNRF 2015). The Ecoregional criteria further specify that SWH occurs in forest or swamp communities (as defined using the ELC system). In Peel Region, the SWH criteria for bat maternity roosts defer to the Provincial guidance in place at the time (MNRF 2000) and list thresholds of 30 Big Brown Bats and 10 Silver-haired bats, as well as other thresholds for bat species not documented on this site.

It is very difficult to confirm actual numbers of specific bat species present without invasive surveys (such as mist-netting), which MNRF discourages. However, the bat habitat and acoustic data collected (NSEI 2016) does not indicate that either the Provincial or Peel criteria are met for bat maternity SWH in the southern half of the P-525 lands. It is very possible that the bat species documented by NSEI

(2016) were documented in the Study Area while foraging and moving between habitats, as the Study Area contains both marsh wetlands and a creek.

In the northern half of P-525, neither a tree inventory nor a snag survey was undertaken because the marsh wetland and associated swamp units are being protected. However, due to the absence of feature-specific data in this location, a precautionary approach was adopted whereby the two swamp units (i.e., ELC units 1 and 2) are being considered candidate SWH for bat maternity roosts based on the presence of documented calls for the required species (albeit a low number of calls) combined with the presence of mature trees in these units (albeit a very small number of mature trees).

Terrestrial Chimney Crayfish

As noted in **Section 4.4.6**, Terrestrial Chimney Crayfish are not well understood and are poorly studied but have become a subject of particular interest in southern Ontario since 2015 when the MNRF included them as a type of SWH in their Ecoregional criteria (MNRF 2015) and suggested the presence of a single chimney in suitable habitat may be confirmation of this type of SWH.

In the Study Area, a single chimney was previously documented in meadow marsh ELC unit 4b (NSEI 2016, 2017). In 2018, Beacon confirmed small groupings of up to three chimneys in meadow marsh ELC unit 4b, as well as within and along the edge of meadow marsh ELC unit 4a and in the adjacent field on May 16, May 17 and June 14, 2018 (see **Map 4b**) in conjunction with other field work. Supplemental surveys undertaken on May 22, 2019 in conjunction with hydrogeological monitoring also confirmed several small groupings of chimneys along the margins of the meadow march unit ELC unit 4a, although slightly further northwest than in 2018 (see **Map 4b**).

Although these groupings of chimneys are less numerous than some observed on other sites in southern Ontario by Beacon staff, they are nonetheless considered persistent in the P-525 lands and, cumulatively, numerous enough to warrant SWH designation as per the current Provincial criteria (MNRF 2015).

5.7 Natural Heritage Linkages

Although ecological linkages or corridors are not a specific natural feature category in the Provincial Policy Statement (MMAH 2014), the policies do state that:

> *The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features* (policy 2.1.2).

In addition, the Provincial Policy Statement defines a Natural Heritage System as being comprised 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*.

The Region's Official Plan broadly recognizes the importance of ecosystem linkages on various scales (policies 1.3.6.2 and 2.3.2.2, Table 1), particularly in relation to river and creek corridors. Similarly, the City's Official Plan commits to encouraging the stewardship and enhancement of linkages that contribute to the NHS (Policy 6.1.1b) and recognizes the important linkage functions provided by existing watercourse corridors and woodlands, as well as the need for terrestrial Linkages where opportunities exist, as described in policies 6.3.21 and 6.3.22 and identified in Schedule 3 as specific mapped components of the NHS.

Although no terrestrial linkages are identified in the Study Area, Cooksville Creek and its floodplain are mapped as a natural hazard (Schedule 3, City of Mississauga 2018a) and both the creek and its associated riparian wetlands can be considered an important local green system linkage. In addition, both the wetland and wooded areas adjacent to the Cooksville Creek corridor help support the movement of the urban adapted wildlife that persists in the area and help manage local stormwater.

On a broader scale, the Study Area supports an important natural heritage linkage in the City's Natural Heritage System and in the Cooksville Creek watershed that provides a range of ecosystem services including wildlife habitat and SWM. On a site-specific basis, the wetlands and some of the immediately adjacent habitats, support movement of Terrestrial Chimney Crayfish (which is considered SWH, see **Section 5.6**) between their underground tunnels and chambers and their above-ground burrows / "chimneys". These burrows may also provide overwintering habitat for reptiles such as Eastern Garter Snakes previously documented in the area (see **Section 4.4.6.4**).

5.8 Summary of Natural Heritage Constraints

In summary, the Study Area:

- Does not currently support any significant habitat for endangered or threatened species;
- Supports a defined valleyland as well as natural erosion hazard lands associated with the Cooksville Creek corridor and defined as part of previous studies in the area (i.e., the Pinnacle development and Fire Station 120 development, see **Appendix G**), both outside of but adjacent to the Park lands;
- Does not support fish but is still considered warmwater fish habitat along Cooksville Creek, also outside of the Park lands;
- Does not support any significant woodlands but does contain some treed areas including two small swamp areas (contained within significant other wetlands), three cultural treed areas (mapped as cultural woodlands using the ELC system) and two hedgerows, as well as a few other scattered trees in the P-525 lands;
- Supports candidate SWH for bat maternity roosts in the small swamp units and confirmed SWH for Terrestrial Chimney Crayfish associated with the wetlands in the P-525 lands; and
- Provides a hydrologic and ecological linkage in the Cooksville Creek watershed and supports local linkages for Terrestrial Chimney Crayfish and other urban adapted species.

Opportunities for natural heritage protection, enhancement and compensation are discussed in the context of the alternative and preferred solutions discussed in **Section 6**.

6. Alternative Solutions Descriptions and Assessment

The identification of alternatives and screening the identified alternatives against established criteria to help identify a preferred alternative are important components of the Municipal EA process. For this project, the process for developing and screening alternatives was different than a typical Class B EA project because: (a) the lands to be developed as a municipal park had already been identified through a prior process along with the various amenities that needed to be accommodated within the identified park lands, and (b) the required SWM, which was the trigger for the EA process, was only one of a long list of components needing to be addressed through the plans for this Park. Therefore, the basis for the different alternatives was exploring options for accommodating the various amenities (e.g., with more space for some than others, in different configurations, etc.) within the established P-524 and P-525 lands while respecting the various environmental constraints in accordance with the applicable policies and also accommodating the required SWM quantity and quality targets for the site and the broader watershed.

Given this context, alternatives were developed in two-phased process, as follows:

- Two preliminary alternatives (called Alternatives A1 and A2 in this ESR) for the Park design based on background information were presented as part of the Phase 1 Consultations (see **Section 3**); and
- Two more refined park development options (called Alternatives B1 and B2 in this ESR) that incorporated additional site-specific information collected and input received over the spring and summer of 2018 were presented as part of the Phase 2 Consultations (see **Section 3**).

Typically, as part of an EA process one alternative to be considered is a “do nothing” scenario against which other alternatives are evaluated from an environmental, social and economic perspective. However, given that the purpose of this project was to incorporate pre-approved amenities and facilities identified by the City under a previous process, “do nothing” was not a feasible alternative to consider.

Both the two preliminary alternatives (A1 and A2) and the two the more refined options (B1 and B2) are described below, however only the two more refined options (B1 and B2) are evaluated in detail against the established criteria as they reflect the input and technical information collected over the spring and summer of 2018.

Consideration of different opportunities for meadow, wetland and woodland restoration was part of each alternative and was required to meet:

- Previous City commitments to CVC (i.e., to incorporate 0.40 ha of woodland restoration);
- Current policy requirements related to compensation for small wetlands and trees that needed removed as part of the different alternatives to accommodate the required amenities and infrastructure for this project; and
- The objective of achieving an overall net gain in ecological habitat quantity and quality.

6.1 Discussion of Alternatives A1 and A2

For this project, two preliminary alternative designs were developed for the first phase of the consultations which for the purposes of the ESR are called Alternative A1 (see **Figure 6**) and Alternative A2 (see **Figure 7**). These alternatives were developed based primarily on existing background information about the Study Area, initial site visits and a preliminary review of the applicable policies, as well as the guidance provided from the City through the RFP in terms of required amenities and key considerations. Park amenities and facilities required by the City included:

- Open lawn and naturalized meadow areas (i.e., less than 10% tree cover);
- One basketball / multi-use court;
- Two tennis courts;
- One informal sports field that can accommodate a "major-sized" soccer pitch;
- A large, centrally located play area targeting children 12 years old and younger;
- An outdoor fitness loop and exercise stations;
- A parking lot for up to 27 vehicles;
- Naturalized enhancement areas that include a diversity of habitats;
- SWM designed to meet CVC criteria;
- A public art installment; and
- A community garden.

As per the City's RFP, it was also recognized that development of the Park lands would require grading and site servicing, a park circulation system and site furnishings such as benches, bleachers, signs, bicycle racks and picnic / activity tables. The integration of "green" technologies (e.g., shade trees, bioswales, permeable pavement) was also identified as an important component of the Park design and development.

Recognized constraints included the floodplain and associated erosion hazard setback (see **Map 5**), the wetlands (as mapped previously by NSEI 2016 but not yet verified by CVC in the field) and the treed areas outside the wetlands (which had not yet been inventoried).

An additional constraint that needed to be considered was the Greenlands versus Open Space zoning. As noted in **Section 2.3.3** and shown in **Figure 3** and **Map 5**, the northern half of P-525 is zoned as City Greenlands (along with the creek corridor) while the remainder of the Park lands are zoned as Open Space. According to the City's Zoning By-law (City of Mississauga 2018b,c), Open Spaces can support a range of active and passive recreational opportunities (including athletic fields and SWM facilities), while permitted used in Greenlands are generally limited to flood control, SWM facilities, erosion management and natural heritage features and area conservation. Both land uses may include trails and related passive recreational uses (e.g., lookouts) and parking areas as long as they are "*constructed of a permeable type of material to minimize impacts on the natural environment*".

Finding an appropriate balance between incorporation of the required City amenities and protection of the natural environment while respecting the constraints of the Greenlands zoning in the Park lands proved to be challenging given the size and configuration of P-524 (1.09 ha) and P-525 (3.72 ha), and the extent and types of natural heritage constraints (i.e., no development in the Cooksville Creek floodplain plus about 1.5 ha in wetlands in P-525) in this relatively small area. Given these challenges, there was no alternative that could accommodate all of the identified park amenities and protect all of the identified wetlands and treed areas. Therefore, the large wetland and associated trees in the

Greenlands-zoned portion of P-525 were prioritized for protection with the understanding that CVC would need to be consulted about options regarding some of the smaller wetlands units after the feature boundaries had been confirmed in the field. As discussed in **Section 2.3**, the applicable CVC, Region and City policies allow for removal of such areas through an EA process where all reasonable alternatives have been considered, negative impacts have been minimized and any negative impacts that cannot be avoided are mitigated through restoration and enhancement.

The initial two alternatives developed were:

- Alternative A1 – "Grouped" Design (see **Figure 6**) distinguished by a design that clustered amenities into pockets with intervening naturalized areas creating a more passive and natural Park character; and
- Alternative A2 – "Stacked" Design (see **Figure 7**) distinguished by a design that provided amenities in blocks so as to maximize the size of the selected programming with a greater emphasis on active recreation spaces that still included protected and naturalized areas.

Both of these alternatives included areas identified for the required Park amenities as conceptual "blocks" of different sizes for: passive recreation, active recreation, gathering, play (i.e., including actual play structures), fitness (i.e., accommodation of fitness stations and/or a loop), grow (i.e., a community garden), public art and parking.

Both alternatives also included areas for wetland protection (including a 10 m buffer) and SWM based on preliminary wetland boundaries determined through the available background (NSEI 2016). Notably, although wetland and SWM areas were identified in the same blocks, it was understood that protected wetlands would not be permitted to serve as active SWM facilities.

As described in **Section 3**, some of the key input from the consultations during and following the first public meeting included:

- Broad support from the community who participated in the consultations for a park that: has a more passive and natural character, provides flexible amenity spaces (e.g., a field that can be used for soccer in the summer as well as other activities including skating in the winter), and provides connectivity and pathways (see **Appendix C3**); and
- Agreement in principle from the CVC that some of the smaller wetlands and treed areas could be removed as long as their removal was in accordance with the applicable policies and that features and/or trees removed were replaced elsewhere in the Study Area with the objective of achieving a net gain in terms of ecological benefits.

In addition, the City and CVC had previously agreed to 0.4 ha of woodland naturalization in the Park lands, which would need to be specifically identified in more refined options going forward.

As described in **Section 4.4** and **Section 5**, based on the field work and analysis completed over the spring and summer of 2018 it was determined that:

- There is currently no habitat for Provincially endangered or threatened species in the Study Area, or other SAR, but the site does support a few species of local conservation concern;
- The Cooksville Creek valley corridor in the Study Area, as defined through work done for other nearby development projects, does not support any fish but does provide potential

warm water fish habitat, provides an important hydrologic linkage, and is associated with significant other wetlands that provide a locally important ecological linkage;
- The wetland areas in the P-525 lands were more extensive than previously identified (NSEI 2016), including a very narrow connection / drainage feature between the two somewhat isolated meadow marsh units (i.e., ELC units 4f and 4h, see **Map 4a**) identified as non-significant other wetlands in the portion of the Park zoned for Open Space intended for active uses;
- Although two small swamp units and three cultural woodland units had been identified using the ELC system in the P-525 lands, none of the treed areas qualified as "woodlands" under the City's policies due to their small size and/or widths, even when adjacent units were considered together; and
- Of the numerous types of SWH potentially occurring, the two identified in the Study Area were: potential SWH for bat maternity roosts in ELC units 1 and 2 and Terrestrial Chimney Crayfish habitat (i.e., one to three chimneys documented in several locations May and June of 2018 and again in May 2019 within or adjacent to meadow marsh habitat).

6.2 Discussion of Alternatives B1 and B2

The input from the Phase 1 consultations and the technical findings (summarized in **Section 6.1**) were considered in the development of two more refined options called Alternatives B1 and B2 for the purposes of this ESR.

The two more refined alternative design concepts developed for the second phase of the consultations (see **Section 3**) both shared a number of components in common including:

- All of the required Park amenities - specifically:
    - A trail network providing connectivity within the site, and to trails and roads adjacent to the Study Area;
    - Several gathering / seating areas associated with both active and passive use areas, with adjacency to natural areas;
    - One open play field, sized to accommodate a senior soccer field, surrounded by a walking loop / fitness track;
    - Two tennis courts and a basketball court in the P-525 lands;
    - A community garden in the P-524 lands (adjacent to the nearby school);
    - A playground in the P-525 lands; and
    - A parking area in the P-525 lands;
- Specific areas outside of the protected wetland anticipated to be required to meet the established criteria for SWM quantity and quality control;
- Respect for the high priority natural constraints by keeping all proposed development outside of the identified floodplain and erosion hazard setbacks, as well as outside of most of the significant other wetland areas in P-525 including a 10 m buffer;
- Identification of the lands with the greatest concentration of Terrestrial Crayfish Chimneys for protection in the form of wetland buffer; and
- A range of habitat creation and restoration areas including:

- Wetlands with a target compensation ratio of 1:1 compensation in the P-525 lands, with the identification of additional area(s) in the floodplain corridor for future wetland restoration;
- At least 0.4 ha of woodland restoration, as compensation for the loss of potential woodland areas associated with the Fire Station 120 site; and
- Tree plantings at a ratio of between 2:1 and 3:1 ratio to compensate for the removals of all trees above 10 cm dbh in fair to good condition, being removed as a result of park development and Fire Station 120 watermain installation.

The two more refined alternative design concepts also included a number of important differences as follows:

- Alternative B1 – Option 1 (see **Figure 8**) was distinguished by a design that included senior soccer sized multi-use play field, tennis and basketball courts next to the parking lot, more wetland removed than Option 2 and less overall habitat creation; and
- Alternative B2 – Option 2 (see **Figure 9**) was distinguished by a design that included a senior soccer sized multi-use play field, tennis and basketball courts next to Fire Station 120 site, less wetland removed than Option 1 and more overall habitat creation. Option 2 also placed the parking further from the active amenities than Option 1 but provided access directly across from the Hollymount Road intersection as opposed to further south onto Fairwind Drive.

Alternatives B1 and B2 are evaluated in more detail in **Section 6.4**.

6.3 Considerations Related to Climate Change including Stormwater Management

The Municipal EA process requires a systematic evaluation of alternatives from an environmental, social and economic perspective using established criteria. In addition, climate change and stormwater management needed to be specifically considered through this process.

In their original guidance the MECP asked the City to:

- Take into account during the assessment of alternative solutions and alternative designs: a) the project's expected production of greenhouse gas emissions and impacts on carbon sinks, and b) resilience or vulnerability of the undertaking to changing climatic conditions; and
- Include quality and quantity control measures to treat stormwater runoff for all new impervious areas and, where possible, existing surfaces.

However (as noted in **Table 1**), consultations with the MECP confirmed that a qualitative (not quantitative) assessment of potential impacts to and from climate change would be appropriate for a project of this scope and scale.

The following discussion was informed by the guidance above as well as high level guidance provided in two documents recently released and recommended by the MECP: *Community Emissions Reduction*

Planning: A Guide for Municipalities (2018) and *Considering Climate Change in the Environmental Assessment Process* (2018).

Potential Impacts of Climate Change on this Project

The greatest vulnerabilities for this project with respect to the potential impacts of climate change relate to the risks of flooding and extreme weather events.

As a site immediately adjacent to the Cooksville Creek floodplain and a site that is dominated by fine clay soils, there is some risk of localized flooding. To address this risk:

- No Park development is planned within the floodplain (equated with the 164.1 masl approved floodline) or erosion hazard limits, and no major park assets (i.e., playgrounds, tennis or basketball courts) are planned within the (more conservative) 165.1 masl flood elevation;
- CVC's stringent SWM criteria for Cooksville Creek quantity control which have been adopted by the City is being implemented through the SWM Plan (i.e. control of the 100-year post-development peak flows to the 2-year pre-development level with a runoff coefficient of 0.25) as well as run-off volume control (i.e. the first 5 mm of runoff shall be retained on-site and managed by way of infiltration, evapotranspiration, or re-use);
- Although the specifics of the SWM Plan will not be developed until the detailed design stage, the anticipated SWM Plan proposes a combination of: permeable pavement (e.g., in the parking lot), a pond and infiltration garden to be used for temporary storage as needed, and bioswales / infiltration trenches to support on-site retention and provide quality control;
- Most of the wetlands in the Study Area are being retained, while the small wetland areas being removed are being recreated, and all trees being removed are being replaced at a minimum 2:1 ratio; and
- Additional flood storage and water quality treatment capacity is being provided in the Park through the various SWM measures to mitigate locally against flood events, and potentially attenuate water to help mitigate flooding downstream.

An additional risk related to climate change impacts in the Park relates to the potential for extreme weather events to damage park amenities including planted materials that, especially when newly planted, will be vulnerable to extended periods of drought and/or freezing and/or extreme winds. Measures such as a preference for use of smaller stock at relatively high densities combined with maintenance schedules that can accommodate supplemental watering if needed can build in more resilience for potential extreme weather-related impacts to new plantings.

Potential Impacts of this Project on Climate Change

This Park is not expected to have a significant negative impact on climate change as much of the Park lands are being retained in or restored to a natural state, although there will be some limited new impervious surfaces introduced. The majority of the negative impacts on climate change are anticipated to be related to the actual construction of this Park which will result in a temporary increase in emissions from activities such as: machinery going to and coming from the site including for grading, installation of trails and other impervious surfaces. There will also be emissions related to the production and transportation of materials required (e.g., erosion and sediment control fencing, benches, lookout, signs), as well as for installation of landscaping and Low Impact Development (LID) measures as well

as monitoring. Following construction of the Park, it is also expected that more people will be driving to the site than currently to make use of the Park's various amenities.

This Park is however expected to have a positive impact in relation to climate change because: (a) much of the Park lands are being retained in or restored to a natural state, (b) measures for enhanced stormwater management are being introduced, and (c) the formalization of this area as an accessible public space for a range of passive and active uses is expected to reduce the need for the two local schools and the local residents to travel for access to a greenspace.

(a) Trees and natural areas are known to sequester carbon. Although the removal of a number of trees and some small wetland pockets will be required as part of the development, these are to be compensated at ratios between 2:1 and 3:1, thereby offsetting these impacts and expected to result in a net gain over time by replacing the current degraded natural features with a greater number and diversity of native species of herbaceous plants, shrubs and trees.

The creation of natural areas, including the creation of new woodlands, will sequester and store carbon and provide localized cooling. Tree plantings along the roads and in the active park spaces will sequester and store carbon as well as provide wind breaks and cooling in the summer, and the potential inclusion of an anthropogenic shade structure will also contribute to cooling.

(b) LID features like those proposed in the SWM and FSR (MTE 2019)[15] are well documented to provide a level of stormwater quantity, quality and erosion control through practices such as bio-retention. These features can store, treat and infiltrate runoff in multiple ways that can be designed to satisfy site-specific constraints. The proposed LIDs include a filter bed designed to provide water quality treatment by passing water through specified layers of soil medium. Additionally, select native vegetation can be planted on these features for additional water attenuation and evapotranspiration. Site-specific hydrogeological and geotechnical work being completed as part of detailed design will inform the selection, location and design of the LID features to be implemented.

Due to the high level or urbanization and limited SWM in the area, the Cooksville Creek watershed is prone to "flashy" responses to storm events and portions of the middle and lower watershed are at risk for flooding and erosion. However, as noted in the *Cooksville Creek Flood Evaluation Master Plan EA* (Aquafor Beech Ltd. 2012):

> …[*over] the last twenty years, it has been proven that innovative stormwater management alternatives including source control… [and] conveyance control …together with end of pipe measures (dry ponds, wet ponds, wetland and subsurface facilities) applied sequentially can replace traditional measures*..

such as storm sewers and detention ponds. Additional flood storage and water quality treatment capacity is being provided in the Park through the various SWM measures to mitigate locally against flood events, and potentially attenuate water to help mitigate flooding downstream. The SWM approach for this project (MTE 2019) is expected to maintain or

[15] The final SWM and FSR (MTE 2019) recommends a combination of permeable pavement, bioswales and a draft SWM pond to manage the anticipated increases in runoff and potential impacts to water quality as a result of changing the site from less than 1% to close to 7% impervious.

improve current levels of quantity control, quality control and volume reduction as compared to existing conditions using a combination of SWM measures, thereby contributing to climate change adaptation and mitigation.

(c) Once the proposed Park development is implemented, it will provide local passive and active park amenities within walking distance for local schools and community members, thereby reducing the need for vehicular travel. The Park will also contribute to the City's Active Transportation Network by providing trails along the Cooksville Creek corridor, thereby reducing the need for vehicular travel and, as a Park on a transit route, will support use of public transit to access the area.

6.4 Evaluation of Alternatives B1 and B2

The evaluation of Alternatives B1 and B2 was completed using criteria that capture environmental, social and economic aspects of the proposed development and that also relate to the goal for the project, as well as to the areas of interest related to the EA process (see **Table 1**).

The City's goal for this project is to "*design and construct an innovative, environmentally responsive, all season community park that effectively integrates park amenities, facilities, and infrastructure with the unique natural features of the site*".

The evaluation criteria developed for this project and their relationship to climate change, where applicable, is presented in **Table 5** below.

Table 5. Evaluation Criteria for Evaluating Park Development Options

Evaluation Criteria	Criterion Description	Relevance to Climate Change
Natural Environment Considerations, including Stormwater Management		
Potential to improve water quantity (i.e., flood) storage capacity	Potential to contribute to flood control in the watershed	SWM measures and wetlands associated with watercourse corridors can contribute to mitigation of sudden and intense storms which occur with greater frequency under climate change and increase risks to both flooding and erosion (and related water quality impacts) on site and downstream.
Potential to improve water quality	Potential to contribute to improved water quality in the watershed	
Potential to reduce risk of erosion	Potential to contribute to reduced erosion risks in the Study area and the watershed	
Potential to improve wetland habitat	Potential to improve wetland habitat in the Study Area in terms of both quantity and/or quality	
Potential to improve terrestrial habitat	Potential to improve terrestrial habitat in the Study Area in terms of both quantity and/or quality (including both woodlands and trees outside of woodlands)	Woody vegetation can mitigate climate change by sequestering and storing carbon. Vegetation that is in good condition and biodiverse is also generally more resilient than habitats that are dominated by vegetation in poor condition with lower diversity.
Potential to improve wildlife habitat	Potential to improve wildlife habitat in the Study Area in terms of both quantity and/or quality	

Evaluation Criteria	Criterion Description	Relevance to Climate Change
Social / Cultural Considerations		
Inclusion of spaces for gathering and small-scale community events	The extent to which park users are provided with gathering spaces through the park design. This was identified as a high priority during community consultations (see **Section 3**).	A local all-season park will discourage local residents from travelling to access recreational opportunities, therefore resulting in an overall reduction in emissions.
Inclusion of amenities for use in all seasons	The extent to which the park uses support all season use. This was identified as a high priority during community consultations and by the City (see **Section 3**).	
Inclusion of fitness and active transportation opportunities	The extent to which park users are provided with informal fitness opportunities and to which active transportation within and through the Park is supported.	Broader and more regular use of active transportation reduces emissions from vehicular transportation.
Integration of park amenities with the existing and proposed natural areas	The extent to which park users are provided with access to the natural environment through the park design. This was identified as a high priority during community consultations (see **Section 3**).	Access to shaded natural areas provides cooling and air quality benefits to users, mitigating some of the extreme heat days and smog associated with summers in a climate change context.
Compatibility with adjacent land uses	The compatibility of the various components in each alternative with the adjacent land uses (i.e., roads, residential, school grounds, fire station, creek corridor) is in accordance with City of Mississauga standards.	
Economic and Logistical Considerations		
Integration of green technologies	The extent to which LID measures have been integrated into the park design. The use of LID measures can alleviate pressure on engineered stormwater management solutions downstream in the watershed, thereby saving the City money.	The use of LID measures can contribute to mitigation of sudden and intense storms which occur with greater frequency under climate change.
Estimated cost of stormwater management	The relative anticipated cost of the proposed SWM measures in each alternative.	
Estimated cost of habitat compensation / creation	The relative anticipated cost of the proposed habitat creation / restoration works in each alternative.	
Estimated cost of operation and maintenance	The relative anticipated cost of operating and maintaining the alternative based on factors such as overall maintenance frequency and intensity and equipment needs.	Les frequent or coordinated maintenance can reduces emissions from vehicular transportation.

The two alternatives (B1 and B2) developed for the second phase of the consultations were both:

- Inclusive of the range of amenities and facilities identified by the City for this Park;
- Compliant with the applicable planning framework (see **Section 2**);
- Refined based on input from the first phase of consultations (see **Section 3**); and
- Developed based on an understanding of the existing watershed-scale and site-specific conditions (see **Section 4**) as well as the natural heritage constraints identified for the Study Area (see **Section 5**).

As such both Alternative B1 and Alternative B2 met the criteria for being subject to detailed evaluation. In the detailed evaluation, the alternatives were compared to each other based on a series of evaluation criteria developed to capture an appropriate range of environmental, social and economic / feasibility considerations (as required under the EA process) as they relate to the proposed development of this Park. An illustration of Alternatives B1 and B2 in relation to natural heritage constraints and opportunities is presented in **Map 6a** and **Map 6b** respectively.

As there were only two alternatives to consider, for each criterion, one alternative is marked as "preferred" or both are marked as "neutral" where one is not preferred over the other, as illustrated in **Table 6**, with explanatory comments provided as needed.

Table 6. Detailed Evaluation of Alternative B1 and Alternative B2

Evaluation Criteria	Alternative B1	Alternative B2	Comments
Natural Environment Considerations, including Stormwater Management (SWM)			
Potential to improve water quantity (i.e., flood) storage capacity	More storage area (0.27 ha) required because less wetland is retained.	Less storage area (0.14 ha) required because more wetland is retained. **PREFERRED**	Both provide stormwater storage areas to meet watershed quantity control.
Potential to improve water quality	More treatment area required because less wetland is retained. Treatment area encroaches into protected wetland buffer.	Less treatment area required because more wetland is retained. **PREFERRED**	Both provide a stormwater treatment area to meet watershed quality control criteria (MTE 2019).
Potential to reduce risk of erosion	**NEUTRAL**	**NEUTRAL**	Both have no Park development within the erosion hazard limits and have stormwater control measures to reduce risk of erosion.
Potential to improve wetland habitat	• More wetland removed (0.19 ha) • Greater than 2:1 compensation (0.39 ha) • More restoration deferred to future (floodplain – 0.20 ha)	• Less wetland removed (0.16 ha) • 2:1 compensation (0.32 ha) • Less restoration deferred to future (floodplain – 0.13 ha) **PREFERRED**	Both provide 1:1 compensation in the P-525 lands and result in removal of small isolated wetland areas to be replaced with expansions to the existing wetland ELC units 3a and 4a for a larger contiguous block of habitat and presumed improved ecological function.
Potential to improve terrestrial habitat	• Slightly less woodland creation (0.31 ha)	• Slightly more woodland creation (0.32 ha)	Both provide comparable levels of woodland creation and tree

Evaluation Criteria	Alternative B1	Alternative B2	Comments
	• Less meadow creation (0.39 ha) • Fewer trees planted (142)	• More meadow creation (0.50 ha) • More trees planted (155) **PREFERRED**	plantings, and neither provide the 0.40 ha of woodland restoration being targeted.
Potential to improve wildlife habitat	Results in development of three documented Terrestrial Chimney Crayfish sites but provides protection for the remaining four sites through buffers to ELC wetland units 3a and 4a. Notably none of the crayfish sites documented in 2019 are within areas proposed for development. **PREFERRED**	Results in development of three documented Terrestrial Chimney Crayfish sites but provides a bit less protection for the remaining documented sites through buffers to ELC wetland units 3a and 4a. Notably none of the crayfish sites documented in 2019 are within areas proposed for development.	Both protect candidate SWH bat roost habitat, the large marsh (ELC unit 3a) and the existing and created wetlands and restored areas associated with the creek corridor which will continue to provide habitat for the bird species of conservation concern documented in the Study Area.
Social / Cultural Considerations			
Access* to spaces for gathering and small-scale community events	• No gathering space in woodland restoration area WO-1 • More gathering space beside woodland restoration area WO-2 • More gathering space associated with the active use areas and in the P-524 lands **PREFERRED**	• Gathering space in woodland restoration area WO-1 • Less gathering space beside woodland restoration area WO-2 • Less gathering space associated with the active use areas	Both to include benches along the trails and bleachers by the multi-use field.
Inclusion of fitness and active transportation opportunities	**NEUTRAL**	**NEUTRAL**	Both include a fitness loop around the multi-use field but no fitness stations in the P-524 lands.
Inclusion of amenities for use in all seasons	**NEUTRAL**	**NEUTRAL**	Both have multi-use fields that can accommodate an open skating rink in the winter.
Integration of park amenities with the existing and proposed natural areas	**NEUTRAL**	**NEUTRAL**	Both concentrate the active park uses in the southern half of the P-525 lands (in accordance with the applicable zoning) and provide trail connections to and within the various naturalized habitats as well as a lookout to the marsh wetland.
Compatibility with adjacent land uses	• Basketball and tennis courts closer to the parking off of Fairwind Drive • Parking lot access south of intersection of Hollymount Drive	• Basketball and tennis courts by the Fire Station 120 site and closer to Eglinton Ave. West • Parking lot access at intersection of Hollymount Drive	Both have the playground in the P-525 lands set back from Eglinton Ave. West and integrate the fitness loop into the setback for the multi-use field. Both also have the parking off of Fairwind Drive.

Evaluation Criteria	Alternative B1	Alternative B2	Comments
		PREFERRED	
Economic and Logistical Considerations			
Integration of green technologies	More extensive use of infiltration galleries and/or bioswales. **PREFERRED**	Less extensive use of infiltration galleries and/or bioswales.	Both allow for permeable pavement to be considered for parking lot.
Estimated cost of stormwater management	Greater cost due to greater area of SWM infrastructure required.	Slightly lower cost due to slightly less area of SWM infrastructure required. **PREFERRED**	Difficult to accurately estimate costs as the details of the SWM Plan will not be developed until the detailed design stage.
Estimated cost of habitat compensation / creation	Slightly lower cost due to less restoration area of overall (approx. 1.09 ha). **PREFERRED**	Slightly higher cost due to less restoration area of overall (approx.1.14 ha).	Difficult to accurately estimate costs as the details of the restoration works will not be developed until the detailed design stage.
Estimated cost of operation and maintenance	**NEUTRAL**	**NEUTRAL**	Both include the same types of active amenities and restoration areas, a similar number of tree plantings, and a comparable length of trails. Access to these areas is also c

* "Access" in this context includes consideration of making park amenities accessible in accordance with the Accessibility for Ontarians with Disabilities Act (AODA) and the City of Mississauga's Facility Accessibility Design Standards (2015).

6.5 Identification of the Preferred Alternative

The process for arriving at the Preferred Concept (shown in **Figure 10** and **Map 7**) was an iterative one, as described below. Elements from Alternatives B1 an B2 were selected based on feedback from the Phase 2 consultations and engagement, and then further refined to address specific comments or achieve specific objectives identified by the City and/or CVC.

Comments from the public carried forward into the Preferred Concept included:

- Inclusion of more shaded areas;
- Support for casual play areas;
- Support for trails adjacent to natural areas and for safe access points;
- Strong support for natural areas protection and enhancement;
- Concerns related to the size of the community gardens;
- Support for proposed storm water management; and
- Preference for the parking access to be located at the Hollymount Road intersection.

Comments from the City carried forward into the Preferred Concept included:

- Preference for a large sized multi-use play field;
- Use of 3.5 m for multi-use pathways and 3 m for standard pathways, and reduction in the pavement area associated with the paths/trail network except at roadway intersections;
- Consideration for Parks maintenance access points and routes;

- An open play field and walking loop to function as a natural ice rink in the winter;
- Sizing of the community garden refined in consultation with Ecosource, the partner for this component of the project;
- Accommodation of the appropriate quantity and quality controls for SWM (as agreed to by the City and CVC Engineers), and identification of specific areas for these requirements;
- Keep all major park assets above 165.1 masl to take a precautionary approach related to potential flooding; and
- Boulevard trees along Fairwind Drive and Eglinton Avenue West.

The Preferred Concept also needed to specifically include the following related to habitat compensation, as agreed by the City and CVC:

- Replacement of wetlands being removed on the subject property at a compensation ratio of at least 1:1, including compensation for the small area (i.e., 88 m^2) of wetland already removed as part of the water / sewer line installation for Fire Station 120 (NSEI 2017);
- Identification of wetland restoration options in the Cooksville Creek corridor to achieve an overall compensation ratio of closer to 2:1, recognizing that these works would need to be undertaken outside of the scope of this project, potentially by City Transportation and Works as part of another project;
- Provision of 10 m naturalized buffers to all protected wetlands with encroachments into these buffers, if required, minimized and excluding impermeable surfaces as well as any SWM components requiring maintenance;
- Compensation for treed areas to be to include a combination of woodland creation / restoration and tree plantings, with a preference for habitat restoration;
- At least 0.40 ha of woodland restoration as compensation for the Fire Station 120 lands (which had been previously targeted for woodland restoration) and the removal of nine (9) retainable trees for the water / sewer line installation;
- Compensation for the retainable trees of at least 10 cm dbh proposed for removal, including the five (5) retainable trees already removed for the water / sewer line installation for Fire Station 120 but not accounted for in the 0.40 ha of woodland creation (see **Appendix J**); and
- Acceptance of a reduced (i.e., 2:1 instead of 3:1) compensation ratio for retainable trees being removed as long as the overall compensation includes woodland and meadow restoration, resulting in a net gain in native ecological diversity and function.

In discussions with CVC staff over the summer and fall of 2018 they indicated that, in general, they are seeking a net gain in wetland cover and function, that they have a preference for compensation that adds to and enhances existing wetlands being protected, and that if adequate wetland compensation cannot be accommodated in the Park lands that additional future wetland compensation areas could be identified in appropriate portions of the floodplain in the Study Area (L. Marray, pers. comm., fall 2018). This position is consistent with the position from City staff in the Forestry Section who have indicated that, in general, they are seeking a net gain in natural heritage / urban forest cover and function. It is also consistent with the direction provided in the City's *Cooksville Creek Flood Evaluation Master Plan EA* (Aquafor Beech Ltd. 2012) which states:

> *Opportunities to enhance and improve the ecological features of this highly urbanised watershed should focus not only on existing natural habitats but also on the entire urban forest and the possibilities presented for ecological restoration in manicured open spaces*.

Based on the feedback provided, the Consulting Team re-examined all possible options to accommodate the required amenities and infrastructure (including SWM areas) while maximizing and optimizing the opportunities for natural habitat protection and enhancement through restoration for the Preferred Concept. This resulted in an overall net gain in terms of the Natural Heritage System in terms of both quantity and quality as the site will upon development include a much greater proportion of native biodiversity than it does under existing conditions.

An overview of the Preferred Alternative in relation to the evaluation criteria is provided in **Table 7** along with specific notation of where there will be no net loss of habitat or function, as well as where there will be net gain. A net gain of habitat and related functions is anticipated as part of the development of the Unnamed Parks 524 and 525 lands, as noted below and discussed in **Section 7**.

Figure 10. Preferred Alternative or Preferred Concept (courtesy of MBTW Group)

Table 7. Overview of Preferred Alternative in Relation to the Natural Environment and Social Evaluation Criteria

Evaluation Criteria	Preferred Alternative (see **Figure 10** and **Map 7**)	No Net Loss or Net Gain
Potential to improve water quantity (i.e., flood) storage capacity	Provides stormwater storage areas (i.e., forebay and dry pond) to meet watershed quantity control criteria (MTE 2019). Storage area (forebay) encroaches into small portion of the created wetland buffer.	Net gain - potential to store stormwater in the Study Area as compared to existing conditions increased.
Potential to improve water quality	Provides stormwater treatment areas (i.e., two infiltration trenches/bioswales) to meet watershed quality control criteria (MTE 2019). With the exception of a small encroachment of the forebay into a portion of the created wetland buffer, treatment areas are outside the wetland buffers.	Net gain - potential to treat stormwater in the Study Area as compared to existing conditions improved.
Potential to reduce risk of erosion	No Park development within the erosion hazard limits, stormwater control measures to reduce risk of erosion and no major park assets below 165.1 masl.	No net loss – proposed development will not increase the risks of erosion.
Potential to improve wetland habitat	Total of 1.47 ha of wetland in the Study Area being retained and 0.18 ha of wetland being removed. Total of 0.18 of wetland creation provided in P-525 lands and at least 0.18 ha identified for future restoration works in the floodplain adjacent to the Fire Station 120 site.	No net loss of area in the P-525 lands and at least 2:1 net gain in wetland restoration area once floodplains are restored. Restoration in P-525 to result in net gain in ecological function related to replacement of small isolated wetland with expansions to the existing wetland block and replacement of invasive shrubs with a diversity of native wet meadow plants.
Potential to improve terrestrial habitat	All of 0.15 ha of wooded swamp being retained and 71 retainable trees being removed. Total of 0.45 ha of woodland creation in Study Area (0.40 ha for prior agreement and 0.05 ha to compensate for the trees / wooded habitat being removed from ELC unit 5c), plus meadow creation and approximately 150 caliper trees being planted.	Net gain – 0.045 ha of woodland (to include about 450 saplings and shrubs) dominated by a diversity of native species and about 150 non-invasive caliper-sized trees to replace native and non-native trees in hedgerows and cultural wooded features dominated by Buckthorn. Current estimated canopy cover in the Study Area of 1150 m^2 to be increased to about 6500 m^2 over the next 15 years. Meadow restoration to introduce additional species diversity and pollinator habitat to broader NHS.
Potential to improve wildlife habitat	Candidate SWH bat roosting habitat retained along with the large marsh (ELC unit 3a) and the existing and created wetlands and restored areas associated with the creek corridor which will continue to provide habitat for the bird species of conservation concern documented in the Study Area.	Net gain – potential bat roost habitat retained and additional potential bat habitat introduced with woodland restoration areas.

Evaluation Criteria	Preferred Alternative (see **Figure 10** and **Map 7**)	No Net Loss or Net Gain
	Development of three Terrestrial Chimney Crayfish sites documented in 2018 but protects the remaining sites through buffers to ELC wetland units 3a and 4a. Notably none of the crayfish sites documented in 2019 are within areas proposed for development.	No net loss – habitat for birds of conservation concern (and common species) retained. No net loss - development of up to three Terrestrial Chimney Crayfish sites compensated for with enhanced protection of remaining four sites and creation of 0.18 additional meadow marsh habitat in the P-525 lands which will, in conjunction with maintenance of the water balance, provide new habitat for the crayfish.
Access* to spaces for gathering and small-scale community events	Gathering spaces provided in both the P-525 and P-524 lands in both the active and passive use / natural areas.	Net gain – no informal gathering areas currently provided.
Inclusion of fitness and active transportation opportunities	Fitness loop around the multi-use field provided and fitness stations added to in the P-524 lands.	Net gain – no fitness loop or stations currently provided.
Inclusion of amenities for use in all seasons	The multi-use field and fitness loop can accommodate an open skating rink in the winter.	Net gain – no skating area currently provided.
Integration of park amenities with the existing and proposed natural areas	Active park uses concentrated in the southern half of the P-525 lands (in accordance with the applicable zoning) and trail connections provided to and within the various naturalized habitats as well as a lookout to the marsh wetland.	Net gain – access to natural areas currently limited to trail and pedestrian bridge at north end of Study area as well as sidewalk along Four Springs Road.
Compatibility with adjacent land uses	• Basketball and tennis courts by the Fire Station 120 site and closer to Eglinton Ave. West • Parking lot access at intersection of Hollymount Drive • Both have the playground in the P-525 lands set back from Eglinton Ave. West	Net gain – field spots (e.g., soccer), basketball, tennis, playground and related parking are not currently supported on this site.
Integration of green technologies	Infiltration galleries and/or bioswales, a naturalized dry pond and permeable pavement for the parking lot are all to be integrated into the plan.	Net gain – these SWM features will contribute to greater potential water storage and quality treatment than under current conditions.

* "Access" in this context includes consideration of making park amenities accessible in accordance with the Accessibility for Ontarians with Disabilities Act (AODA) and the City of Mississauga's Facility Accessibility Design Standards (2015).

7. Impact Assessment and Recommended Mitigation

The following impact assessment focusses on potential environmental impacts related to the Preferred Alternative or Preferred Concept (see **Figure 10**). Addressing potential social or economic impacts related to the Park development is outside the scope of this ESR but have been considered by the City. Some aspects of the impacts and mitigation may need to be refined or amended through the detailed design process. However, the approach and principles as well as most of the site-specific recommendations are expected to continue to be applicable through the detailed design phase. Refinements or amendments, if required, will be documented in follow-up memos.

To highlight impacts related to climate change mitigation and adaption, recommended measures that are expected to avoid or reduce greenhouse gas (GHG) emissions and/or enhance carbon storage when the project is implemented have been noted with an asterisk (*) in the table.

Table 8. Environmental Impact Assessment and Recommended Mitigation for the Preferred Concept

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
Air quality **Noise (adjacent residential areas and schools)**	DURING CONSTRUCTION • Dust and noise related to the grading and installation of park amenities may impact the protected natural areas in the Study Area as well as the adjacent residences and schools during construction. FOLLOWING CONSTRUCTION • No new air quality impacts are anticipated and, in time, the additional tree plantings and naturalization are expected to contribute to some local air quality benefits. • Some limited changes to noise levels will be associated with the active recreation areas when they are in use, however all active uses are buffered from adjacent residential land uses in accordance with City standards.	DURING CONSTRUCTION • Dust** and noise control is to be addressed through the construction plans to ensure nearby environmental features and residential land uses are not adversely affected during construction. • Trees and landscaping berms have been integrated around the perimeter of the Preferred Concept to provide some noise attenuation (and visual buffers) between the park and nearby residences. FOLLOWING CONSTRUCTION • None
Provincially endangered and/or threatened species habitat	Not applicable (no such species present)	Not applicable

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
Groundwater resources	Based on comparative monitoring of the groundwater and surface water elevations, no connection was detected between groundwater and surface water within or close to the protected wetland. As such, the water within the wetland is understood to infiltrate downward as groundwater recharge, or on a subsurface path to the adjacent water course (BEL 2019). From the hydrologic water balance estimations, the proposed development is anticipated to create a small amount of additional run-off. This run-off will be directed to the created wetland area and help maintain existing wetland water depths in the overall wetland area. Details of the stormwater management approach are provided in the Functional Servicing and Stormwater Management Report (MTE 2019). Therefore, based on the estimates provided in this report, hydrologic conditions in the existing and proposed wetland areas are anticipated to be comparable under pre- and post-development conditions (BEL 2019).	DURING CONSTRUCTION • All excavations should be conducted in accordance with Occupational Health and Safety Act (OHSA) regulations, including dewatering to greater than or equal to 1 m below the proposed excavation floor. As such, groundwater levels may require dewatering. • Provided that grading, infrastructure or structure excavation, and/or SWM facilities (e.g., LIDs) do not approach 1 metre above groundwater levels, little impact to the groundwater resources in the Study Area is anticipated. • LIDs (and some infrastructure, if applicable) will require access to soils below frost depths. DURING AND FOLLOWING CONSTRUCTION • The FSR and SWM Report (MTE 2019) indicates that a treatment train approach that includes permeable pavement in the parking lot, bioswales on both the P-524 and P-525 lands and a dry SWM pond will be effective at meeting the established water quantity and quality control targets. • The Hydrogeological Assessment (BEL 2019) indicates that the changes in infiltration as a result of the development of the park lands will be fully mitigated by implementing the recommended SWM measures noted above.
Surface water	Drainage in the Study Area under existing conditions, as illustrated in the SWM and FSR (see **Appendix H**), is from the respective Park lands (on either side towards the creek corridor. Cooksville Creek flows northwest to southeast across the Study Area and passes through a culvert beneath Eglington Avenue West. Cooksville Creek is identified on MNRF mapping as a permanently flowing stream with a warmwater thermal regime. The creek has been channelized across the property, flowing over top of a combination of gabion stone and natural substrate. Flows are generally low.	DURING CONSTRUCTION • An erosion and sediment control (ESC) Plan will be developed and implemented during construction to protect the creek, floodplain, protected wetlands and adjacent sewers from receiving sediment laden runoff. This will include regular inspections to ensure ESC measures are in place and functioning as intended. FOLLOWING CONSTRUCTION • The FSR and SWM Report (MTE 2019) indicates that a treatment train approach that includes permeable pavement in the parking lot, bioswales on both the P-524 and P-525 lands and a dry SWM pond

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
	No development is proposed within the creek corridor with the exception of a small outlet to the proposed SWM pond (see **Figure 10**, **Map 7**). DURING CONSTRUCTION • Grading works have the potential to result in sediment runoff to the creek and/or protected wetlands. FOLLOWING CONSTRUCTION • The proposed SWM pond outlet has some potential to contribute to erosion and negatively impact water quality in the creek. • The introduction of a small parking lot, basketball court and two tennis courts, as well as a network of paved trails introduces some new impervious surfaces which may contribute to additional runoff. • The introduction of a small parking lot also has the potential to impact runoff water quality.	will be effective at meeting the established water quantity and quality control targets*.
Floodplain, creek corridor and fish habitat	No development is proposed within the floodplain or erosion hazard limits, which include, and in some locations exceed, a vegetated setback of 15 m from the watercourse. *Same as Surface Water impacts above.*	*Same as Surface Water recommendations above.*
Significant wetlands and other wetlands	No Provincially significant wetlands occur in the Study Area. DURING CONSTRUCTION • Of the 1.5 ha of significant other wetlands in the Study Area, about 0.07 ha will need to be removed in the P-525 lands to accommodate the northern end of the multi-use play field, a multi-use trail connection and the SWM storage areas (i.e., bio-infiltration garden and pond area). • Of the 0.13 ha of non-significant other wetlands in the Study Area, about 0.1 ha will need to be removed in the P-525 lands to accommodate the northern end to accommodate the basketball and tennis courts and the	DURING AND FOLLOWING CONSTRUCTION • For the total 0.18 ha of wetland being removed, at least 0.18 ha of wetland area will be created in the P-525 lands*. • Wetland removal is to be undertaken outside of the late fall to winter (i.e., mid- to late-November to the end of March) to avoid disturbance to any overwintering amphibians or reptiles, • Restoration areas WE-2 and WE-3 (see **Map 7**) should generally be graded to be at the same elevation as the immediately adjacent wetlands and naturalized with marsh and marsh meadow species. • Wetland restoration area WE-1 (see **Map 7**) should not be graded to protect Terrestrial Chimney Crayfish habitat and the area should not be disturbed with plantings either. It is anticipated that, over

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
	SWM storage areas (i.e., bio-infiltration garden and pond area). • An additional 0.01 ha or specifically 0.0088 ha (88 m^2 of non-significant other wetland) has already been removed to accommodate the water / sanitary sewer line for the Fire Station 120 development. • Of the 0.23 ha of buffer around the protected wetlands in the P-525 lands, SWM infrastructure will encroach into about 0.05 ha at the southern end of the created wetlands.	time, native meadow marsh species being planted in the immediately adjacent buffers will spread into this area. • A buffer of 10 m should be applied to both existing wetlands being protected in P-525 and created wetlands to be naturalized. • ESC fencing should be installed and maintained at the limit of grading around WE-1 and all construction activities (e.g., temporary placement of equipment, fill) should be excluded from the protected wetlands and the buffer to the crayfish habitat. • Park amenities and impervious surfaces (e.g., trails) should be excluded from these buffers*. • The encroachment of SWM infrastructure in the buffer should be limited to the greatest extent possible and the SWM areas should be naturalized with suitable native species so as to provide buffering functions. • Grading in the buffer around WE-1 (and associated plantings) should be restricted entirely if possible or pushed to the outer 5 m of the buffer to protect Terrestrial Chimney Crayfish habitat. FUTURE WETLAND RESTORATION • An additional area of 0.18 to 0.22 ha has been identified in the floodplain area just east of the Fire Station 120 site for wetland restoration outside of this project and to provide at least a 2:1 wetland compensation ratio in the Study Area*.
Significant woodlands and other wooded / treed areas	No significant woodlands occur in the Study Area. The small treed swamp units (0.15 ha) will be retained and protected. DURING CONSTRUCTION • During construction tree removals have the potential to impact nesting birds protected under the MBCA and roosting bats protected under the ESA or the Provincial Policy Statement. No tree removals are proposed within confirmed or candidate habitat for SAR or SWH bats, therefore no mitigation is required for this taxonomic group. • The Tree Inventory and Preservation Plan completed by Beacon (see **Appendix J**) documented 134 trees of at least	DURING CONSTRUCTION • Clearing of treed areas should ideally be done between September 1 and March 31 to avoid potential impacts to breeding birds. • If required, clearing could be done between April 1 and May 15, or between August 1 and August 31, if surveys conducted by a qualified Environmental Inspector finds no active nests within three days of the proposed works being undertaken. • Clearing of vegetation should not be undertaken between May 16 and July 31. DURING AND FOLLOWING CONSTRUCTION Although the City typically requests 3:1 compensation for trees approved for removal, for this project a ratio of 2:1 was considered

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
	10 cm dbh, with 63 being in poor condition or dead including a high proportion of exotic and invasive species (i.e., Scotch Pine, Siberian elm, Norway Spruce). All 71 of the retainable trees will need to be removed as part of the proposed development to accommodate the required active park uses and SWM areas. • An additional 14 retainable trees have already been removed as part of the watermain installation related to the Fire Station 120 development (UFI 2017).	acceptable by City Forestry staff in recognition of the combination of meadow and woodland restoration being accommodated in the Park. The combination of tree, woodland and meadow compensation for the Park lands and the Fire Station 120 lands consists of the following: • A total of 0.40 ha of woodland restoration* (as previously agreed by the City with CVC) at a density of 1000 to 1200 trees and shrubs/ha (e.g., about 400 trees and shrubs) to compensate for the Fire Station 120 lands (which were previously identified for woodland restoration) being developed, as well as for the removal of 9 retainable trees along Eglinton Ave. West for the sanitary sewer line for the Fire Station; • An additional 0.05 ha of woodland restoration* at a density of 1000 to 1200 trees and shrubs/ha to compensate for the removal of 30 retainable trees from the cultural areas (i.e., ELC units 5a, 5b and 5c) at a ratio of 2:1 (e.g., about 60 trees and shrubs); • About 150 caliper stock trees (i.e., 40 mm to 60 mm balled and burlap trees) being planted* throughout the Park outside the protected or restored natural areas to more than compensate for the remaining retainable trees being removed in the P-525 lands and already removed for the Fire Station 120 watermain installation; plus • about 0.50 ha of native meadow creation* throughout the P-525 lands. Invasive species and Ash should not be planted. Naturalization areas should be planted with exclusively site-appropriate native species. No buffers to the created woodlands are required however, the features should include shrubs around their edges to provide a transition to the adjacent meadow or trail or mown areas.
Significant wildlife habitat (SWH)	Two types of SWH have been identified in the Study Area: candidate bat maternity roost habitat and confirmed Terrestrial Chimney Crayfish habitat. No development is proposed within the candidate bat roost SWH as the small treed swamp units (0.15 ha) will be retained and protected, and no indirect impacts are anticipated as a result of the Park development.	DURING AND FOLLOWING CONSTRUCTION • Wetland restoration area WE-1 captures the area where the greatest concentration of chimneys was observed (i.e., four sites of one to three chimneys in close proximity). This area is to be protected from development with a 10 m buffer and both grading and wetland plantings are to be avoided in WE-1 and limited to the

Environmental Receptor	Potential Impact(s)	Recommended Mitigation Measure(s)
	Although there appears to have been a "migration" of some of the chimney locations between 2018 and 2019, they have remained concentrated along or close to the boundary of meadow marsh wetland unit 4a where, based on the groundwater analyses, localized and seasonal shallow groundwater levels ('hyporheic waters') are thought to occur just below the surface. It is anticipated that these conditions will be sustained post-development as long as the identified mitigation and stormwater management measures (see MTE 2019 for more detail) are implemented as recommended. DURING CONSTRUCTION • Development is proposed in three of the seven sites identified with one to three chimneys from Terrestrial Chimney Crayfish to accommodate the northern portion of the multi-use play field and the basketball and tennis courts.	outer 5 m of the buffer to the created feature in order to protect the existing crayfish habitat. • ESC fencing should be installed and maintained at the limit of grading around WE-1 and all construction activities (e.g., temporary placement of equipment, fill) should be excluded from the protected wetlands and the buffer to the crayfish habitat. • The disturbance of three Terrestrial Crayfish Chimney locations and of three small meadow marsh units associated with the crayfish habitat is to be undertaken outside of the late fall to winter (i.e., mid- to late-November to the end of March) to avoid disturbance to any overwintering amphibians or reptiles, and will be compensated by adding 0.18 ha of created wetland* to the existing protected wetland thereby creating a larger and more contiguous wetland patch in the P-525 lands which, presumably, will continue to support Terrestrial Chimney Crayfish and chimneys around its' margins and provide more ecological functions than the current wetland configuration, particularly once the created wetlands and their buffers are planted with a diversity of native species. • All protected wetlands in P-525 are to be provided with a 10 m buffer* which is to be naturalized, providing opportunities for new chimney creation. • Wetland hydrology is to be maintained based on a water balance as determined through the SWM Plan (to be developed as part of the detailed design).

* Recommended mitigation measures that are expected to avoid or reduce greenhouse gas (GHG) emissions and/or enhance carbon storage when the project is implemented.
** The MECP recommends non-chlorine dust suppressants, if required.

7.1 Climate Change

As discussed in **Section 6.3**, the potential impacts of climate change on this project are related to the risks of flooding and extreme weather events. The flood risks are to be mitigated by:

- Keeping development outside the floodplain (equated with the 164.1 masl approved floodline) and erosion hazard limits;
- Keeping major park assets (i.e., playgrounds, tennis or basketball courts) outside the (more conservative but not yet approved) 165.1 masl flood elevation;
- Implementing a SWM Plan that meets the stringent SWM criteria for Cooksville Creek quantity control and volume control as recommended by CVC and adopted by the City;
- Retention of most of the wetlands in the Study Area and replacement of the wetlands being removed, as well as replacement of all the trees being removed at a minimum 2:1 ratio; and
- Use of predominantly smaller stock in landscaping (which is more resistant to extreme weather events than larger stock).

Although the specifics of the SWM Plan will not be confirmed until the detailed design stage, the current FSR and SWM report recommends a combination of LID measures ("green" infrastructure) to meet the established targets, further contributing to the natural character of the Park and enhancing the resilience of the site to storm events (i.e., permeable paving in the parking lot, bioswales and a dry SWM pond).

As also discussed in **Section 6.3**, the potential impacts of this project on climate change are more positive than negative as much of the Park lands are being retained in or restored to a natural state, and only limited impervious surfaces are being introduced (see **Figure 10** and **Map 7**). The majority of the negative impacts on climate change are anticipated to be related to the actual development of this Park (i.e., construction and materials, selected tree removals), while the positive impacts are expected to increase over time as the various restoration areas and tree plantings establish and mature. In addition, the conversion of P-524 and P-525 lands into an accessible public space for a range of passive and active uses is expected to reduce the need for the two local schools and the local residents to travel for access to greenspace.

Specific measures that are expected to contribute to local climate change adaptation include:

(a) The creation of natural areas (including the creation of new woodlands) and new tree plantings along the roads and in the active park spaces which will sequester and store carbon as well as provide wind breaks and cooling in the summer;
(b) Additional flood storage capacity in the Park through the various SWM measures;
(c) Providing local passive and active park amenities within walking distance for local schools and community members;
(d) Contributing to the City's Active Transportation Network by providing trails along the Cooksville Creek corridor; and
(e) The creation of a Park on transit route, encouraging use of public transit to access the area.

The SWM approach for this project (MTE 2019, **Appendix H**) is expected to maintain or improve current levels of quantity control, quality control and volume reduction as compared to existing conditions using a combination of SWM measures, thereby contributing to climate change adaptation and mitigation.

7.2 Soil Management

As noted in **Section 4.4.2**, Phase One and Phase Two ESAs completed in support of the Fire Station 120 development found evidence of levels of PHCs, PAHs and VOCs in exceedance of provincial standards in the soil samples taken along Eglinton Avenue West. The impacted soils were removed for proper disposal and the excavation area was backfilled with clean soil in 2017 (Martech Group 2017).

As part of the work for this project, Phase One and preliminary Phase Two Environmental Site Assessments (ESAs) were completed for P-524 and P-525 (SEL 2018a,b; SEL 2019 b,c) and are provided under separate cover. A separate delineation, remediation and/or risk assessment report which supplements that initial Phase Two ESAs will be developed as deemed appropriate by the City.

A detailed grading and soils management plan will be provided as part of the detailed design process to confirm the mitigation proposed, and if needed will incorporate recommendations of the delineation, remediation and/or risk assessment report.

Once contamination issues are addressed in accordance with the applicable legislation, a Soil Management Plan (SMP) will be required to addresses any proposed excavation, stockpiling, disposal, temporary storage and importation of soils required as part of the implementation of the Preferred Concept.

In general, the Preferred Concept has been designed to accommodate the required park amenities with limited grading while respecting the natural hazard constraints and accommodating the required SWM areas. The details of how much cut and fill will be required and in which locations will be determined as part of the detailed design process.

The SMP will need to follow best management practices as per *Management of Excess Soil – A Guide for Best Management Practices* (2014) available online (http://www.ontario.ca/document/management-excess-soil-guide-best-management-practices) as noted in the City's RFP and in the guidance for this ESR from the MECP (see **Appendix C2**).

7.3 During and Post-Construction Monitoring

Contractors implementing the Park development must be made aware of all environmental considerations so that the environmental commitments for both construction and operation are met during the construction process. In addition, targeted post-construction monitoring is recommended to ensure that mitigation measures are functioning as intended.

A Monitoring Plan will be developed as part of the detailed design process, and should include, for each component being monitored:

- The objective(s) of the monitoring;
- The methods/protocols for data collection (including number and location of sampling sites) and, if applicable, the types of analyses to be applied to the data collected;
- The frequency and duration of the monitoring; and
- The targets or thresholds (if applicable) that indicate the objective has been met, or if not what adaptive management or remedial measures may be possible, if any.

Given the existing conditions and the impact assessment and mitigation (see **Table 8**) in relation to the Preferred Concept, it is recommended that the following components be monitored:

- During construction:
    1. Tree removals in accordance with the MBCA;
    2. Adherence to the dust and noise control plans / measures developed and approved as part of detailed design;
    3. Adherence to the ESC plans[16] that are developed and approved as part of detailed design and in conformity with the City's ESC by-law and sediment control standards;
    4. Avoidance of grading activities in the Terrestrial Crayfish Chimney habitats to be removed during late fall and winter (i.e., mid- to late-November to the end of March);
    5. Supervision to ensure that:
        - Protected wetland areas including associated Terrestrial Crayfish Chimney habitats (i.e., wetland restoration area WE-1 and at least the inner 5 m of the associated 10 m buffer) are not disturbed; and
        - Habitat creation and naturalization are being implemented as per the approved landscaping plans.

- Post-construction:
    5. The development of standard operating and maintenance procedures / manuals for all SWM facilities including LID features;
    6. To confirm SWM facilities meet the City's criteria and can be assumed;
    7. Targeted surface and, if needed, groundwater monitoring (depending on the findings of the hydrogeological work to be completed) to ensure that the hydrology of the protected wetland has been maintained;
    8. Terrestrial Crayfish habitat surveys between April and June;
    9. Breeding bird surveys; and
    10. Inspections of the naturalization areas and other tree plantings assess the survival and condition of the plantings following implementation.

Details of the monitoring will be determined through the detailed design process.

Notably, for components 7, 8 and 9 above, the data collected in support of this ESR and the follow-up hydrogeological work will provide the pre-construction data to be used as baseline data for the purposes of comparison to post-construction conditions.

[16] Examples of ESC measures to be used include: heavy-duty sediment silt-fencing, silt sacks, silt socks, construction mud-mats to avoid dispersion of sediments via trucks or equipment, or rip-rap (per OPSD 810.010) for outfalls erosion control.

8. Policy Compliance Review

Table 9 provides a summary of the applicable policies and regulations and demonstrates how the Preferred Concept (see **Figure 10**) and the related recommendations in the ESR (see **Table 7** and **Table 8**) are compliant with these policies. In some cases, further consultation with relevant agencies will be required at the detailed design stage.

Table 9. Summary of Act and Policy Compliance for the Development of Unnamed Park 524/525

Act or Policy	Applicability	Compliance
***Fisheries Act* (1985)**	• Section 35 (1) of the Federal *Fisheries Act* precludes "any *work, undertaking or activity that results in serious harm to fish*" except where authorized by the Minster. • Compliance with the provisions of s. 35 for water bodies is now made on a case-by-case basis through a self-assessment process to determine impacts to fish and fish habitat and to identify appropriate responses. • Although it does not support any fish, the portion of Cooksville Creek running through the Study Area is considered potential warmwater fish habitat. • For warmwater fish habitat, 15 m setbacks to the bankfull width are generally recommended. • No in-water work or crossings of the fish habitat are being proposed as part of the Park development. • Potential impacts are limited to indirect impacts to water quantity and quality related to development of the Park and potential habitat restoration works in the floodplain (to be undertaken by the City and/or its partners in the future).	• No development is proposed within the creek or within the floodplain or erosion hazard limits, which include and exceed a vegetated setback of 15 m from the warmwater fish habitat. • This project was screened through the self-assessment process and it was determined that DFO review is not required (see **Section 5.3**). • Proposed stormwater management measures on the subject property are not expected to have a negative impact on the quantity or quality of water in the creek. • Potential sediment runoff into the creek during construction of the Park will be managed with an Erosion and Sediment Control (ESC) plan (see **Section 7**). • Implementation of the measures recommended in the approved FSR and Stormwater Management (SWM) report (MTE 2019) to maintain the current water balance and ensure that any runoff from the Park lands into the creek during a storm event is treated and outlet to the creek in a dispersed manner so as not to cause erosion or add sediment to the creek.
Federal *Species at Risk Act* (2002)	• Not applicable (see **Section 2.1.2**)	
***Migratory Birds Convention Act* – MBCA (1994)**	• The MBCA (1994) protects the nests, eggs and young of most bird species from harassment, harm or destruction. • Although there are no permitting requirements, all proponents must comply with the legislation and may be fined if found to be in contravention of this Act.	At the implementation stage, any works that involve tree or vegetation removal are to be undertaken to comply with the Act, as described in **Section 2.1.3** and recommended in **Table 7**. Notes specifying the applicable requirements are to be included in all final drawings provided to contractors during implementation.

Act or Policy	Applicability	Compliance
	• For this project, this legislation would apply in relation to any proposed vegetation clearing as part of the implementation of the proposed Preferred Concept, once approved.	
Provincial *Environmental Assessment* (EA) *Act* as it applies to Municipal Class B EAs	A Municipal Class B EA process, as followed for this project, must include: • A Notice of Study Commencement • Consultation to ensure that all stakeholders are notified at the outset of the project and that their concerns are adequately addressed before proceeding to detailed design • Consideration of a reasonable range of alternatives and assessment of the effects of each alternative on all aspects of the environment • Provision of clear and complete documentation of the planning process followed, to allow "traceability" of decision-making with respect to the project • Documentation of the applicable Areas of Interest being addressed. • A Notice of Project Completion	• A Notice of Study Commencement was released at the end of May 2018 (see **Appendix B**). • A two-phased consultation process with the City, agencies, and community was completed over 2018 as documented in **Section 3** of this ESR and **Appendices A through C.** The appropriate indigenous groups were engaged as discussed in **Section 3** and documented in **Appendix D**. • A range of alternatives were developed and two refined alternatives were screened against established criteria as documented in **Section 6.** • The planning process for this project has been documented in this ESR. • The Areas of Interest have been identified and addressed as specified in **Table 1.** • A Notice of Completion is to be submitted upon finalization of this ESR and the EA. • Further consultation with and approvals from MECP may be required as part of the detailed design process.
Provincial *Endangered Species Act* – ESA (2007)	• The ESA regulates the habitat of all species listed as endangered or threatened in Ontario. • A Species at Risk (SAR) screening report completed for P-525 as part of the approval process for the Fire Station 120 site in the Study Area concluded that this site does not support habitat for any SAR (NSEI 2016). • Correspondence with MNRF (see **Appendices C1 and C2**) confirmed that this screening was considered applicable to this project and that the only additional screening required would be for Butternut as part of vegetation and tree surveys completed in 2018.	• No Butternut were identified in the Study Area as part of the vegetation assessments or tree inventory work. • Screening work undertaken in accordance with MNRF guidance found no significant habitat of Provincially endangered or threatened species in the Study Area, therefore no further action is required to comply with the ESA as part of this project.
Provincial Policy Statement (2014) Section 2.1 – Natural Heritage		
1. Habitat for Threatened and	See discussion in the Provincial ESA section above.	See discussion in the Provincial ESA section above.

Act or Policy	Applicability	Compliance
Endangered Species		
2. Significant Valleylands	• The floodplain and erosion hazard limits of Cooksville Creek in the Study Area (see **Map 5**) define the extent of the valleylands. • These valleylands may be considered Provincially significant and qualify as significant at the City level (see **Section 5.3**). • Development may be permitted within or adjacent to significant valleylands if it can be demonstrated "*that there will be no negative impacts on the natural features or their ecological functions*".	No development is being proposed within the significant valleylands and so no direct impacts are anticipated. In addition, no indirect impacts to the valleylands are anticipated to the form or function of the valleylands as a result of the proposed Park development either during or following construction.
3. Significant Wetlands	• Provincially significant wetlands (PSWs) are identified by the MNRF. • No PSWs have been identified in the Study Area, although other wetlands have been confirmed (see **Section 5.5** and City policy section below).	Not applicable
4. Significant Woodlands	• Significant woodlands are currently identified in accordance with the applicable planning authority policies – in this case the City of Mississauga (which must be consistent with Regional policies). • The wooded features as mapped according to the Ecological Land Classification (ELC) system include: two small swamp units, three small cultural woodland units and two hedgerows. Based on analyses completed for this project (see **Section 5.4** and City policy section below), none of wooded features in the Study Area meet the City's definition of "woodland" based on their size and/or shape, even when contiguous units are considered together.	Not applicable
5. Significant Wildlife Habitat (SWH)	• SWH is a complex category encompassing a broad range of habitat types. For this project SWH was screened based on guidance from the Province (MNRF 2000, 2015) and the Region (NSEI *et al.,* 2009). • Development may be permitted within or adjacent to SWH if it can be demonstrated "*that there will be no negative impacts on the natural features or their ecological functions*". • Screening for this project (see **Section 5.6**) determined that the two small swamps provide candidate bat maternity roost habitat for SWH species and confirmed Terrestrial Chimney Crayfish habitat occurs in association with the marsh wetlands in the P-525 portion of the Study Area.	• No development is being proposed within the candidate SWH bat maternity roost habitat, and the proposed changes in the adjacent lands are not expected to negatively impact the habitat for bats and will, over time, expand and enhance this habitat (i.e., 0.45 of woodland restoration). • Of the seven locations where clusters of one to three Terrestrial Crayfish Chimneys were documented in spring 2018, four of them will be protected. All of the locations where one to three Terrestrial Crayfish Chimneys were documented in spring 2019 are being protected. • The Hydrogeological Assessment (BEL 2019) and FSR and SWM report (MTE 2019, **Appendix H**) confirm that if the recommended

Act or Policy	Applicability	Compliance
		SWM measures are implemented, the protected and proposed wetlands are expected to be sustained. • In addition, grading and landscaping are to be excluded from the protected crayfish habitat area, including a "no touch" buffer of at least 5 m. • The potential disturbance of crayfish chimney locations is to be mitigated by avoiding grading around the wetlands the late fall and winter period (i.e., mid- to late-November to the end of March) so as not to disturb any overwintering amphibian or reptiles. • As a precautionary measure, this potential disturbance will be compensated by adding close to 0.2 ha of created wetland to the existing protected wetland thereby creating a larger and more contiguous wetland patch in the P-525 lands which is expected continue to support Terrestrial Chimney Crayfish and chimneys around its' margins.
6. Significant Areas of Natural and Scientific Interest (ANSIs)	The Study Area does not include or overlap with any earth or life science ANSIs.	Not applicable
7. Fish Habitat	See discussion in the Federal *Fisheries Act* section above.	See discussion in the Federal *Fisheries Act* section above.
Provincial Policy Statement (2014) Section 2.3 – Natural Hazards	• Development in areas prone to flooding and erosion is generally restricted or prohibited. • For defined valley systems (as in the Study Area), the erosion hazard limit is defined by the top of stable slope and equivalent to the Riverine Erosion Hazard (as defined by CVC 2010). • Both the floodplain and the erosion hazard limits were confirmed as part of work undertaken for the Pinnacle development and Fire Station 120 site (see **Section 5.2, Appendix G** and **Map 5**).	• No development is proposed within the confirmed floodplain (i.e., below 164.1 masl) and the erosion hazard limits. • In addition, no major park assets are planned below the more conservative but not yet approved flood elevation (i.e., 165.1 masl). • The proposed development is not expected to increase the risk of natural hazards as stormwater will be addressed in accordance with the established SWM criteria (MTE 2019).
Credit Valley Conservation (CVC) Policies and Regulations (2010)	• CVC (a) regulates land use activities within and adjacent to wetlands, watercourses and valleylands, and (b) advises the City with respect to natural heritage policy compliance under the *Planning Act* and *Environmental Assessment Act*. • CVC's guiding policies with respect to natural heritage (see **Section 2.3.1**) are to encourage an ecological net gain or at least	• No development is proposed within the floodplain and associated hazard lands. • Other wetlands identified for protection have been given a 10 m buffer in accordance with CVC's policies. • Other wetlands proposed for removal are being compensated at a 1:1 ratio within the P-525 lands, and additional wetland

Act or Policy	Applicability	Compliance
	ensure no net loss, promote a systems-based approach and recommend appropriate buffers. • Under CVC's policies, the valleylands in the Study Area are defined. The refined floodplain limits (as defined and approved by the City and CVC under a previous planning process) are considered coincident with the top of stable slope as well as the Erosion Hazard Limit and the Riverine Erosion Hazard. • CVC will not support modifications to any components of the Natural Heritage System (including hazardous lands and buffers) to accommodate or facilitate development "*unless the modifications have been appropriately addressed through an environmental assessment… to the satisfaction of CVC*". • Modifications that may be permitted include SWM facilities (policy 6.1) as well as development or site alteration associated with "*passive or low intensity outdoor recreation and education*". • In addition, for parks, trails and recreational areas (policy 7.2.8(c)): "*CVC may permit interference or development associated with new passive or low intensity recreational uses within watercourses, wetlands, hazardous land and natural features and areas contributing to the conservation of land where the proposal is consistent with CVC standards, and it has been demonstrated that the interference is acceptable and, in the opinion of CVC, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected*".	compensation that could be undertaken as part of a future project has been identified in the floodplain to achieve at least a 2:1 compensation ratio. • Encroachment into the wetland buffer by SWM infrastructure is to be limited to a small portion about (0.05 ha) of the buffer to the created wetland WE-2 for the SWM forebay which is to be naturalized with native species. • This ESR demonstrates how an appropriate balance has been achieved between accommodation of the required Park amenities (see **Section 6**) and natural heritage protection and enhancement, including compensation for small natural areas and trees removed, and replacement with a greater diversity of native species that will, over time, result in net ecological gains in the Study Area (see **Table 6**). • Further consultation with and permitting from CVC will be required as part of the detailed design process. FUTURE RESTORATION – NOT PART OF THIS PROJECT • Activities within the floodplain are limited to habitat restoration and enhancement that will supplement work already completed as part of the Pinnacle development. These activities have been targeted in areas outside of steep slopes to limit the risk of contributing to erosion or sedimentation.
Region of Peel Official Plan (2016)	• Peel's Official Plan (2016 Consolidation) contains policies aimed at protecting, maintaining, and restoring a Regional Greenlands System consisting of Core Areas, Natural Areas and Corridors (NACs), and Potential Natural Areas and Corridors (PNACs). • The Study Area does not include any lands identified as Core Areas in the Region's Greenlands mapping (Schedule A). • The Region defers to the City for implementation of its Greenlands policies as long as they are consistent with Regional policies, and compliance is therefore addressed through the City policies section below.	• No development or site alteration is proposed within the identified valleylands or fish habitat. • The two types of SWH identified in the P-525 lands in the Study Area are being protected in accordance with the City of Mississauga's policies which defer to the Province – see discussion for SWH above.
City of Mississauga Official Plan (2018a)	• The City's Official Plan Chapter 6 includes policies that address protection of the Natural Heritage System (NHS), including Significant Natural Areas, Natural Green Spaces and Linkages.	Under the Preferred Concept (see **Figure 10** and **Map 7**) in the Study Area:

Act or Policy	Applicability	Compliance
	• The Study Area has been determined (see **Section 5**) to include the following types of Significant Natural Area: fish habitat (in the creek), SWH (see discussion above), and significant valleylands and significant other wetlands. • Significant other wetlands in the Study Area include ELC units 1, 2, 3a, 3b, 3c, 4a, 4b and 4c which form a contiguous wetland extending from the P-525 lands to the creek corridor. • Policy 6.3.27: *Development and site alteration as permitted in accordance with the Greenlands designation within or adjacent to a Significant Natural Area will not be permitted unless all reasonable alternatives have been considered and any negative impacts minimized. Any negative impact that cannot be avoided will be mitigated through restoration and enhancement to the greatest extent possible. This will be demonstrated through a study in accordance with the requirements of the Environmental Assessment Act…* • The Study Area has been determined to include the following types of Natural Green Spaces: other wetlands (see **Section 5**). • Non-significant other wetlands in the Study Area include the smaller and more isolated ELC units 4f, 4g and 4h, as well as units 4d and 4e which are the result of wetland creation in the floodplain completed as part of the Pinnacle development. • Policy 6.3.32 states that development and site alteration will not be permitted within or adjacent to Natural Green Spaces unless it has been demonstrated through an EA (or EIS) that there will be no negative impact to the natural heritage features and their ecological functions and opportunities for their protection, restoration, enhancement and expansion have been identified. • The City's Official Plan Chapter 6 also includes policies that address natural hazards and protection of the Urban Forest, including trees outside of the NHS. • Development and site alternation are not permitted within erosion hazard lands (associated with valleylands and watercourses (policy 6.3.47) and proposed development adjacent to erosion hazard lands may need to be supported by slope stability and/or stream erosion studies (policy 6.3.48) as well as an Erosion and Sediment Control Study (policy 6.3.63).	VALLEYLANDS AND FISH HABITAT • No development is proposed within fish habitat or significant valleylands (see discussions above). WETLANDS • No development is proposed within the significant other wetlands except for a very small area represented by the southern "hook" at the southern end of ELC unit 4a. • Development is proposed in three of the five non-significant other wetlands (i.e., ELC units 4f, 4g and 4h which represent a bit more than 0.17 ha together) to accommodate the required park amenities on the Open Space zoned lands in P-525. In addition, a little less than 0.1 (i.e., 0.0088 ha) of non-significant other wetland was already removed to accommodate the Fire Station 120 water main installation. • The removal of a total of 0.18 ha of non-significant other wetland will be compensated with 0.18 ha of wetland creation in the P-525 lands as part of this project, and an additional 0.18 – 0.22 ha of wetland creation in the Study Area floodplain as part of a future project. • All protected and created wetlands are to be provided with a 10 m buffer which, where it falls within P-525, is to be naturalized. SIGNIFICANT WILDLIFE HABITAT • No development is proposed within the candidate bat roost SWH, or in four of the seven Terrestrial Crayfish Chimney locations (see SWH discussion above) and measures are recommended to protect this area during construction (i.e., no grading, no landscaping, ESC fencing). • The disturbance of three Terrestrial Crayfish Chimney locations and of three small meadow marsh units is to avoid late fall and winter period (i.e., mid- to late-November to the end of March) and will be compensated by adding 0.18 ha of created wetland to the existing protected wetland thereby creating a larger and more contiguous wetland patch in the P-525 lands which, presumably, will continue to support Terrestrial Chimney Crayfish and chimneys around its' margins and provide more ecological

Act or Policy	Applicability	Compliance
	• Policy 6.3.44 specifically states that: *Development and site alteration will demonstrate that there will be no negative impacts to the Urban Forest. An arborist report and tree inventory that demonstrates tree preservation and protection both pre and post construction, and where preservation of some trees is not feasible, identifies opportunities for replacement, will be prepared to the satisfaction of the City in compliance with the City's tree permit by-law*. • The Tree Inventory and Preservation Plan completed by Beacon (see **Appendix J**) documented 134 trees of at least 10 cm dbh, with 63 being in poor condition or dead including g a high proportion of exotic and invasive species (i.e., Scotch Pine, Siberian elm, Norway Spruce). All 71 of the retainable trees will need to be removed as part of the proposed development and will therefore need to be compensated. • Public Open Space policies, which apply to all of P-524 and the southern half of the P-525 lands, are intended to allow for safe and connected trails (policy 6.3.66) but also acknowledge the need to respect the applicable NHS policies and seek opportunities to expand the NHS (policies 6.3.78 and 6.3.79).	functions than the current wetland configuration, particularly once the created wetlands are planted with a diversity of native species. • An additional 0.18 - 0.22 ha of wetland creation (to be undertaken in the future outside of this project) has been identified in the floodplain just east of the Fire Station 120 Site to provide at least 2:1 in areal compensation for the small wetlands proposed for removal, resulting in a net gain. WOODLANDS AND TREES • No areas meeting the City's definition of "woodlands" occur in the Park lands. • A total of 71 retainable trees are being removed as part of this project and an additional 14 retainable trees have already been removed as part of the watermain installation for Fire Station 120. Although the City typically requests 3:1 compensation for trees approved for removal, for this project a ratio of 2:1 was considered acceptable by City Forestry staff in recognition of the combination of meadow (including wetland buffer naturalization) and woodland restoration being provided in addition to the caliper tree plantings in and around the park. • Compensation will be with exclusively native species.

8.1 Project Phase 2 Additional Work and Permit Requirements

Based on the Preferred Concept, additional work and studies that will be required as part of the detailed design process (i.e., Phase 3 of the project) are listed below:

- A Hydrogeological Report to provide current site-specific information on subsurface groundwater and surface water interactions and conditions to inform both the natural heritage studies and the stormwater management planning. Specifically, this work will need to:
  - Confirm seasonal groundwater levels in key areas related to the Preferred Concept;
  - Confirm seasonal groundwater levels in potential wetland creation areas;
  - Confirm the connectivity of soil layers (i.e., hydraulic testing); and
  - Confirm if the existing or potential wetland creation areas are fed by connection to upfiltration from potential pressurized aquifers.
- A SWM Plan Plan that includes a water balance for the P-525 and P-524 lands respectively and design components (e.g., bioswales and/or infiltration trenches, infiltration gardens, dry SWM pond, etc.) to ensure current conditions with respect to surface water infiltration and runoff are maintained, that water quality is maintained or improved, and that there are no risks of increased erosion;
- Grading plans and related ESC plans; and
- A Soils Management Plan.

In addition, based on the information contained in the ESR and the Preferred Concept it is anticipated that the following environmental permits and approvals will be required at the detailed design stage (i.e., Phase 3 of this project):

- Approval under the *Environmental Assessment Act*;
- Permit from Credit Valley Conservation (under Ont. Reg. 160/06);
- Tree permit from the Urban Forestry Section of the City;
- Erosion and sediment control permit from the City;
- Site Plan Approval (SPA) and building permit from the City; and
- Site Plumbing Permit from the City.

It is unknown at this time if a Permit To Take Water (PTTW) will be required. Construction site dewatering requires registration in the Environmental Activity and Sector Registry (EASR). The EASR registration captures the takings of groundwater and stormwater for the purpose of dewatering in relation to construction projects that require dewatering between 50,000 and 400,000 L/day. If the water takings are within the range prescribed by EASR, a PTTW is not required. The activity must be registered in the EASR unless the water taking is 100% stormwater. The activity requirements of the EASR regulation must be followed in all cases. Any other water takings from water bodies except for road construction purposes and construction site dewatering will require a PTTW.

As noted in **Section 5.3**, a permit from DFO will not be required.

The Consulting Team will continue to work with the City and the appropriate agencies, as required, to ensure the commitments and recommendations from this ESR (see **Section 7**) are carried forward through to detailed design and, as appropriate, to the construction of the Park itself.

9. Concluding Remarks and Next Steps

This ESR provides the planning and technical documentation to support the approval of the identified Preferred Concept and form the basis for the detailed design phase of the project. Specifically, this ESR documents how a Preferred Concept for the Park, including the required amenities and infrastructure, was: developed to be compliant with the applicable policies and regulations, based on a good understanding of the existing conditions, and refined with input from the consultations and engagement process.

This ESR also fulfills the reporting requirements for a Municipal Class B EA process by addressing all the applicable Area of Interest including:

- Source Water Protection (see **Section 4.3.6**);
- Climate change (see **Sections 4.3.1, 6.3** and **7.1**);
- Planning and policy (see **Sections 2, 5** and **8**);
- Air quality, dust and noise (see **Sections 4.3.2** and **Table 8**);
- Ecosystem protection and restoration (see **Sections 5, 6** and **Table 8**);
- Surface water (including stormwater management) (see **Sections 4.3.5, 4.4.4, 5.2, 5.3** and **Table 8**);
- Groundwater (see **Sections 4.3.4, 4.4.3** and **Table 8**);
- Contaminated soils and excess materials management (including soils) (see **Section 7.2**);
- Mitigation and monitoring (see **Table 8** and **Section 7.3**); and
- Broad consultations and engagement (see **Section 3**).

The Preferred Concept meets the City's goal to "*design and construct an innovative, environmentally responsive, all season community park that effectively integrates park amenities, facilities, and infrastructure with the unique natural features of the site*". It does so by appropriately balancing the natural environment and natural hazard constraints with the incorporation of areas to meet the SWM requirements and integration of the various amenities and facilities identified by the City for the P-524 and P-525 lands.

The Preferred Concept also results in a net gain from an environment perspective by: including SWM areas that will allow for enhanced storm water quantity and quality controls, restoration areas that will (in time) result in additional and better quality woodland and wetland habitat, and enhancements to urban forest canopy cover and quality (see **Table 7**).

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Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)

Site Location and Study Area | **Map 1**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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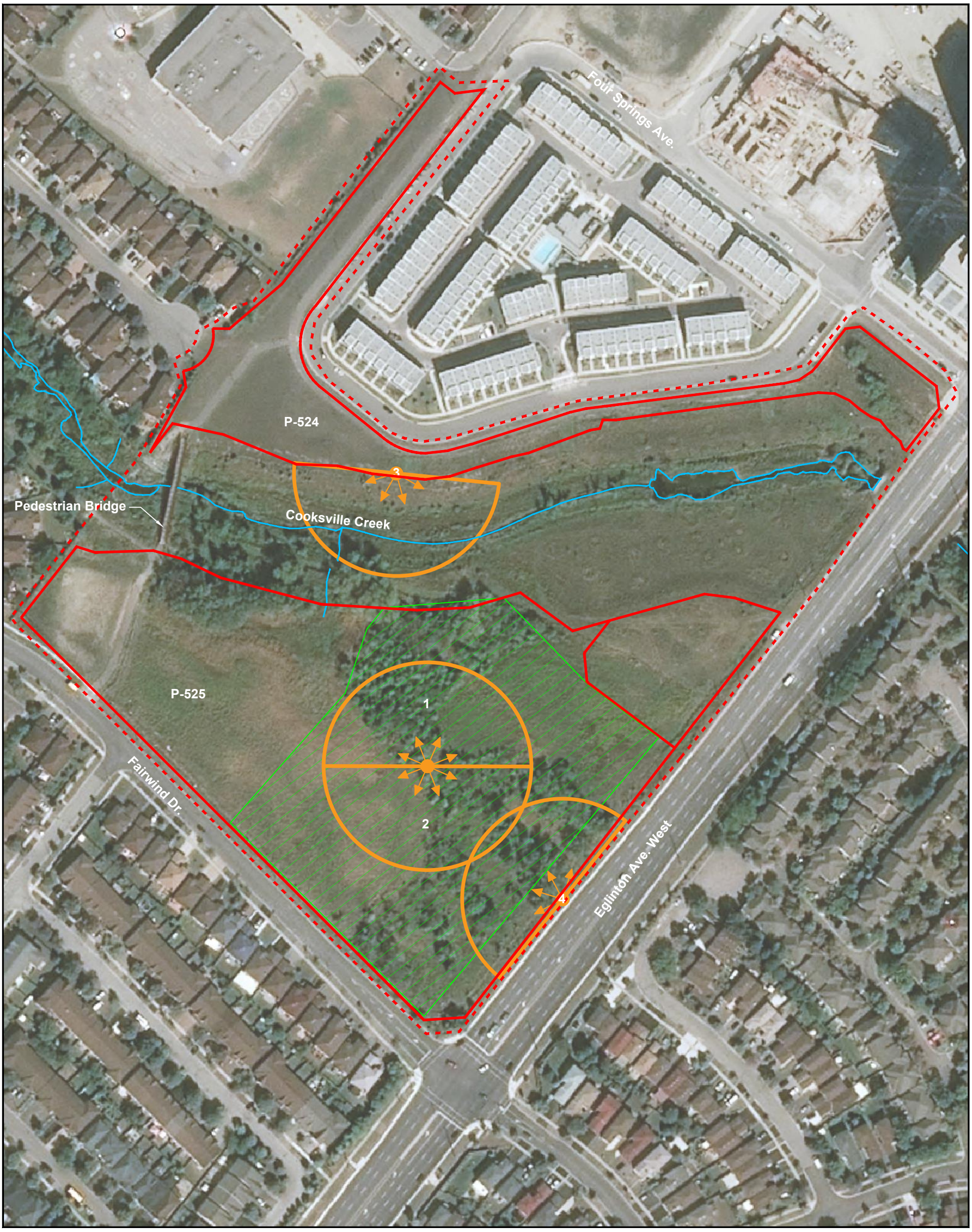

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Calling Amphibian Survey Stations
- Tree Inventory

Note: Breeding bird surveys and Ecological Land Classification were undertaken for the entire Study Area

Natural Heritage Survey Stations and Areas | **Map 2**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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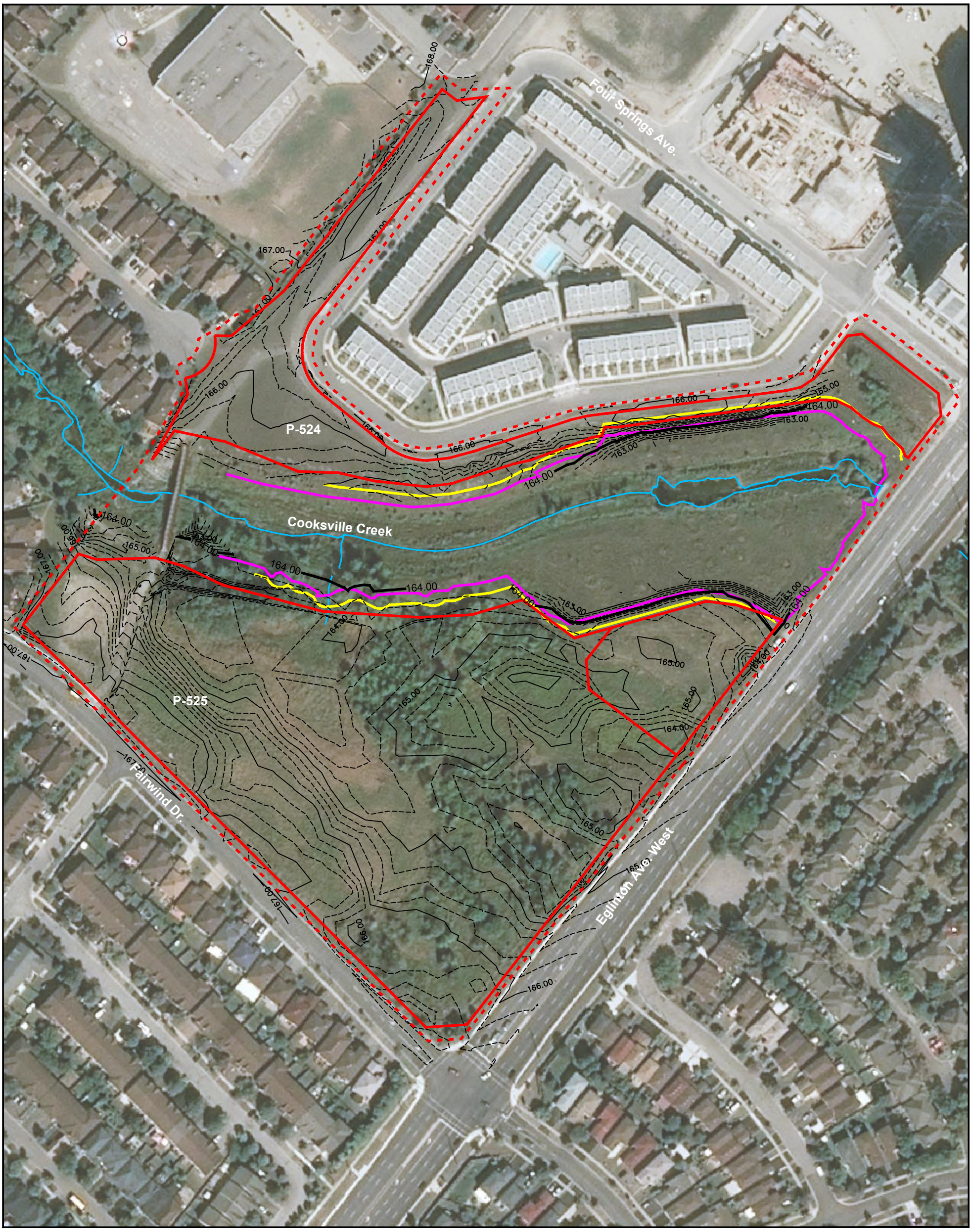

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Erosion Hazard Including Setback (City of Mississauga 2018)
- Approved Regional Storm Floodline (IBI Group 2011)*
- 165 — 1.0 m Major Contour Interval (City of Mississauga 2018)
- 0.25 m Minor Contour Interval (City of Mississauga 2018)
- 164 — Approved Regional Floodline (CVC 2018)

*Note: Linework is approximate, digital file not available.
Adapted from IBI Group 2011, Appendix B2

Topography and Natural Hazards | **Map 3**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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Unit(s)	ELC Vegetation Type	ELC Code
1	Swamp Maple Mineral Deciduous Swamp	SWD3-3
2	Willow Mineral Deciduous Swamp	SWD4-1
3	Cattail Mineral Shallow Marsh	MAS2-1
4	Reed Canary Grass Mineral Meadow Marsh	MAM2-2
5	Mineral Cultural Woodland	CUW1
6	Gray Dogwood Cultural Thicket	CUT1-4
7	Dry-Moist Old Field Meadow	CUM1-1
8	Hedgerow	H

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Created Wetland Craters*
- Wetland Boundary (as staked by CVC June 14, 2018)

ELC Communities

- Cultural Meadow (CUM)
- Cultural Thicket (CUT)
- Cultural Woodland (CUW)
- Hedgerow (H)
- Marsh (MAS)
- Meadow Marsh (MAM)
- Deciduous Swamp (SWD)

*Note: The wetland "craters" and units 4d and 4e are the result of wetland creation efforts in Cooksville Creek Corridor between 2013 and 2018.

Existing Natural Heritage Conditions: Vegetation Communities

Map 4a

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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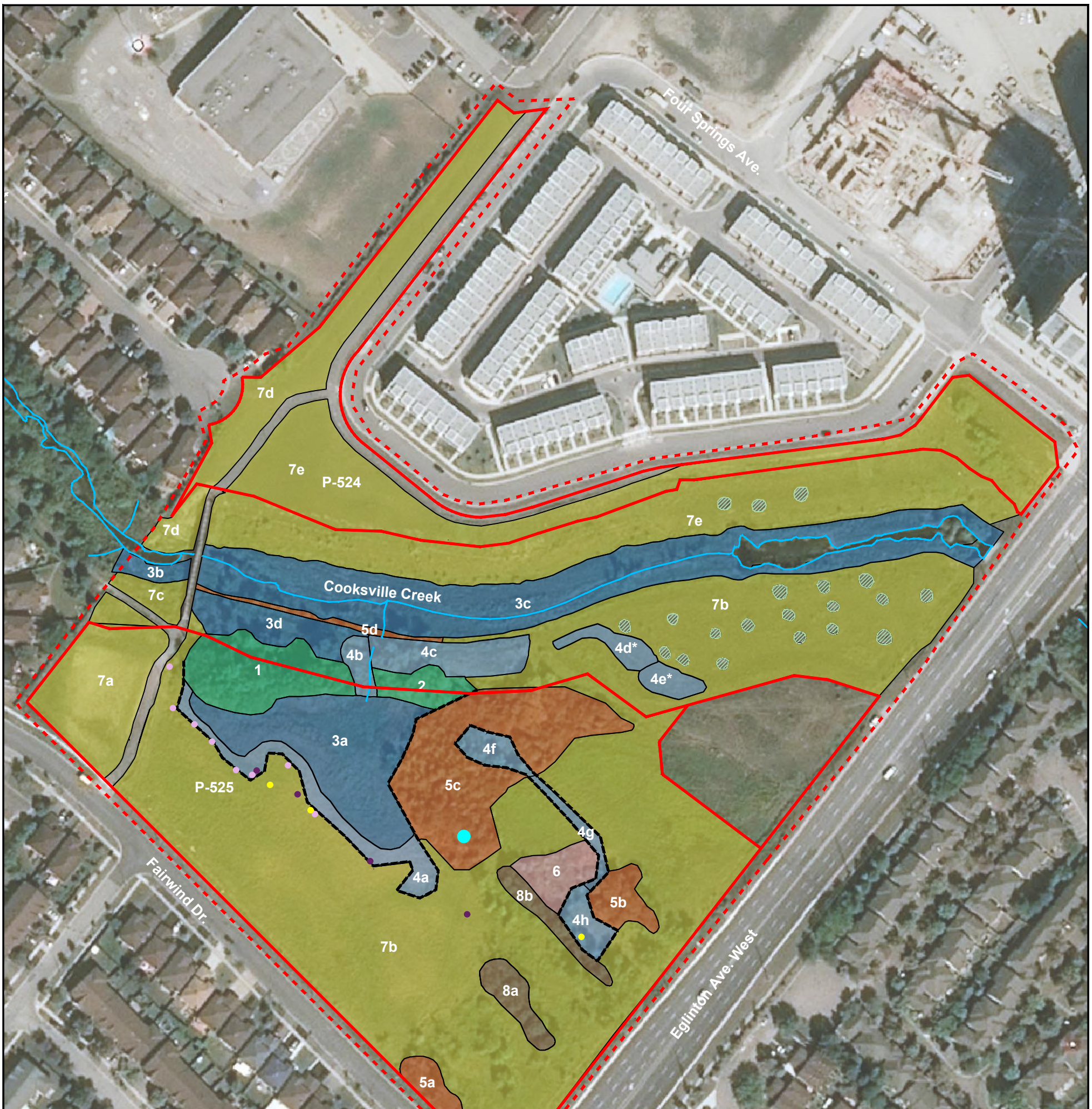

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Created Wetland Craters*
- Wetland Boundary (as staked by CVC June 14, 2018)
- Coyote Den 2018, 2019 (approx. location)

Terrestrial Crayfish Chimneys (approx. locations representing 1-4 chimneys)

- May 16, 2018
- June 14, 2018
- May 22, 2019

*Note: The wetland "craters" and units 4d and 4e are the result of wetland creation efforts in Cooksville Creek Corridor between 2013 and 2018.

Existing Natural Heritage Conditions: Wildlife Observations

Map 4b

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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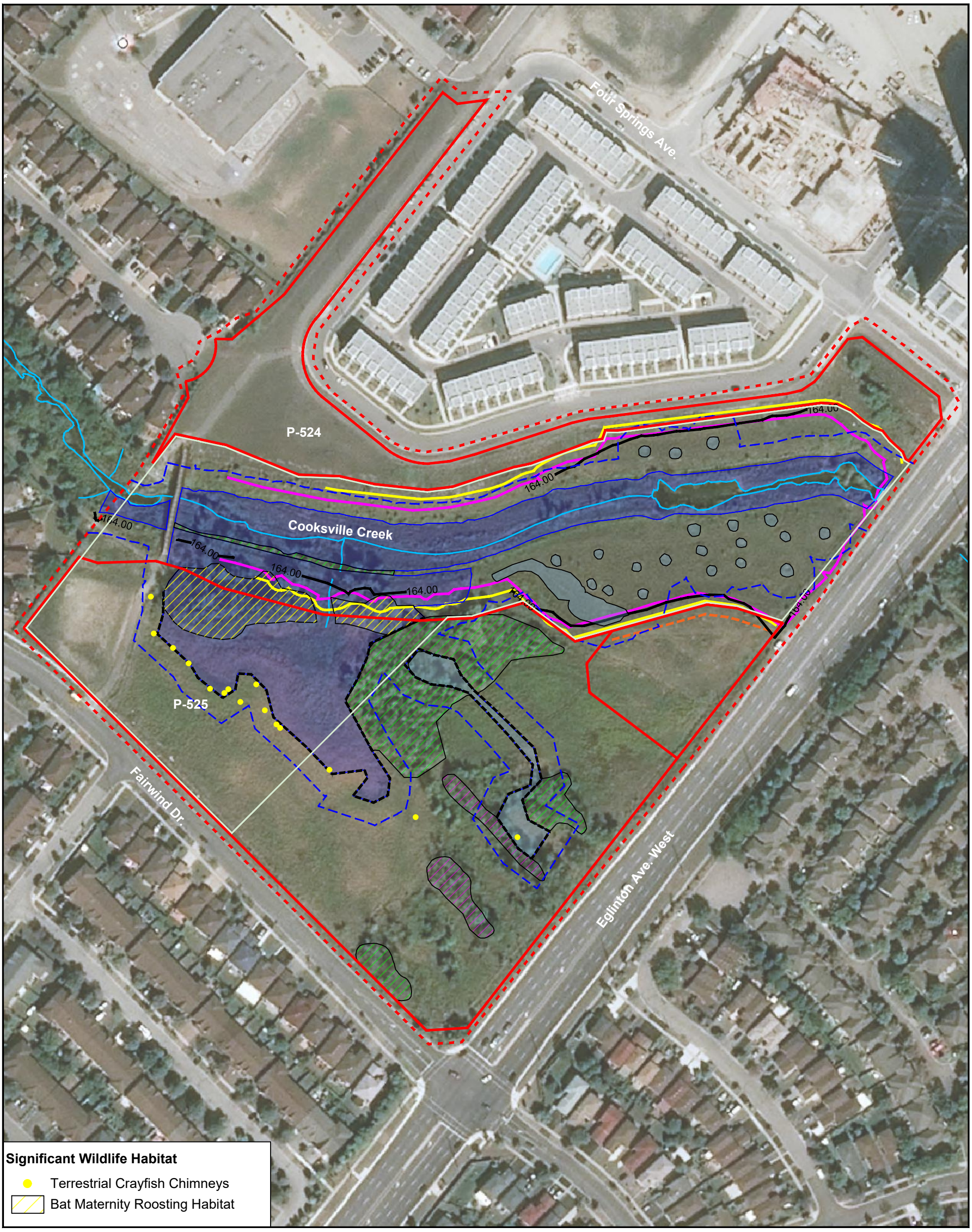

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Erosion Hazard Including Setback (City of Mississauga 2018)
- Approved Regional Storm Floodline (IBI Group 2011)*
- 5 m Trail Setback
- Wetland Boundary (as staked by CVC June 14, 2018)
- City Greenland Zoning
- Significant Other Wetlands
- Non-Significant Other Wetlands
- Wetlands 10 m Buffer
- Cultural Non-Significant Woodland
- Hedgerow
- 164 — Approved Regional Floodline (CVC 2018)

Note: Linework is approximate, digital file not available.
Adapted from IBI Group 2011, Appendix B2

Natural Heritage Constraints | **Map 5**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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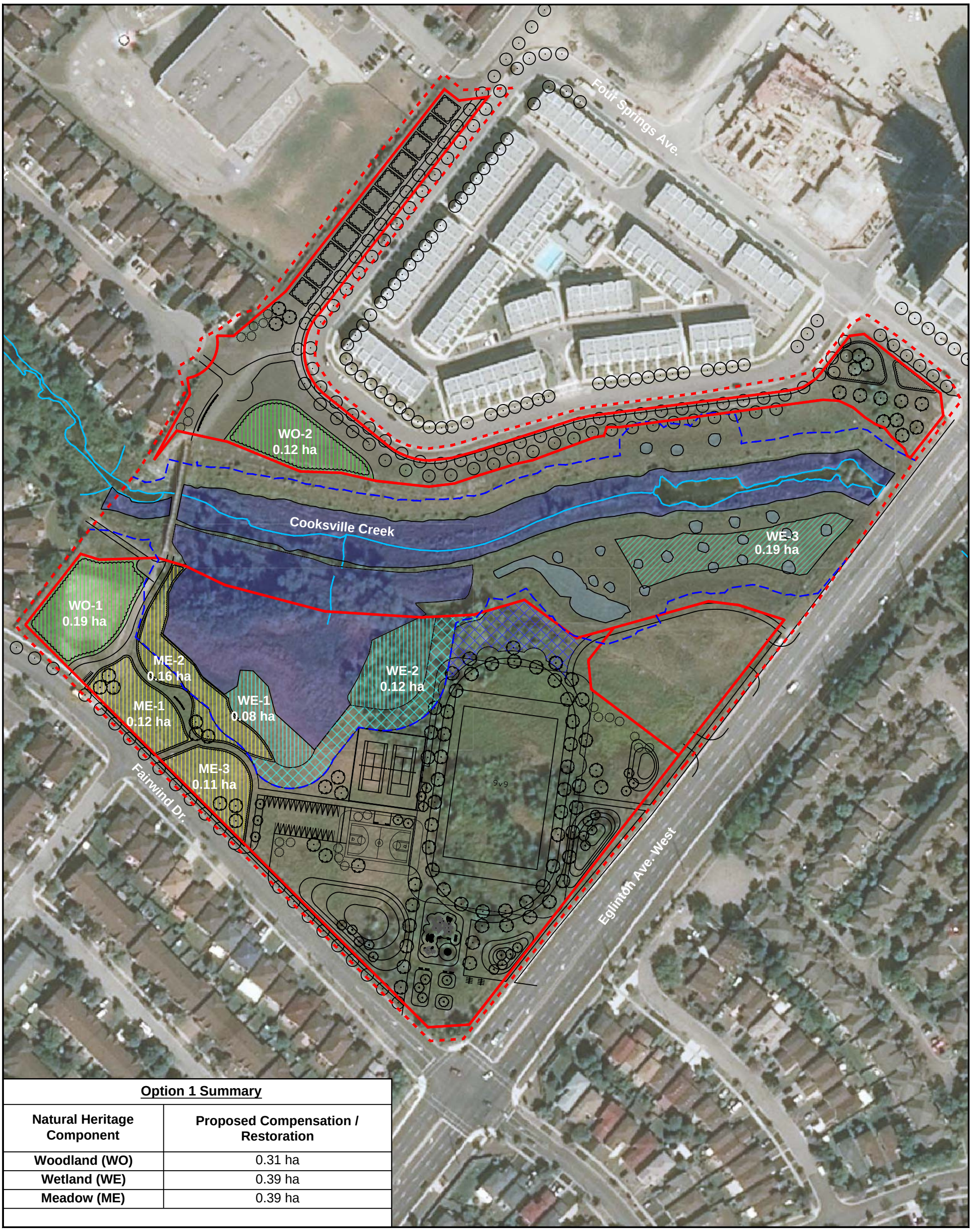

Option 1 Summary	
Natural Heritage Component	**Proposed Compensation / Restoration**
Woodland (WO)	0.31 ha
Wetland (WE)	0.39 ha
Meadow (ME)	0.39 ha

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Wetlands 10 m Buffer
- Protected Wetlands
- Previously Created Wetlands Being Protected
- Wetland Restoration Area (WE)
- Woodland Restoration Area (WO)
- Meadow Restoration Area (ME)
- Stormwater Quality Area
- Stormwater Storage Area
- Future Wetland Restoration Area (WE)

Natural Heritage Constraints and Opportunities - Option 1 | **Map 6a**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

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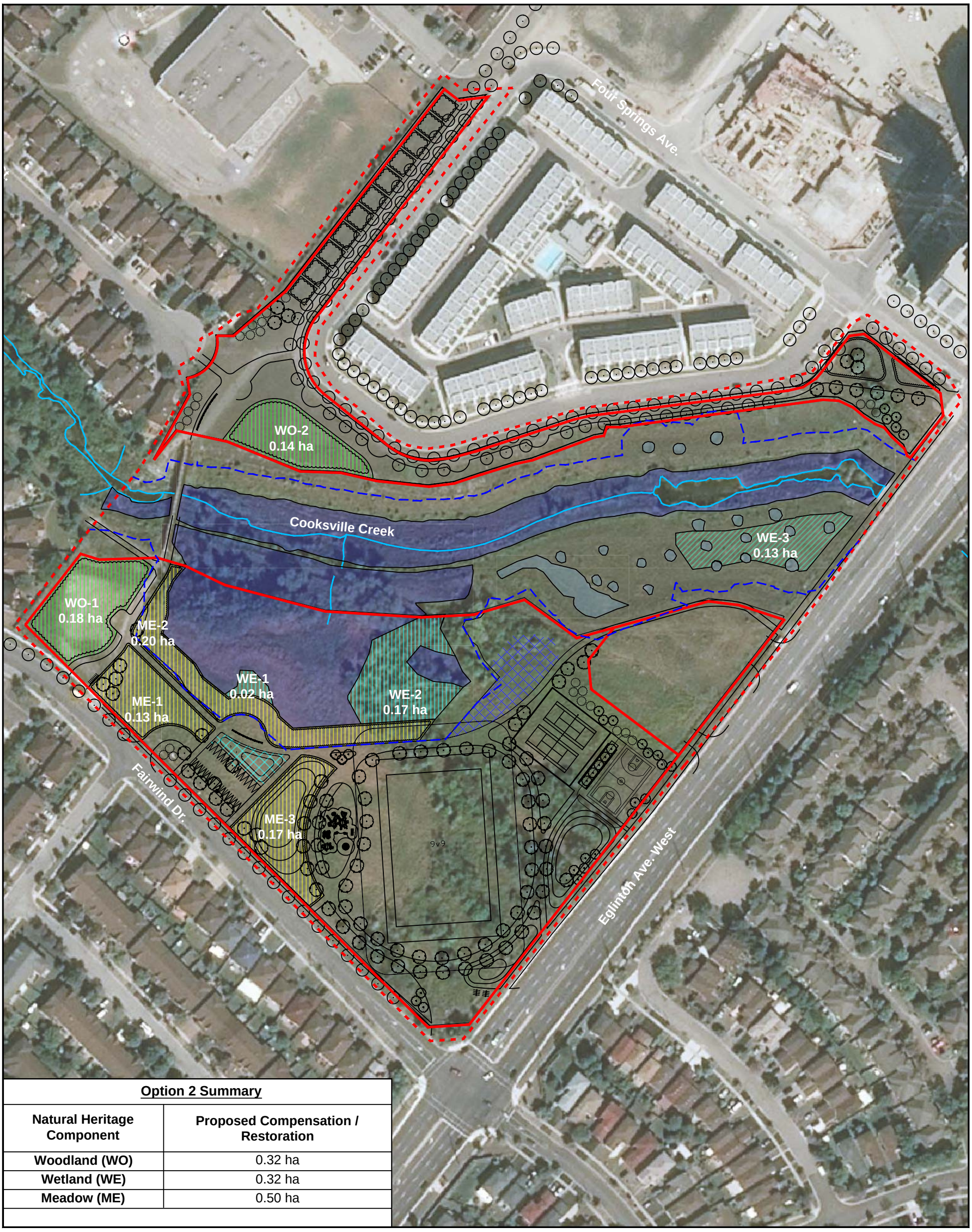

Option 2 Summary

Natural Heritage Component	Proposed Compensation / Restoration
Woodland (WO)	0.32 ha
Wetland (WE)	0.32 ha
Meadow (ME)	0.50 ha

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Wetlands 10 m Buffer
- Protected Wetlands
- Previously Created Wetlands Being Protected
- Wetland Restoration Area (WE)
- Woodland Restoration Area (WO)
- Meadow Restoration Area (ME)
- Stormwater Quality Area
- Stormwater Storage Area
- Future Wetland Restoration Area (WE)

Natural Heritage Constraints and Opportunities - Option 2 | **Map 6b**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

Client: City of Mississauga

Prepared by: MB
Checked by: MU

N

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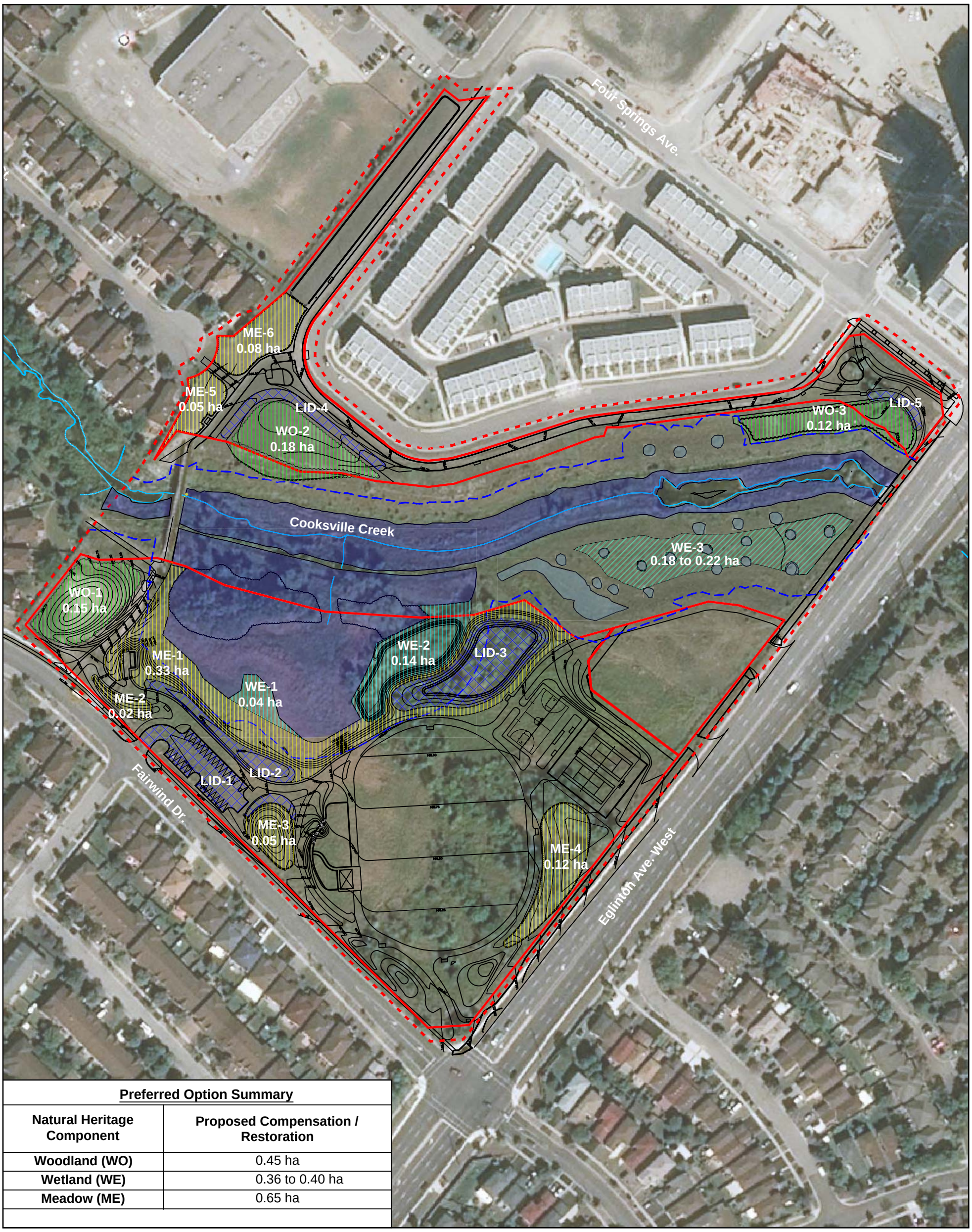
0 25 50 75 m



Preferred Option Summary	
Natural Heritage Component	**Proposed Compensation / Restoration**
Woodland (WO)	0.45 ha
Wetland (WE)	0.36 to 0.40 ha
Meadow (ME)	0.65 ha

Legend

- Subject Property
- Study Area
- Watercourse (City of Mississauga 2018)
- Wetlands 10 m Buffer
- Protected Wetlands
- Previously Created Wetlands Being Protected
- Wetland Restoration Area (WE)
- Woodland Restoration Area (WO)
- Meadow Restoration Area (ME)
- Low Impact Development Area (LID)
- Future Wetland Restoration Area (WE)

Natural Heritage Constraints and Opportunities - Preferred Concept | **Map 7**

Unnamed Parks 524 & 525
City of Mississauga

BEACON ENVIRONMENTAL

Project: 218010
Last Revised: 2019-12-19

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