WIDENING OF MCLAUGHLIN ROAD AND CONSTRUCTION OF EAST-WEST SPINE ROAD (MAYFIELD WEST PHASE 2)

FINAL REV 0
NATURAL ENVIRONMENT EXISTING CONDITIONS REPORT

In Support of a Schedule 'C' Municipal Class Environmental Assessment

Submitted to:

Corporation of the Town of Caledon
6311 Old Church Road
Caledon Ontario
L7C 1J6

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited
160 Traders Blvd., Suite 110
Mississauga, Ontario
L4Z 3K7

June 2019
TPB166090

EXECUTIVE SUMMARY

The Project area is located within the Credit River and Etobicoke Creek watersheds under the jurisdiction of the Credit Valley Conservation (CVC), Toronto and Region Conservation Authority (TRCA), and the Aurora District Ministry of Natural Resources and Forestry (MNRF). This report provides a summary of natural environment (aquatic and terrestrial) existing conditions from both secondary source information and Amec Foster Wheeler field investigations conducted in the spring and summer of 2017.

Aquatic investigations within the Project area, conducted on May 24, 2017, found that all the drainage features are ephemeral, and the majority were dry at the time of investigation. Drainage feature crossing locations C1 through C8 and features adjacent to McLaughlin Road at locations T1 and T2 are within CVC's jurisdiction and these tributaries have been identified by MNRF as contributing Redside Dace habitat. Drainage feature crossing locations C9 through C14 are within TRCA's jurisdiction and do not provide fish habitat. Roadside drainage features adjacent to the Highway 410 interchange were found to have standing water which ultimately drains to Etobicoke Creek during wetter conditions and these features provide indirect fish habitat. The primary concern related to potential impacts to fish habitat is associated with Redside Dace within occupied reaches of Fletchers Creek located downstream of the Project. Further consultation with the MNRF will be required during the Detailed Design phase to ensure the appropriate permitting/clearance is acquired and suitable mitigation measures are employed to prevent impacts within contributing habitat and to downstream occupied reaches. Although Redside Dace is protected federally under the *Species at Risk Act, 2002* (SARA), contributing Redside Dace habitat is not protected and permitting/clearance under SARA will not be necessary for the proposed Project.

Wildlife and vegetation surveys were completed on May 24 and 26, June 15 and 16, and July 5 and 6, 2017 from the existing roadway right-of-way and on properties where permission to enter had been granted. One rare plant species, Butternut, was observed within the Project study area but outside the Project footprint; this species is listed as an Endangered species under the *Endangered Species Act, 2007* (ESA) and neither this individual tree, or the area within a 50 m buffer around it, will be impacted by the Project. The majority of the bird species recorded within the vicinity of the study area are provincially common with the exception of Barn Swallow, which is listed as a Threatened species under the ESA and Eastern Wood-Pewee and Wood Thrush which are listed as Special Concern under the ESA. Rare mammals which may occur in the Project area (Dobbyn 1994; BCI 2017) are Eastern Small-footed Myotis, Little Brown Myotis, Northern Long-eared Myotis, and Tri-colored Bat, all listed as Endangered under the ESA. No evidence of rare mammals was observed within the study area during field investigations though targeted bat surveys were not conducted. Suitable amphibian and reptile habitat is limited with the study area and primarily located along vegetated drainage features. Rare reptile species potentially occurring in the Project area include Blanding's Turtle, Threatened under the ESA, and Common Snapping Turtle and Northern Map Turtle, both Special Concern under the ESA (Ontario Nature 2016). No rare reptiles or amphibians were observed within the study area during field investigations.

Four of the six woodlands within the study area contain areas of wetland which have been evaluated and designated as Provincially Significant Wetlands (PSW). The PSWs are part of the Upper Fletchers Creek Wetland Complex and the Etobicoke Creek Headwater Wetland Complex (MNRF 2017a). A small section of the study area falls within the Greenbelt Area which extends along a reach of Etobicoke Creek in this area (MNRF 2017a). Several candidate significant wildlife habitats are present within the Project study area, including raptor wintering areas, bat maternity colonies, turtle wintering areas, and colonially nesting bird breeding habitat (trees/shrubs), water fowl nesting areas, amphibian woodland breeding habitats, special concern and rare wildlife species habitats, and amphibian movement corridor habitat.

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1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), has been retained by the Town of Caledon to undertake the required Schedule 'C' Municipal Class EA for the proposed widening of McLaughlin Road and the construction of the new east-west Spine Road (the Project). This Natural Environment Existing Conditions Report includes both terrestrial and aquatic habitat and will facilitate the preparation of an Environmental Study Report (ESR) for the Project and aid in the completion of the Municipal Class EA Process.

1.1 Background

The Project will include the update of Phases 1 and 2, which were completed as part of the Mayfield West Phase 2 – Transportation Master Plan (MW2-TMP; Paradigm 2015) work, and the completion of the remaining Phases 3 and 4. The MW2-TMP was undertaken as a part of the preparation of the Secondary Plan for development within lands north of Mayfield Road, east of Chinguacousy Road, south of the Etobicoke Creek, and west of Hurontario Street in the Town of Caledon to guide the provision of fully integrated transportation infrastructure and services. The Town carried out the MW2-TMP in accordance with the Phases 1 and 2 of the MCEA process to formulate a comprehensive transportation strategy focusing on a sustainable, connected, and pedestrian/cyclist friendly community. The MW2-TMP identifies a need for the widening of McLaughlin Road, from Mayfield Road north approximately 1,700 metres (m), and the construction of the east-west Spine Road, reaching from Hurontario Street to Chinguacousy Road.

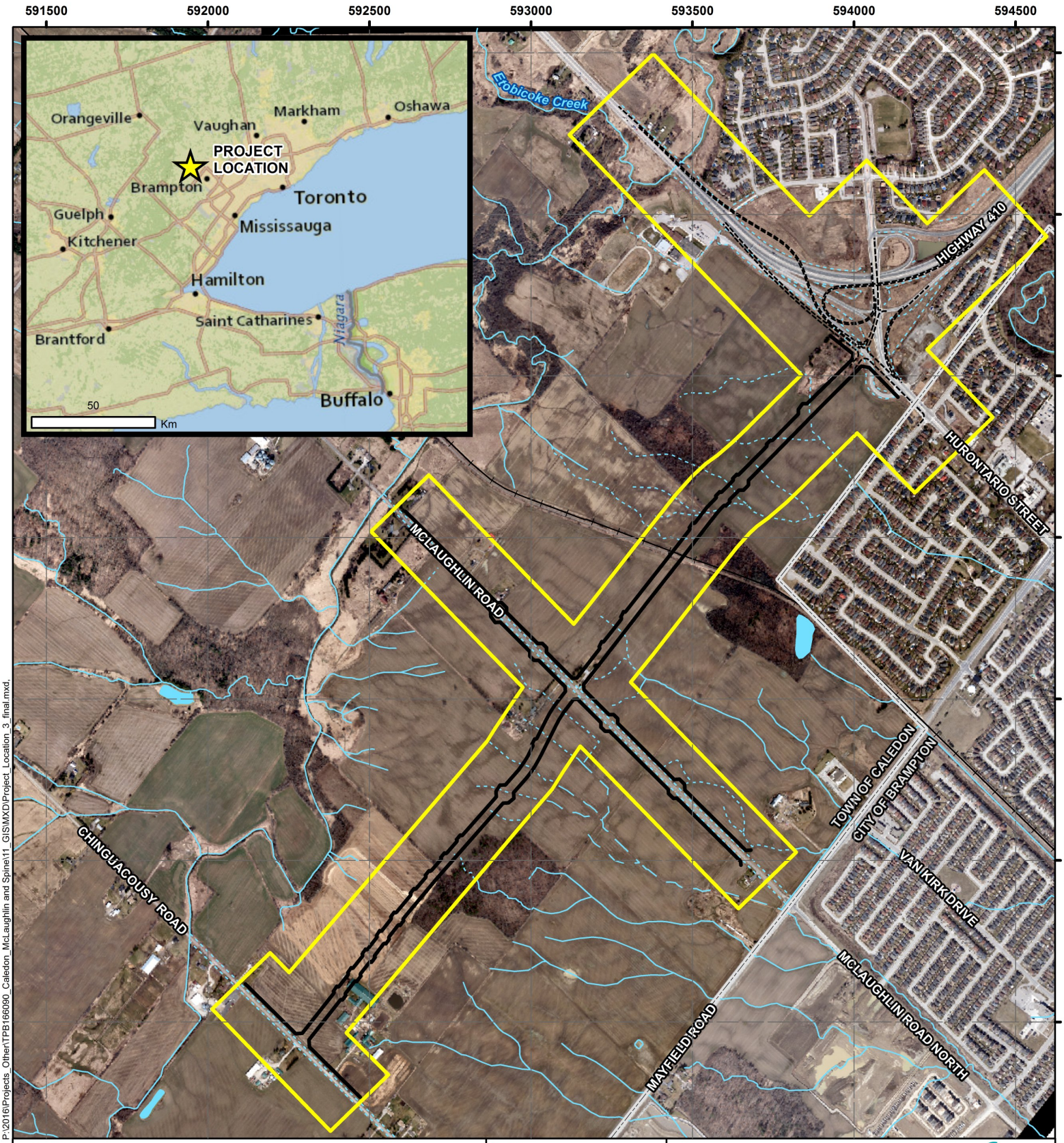
The MCEA process entails:

- McLaughlin Road extending north approximately 1,700 m from Mayfield Road, generally along the current alignment; and
- An east–west Spine Road that will connect Chinguacousy Road and McLaughlin Road along with a connection to the Highway 410 interchange with Valleywood Boulevard and Hurontario Street.

This report provides a summary of natural environment existing conditions from both secondary source information and 2017 field investigations conducted within the study area delineated in Figure 1-1.

1.2 Study Area

The terrestrial study area for the Project, illustrated in Figure 1-1, includes an approximate 120 m buffer from the Project's centerline, as specified by preliminary design drawings. The aquatic study area for the Project includes each location where a watercourse/drainage feature crosses the proposed Spine Road centerline, as well a location approximately 50 m upstream and 200 m downstream of the each of the proposed crossings. At the east end of the Project, where the new connection with Highway 410 is proposed, the aquatic study area included the existing drainage features which will be impacted by the proposed Project (Figure 1-2).



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LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Railway
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Municipal Boundary

0 0.2 0.4 0.6 0.8 1 Kilometres

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
- Watercourse information is a combination of data from Ontario Hydro Network, Ontario Base Map, MNRF constructed drains, Peel Region, and Dougan and Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value of "Permanent".

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

TOWN OF CALEDON

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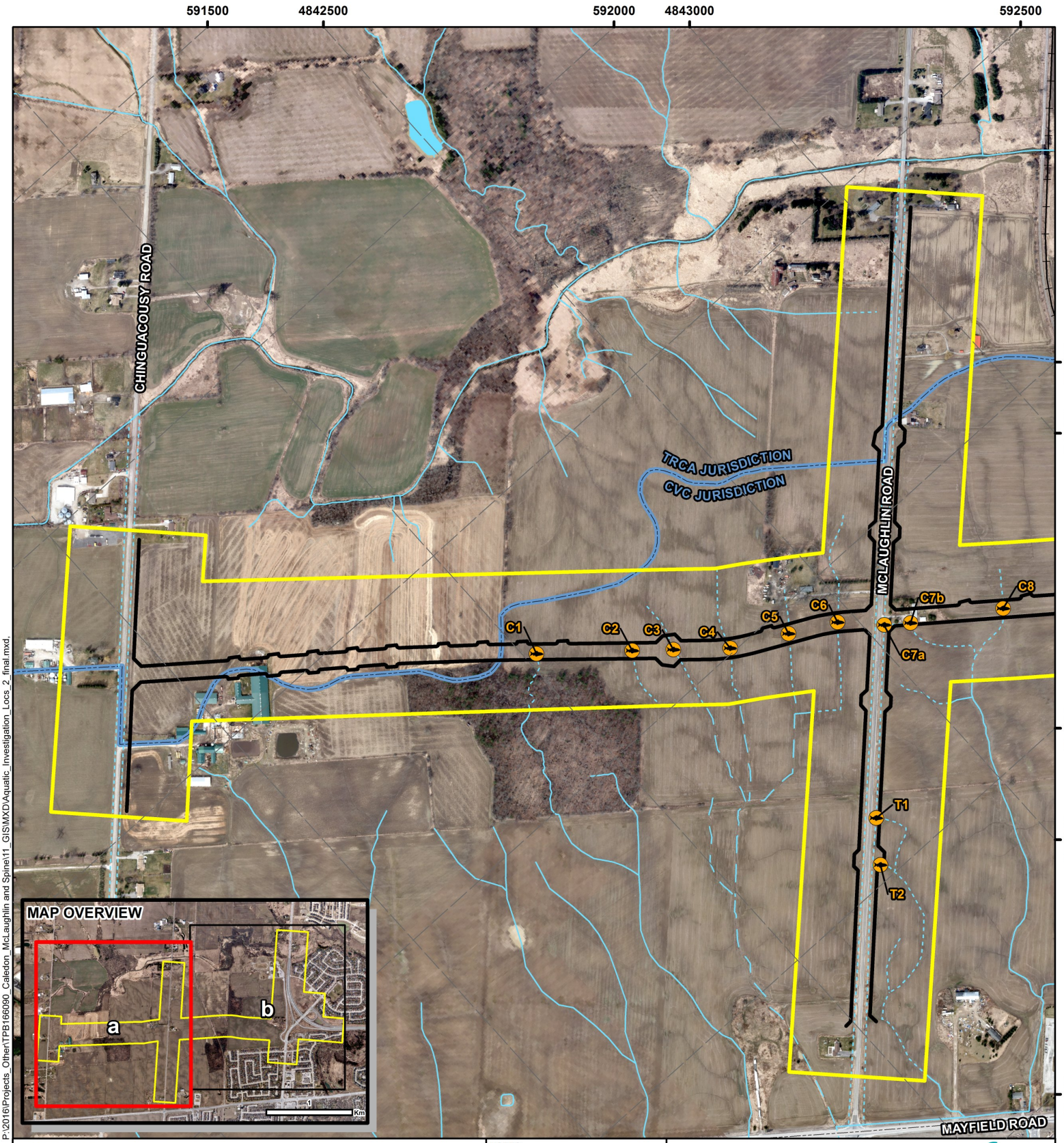
McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Project Location and Study Area

PROJECT N°: TPB166090 | **FIGURE: 1-1**

SCALE: 1:16,000 | DATE: February 2019



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- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Railway
- Municipal Boundary
- Watershed Boundary

Aquatic Investigation Locations

- Contributing Redside Dace Habitat (Indirect Fish Habitat)
- Indirect Fish Habitat
- No Fish Habitat

NOTES:
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- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
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Datum & Projection: NAD 1983 UTM Zone 17N

0 0.1 0.2 0.3 0.4 0.5 Kilometres

TOWN OF CALEDON

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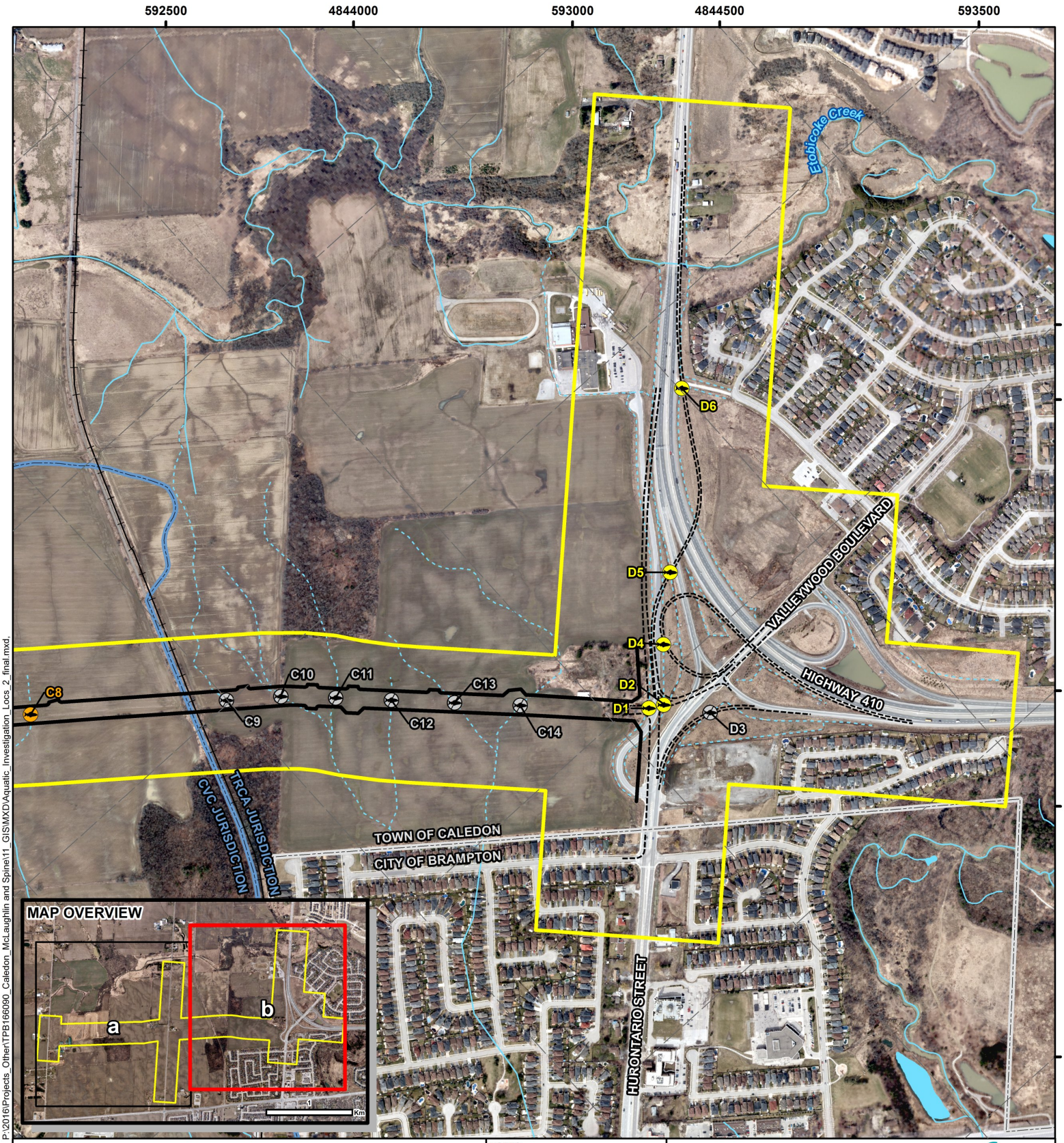
McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Aquatic Investigation Locations and Findings

PROJECT N°: TPB166090	**FIGURE: 1-2a**
SCALE: 1:9,500	DATE: February 2019



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TOWN OF CALEDON

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McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Aquatic Investigation Locations and Findings

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.1 0.2 0.3 0.4 0.5 Kilometres

PROJECT N°: TPB166090

FIGURE: 1-2b

SCALE: 1:9,500

DATE: February 2019

2.0 AQUATIC HABITAT

Within the Project limits, there are 14 first/second order drainage features crossings reported, excluding roadside drainage ditches adjacent to Highway 410 and the surrounding roads. Of these features, eight are tributaries to Fletchers Creek (C1 through C8) and six are tributaries to Etobicoke Creek (C9 through C14). These features will each be crossed by the proposed Spine Road (Figure 1-2).

Land Information Ontario data (MNRF 2017b) indicates that there are no drainage feature crossings supporting direct or indirect fish habitat along McLaughlin Road within the study area; however, one small culvert upstream of C7 was observed during the 2017 field investigation (Figure 1-2).

Additional drainage features adjacent to, but not crossing, McLaughlin Road (T1 and T2) and at the east end of the Project where the highway interchange is proposed (including, but not limited to D1 through D6) also have potential to be impacted by Project works (Figure 1-2).

Section 5.7 of the approved Mayfield West Phase 2, Stage 1 Environmental Impact Study and Environmental Implementation Report (EIS/EIR) includes the Headwater Drainage Feature Assessment for the secondary plan area and Appendix B of the report includes the Headwater Drainage Feature Assessment classification map. Please refer to these reports for the results of the assessment.

2.1 Methodology

2.1.1 Secondary Source Review

Searches of secondary sources and databases were conducted to ascertain fish community and aquatic habitat data, including potential occurrences of species of conservation concern relevant to the Project limits. Common and scientific names of fish species are based on the current nomenclature as listed in the NHIC database. Only common names are provided within the body of the report.

Secondary sources included:

- Credit Valley Conservation (CVC) publications:
    - *Credit River Fisheries Management Plan* (CVC 2002);
    - *Credit River Water Management Strategy Update* (CVC 2007);
    - *Draft Fletchers Creek Restoration Study* (CVC 2012); and
    - 2013 Credit River Watershed Report Card (CVC 2013).
- Toronto and Region Conservation Authority (TRCA) publication:
    - *Etobicoke Creek Watershed Report Card 2013* (TRCA 2013).
- *Recovery Strategy for Redside Dace (Clinostomus elongatus) in Ontario: Ontario Recovery Strategy Series* (RDRT 2010);

- *Mayfield West, Phase 2 Secondary Plan Comprehensive Environmental Impact Study and Management Plan* (AMEC 2014);
- *Mayfield West Phase 2 Secondary Plan Transportation Master Plan Final Report* (Paradigm 2015);
- *Draft Environmental Impact Statement/Environmental Implementation Report for the Mayfield West Phase 2 Landowners Framework Plan* (Hensel 2016);
- *Comprehensive Fisheries Compensation Plan (CFCP) ADDENDUM. Block 51-2, Mount Pleasant North West Brampton. Revised Final – April 2016* (Savanta et al. 2016);
- *Species at Risk in Ontario List* (MNRF 2017c);
- *Species at Risk Public Registry* database (ECCC 2017);
- Federal aquatic SAR mapping: *Ontario South West Map 9* (DFO 2016);
- MNRF Natural Heritage Information Centre (NHIC) database 1 km^2 squares encompassing the Project (17NJ9344, 17NJ9444, 17NJ9243, 17NJ9343, 17NJ9443, 17NJ9242, 17NJ9342, 17NJ9141, 17NJ9241, and 17NJ9341) (MNRF 2017a; and
- Correspondence with CVC, TRCA, and MNRF (Aurora District) (Appendix A).

2.1.1.1 Species at Risk and Provincially Rare Species

In Ontario, Species at Risk (SAR) are listed for both plant and animal species whose individuals or populations are considered Extirpated, Endangered, Threatened, or Special Concern, as determined by the provincial Committee on the Status of Species at Risk in Ontario (COSSARO) and the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC). SAR and their critical habitat are regulated by the provincial *Endangered Species Act*, *2007* (ESA) and the federal *Species at Risk Act, 2002* (SARA).

In Ontario, if a species is listed under the ESA as Extirpated, Endangered or Threatened, Section 9 of the Act prohibits killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, leasing, trading or offering to buy, sell, lease or trade a member of the species. Some of these prohibitions also apply to body parts of a member of the species and to things derived from a member of the species. Similarly, if a species is listed under the ESA as Endangered or Threatened, Section 10 of the Act prohibits damaging or destroying the habitat of the species. Species listed as Special Concern are not afforded protection under Section 9 and 10 of the ESA.

Provincially rare species are those with a provincial rank of S1, S2 or S3 and classified as critically imperiled, imperiled, or vulnerable, respectively. Provincially rare species are tracked by the MNRF's NHIC and are not protected under the ESA until they are also assigned an ESA rank. These species are acknowledged in this report as they are considered rare within the province of Ontario and should be taken into consideration for planning purposes.

The potential for SAR and rare species to occur with the Project study area was determined based on a review of background information and agency consultation. The background information included a review of the NHIC online database of significant floral and faunal species near the

Project study area. The background information noted above which were used to develop a complete list of SAR and rare species occurrences that may overlap the Project study area.

2.1.2 Field Investigations

To augment the secondary source information, at locations where permission to enter was granted, on May 24, 2017 Amec Foster Wheeler staff conducted field investigations to assess fish habitat, where present.

Field conditions were assessed referencing the principles and methods described by the Ontario Ministry of Transportation's *Environmental Guide for Fish and Fish Habitat* (MTO 2009). With the exception of roadside drainage ditches at the eastern limits of the Project, all drainage features along McLaughlin Road, and the proposed Spine Road right-of-way were dry, or had minimal standing water, at the time of inspection. As such, all drainage features were determined to be ephemeral and further assessment was deemed unnecessary. A photo record to document the absence of direct fish habitat has been included as Appendix B. Additional aquatic photos were taken during terrestrial field assessments conducted on May 26, 2017, which provides a record of aquatic conditions one day after approximately 44 mm of rainfall (Appendix B).

2.2 Results

2.2.1 Secondary Source Review and Agency Consultation

The Project area is located within Credit River Watershed and Etobicoke Creek Watershed, which are under the jurisdiction of Credit Valley Conservation and Toronto and Region Conservation Authority, respectively (Figure 1-2). The following subsections provide a brief overview of these watersheds as they relate to the Project area.

2.2.1.1 Credit River Watershed

The Credit River watershed is located within the most densely populated region of Canada and drains an area of approximately 870 km^2 that is divided into three physiographic zones: Upper Watershed, Middle Watershed, and Lower Watershed (CVC 2002; CVC 2007). Drainage feature crossing locations C1 through C8 are located in Fletchers Creek Subwatershed at the northern extent of the Lower Watershed. The Lower Watershed is largely characterized by urbanized lands, and of the three watershed zones has the highest concentration of anthropogenic impacts, where land use and climate change represent the two dominant stressors influencing the health of the watershed (CVC 2013).

2.2.1.2 Fletchers Creek Subwatershed

Drainage feature crossing locations C1 through C8 are first order tributaries to Fletchers Creek. As is evident by this Project, the Fletchers Creek subwatershed area is currently undergoing land use changes predominantly from agricultural to urban land use (CVC 2007). In the *Fletchers Creek Restoration Study*, CVC (2012) has developed criteria and targets to assess the overall environmental health of Fletchers Creek. In 2004, the Fletchers Creek Outreach Program began

as a response to trends observed through CVC's monitoring of the creek. The goal of the Outreach Program is to create awareness among the West Brampton community on current threats to the health of Fletchers Creek, and to encourage the residents to implement practices that will reduce the harmful impacts of urbanization on the Creek (CVC 2007).

Located within agricultural fields, cultivation appears to extend across all eight of these drainage features and they are suspected to only maintain flow in response to precipitation and runoff events. Within the Credit River watershed, the drainage features at C2 through C8 converge downstream of the proposed roadway with a watercourse in which Blacknose Dace and Pumpkinseed were captured in standing water north of Mayfield Road in 2005 and 2007, respectively (AMEC 2014). Electrofishing efforts, in 2005 and 2007, downstream in the C1 drainage feature resulted in no captures; however, the tributaries associated with locations C1 through C8 all converge south of Mayfield Road. As such, within the Project right-of-way, these features were determined to provide indirect fish habitat.

2.2.1.3 Etobicoke Creek Watershed

The Etobicoke Creek watershed is also located within the most densely populated region of Canada and drains an area of approximately 212 km^2 (TRCA 2013). At the time of the 2013 Watershed Report Card, the Etobicoke Creek watershed was characterized by 71% urban, 22% rural, and 7% urbanizing land use. Within these land uses there is approximately 15% natural cover comprised of 8% meadow, 5% forest, 1% successional, and 1% wetland (TRCA 2013).

The main branch of Etobicoke Creek is a permanent stream that flows eastward within the northern part of the Project area within a well-defined valley. The valley lands were, and some areas continue to be, used for pasture and livestock continue to have access to some reaches of the watercourse (AMEC 2014). Livestock access typically reduces channel complexity, decreases depth and increases width through trampling of the bed and banks. Winter observations, completed by AMEC (2014), suggest that groundwater contributions to the main branch are greater further to the west. The Etobicoke Creek contains a relatively diverse fish community, including Blacknose Shiner, Northern Redbelly Dace, and Pearl Dace. Also present is Central Mudminnow which TRCA have identified as a species of conservation concern because of their sensitivity to habitat alteration, chemical pollution, siltation, and increased flow velocities (AMEC 2014).

Drainage features within the Etobicoke Creek Watershed in the west and north portion of the Project limits are limited to roadside drainage. On the east side of the Project area, the drainage features in the Etobicoke Creek Watershed that will cross the proposed Spine Road (C9 through C14) and highway interchange (including but not limited to D1 through D6) do not provide direct fish habitat. Immediately south of the Project area, the drainage features at C9 through C14 flow into an urbanized area where they enter the stormwater system and are transported greater than 500 m underground. Roadside drainage features in this area, including D1 through D6 and the surrounding proposed crossings, are intermittently wet with limited flow providing only indirect fish habitat.

2.2.1.4 Species at Risk and Provincially Rare Species

An online search of the MNRF's NHIC database (MNRF 2017a) was conducted within ten 1 km^2 squares encompassing the Project to identify potential presence of provincial aquatic SAR. Similarly, DFO's federal aquatic SAR mapping (DFO 2016) was referenced to identify potential presence of federal aquatic SAR. Records of Redside Dace within Fletchers Creek (downstream of the Project) have been confirmed through secondary source review (CVC 2002; CVC 2007) and correspondence with the MNRF (Appendix A).

The MNRF has developed a Redside Dace recovery strategy (RDRT 2010) as a component of their ever-growing Ontario Recovery Strategy Series. This series presents a collection of recovery strategies that are prepared or adopted as advice to the province of Ontario on the recommended approach to recover SAR. The preparation of recovery strategies is one method by which the province strives to meet its commitments to recover SAR under the ESA and protect SAR throughout the country.

Redside Dace

Redside Dace is listed as provincially- and federally-Endangered, and as such, Redside Dace are protected under the ESA and SARA (CVC 2007; MNRF 2017c; ECCC 2017). However, SARA does not afford habitat protection for contributing habitat for Redside Dace and therefore, at the time of submission of the report, SARA permitting is not required. Provincially, Redside Dace habitat is only regulated for 'occupied' reaches; however, impacts to contributing habitat may require a Letter of Advice from the MNRF.

Redside Dace have been found at numerous locations in the Credit River watershed, most of which are being impacted by land use changes. Redside Dace have a limited range in Ontario, occurring in clear streams flowing into western Lake Ontario. Redside Dace are sensitive to turbidity and prefer coolwater habitats with overhanging vegetation which provides cover and a source of terrestrial invertebrates that this fish mainly preys on (CVC 2002, CVC 2007).

Fish collection records for the Credit River watershed indicate Redside Dace occur throughout much of the watershed, including Fletchers Creek. Furthermore, correspondence records from the Aurora District MNRF indicate that the Project area includes Redside Dace contributing habitat, which drains to occupied reaches of Fletchers Creek south of Wanless Drive (Appendix A). These include drainage features located at C1 through C8, T1, and T2 (Figure 1-2).

Currently, Redside Dace are managed as a coolwater species and efforts are being made to protect and enhance the semi-open, natural riparian conditions with overhanging vegetation along the streambanks that Redside Dace depend on (CVC 2002, CVC 2007). The *Recovery Strategy for Redside Dace* (RDRT 2010) has been produced through the ongoing collaboration of CVC, MNRF, and other stakeholders as a component of their ever-growing Ontario Recovery Strategy Series. This series presents a collection of recovery strategies that are prepared or adopted as advice to the province of Ontario on the recommended approach to recover SAR.

The Redside Dace Recovery Team continues to conduct research, to further the restoration of Redside Dace habitat and develop policies to further protect and support the species. The recovery strategy identifies both water quality and quantity issues related to its overall decline in Southern Ontario, particularly urbanization (CVC 2007).

2.2.2 Field Investigations

In confirmation of background data, field survey results reported that the entire Project area has been influenced by human activity and is characterized primarily by agricultural land use. As such, many of the drainage features where crossings are proposed are drainage swales or existing roadside drainage, exhibiting ephemeral flow and providing indirect or no fish habitat. At the time of the May 24, 2017 Amec Foster Wheeler aquatic investigation all drainage features were dry or contained pools of standing water with no apparent flow.

A summary of fish habitat conditions at the drainage features that will be impacted by the proposed Project is provided in Table 2-1 and illustrated in Figure 1-2. Photos of the crossings are provided in Appendix B.

Table 2-1: Fish Habitat Summary

Crossing No.	Fish Habitat
C1, C2, C3, C4, C5, C6, C7a, C7b, C8, T1, T2	Indirect contributing Redside Dace habitat
C9, C10, C11, C12, C13, C14	None
D1, D2, D3, D4, D5, D6	Indirect

Drainage features at C1 through C14, T1, and T2 (Figure 1-2) were field verified as ephemeral swales within agricultural fields. No groundwater seepage or wetland functions were detected within the Project area and evidence of cultivation and seasonal crops with a lack of natural vegetation was apparent. Drainage features at C1 through C8, T1, and T2 have been categorized as indirect contributing Redside Dace habitat based on MNRF correspondence and the known presence of Redside Dace downstream (Appendix A). Drainage features C9 through C14 are known to drain to an urbanized area where they enter the stormwater system and are transported significant distances (great than 500 m) underground. As such, these features do not provide fish habitat.

At the east end of the Project, in the vicinity of the proposed highway interchange, roadside drainage features were inspected to determine the potential for fish habitat. These features were found to be dominated by Common Reed and contain standing water with no apparent flow. However, it is expected that flows in response to precipitation and runoff events will drain to the Etobicoke Creek, to the north or southeast. As such, these features have also been categorized as indirect fish habitat.

3.0 TERRESTRIAL HABITAT

3.1 Methodology

3.1.1 Secondary Source Review

Searches of secondary sources and databases were conducted to ascertain plant and wildlife species present within the Project limits and whether any Areas of Natural or Scientific Interest (ANSI), Environmentally Sensitive Areas (ESA), and/or Provincially Significant Wetlands are located within or adjacent to the terrestrial study areas.

Species of conservation concern include SAR and provincially rare species. Potential terrestrial species of conservation concern occurring within the terrestrial study areas was analysed through review of the secondary sources in conjunction with known habitat preferences of each potential species and distribution of these habitat types within the terrestrial study areas.

The approved Mayfield West Phase 2, Stage 1 EIS/EIR includes figures showing the location and limits of the natural heritage features within the secondary plan and in relation to the proposed Spine Road. The feature boundaries as established through the approved March 2019 EIS/EIR will continue to be applied at the detailed design stage. (Refer to Figure.11 “C-1 Constraints Development”, Figure. 12 “Landowners Framework Plan”, and Figure. 19 “IP-1 Implementation Principle for the Natural Heritage System”).

Sources reviewed include:

- *Draft Fletchers Creek Restoration Study* (CVC 2012);
- *Natural Heritage Existing Conditions Report Mayfield Road from Chinguacousy Road to Heart Lake Road Class Environmental Assessment* (GENIVAR Inc. 2014)
- *Mayfield West, Phase 2 Secondary Plan Comprehensive Environmental Impact Study and Management Plan* (AMEC 2014);
- *Mayfield West Phase 2 Secondary Plan Transportation Master Plan Final Report* (Paradigm 2015);
- *Draft Environmental Impact Statement/Environmental Implementation Report for the Mayfield West Phase 2 Landowners Framework Plan* (Hensel 2016);
- Species at Risk Public Registry database (ECCC 2017);
- Species at Risk in Ontario List (MNRF 2017c);
- MNRF Natural Heritage Information Centre (NHIC) database 1 km^2 squares encompassing the Project area (17NJ9344, 17NJ9444, 17NJ9243, 17NJ9343, 17NJ9443, 17NJ9242, 17NJ9342, 17NJ9141, 17NJ9241, and 17NJ9341) (MNRF 2017a);
- The Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2016);
- The Atlas of the Mammals of Ontario (AMO) (Dobbyn 1994);

- Bat species profiles and range maps for the province of Ontario provided by Bat Conservation International, Inc. (BCI 2017);
- The Second Atlas (2001-2005) of Breeding Birds of Ontario (ABBO) 10 X 10 km survey square 17NJ94 within Region 10 (Cadman et al. 2007); and
- Correspondence with CVC, TRCA, and MNRF (Aurora District) (Appendix A).

3.1.1.1 Species at Risk and Provincially Rare Species

For general background information on SAR in Ontario please refer to Section 2.1.1.1.

The potential for SAR and rare species to occur with the Project study area was determined based on a review of background information and agency consultation. The background information included a review of the NHIC online database of significant floral and faunal species near the Project study area. The background information noted above were also used to develop a complete list of SAR and rare species occurrences that may overlap the Project study area.

3.1.2 Field Investigations

To augment the secondary source review, field investigations were performed within the study area (Figure 1-1). Natural heritage features examined included vegetation communities, plant species occurrence, breeding bird occurrences, and areas of candidate significant wildlife habitat. No formal surveys were conducted for mammals, reptiles, or amphibians; however, additional wildlife searches were undertaken concurrently with other field investigations and included direct sightings and evidence of occurrence.

Amec Foster Wheeler biologists conducted field investigations within the terrestrial study area on May 24 and 26, June 15 and 16, and July 5 and 6, 2017. Description of field survey methodologies are provided in the subsections below.

Amec Foster Wheeler also conducted a tree inventory to provide technical site-specific information to support the future preparation of a Tree Compensation Plan in concordance with local Conservation Authority's guidelines. The methodology and results of the tree inventory are presented in a separate Technical Memorandum (Appendix C).

3.1.2.1 Vegetation Communities and Plant Inventories

Site investigations included visiting vegetation units with the terrestrial study area. Ecological Land Classifications (ELC; Lee et al.1998), which were delineated and classified in a previous study (Hensel 2016), were confirmed and updated where land use had changed or matured.

The First Approximation of ELC (Lee et al. 1998) was applied for the determination of ecosite type; however, the 2008 catalogue of ecosite types (Lee 2008) was applied where ecosites could not be determined through the application of the First Approximation or were better matched with the updated catalogue. The occurrence of ELC communities were cross-referenced with provincially significant vegetation communities as identified in the Significant Wildlife Habitat

Technical Guide (SWHTG) (MNR 2000; MNRF 2015) to determine whether these communities exist with the Project study area.

Botanical inventories were conducted and included documenting all visible species in ELC communities within the Project study area. The compiled plant species list is provided in Appendix D. Plant species occurrences were cross-referenced with NHIC database to determine existence of rare species within the Project study area. Common and scientific names of plant species are based on the current nomenclature as listed in the NHIC database. Only common names are provided within the body of the report; all scientific names are provided within Appendix D.

3.1.2.2 Breeding Bird Surveys

Twenty-nine (29) point count stations (Appendix E) were surveyed on May 24 and 26, June 15 and 16, and July 5 and 6, 2017 by qualified biologists skilled in the identification of birds by sight and sound. Surveys were conducted for ten minutes at each station (instead of the five minute listening period outlined in the ABBO) and all birds heard or observed were recorded at intervals of 0-50 m, 50-100 m, >100 m, and flyovers (birds seen flying overhead). In addition, birds were recorded at intervals of 0-3 minutes, 3-5 minutes, and 5-10 minutes. Surveys were initiated no earlier than 30 minutes prior to sunrise and extended to five hours after sunrise. Species were identified through their unique vocalisations and visual observations. Each bird was recorded once and mapped on the field data sheets to ensure no duplication of individual birds. All bird surveys were undertaken in good weather with warm temperatures, no precipitation, and little or no wind.

3.1.2.3 Wildlife Habitat

Based on the SWHTG, the MNRF defines Significant Wildlife Habitat (SWH) 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 (MNR 2000). SWH is divided into four main categories:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities and Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern (excluding Endangered or Threatened species); and
- Animal Movement Corridors.

To determine the existence of SWH within the Natural Heritage System, the MNRF has developed SWH Criterion Schedules for identifying ecosites and/or natural features suitable for wildlife to carry our critical life processes (listed within the four main categories described above). The Project study area falls within ecoregion 6E (Lake Simcoe-Rideau Ontario Ecoregion); accordingly, the SWH Criterion Schedules for Ecoregion 6E (MNRF 2015) was applied to document the occurrence of candidate SWH within the Project study area.

3.2 Results

3.2.1 Secondary Source Review and Agency Consultation

3.2.1.1 Physiography and Soils

The Project area is located within the South Slope physiographic region (ECCC 2015). The South Slope region, found primarily in northern Peel Region and western York Region, is characterized by low-lying, fine-grained, undulating ground moraine and knolls and contains mostly fertile soils (Region of Peel 2011).

3.2.1.2 Vegetation Communities and Habitat

The Project study area is within Ecoregion 6E and is contained within the Lake Simcoe-Rideau Forest Region. Land use in the surrounding area is comprised predominantly of natural forests and wetlands, conifer plantations and rural residential and agricultural areas. Natural vegetation cover within Ecoregion 6E is primarily agriculture with a significant forested component. Most of the natural communities show signs of extensive current or historic disturbance with a mixture of native and non-native species.

The Environmental Impact Statement/Environmental Implementation Report (EIS/EIR; Hensel 2016) notes that land use within the subject lands is predominantly agricultural. Natural habitat is sparse and invasive species are prevalent. The naturalized vegetated areas are generally lowland forest and/or riparian associated with the watercourses throughout the terrestrial study areas.

Three isolated woodlands overlap with the Project study area, including portions of a 3.8 hectare (ha) deciduous forest located in agricultural fields west of the Highway 410 and Hurontario Street interchange, an 8.4 ha deciduous forest bisected by train tracks north-east of the intersection of McLaughlin and Mayfield Roads, and an 8.5 ha deciduous/mixed forest located in agricultural fields between Chinguacousy and McLaughlin Roads north of Mayfield Road (Hensel 2016). There are also woodland areas surrounding Etobicoke Creek which have small areas overlapping the Project area.

Four of the six woodlands contain areas of wetland which have been evaluated and designated as PSWs and are part of the Upper Fletchers Creek Wetland Complex and the Etobicoke Creek Headwater Wetland Complex as shown in Figure 3-1 (MNRF 2017a).

3.2.1.3 Wildlife

Wildlife inventories were compiled from available literature and resources (as listed in Section 3.1.1). Based on a review of background information, 140 species of birds, 42 species of mammals, 13 species of amphibians, and 10 species of reptiles are reported to occur within the region encompassing the Project study area. A compiled species list with conservation ranks and the record sources is provided in Appendix F. Only common names are provided within the body of the report; all scientific names are provided within Appendix F.

Birds

A total of 140 avian species were recorded within the vicinity of the Project study area through a review of secondary source information.

Ten bird surveys were completed in the Mayfield West Phase 2 project area during the breeding bird seasons between 2005 and 2014 (refer to Hensel's 2016 *Draft Environmental Impact Statement/Environmental Implementation Report for the Mayfield West Phase 2 Landowners Framework Plan* for the delineation of the Mayfield West Phase 2 study area as shown in Figure T1). The current study area is encompassed by the Mayfield West Phase 2 project area so species observed on these subject lands may also be found within our study area.

These surveys yielded 72 species of birds directly within the subject lands of the EIS/EIR (Hensel 2016) and the report identified an additional 53 species compiled from secondary sources (including the ABBO; Cadman et al. 2007) from a wider North West Brampton area and the 10x10km square encompassing the study area.

In addition to the EIS/EIR, 15 additional species were identified in the *Appendix 1 DRAFT Fletchers Creek Restoration Study Characterization Report* (CVC 2012) as occurring within the vicinity of the study area.

It is important to note that the exact locations of species occurrences are not available from the atlas and occurrences are instead recorded from point count locations within 10 x 10 km squares. Similarly, the exact locations were not available from the reports and instead recorded from their respective study areas. Consequently, it is not certain that these species or their habitats are present within the current Project limits, however it identifies them as potentially present due to their presence in nearby locales.

The majority of the bird species recorded within the vicinity of the study area are provincially ranked S5 (very common, demonstrably secure), S4 (common to very common) or SNA (not suitable for conservation activities); however, 13 of the 140 bird species recorded within the vicinity of the Project area are SAR (Section 3.2.1.4) with an additional 3 species ranked provincially rare and an additional 16 species on the Ontario Partners in Flight (2008) priority species list. A compiled wildlife species list with conservation ranks is provided in Appendix F.

Mammals

In total, 42 species of mammals have the potential to occur within the vicinity of the Project area. This data was gathered from both range maps in the AMO (Dobbyn 1994) and Bat Conservation International records (BCI 2017) and species recorded during previous studies' field investigations as detailed in Section 3.1.1.

The majority of mammal species recorded within the applicable atlas block are provincially ranked S5 (very common, demonstrably secure), S4 (common to very common), or SNA (not suitable for conservation activities). Four mammal species whose ranges include the study area are

considered species of conservation concern (see Section 3.2.1.4). A compiled wildlife species list with conservation ranks and the records source is provided in Appendix F.

Reptiles and Amphibians

A review of the ORAA (Ontario Nature 2016) species list for the natural heritage square encompassing the Project area and species recorded during previous field investigations as detailed in Section 3.1.1 indicated ten reptile and thirteen amphibian species have been observed in the area.

The majority of reptile and amphibian species recorded within the applicable area are provincially ranked S5 (very common, demonstrably secure), S4 (common to very common), or SNA (not suitable for conservation activities). Four reptile species and one amphibian are ranked as species of conservation concern (see Section 3.2.1.4).

It is important to note that the exact locations of these species records are not available through the ORAA or within the reports reviewed, as a result, while these species are known to occur in the vicinity, it does not confirm the presence of the species or their habitat within the terrestrial study areas. A compiled wildlife species list with conservation ranks is provided in Appendix F.

3.2.1.4 Species at Risk and Provincially Rare Species

Secondary source review revealed the presence of 1 plant, 16 bird, 4 mammal, 1 amphibian, 3 reptile and 1 butterfly SAR / provincially rare species documented within the vicinity of the Project area (MNR 2017b; Cadman et al. 2007; BCI 2017; Dobbyn 1994; Ontario Nature 2016, CVC 2012; Hensel 2016; Dougan & Associates 2014; GENIVAR Inc. 2014; Correspondence with MNRF). It is important to note that the exact locations of these species are not available through the reviewed sources. As a result, it is unknown if these species are present within the terrestrial study areas.

The NHIC database reported the presence of Butternut (provincially Endangered and ranked S2?) and Dougan and Associates recorded some specimens within the Greenbelt Plan Area.

Data from various sources identified Bobolink and Eastern Meadowlark; both designated Threatened provincially, as present in the vicinity of the study area. It should be noted that agricultural management practices affect the availability of breeding habitat for these species, and updated surveys during breeding season will be required to confirm the extent of local populations and suitable habitat in a given year.

Terrestrial SAR which have been recorded on or near the Project area, documented though desktop resources include:

- Endangered species:
    - Butternut (Juglans cinerea)
    - Eastern Small-footed Myotis (*Myotis leibii*)

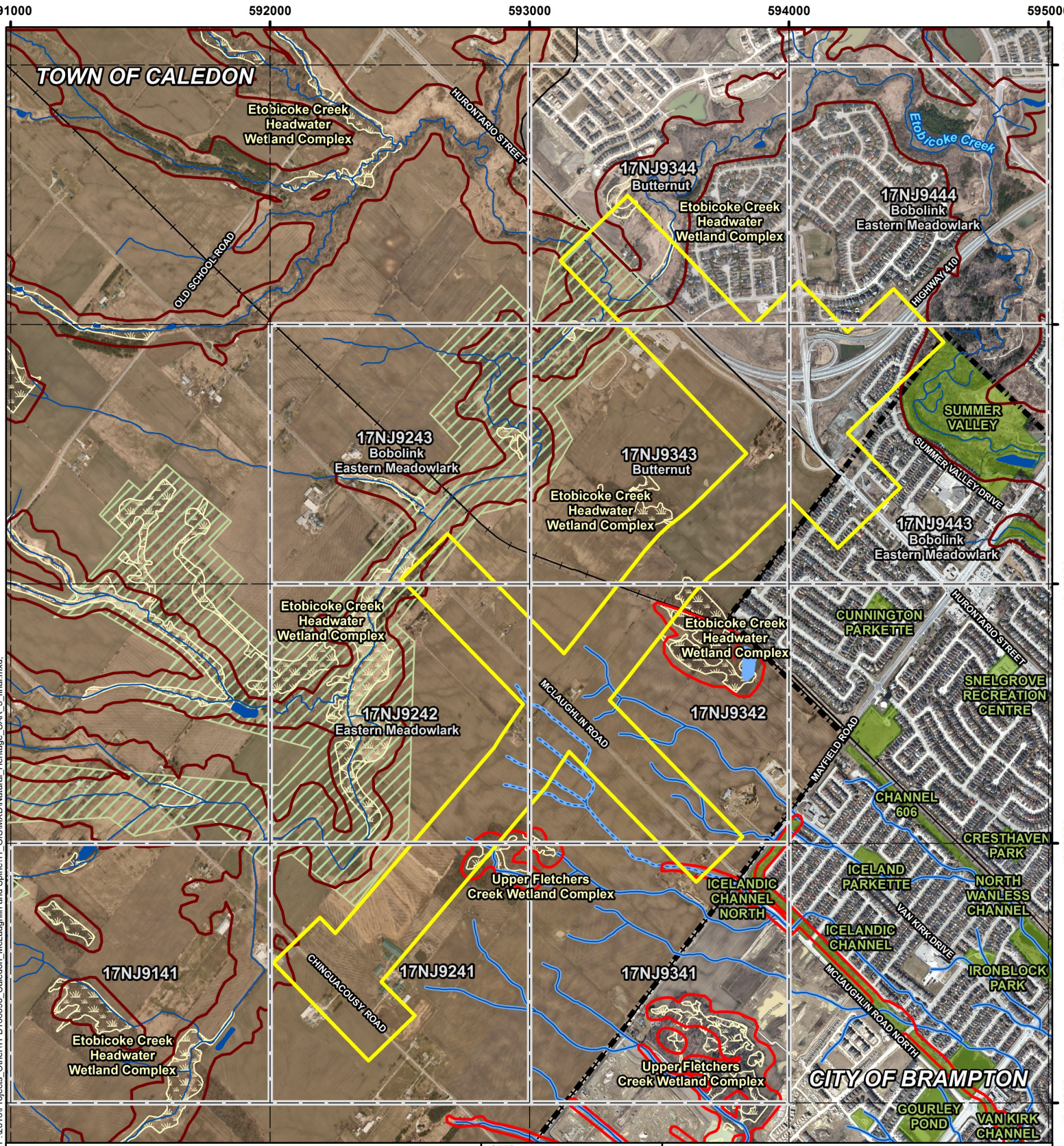
- Little Brown Myotis (*Myotis lucifugus*)
- Northern Myotis (*Myotis septentrionalis*)
- Tri-Colored Bat *(Perimyotis subflavus*)

- Threatened species:
  - Bank Swallow (*Riparia riparia*)
  - Barn Swallow (*Hirundo rustica*)
  - Bobolink (*Dolichonyx oryzivorus*)
  - Chimney Swift (*Chaetura pelagic*)
  - Eastern Meadowlark (*Sturnella magna*)
  - Eastern Whip-poor-will (*Androstomus vociferus*)
- Special Concern species:
  - Common Nighthawk (*Chordeiles minor*)
  - Eastern Wood-Pewee *(Contopus virens*)
  - Grasshopper Sparrow (*Ammodramus savannarum*, listed federally only)
  - Hooded Warbler (*Setophaga citrina, listed federally only*)
  - Red-headed Woodpecker (*Melanerpes erythrocephalus*)
  - Short-eared Owl (*Asio flammeus*)
  - Wood Thrush (*Hylocichla mustelina*)
  - Blanding's Turtle (*Emydoidea blandingi*)
  - Northern Map Turtle (*Graptemys geographica*)
  - Snapping Turtle (Chelydra serpentina)
  - Western Chorus Frog (*Pseudacris triseriata*, Great Lakes/St. Lawrence Population, listed federally only)
  - Monarch (*Danaus plexippus*)

3.2.1.5 Significant Natural Heritage Features

A search of the MNRF's NHIC database revealed that there are areas of wetland which have been evaluated and designated as Provincially Significant Wetlands (PSW). The PSWs are part of the Upper Fletchers Creek Wetland Complex and the Etobicoke Creek Headwater Wetland Complex as shown in Figure 3-1 (MNRF 2017a).

In addition, a small section of the study area falls within the Greenbelt Area which extends along a reach of Etobicoke Creek in this area (Figure 3-1) (MNRF 2017a).



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LEGEND

- Approximate Study Area
- CVC Regulation Limits
- TRCA Regulation Limits
- Greenbelt Act
- PARK — Parks (City of Brampton)
- Prime Agricultural Land
- PSW — Provinncially Signficiant Wetland
- Non-evaluated Wetland
- NHIC — NHIC 1 km Square (Labelled with ID and SAR occurances within the last 20 years)
- Watercourse with Redside Dace
- Waterbody with Redside Dace
- Railway
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Municipal Boundary

NOTES:
- Background imagery from Town of Caledon, 2016
- Topographic features extracted from LIO, MNRF.

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.2 0.4 0.6 0.8 1 Kilometres

TOWN OF CALEDON

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McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Secondary Source Natural Heritage Features and Species at Risk

PROJECT N°: TPB166090 | **FIGURE: 3-1**

SCALE: 1:20,000 | DATE: February 2019

3.2.2 Field Investigations

3.2.2.1 Vegetation Communities

Many of the vegetation communities within the terrestrial study area have been created by human disturbance and are classified as cultural. The majority of the land within the terrestrial study area includes agricultural fields, residential areas, and cultural meadows. The most significant vegetation communities are the fragments of woodland/forest; these fragments of forest, and cultural woodlot often buffer the watercourses throughout the terrestrial study areas and are a relatively significant feature in context of the Project area landscape, given that the area is characterized by a high degree of agriculture and development.

A summary table of the vegetation communities and land use within the study area is presented in Table 3-1, and distribution of land use and ELC units are illustrated in Figure 3-2. A series of photos representing some of the identified land classifications is included in Appendix G.

A compiled plant species list is included in Appendix D, though this should not be taken as an exhaustive list as permission to enter was not granted for all locations within the terrestrial study areas and not all communities were investigated thoroughly. Of the 90 plant species identified within the Project study area during Amec Foster Wheeler investigations, 33 are not native to Ontario (MNRF 2017a) and eight (8) were identified to genus only. Where permission to enter had not been granted, ELC data mapped by Dougan and Associates, as cited in Hensel (2016), was confirmed from a distance. In such instances, species lists were not obtained.

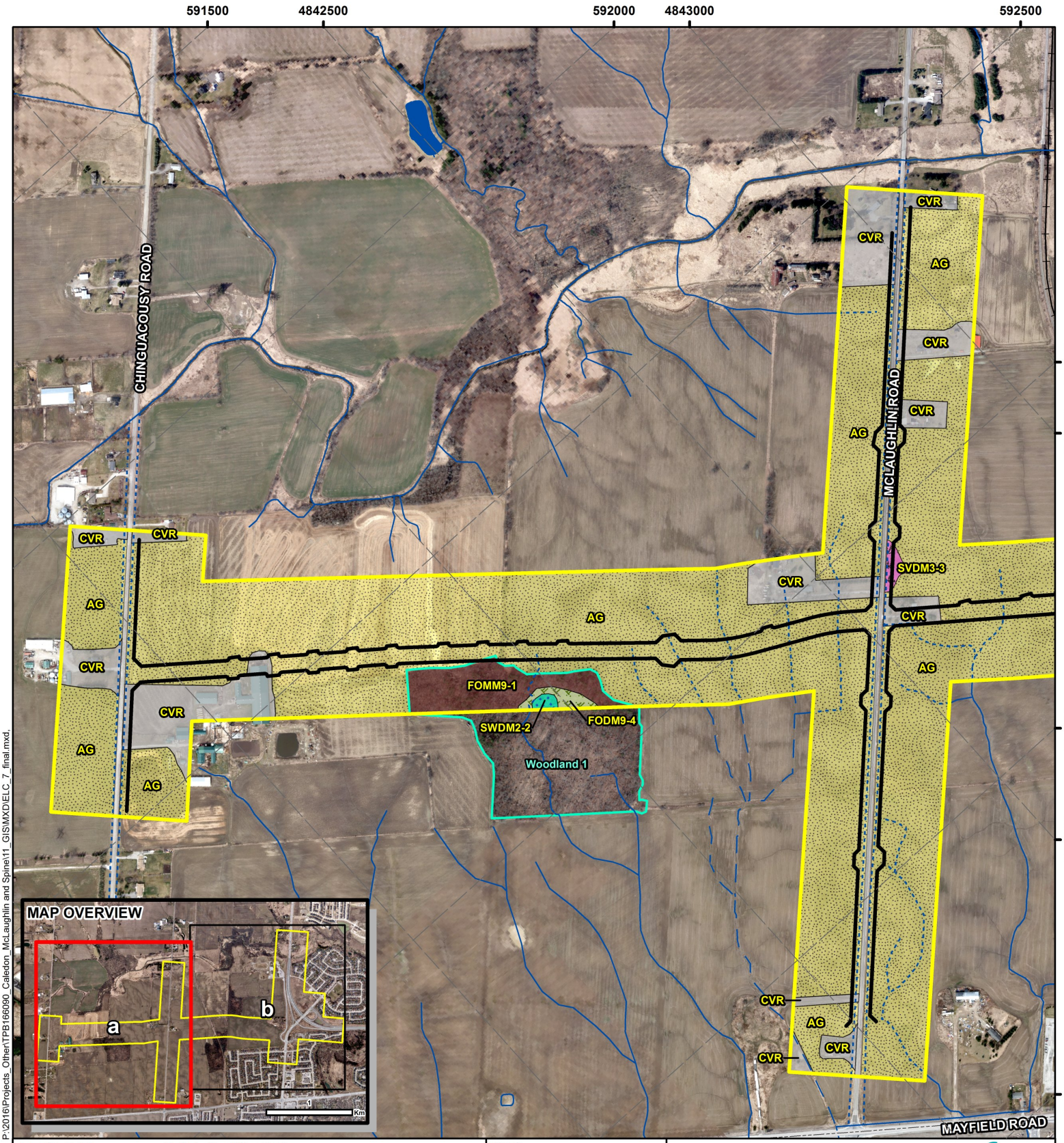
A total of 17 ELC community types / land uses were identified within the terrestrial study area. Of the 169.1 hectares (ha) that make-up the Project study area, 96.6% was made up of community types / land uses considered anthropogenic or cultural in origin (e.g., constructed/agricultural). The remaining 9.59% comprised of swamps, forests and open aquatic habitats. These habitats contain numerous non-native species due to their proximity to cultural habitats.

Table 3-1: ELC Vegetation Communities and Land Uses

ELC Type	Community Description
Vegetated / Natural Communities	
FODM4-10 Dry-Fresh Hawthorn – Apple Deciduous Forest Type Total Area: 0.6 ha (0.4%)	Two polygons of Dry-Fresh Hawthorn – Apple Deciduous Forest Type were present within the study area. This community is dominated by Hawthorn species and Common Apple with an understory dominated by grasses, Tall Goldenrod, Canada Thistle and Common Dandelion. One Butternut was observed in this community near Breeding Bird station 29 (Appendix B). This individual was sampled for DNA analysis but results have not yet been obtained. This ecosite was likewise classified by Dougan and Associates as a Dry-Fresh Hawthorn – Apple Deciduous Forest; however, the ELC code has been updated to the 2008 catalogue (Lee 2008).
FODM5-2 Dry Fresh Sugar Maple – Beech Deciduous Forest Type Total Area: 0.6 ha (0.4%)	One polygon of Dry Fresh Sugar Maple – Beech Deciduous Forest Type was located at the eastern limit of the study area. This community was dominated by Sugar Maple and American Beech with Ironwood, Basswood, and Ash also common. The shrub layer contains Hawthorns, European Buckthorn, and Choke Cherry and the ground layer is sparse with common grasses, sedge species and Garlic Mustard. This ecosite was likewise classified by Dougan and Associates as a Dry Fresh Sugar Maple – Beech Deciduous Forest; however, the ELC code has been updated to the 2008 catalogue (Lee 2008).
FODM7-2 Fresh – Moist Green Ash - Hardwood Lowland Deciduous Forest Type Total Area: 0.6 ha (0.4%)	Two polygons of Fresh Moist Green Ash - Hardwood Lowland Deciduous Forest Type are present within the study area bisected by the railway tracks. This community was dominated by White Ash and Green Ash however they are predominantly dead or dying and the community is transitioning into a thicket dominated by European Buckthorn. Other species present include Trembling Aspen, Bur Oak and Basswood. Ground layer species include grass species, Tall Goldenrod, and Poison Ivy. This ecosite was previously classified by Dougan and Associates as a Fresh Moist Ash Lowland Deciduous Forest; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
FODM7-7 Fresh - Moist Manitoba Maple Lowland Deciduous Forest Type Total Area: 0.3 ha (0.2%)	One polygon of Fresh – Moist Manitoba Maple Lowland Deciduous Forest Type was found at the north-eastern limit of the study area. This community is dominated by Manitoba Maple with willow species and Green Ash. As with the more ash dominated forest, many of the ash were dying resulting in a lot of standing snags. This ecosite was likewise classified by Dougan and Associates as a Fresh - Moist Manitoba Maple Lowland Deciduous Forest; however, the ELC code has been updated to the 2008 catalogue.
FODM9-4 Fresh - Moist Shagbark Hickory Deciduous Forest Type Total Area: 0.3 ha (0.2%)	One polygon of Fresh-Moist Shagbark Hickory Deciduous Forest was present in the western woodlot. This community is dominated by Shagbark Hickory with White Oak. An exhaustive species list was not obtained due to difficulties accessing this community due to abundant Poison Ivy in the ground layer of this community and the surrounding forest community. This ecosite was likewise classified by Dougan and Associates as a Fresh-Moist Shagbark Hickory Deciduous Forest; however, the ELC code has been updated to the 2008 catalogue (Lee 2008).

ELC Type	Community Description
FOMM9-1 Fresh - Moist White Pine – Sugar Maple Forest Type Total Area: 2.4 ha (1.4%)	One polygon of Fresh-Moist White Pine – Sugar Maple Forest Type was present in the western woodlot. This community is dominated by White Pine joined with Sugar Maple, Large-tooth Aspen, and Basswood. European Buckthorn and Choke Cherry are common in the shrub layer with a sparse ground layer containing species such as Jack-in-the-pulpit, Wild Strawberry, Garlic Mustard and Poison Ivy. This ecosite was previously classified by Dougan and Associates as a Fresh-Moist White Pine – Hardwood Forest; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
SWDM2-2 Green Ash Mineral Deciduous Swamp Type Total Area: 0.1 ha (0.1%)	One polygon of Green Ash Mineral Deciduous Swamp Type was identified within the study area in the Dougan and Associates ELC mapping (Hensel 2016) within the western woodlot. Due to large amounts of poison ivy in the surrounding forest polygon, this community was not confirmed during Amec Foster Wheeler field investigations and a species list was not generated. This ecosite was likewise classified by Dougan and Associates as a Green Ash Mineral Deciduous Swamp; however, the ELC code has been updated to the 2008 catalogue (Lee 2008).
SWDM3-3 Swamp Maple Mineral Deciduous Swamp Type Total Area: 0.5 ha (0.3%)	One polygon of Swamp Maple Mineral Deciduous Swamp was identified within the study area just east of the railway track. This community was dominated by Freeman's Maple, with Shagbark Hickory and Bur Oak also present in the canopy, European Buckthorn and Red-osier Dogwood are present in the shrub layer and grasses, Sensitive Fern and Spotted Jewelweed some of the abundant species in the ground layer. This ecosite was likewise classified by Dougan and Associates as a Swamp Maple Mineral Deciduous Swamp; however, the ELC code has been updated to the 2008 catalogue (Lee 2008).
Vegetated / Cultural Communities	
THDM3-1 Buckthorn Deciduous Hedgerow Thicket Type Total Area: 0.1 ha (0.1%)	One hedgerow was present within the study area between agricultural fields. This community was dominated by European Buckthorn and Hawthorn species with a few trees (Siberian Elm and Green Ash) and a weedy ground layer. Despite their anthropogenic nature these communities can host wildlife and can at times provide landscape linkages between natural habitats. This ecosite was previously classified by Dougan and Associates as a Treed Hedgerow; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
CUM1-1 Dry – Moist Old Field Meadow Type Total Area: 17.9 ha (10.6%)	Numerous polygons of this community are found at the east end of the Project area around the Highway 410 interchange. Cultural meadows result from, or are maintained by, cultural or anthropogenic based disturbances, and are characterized by ≤ 25% tree and shrub cover. This community was dominated by grasses and Tall Goldenrod with occurrences of Cottonwood, willow species, Austrian Pine and Silver Maple in the shrub and sub-canopy layers.
MEG Graminoid Meadow Total Area: 7.5 ha (4.4%)	Two polygons of this community are found in the riparian areas at the north-east of the study area bisected by Highway 410. Cultural meadows result from, or are maintained by, cultural or anthropogenic based disturbances, and are characterized by ≤ 25% tree and shrub cover. This community was dominated by grasses and Tall Goldenrod with Spotted Jewelweed, Common Reed in the ground cover; Russian Olive and Hawthorn sp. in the shrub layer and Manitoba Maple dominant in the canopy. This ecosite was previously classified by Dougan and Associates as an Exotic Cool-season Grass Meadow; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).

ELC Type	Community Description
SVDM3-4 Hawthorn Deciduous Savanna Type Total Area: 0.9 ha (0.6%)	One polygon consisting of Hawthorn Deciduous Savanna Type was identified within the study area. Cultural savannas are characterized by 25% to 35% tree cover. This community was dominated by Hawthorn with occurrences of Manitoba Maple and willow species also present, ground cover was dominated by grasses and Tall Goldenrod. This ecosite was previously classified by Dougan and Associates as a Hawthorn Cultural Savannah; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
SVDM3-3 Dry – Fresh Bur Oak Deciduous Savanna Type Total Area: 0.3 ha (0.2%)	One polygon consisting of Dry – Fresh Bur Oak Deciduous Savanna Type was identified within the study area. Cultural savannas are characterized by 25% to 35% tree cover. This savanna community was less varied and was exclusively Bur Oak in the canopy, ground cover was dominated by grasses and Tall Goldenrod. This ecosite was previously classified by Dougan and Associates as a Native Deciduous Cultural Savannah; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
THDM2-11 Hawthorn Deciduous Shrub Thicket Type Total Area: 0.7 ha (0.4%)	One area of cultural thicket was identified in the north-eastern part of the study area. Cultural thickets are characterized by ≤ 25% tree cover and > 25% shrub cover. This community is primarily populated by hawthorns and European Buckthorn, with grass species and Tall Goldenrod dominant in the ground layer.
OAW Open Water Total Area: 0.4 ha (0.2%)	One area of open water was identified within the study area within the highway interchange.
Constructed Areas	
CVR Residential Total Area: 33.3 ha (19.7%)	Several areas were individual residential properties and some were subdivisions with multiple properties. Residential properties often had gardens and landscaping with a mix of native and exotic species. This ecosite was previously classified by Dougan and Associates as Anthropogenic; however, the ELC description and code have been updated to the 2008 catalogue (Lee 2008).
AG Agriculture Total Area: 102.6 ha (60.7%)	Agricultural lands were prevalent throughout the entire area. Some weedy species of plants were noted on the field edges though these were not considered part of the community.



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LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Core Woodland
- Natural Area and Corridor Woodland
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Railway
- Municipal Boundary

Ecological Land Classification

- AG: *Agricultural*
- CVR: *Residential*
- FODM9-4: *Fresh-Moist Shagbark Hickory Deciduous Forest Type*
- FOMM9-1: *Fresh-Moist White Pine - Sugar Maple Forest Type*
- SWDM3-3: *Swamp Maple Mineral Deciduous Swamp Type*
- SWDM2-2: *Green Ash Mineral Deciduous Swamp Type*

0 0.1 0.2 0.3 0.4 0.5 Kilometres

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
- Watercourse information is a combination of data from Ontario Hydro Network, Ontario Base Map, MNRF constructed drains, Peel Region, and Dougan and Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value of "Permanent".

Datum & Projection: NAD 1983 UTM Zone 17N

TOWN OF CALEDON

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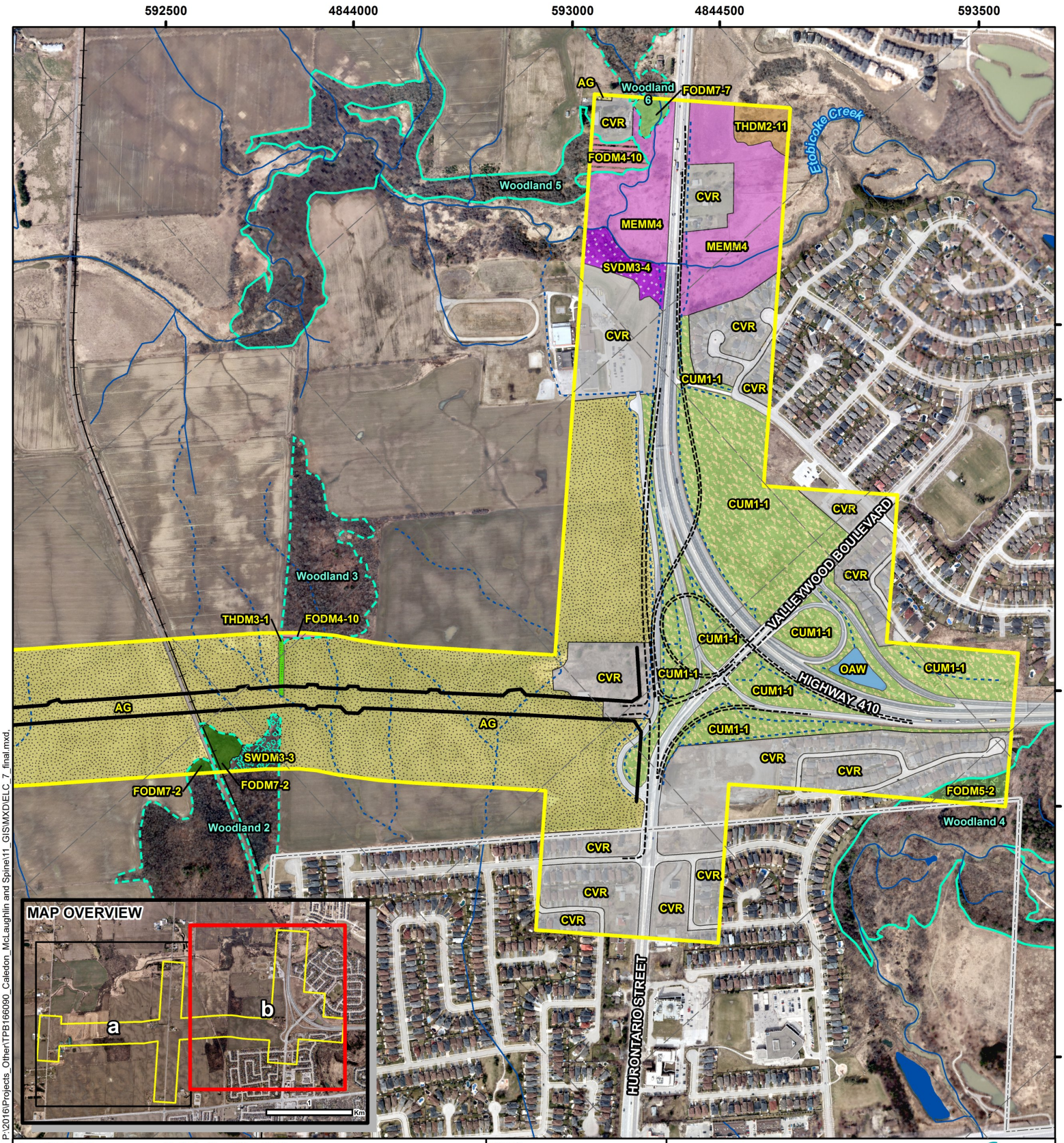
McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Ecological Land Classification and Significant Woodlands

PROJECT N°: TPB166090 | **FIGURE: 3-2a**

SCALE: 1:9,500 | DATE: February 2019



LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Core Woodland
- Natural Area and Corridor Woodland
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Railway
- Municipal Boundary

Ecological Land Classification

- AG: *Agricultural*
- CUM1-1: *Dry-Moist Old Field Meadow*
- CVR: *Residential*
- FODM4-10: *Dry-Fresh Hawthorn - Apple Deciduous Forest Type*
- FODM5-2: *Dry-Fresh Sugar Maple - Beech Deciduous Forest Type*
- FODM7-2: *Fresh-Moist Green Ash - Hardwood Lowland Deciduous Forest Type*
- FODM7-7: *Fresh-Moist Manitoba Maple Lowland Deciduous Forest Type*
- MEMM4: *Graminoid Meadow*
- OAW: *Open Water*
- SVDM3-4: *Hawthorn Deciduous Savanna Type*
- SWDM2-2: *Green Ash Mineral Deciduous Swamp Type*
- SWDM3-3: *Swamp Maple Mineral Deciduous Swamp Type*
- THDM2-11: *Hawthorn Deciduous Shrub Thicket Type*
- THDM3-1: *Buckthorn Deciduous Hedgerow Thicket Type*

0 0.1 0.2 0.3 0.4 0.5 Kilometres

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
- Watercourse information is a combination of data from Ontario Hydro Network, Ontario Base Map, MNRF constructed drains, Peel Region, and Dougan and Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value of "Permanent".

Datum & Projection: NAD 1983 UTM Zone 17N

TOWN OF CALEDON

amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Ecological Land Classification and Significant Woodlands

PROJECT N°: TPB166090 | **FIGURE: 3-2b**

SCALE: 1:9,500 | DATE: February 2019

3.2.2.2 Wildlife

A detailed description of the survey processes used during field investigations is provided in Section 3.1.2 above. The following sub-sections provide details of the field investigations findings and relate them to the secondary source data gathered.

Birds

Of the 140 bird species documented in the secondary source review as potentially present within the study areas, 56 of the species were identified within the study area during the Amec Foster Wheeler 2017 breeding bird point count survey (Appendix H), with one additional species (Wild Turkey) observed during vegetation surveys. With the exception of Barn Swallow, Eastern Wood-Pewee, and Wood Thrush, all species recorded during Amec Foster Wheeler field investigations are considered secure. Barn Swallow was observed multiple times throughout the study area (Figure 3-3). Two Eastern Wood-Pewee and one Wood Thrush were recorded at two point counts and it is likely the same birds were heard from both stations as they are close proximity to each other.

The most commonly recorded birds included Ring-billed Gull (215), European Starling (94), Red-winged Blackbird (87), House Sparrow (83), and Horned Lark (74). Together these species represented 44.8% of all birds recorded. These species are typical of urban settings and anthropogenically influenced natural areas. Several other less common species were recorded during the field surveys, such as Wood Thrush, Eastern Wood-Pewee, Rose-breasted Grosbeak, and Brown Thrasher.

Mammals

In total, 42 species of mammals were identified in the secondary source review as potentially present within the study areas. Of the 42 species, 4 were reported during the field investigations, including the urban tolerant Red Squirrel, Raccoon, White-tailed Deer, and Coyote. The majority of other potentially occurring mammal species are small such as mice, voles, and shrews, or nocturnal such as flying squirrels and bats. These species are difficult to detect using standard, non-invasive methods.

Reptiles and Amphibians

Ten reptile and thirteen amphibian species were identified in the secondary source review as potentially present within the study areas (Appendix F). Northern Leopard Frog was observed during the Amec Foster Wheeler 2017 site investigations. As targeted herpetile field investigations were no conducted, there were limited opportunities to observe reptiles and amphibians within the Project study area. The wetland present within the study area provide suitable habitat for a variety of reptile and amphibian species.

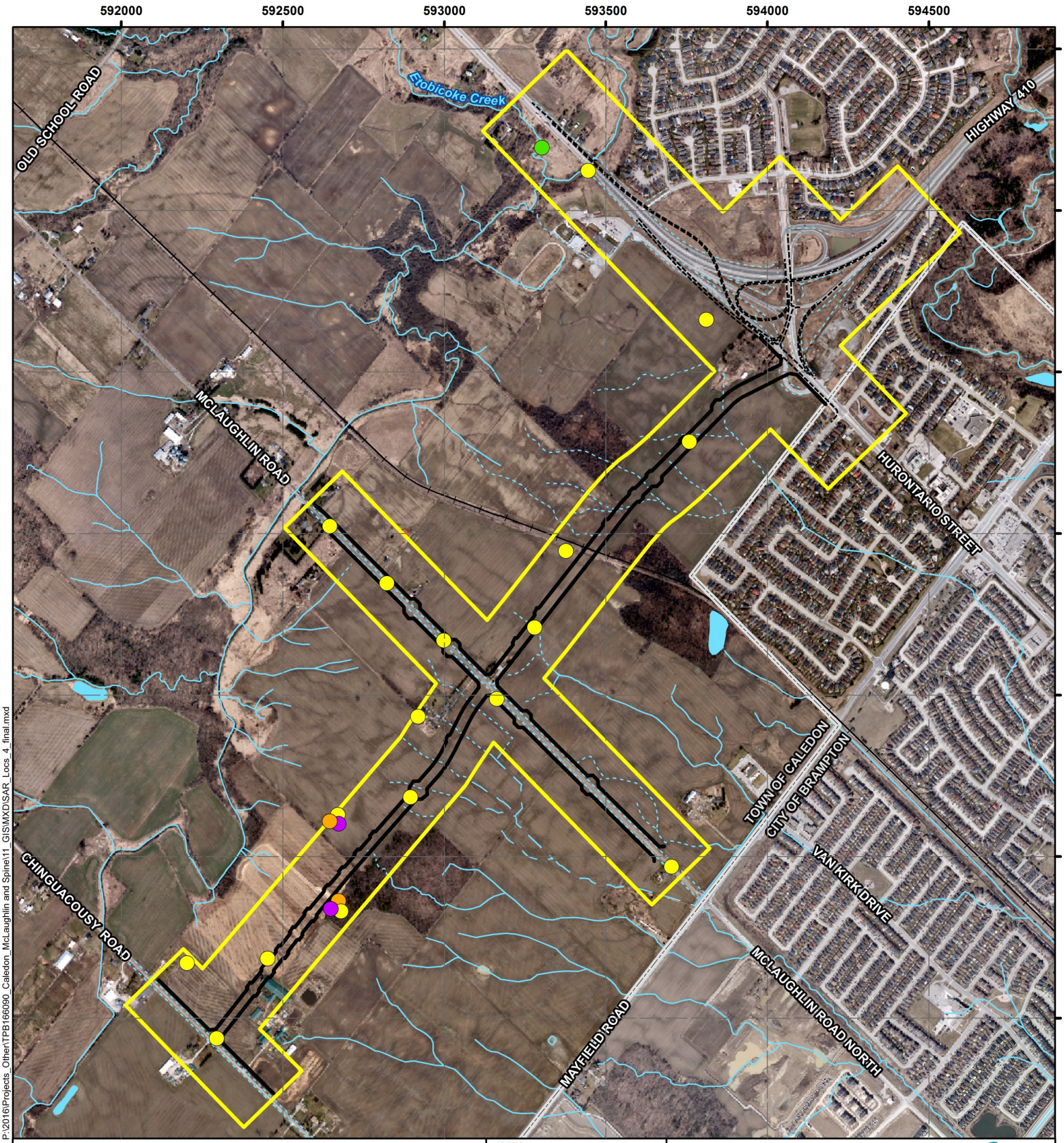
3.2.2.3 Species at Risk (Endangered and Threatened)

Species identified through secondary source review and from field investigations were synthesized in Table 3-2 for the purpose of identifying potential/confirmed occurrence of

Endangered and Threatened SAR within the Project study area. Special concern and provincially rare species are discussed in the context of significant wildlife habitat (Section 3.2.2.4.2). The probabilities provided in Table 3-2 are based on an assessment of each species' habitat preferences/needs in conjunction with existing conditions observed during 2017 field investigations and background information. The occurrence of SAR and provincially rare species observed during the 2017 field investigations is illustrated in Figure 3-3.

The presence and status of SAR is dynamic such that a species may come into the area or species already occurring in the area may be up-listed at any time. For this reason, ongoing communication with the MNRF is recommended to ensure compliance with the ESA. The probabilities of occurrence are defined as 'Confirmed Present', 'High', 'Moderate', 'Low', and 'None' and are based on the following definitions:

- **Confirmed Present**: Those species recorded directly within the Project study area during current or previous field investigations.
- **High**: Those species recorded in the vicinity of the Project (typically within 10 km and recorded in the past 20 years) and whose preferred habitat is abundant within the Project study area. Species with high probability of occurrence would be expected to breed within or frequently use the habitats available within the Project study area and would be known to have a high relative abundance within the region (i.e., compared to other regions in Ontario).
- **Moderate**: Those species in the vicinity of the Project, but have limited suitable habitat within the Project study area. Species with moderate probabilities of occurrence may not occur within the Project study area frequently, but may intermittently use it for foraging, migration or movement to other parts of their home-range.
- **Low**: Those species recorded in the vicinity of the Project study area, but whose preferred habitat does not occur or is extremely limited within the study area. These species may intermittently move through the study area, but are unlikely to become permanent residents.
- **None**: Those species whose preferred habitat is completely absent from the Project study and may only migrate intermittently through the Project study area.



P:\2016\Projects_Other\TPB166090_Caledon_McLaughlin and Spine\11_GIS\MXD\SAR_Locs_4_final.mxd

LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Railway
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Municipal Boundary

Species at Risk

- Barn Swallow
- Eastern Wood-Pewee
- Wood Thrush
- Butternut

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
- Watercourse information is a combination of data from Ontario Hydro Network, Ontario Base Map, MNRF constructed drains, Peel Region, and Dougan and Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value of "Permanent".

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.2 0.4 0.6 0.8 1 Kilometres

TOWN OF CALEDON

amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Species at Risk Locations

PROJECT N°: TPB166090 | **FIGURE: 3-3**

SCALE: 1:16,000 | DATE: February 2019

Table 3-2: Records of Endangered and Threatened Species at Risk within the Vicinity of the Study Area and Probability of Occurrence

Species Name, Status (SARA, ESA, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence on Project site
SAR Birds		
Bank Swallow (*Riparia riparia*) SARA: No Status ESA: Threatened S-Rank: S4B Source: ABBO (2001-2005), CVC 2012, Hensel 2016	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable (COSEWIC 2013a).	**Low** – There are no suitable nesting sites within the study area. There is some suitable foraging habitat and it is possible that Bank Swallows may travel to the study area from nesting sites elsewhere in the area. This species has been observed within the 10x10km breeding bird atlas square which encompasses the study area and has been reported in the nearby Fletchers Creek subwatershed.
Barn Swallow (*Hirundo rustica*) SARA: No Status ESA: Threatened S-Rank: S4B Source: ABBO (2001-2005) CVC 2012, AMEC 2014, Hensel 2016, Amec Foster Wheeler Field Investigations (2017)	Barn Swallows have shifted largely to nesting in and on artificial structures, including buildings, bridges and road culverts, and prefer various open habitats for foraging including grassy fields, pastures, agricultural crops and over open water (COSEWIC 2011a).	**Confirmed Present** – Much of the land within the study area consists of open meadows, agricultural fields, roadside and lawn which are suitable foraging habitats. There are limited bridge or culvert nesting sites within the study area, but there are potential nesting sites on various buildings. This species was observed during Amec Foster Wheeler 2017 field investigations.
Bobolink (*Dolichonyx oryzivorus*) SARA: No Status ESA: Threatened S-Rank: S4B Source: NHIC 2017, ABBO (2001-2005), CVC 2012, AMEC 2014, Hensel 2016	Bobolink nest primarily in forage crops, hayfields and associated pastures. Bobolink also occur in wet prairie, graminoid peatlands and abandoned fields dominated by tall grasses, no-till cropland, small-grain fields, reed beds and irrigated fields in arid regions. The species does not generally occupy fields of row crops such as corn, soybean and wheat, pastures in valleys with high shrub density or intensively grazed pastures (COSEWIC 2010a).	**Low/Moderate** – Bobolink have been recorded numerous times within the NHIC natural heritage square and within the 10x10km breeding bird atlas square which encompasses the study area. There are several agricultural fields in the study area that could provide suitable habitat if used for hay however during 2017 Amec Foster Wheeler field investigations there was very limited suitable habitat for this species within the study area. As agricultural management practices affect the availability of breeding habitat for this species, surveys during breeding season would be required to update the extent of local populations and suitable habitat in a given year.
Chimney Swift (*Chaetura pelagica*) SARA: Threatened ESA: Threatened S-Rank: S4B, S4N Source: ABBO (2001-2005) Hensel 2016	Chimney Swifts have increasingly moved into building chimneys. Today, the species is mainly associated with areas where the birds can find buildings to use as nesting and resting sites, however a small portion of the population continues to use hollow trees. (COSEWIC 2007a).	**Low** – Within and around the study area, Chimney Swifts have limited/no access to potential chimneys of a substantial enough size to permit nesting. This species has been observed within the 10x10km breeding bird atlas square which encompasses the study area.

Species Name, Status (SARA, ESA, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence on Project site
Eastern Meadowlark (*Sturnella magna*) SARA: No Status ESA: Threatened S-Rank: S4B Source: NHIC, ABBO (2001-2005), CVC 2012, AMEC 2014, Hensel 2016	As a ground nesting grassland specialist, the Eastern Meadowlark inhabits grassland habitats, native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows and airfields (COSEWIC 2011b).	**Low/Moderate** – Eastern Meadowlark have been recorded numerous times within the NHIC natural heritage square and within the 10x10km breeding bird atlas square which encompasses the study area. There are several agricultural fields in the study area that could provide suitable habitat if used for hay however during 2017 Amec Foster Wheeler field investigations there was very limited suitable habitat for this species within the study area. As agricultural management practices affect the availability of breeding habitat for this species, surveys during breeding season would be required to update the extent of local populations and suitable habitat in a given year.
Eastern Whip-poor-will (*Antrostomus vociferus*) SARA: Threatened ESA: Threatened S-Rank: S4B Source: Hensel 2016	Whip-poor-will breeding habitat is dependent upon forest structure; the species avoids both wide-open spaces and closed-canopy forests. Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred as nesting habitat (COSEWIC 2009).	**Low** – Within and around the study area, there is very limited suitable nesting habitat for Eastern Whip-poor-will.
SAR Mammals		
Eastern Small-footed Myotis (*Myotis leibii*) SARA: Endangered ESA: Endangered S-Rank: S2S3 Source: AMO, BCI 2017	The Eastern Small-footed Myotis is one of the less common species found to hibernate in Ontario. Caves and mines serve as significant hibernacula while streams and ponds serve as foraging areas (MNR 2017a).	**Low/Moderate** – There are no known caves and mines within the study area, and limited woodlands within the study area indicate that the probability of this species using the study area to breed or roost is low. However, they may forage over open fields or local watercourses
Little Brown Myotis (*Myotis lucifugus*) SARA: Endangered ESA: Endangered S-Rank: S4 Source: AMO, BCI 2017	The Little Brown Myotis is wide-spread throughout the southern half of Canada and is especially associated with humans, often forming nursery colonies in buildings, attics, and other man-made structures. Little Brown Myotis forage over water where their diet consists of aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. They also feed over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects, from moths and beetles to crane flies (COSEWIC 2013c; BCI 2017).	**High** – Although limited woodland and wetland habitats are present in the Project study area, the presence of farm buildings and residential areas provide potentially suitable maternal roost habitat for this species.

Species Name, Status (SARA, ESA, S-Rank)[1,2,3], and Data Source	Preferred Habitat	Potential SAR Habitat/Occurrence on Project site
Northern Myotis (*Myotis septentrionalis*) SARA: Endangered ESA: Endangered S-Rank: S3 Source: AMO, BCI 2017	The Northern Myotis is one of the less common species found to hibernate in Ontario. This species is closely associated with woodlands and use trees as maternity sites (COSEWIC 2013c; MNR 2017a).	**Low/Moderate** – Limited woodlands within the study area indicate that the probability of this species using the study area to breed or roost is low. However, they may forage over open fields or local watercourses
Tri-colored Bat (*Perimyotis subflavus*) SARA: Endangered ESA: Endangered S-Rank: S3? Source: AMO, BCI 2017	Within treed habitats, Tri-colored Bat primarily roosts in tree foliage (mainly within oak leaves). Leaf roosts are shaped like umbrellas with a "roof" and a hollow core where bats rest. Studies have shown that oak leaves are a preferred roost site. Maple leaves are also selected, although less commonly. It is thought that Tri-colored Bat may prefer roost trees in more open woodlands, as opposed to deep woods. Roosts in tree cavity are used less frequently than Myotis species (COSEWIC 2013c; BCI, 2017).	**Low/Moderate** – Limited woodlands within the study area indicate that the probability of this species using the study area to breed or roost is low. However, they may forage over open fields or local watercourses
SAR Reptiles		
Blanding's Turtle (*Emydoidea blandingii*) SARA: Threatened ESA: Threatened S-Rank: S3 Source: ORAA 2016	Blanding's Turtle preferred habitat includes ponds and wetlands characterized by clean water and mucky bottoms. Overwintering occurs in the soft bottoms of permanent pools (Ontario Nature 2016).	**Low** – This species has been recorded within the 10x10km Ontario Reptile and Amphibian Atlas square which encompasses the study area. There is limited suitable habitat within the study area and it is unlikely this species uses the study area for its life processes.
SAR Plants		
Butternut (*Juglans cinerea*) SARA: Endangered ESA: Endangered S-Rank: S2? Source: NHIC, Hensel 2016, Amec Foster Wheeler Field Investigations (2017)	Butternut is widespread and relatively common in southern Ontario (more than 100 occurrences). Populations of this species are being devastated throughout its natural range by a fungal disease known as Butternut Canker (MNR 2013).	**Confirmed Present** – One Butternut was observed near a breeding bird point count station at the north east of the study area. It is possible other individuals exist within the study area as the woodlots were not surveyed extensively. This individual was sampled for DNA analysis but results have not yet been obtained.

Birds

Of the Endangered and Threatened avian SAR potentially present within the vicinity of the study area (Section 3.2.1.4), one Barn Swallow (Threatened) was reported during the 2017 Amec Foster Wheeler field investigations. The critical habitat for species which have a moderate to high probability of occurrence within the study area are detailed below.

Barn Swallow

Before European settlement in Ontario, Barn Swallows nested mostly in caves, holes, crevices and ledges in cliff faces (COSEWIC 2011a). Although Barn Swallows continue to nest in

traditional natural habitats, they are now most closely associated with human structures in rural areas. Such nesting sites include a variety of artificial structures that provide either a horizontal nesting surface (e.g., a ledge) or a vertical face, often with some sort of overhang that provides shelter (COSWEIC 2011a). Nests are most commonly located in and around open barns, garages, sheds, boat houses, bridges and road culverts, and are situated on such surfaces as beams and posts, light fixtures, and ledges over windows and doors (COSEWIC 2011a). Barn Swallow nests are constructed of mud pellets and therefore require nest sites that have a source of nearby mud, which makes bridges and large culverts ideal sites for nesting (COSEWIC 2011a). Barn Swallows typically select foraging sites close to open habitats such as farmlands of various descriptions, wetlands, road rights-of-way and large forest clearings (COSEWIC 2011a). Barn Swallow is listed as Threatened provincially and are, therefore, protected under the ESA.

The secondary source review indicated records of Barn Swallow in the vicinity of the study area. The Project study area provides some suitable open foraging habitat for the Barn Swallow, including open meadows, agricultural fields, and fallow roadside areas. There are limited suitable bridge or culvert nesting sites within the study area, but there are potential nesting sites on various out-buildings and barn structures within the study area. Within the study area, 49 individual Barn Swallows were recorded at 17 breeding bird survey locations during the field investigations. It is likely some of these observations are recounts from neighbouring survey stations as well as from previous rounds of surveys. Given that this species was observed and that suitable foraging and nesting habitat exists on site, there is high potential for this species to be utilising the site to carry out life processes.

Bobolink

Prior to European settlement, the Bobolink nested in the tall-grass prairie of the mid-western U.S. and south central Canada; however, the conversion of much of the forested land to agricultural forage crops (e.g., hayfields and pastures) throughout the majority of southern Ontario and parts of northern Ontario has provided abundant habitat for this species. As such, Bobolinks in Ontario nest primarily in forage crops (e.g., hayfields and to a lesser extent pastures) dominated by species such as timothy, Kentucky bluegrass, orchard grass, and smooth brome. Hayfields and meadows dominated by broad-leaved flowering plants, such as clover, alfalfa or wild carrot (but containing lower proportions of grass species) are less commonly used. These hayfields provide grasses used for nesting, feeding, and seeking cover to escape from predators and poor weather conditions (i.e., excess cold, wind, rain, and sun). Bobolinks are moderately area-sensitive, preferring habitat patches greater than 10 ha (Herkert 1991), and are most likely to nest in fields surrounded by other open habitats as opposed to forested areas (COSEWIC 2010a). The Bobolink is listed as Threatened provincially and are, therefore, protected under the ESA.

Bobolink have been recorded numerous times within the NHIC natural heritage square and within the 10x10km breeding bird atlas square which encompasses the study area. There are several agricultural fields in the study area that could provide suitable habitat if used for hay, however during 2017 Amec Foster Wheeler field investigations, there was very limited suitable habitat for this species within the study area. As agricultural management practices affect the availability of breeding habitat for this species, surveys during breeding season would be required to update the extent of local populations and suitable habitat in a given year.

Eastern Meadowlark

Eastern Meadowlarks prefer grassland habitats, including native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows and airfields (COSEWIC 2011b). In hayfields, Eastern Meadowlarks prefer older sites due to the availability of moderately tall (25 to 50 cm) grass with abundant litter cover, a high proportion of grass, moderate to high forb density, low shrub and woody vegetation cover and low percent cover of bare ground (COSEWIC 2011b). As such, perpetual hayfields are preferred over hayfields converted regularly (yearly) to row crops (i.e., part of a crop rotation). In addition, Eastern Meadowlark habitat is often associated with grassy hedgerows (with scattered perch sites for singing) surrounded by other open habitat. Eastern Meadowlarks are moderately area-sensitive preferring larger tracts of grasslands over smaller fragments, they exhibit high site fidelity and breeding densities are positively associated with grassland area; the minimum area required is estimated at 5 ha (COSEWIC 2011b). Territory sizes are variable across the species range, but generally vary from 1.2 to 6.0 ha (Hull 2003). Eastern Meadowlark is listed provincially as Threatened and is, therefore, protected under the ESA.

Eastern Meadowlark have been recorded numerous times within the NHIC natural heritage square and within the 10x10km breeding bird atlas square which encompasses the study area. There are several agricultural fields in the study area that could provide suitable habitat if used for hay; however, during 2017 Amec Foster Wheeler field investigations there was very limited suitable habitat for this species within the study area. As agricultural management practices affect the availability of breeding habitat for this species, surveys during breeding season would be required to update the extent of local populations and suitable habitat in a given year.

Mammals

Through a review of the mammal atlases available online, the Bat Conservation International (BCI 2017) database and available range maps, it was determined that four bat SAR have the potential to exist within the Project area, including Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-coloured Bat. Habitat suitable for bat maternity roosting is very limited within the Project study area; though habitat suitable for foraging is present. Further details regarding the suitability of the habitat on site in providing suitable habitat for SAR bats are provided below.

Eastern Small-footed Myotis

While some are found in caves/mines of eastern North America, they generally roost on the ground under rocks and in crevices, as well as hollow trees, in buildings and under tree bark (MNR 2011). Caves and mines are primarily used for wintering habitat. Similar habitat requirements as other Myotis species. There is very limited potential maternal roost habitat present in the limited areas of woodland habitat on site though the agricultural fields, cultural meadows and wetlands provide foraging opportunity for this species.

Little Brown Myotis

Little Brown Myotis are cavity roosting bat species that hibernate in Ontario. The Little Brown Myotis was listed as Endangered in February 2012 by COSEWIC and was subsequently listed as Endangered in October 2012 by COSSARO thereby receiving protection as a SAR under the *Endangered Species Act*. Little Brown Myotis feed over open bodies of water, the margins of waterbodies and forests, in clearings and along open forest roads (COSEWIC 2013c). The forests, wetlands and residential areas provide ample suitable maternal roost habitat within the study area.

Northern Myotis

Northern Myotis are cavity roosting bat species that hibernate in Ontario. Similar to Little Brown Myotis, Northern Myotis was listed as Endangered in February 2012 by COSEWIC. This species was listed as Endangered in October 2012 by COSSARO thereby receiving protection as a SAR under the *Endangered Species Act*. Northern Myotis is a generalist in terms of foraging habitat and show no preference for over water versus over land sites, edge versus non-edge sides, areas with versus without canopy enclosures, or urban versus rural environments (COSEWIC 2013c). There is very limited potential maternal roost habitat present in the limited areas of woodland habitat on site though the agricultural fields, cultural meadows and wetlands provide foraging opportunity for this species.

Tri-colored Bat

Within treed habitats, Tri-colored Bat primarily roosts in tree foliage (mainly within oak leaves). Leaf roosts are shaped like umbrellas with a "roof" and a hollow core where bats rest. Studies have shown that oak leaves are a preferred roost site. Maple leaves are also selected, although less commonly. It is thought that Tri-colored Bat may prefer roost trees in more open woodlands, as opposed to deep woods. Roosts in tree cavity are used less frequently than Myotis species (BCI 2017; COSEWIC 2013c). There is very limited potential maternal roost habitat present in the limited areas of woodland habitat on site though the agricultural fields, cultural meadows and wetlands provide foraging opportunity for this species.

Reptiles and Amphibians

No Threatened or Endangered reptiles or amphibians were observed, or have a moderate/high probability of occurring in the vicinity of the Project study area.

Plants

Amec Foster Wheeler field investigation reported a Butternut within the study area near the north end of the Project area (Figure 3-3). Butternut is designated as Endangered both provincially and federally. Butternut often grows alone or in small groups in deciduous woodlots and riparian areas (COSEWIC 2003; MNRF 2017c). This species prefers moist, well drained soils or well-drained gravel substrates. It is possible that other individuals exist within the same woodlot. As this area west of Highway 410 and north of the Highway 410 Etobicoke Creek crossing will not be directly impacted by the Project activities, the woodlot was not surveyed extensively.

3.2.2.4 Significant Natural Heritage Features

Significant Woodlands

Peel Region has several criteria to designate significant woodlands. These include, but are not limited to size, age, supporting significant species, and proximity to other significant features (Region of Peel 2016). Based on the criteria structure presented in the Region of Peel Official Plan (2016), designation as a 'Core Woodland' and a 'Natural Area and Corridor Woodland' are mutually exclusive.

Portions of six woodlands are within the Project study area. Table 3-3 contains brief descriptions of these woodlands, including which ELC types they contain within the study area, woodland size, and the criteria used to designate them significant woodlands. Based on the Peel Region criteria, three woodlands are designated as significant 'Core Woodlands' and three woodlands are designated as significant 'Natural Area and Corridor Woodland' (Figure 3-2). However, as field investigations were limited to the boundaries of the study area; it is important to note that the extent of each wooded area (delineated in MNRF's Land Information Ontario database) may not be consistent with the classification identified in this report (e.g., SAR may be present outside of the study area within the boundary of a woodland).

Please refer to figure 11 "C-1 Constraints Development" and figure 12 "Landowners Framework Plan" from the approved March 2019 EIS/EIR for information regarding the boundaries of the significant woodlands.

Table 3-3: Significant Woodlands within the Study Area

Woodland ID ELC and Location within the Study Area	Category and Definition			
	Core Woodland Criteria			Natural Area and Corridor Woodland Criteria
	Size	Age	Significant Species	Proximity
	• ≥ 16 ha in a Rural System	• ≥ 4 ha • ≥ 0.5 ha native trees • > 100 years	• ≥ 4 ha size • any G1, G2, G3, S1, S2 or S3 species • any Threatened, Endangered, or Special Concern species	• ≥ 0.5 ha • Within 100m of another significant feature.
Woodland 1 FODM9-4, FOMM9-1, SWDM2-2 In fields between McLaughlin and Chinguacousy Roads.	8.5 ha	Unknown	Wood Thrush and Eastern Wood-Pewee both Special Concern under the ESA.	PSW contained within the woodland.
Woodland 2 FODM7-2, SWDM3-3 Southeast end of study area adjacent to subdivision.	8.4 ha (bisected by railway tracks)	Unknown	None confirmed present.	PSW contained within the woodland.
Woodland 3 FODM4-10 North side of Spine Road right-of-way, in fields between Highway 410 and McLaughlin Road.	3.8 ha	Unknown	None confirmed present.	PSW contained within the woodland.
Woodland 4 FODM5-2 Eastern limit of study area behind subdivision.	17.6 ha	Unknown	None confirmed present.	Not present.
Woodland 5 FODM4-10 North east limit of study area.	10.2 ha	Unknown	Butternut present designated Endangered by COSEWIC and COSSARO.	PSW contained within the woodland and within 100 m of a National Area and Corridor Woodland (i.e., Woodland 6).
Woodland 6 **FODM7-7** North east limit of study area.	2.1 ha (bisected by a private driveway)	Unknown	None confirmed present.	Within 100 m of a Core Woodland (i.e., Woodland 5)

* Note: Shaded cells indicate that criteria has been met.

Significant Wildlife Habitat

Seasonal Concentration Areas

Seasonal concentration areas are those habitats where large numbers of a single species or many species congregate at one (or several) times a year. The SWH Criterion Schedules for Ecoregion 6E outlines 14 wildlife habitats meeting the criteria for seasonal concentration areas of Animals. Based on habitats and ecosites documented during field investigations, four candidate significant seasonal concentration areas are present within the Project study area, including raptor wintering areas, bat maternity colonies, turtle wintering areas, and colonially nesting bird breeding habitat (trees/shrubs).

Raptor wintering areas typically consist of a mix of open fielded habitat and forested habitat that provide roosting, foraging and resting habitats for wintering raptors. Fielded and forested habitats must be of a large enough size (>15 ha for field meadow habitat, >20 ha for forested habitat). There is a mix of forest communities (i.e., FODM, FOMM) and upland communities (i.e., CUM, MEG, THDM, SVDM) within the study area. Through a desktop review, these areas are observed to continue beyond the study area and are of considerable size. As such, the effects of the proposed works to potential raptor overwintering areas should be considered.

The locations and site characteristics of bat maternal colony habitats are poorly known (MNRF 2015). In Ontario, bats use two strategies for roosting during the day. Most species roost in small spaces or crevices found in loose bark, hollow trees, rock faces and human structures such as attics, walls and bat boxes and colony numbers may range from a few to hundreds of individuals. During the summer, females often roost in large maternity colonies while males tend to roost in small groups or individually (MNR 2011). Maternity colonies are characterized by large diameter (>25 cm diameter at breast height) with >10/ha. Other bat species roost in foliage in small groups or individually very high up in the tree canopy and as such are often difficult to detect. The presence of multiple forest communities in the Project study area suggests this habitat may be present. Large diameter trees were not observed during field surveys; however, only small portions of the woodlots fell within the study area and they were not surveyed extensively. The areas of woodlot outside the study area could contain large trees so the presence of potential bat maternity colony habitat could not be fully ascertained.

Turtle over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen, deeper rivers or streams with current can also be used. These areas may support congregations of turtles if over-wintering habitats are limited (MNRF 2015). There is one area within Etobicoke Creek, in the north east of the study area, which exhibits ponding and slow flows. Several turtle species which have been recorded in the vicinity of the Project study area (Snapping Turtle, Northern Map Turtle) may overwinter in the slow moving waters of Etobicoke Creek.

Colonially nesting bird breeding habitat (trees/shrubs) provides nesting areas for heron species such as the Great Blue Heron. Only one Great Blue Heron was observed during field investigations flying over the study area; the species was not observed using that available habitats and no nests of this species were observed. Deciduous swamp habitat (i.e., SWDM2-2,

SWDM3-3) are found within the Project area which provides colonially nesting breeding habitat for this species (OMNRF 2015) though due to only one individual heron being observed flying over the study area, it is unlikely nesting colonies are present within the study area.

Specialized Habitat of Wildlife

Specialized habitat for wildlife are those microhabitats that are critical to a species or several species. The SWH Criterion Schedules for Ecoregion 6E outlines eight wildlife habitats meeting the criteria for specialized habitat for wildlife. Based on habitats and ecosites documented during field investigations, two candidate significant specialized habitat for wildlife are present within the Project study area, including waterfowl nesting areas and amphibian breeding habitat (woodland).

Waterfowl nesting areas are typically upland areas within 120 m of a wetland. Upland areas should be at least 120 m wide to reduce potential for predators to find and predate nests (MNRF 2015). Given the presence of deciduous swamp habitats on site (i.e., SWDM2-2 and SWDM3-3) as well as adjacent upland areas including forest and fielded habitat/agricultural areas, there is potential that waterfowl nesting areas are present on site. As such, the proposed Project should take into account these sensitive areas and avoidance, protection and mitigation measures should be implemented as required to minimize impacts of the proposed works to this habitat.

Amphibian woodland breeding habitat may occur in any treed ecosite supporting permanent and/or vernal woodland ponds. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat (MNRF 2015). The presence of moist forest and deciduous swamp communities in the Project study area (SWD2-2, SWDM3-3, FODM7-2, FODM7-7, and FODM9-4 ecosites) suggests this habitat may be present and vernal pooling and flooding was present in some of the habitats visited.

Habitat for Species of Conservation Concern

Habitat for species of Conservation Concern includes wildlife habitats that are rare in southern Ontario and habitats for those species that are not afforded protection under the provincial ESA (e.g., special concern species, provincially rare species - low S-ranking species). The SWH Criterion Schedules for Ecoregion 6E outlines five wildlife habitats meeting the criteria for habitat for species of conservation concern.

Based on habitats and ecosites documented during field investigations, only Special Concern and rare wildlife species habitats are present. Fifteen species of Conservation Concern, not afforded protection under the provincial ESA, were recorded during the site investigations, identified through secondary sources, and/or were documented as potentially occurring through consultations with the MNRF (Table 3-4).

Table 3-4: Species of Conservation Concern Recorded within the Project Study Area

Species Common Name	Scientific Name
Black-crowned Night-heron	*Nycticorax nycticorax*
Caspian Tern	*Hydroprogne caspia*
Common Nighthawk	*Chordeiles minor*
Eastern Wood-Pewee[1]	*Contopus virens*
Grasshopper Sparrow	*Ammodramus savannarum*
Great Egret	*Ardea alba*
Hooded Warbler	*Setophaga citrina*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Short-eared Owl	*Asio flammeus*
Wood Thrush[1]	*Hylocichla mustelina*
Western Chorus Frog	*Pseudacris triseriata*
Northern Map Turtle	*Graptemys geographica*
Snapping Turtle	*Chelydra serpentina*
Eastern Milksnake	*Lampropeltis triangulum*
Monarch	*Danaus plexippus*

[1] Species was observed during 2017 Amec Foster Wheeler field investigations

Black-crowned Night-heron

Black-crowned Night-heron prefer various types of wetland including, marsh, swamp, lake, ponds, rivers and even wet agricultural fields. They feed in aquatic habitat and roost in terrestrial vegetation (Cornell Lab of Ornithology 2015). This species is provincially ranked S3B, S3N. No Black-crowned Night-heron were observed within the study area. Suitable habitat is limited within the study area so there is a low probability this species would use habitats within the study area to carry out its life processes.

Caspian Tern

In Canada, Caspian Tern are associated with habitats near water; marshes, island in lakes, rivers and shorelines (Cornell Lab of Ornithology 2015). This species is provincially ranked S3B. This species may travel or forage over the study area though no suitable nesting habitat is present.

Common Nighthawk

Common Nighthawks nest in a wide range of open, vegetation free habitats including dunes, beaches, recently cleared forests, grasslands, pastures, peat bogs, marshes, lakeshores and river banks (COSEWIC 2007b). This species is listed provincially under the ESA as Special Concern. This species may forage over the study area but very limited suitable nesting habitat for Common Nighthawks occurs within the study area, there is a low probability this species would use habitats within the study area.

Eastern Wood-Pewee

In Ontario, Eastern Wood-Pewee largely inhabits deciduous or mixed forests. This species is not area sensitive and will inhabit both small woodlots and large undisturbed forests. Nests are positioned near forest edges, clearings or water. This species is not known to be sensitive to fragmentation, though no studies have compared reproductive success to habitat size (Blake and Karr 1987; Robbins et al. 1989; Freemark and Collins 1992). This species is listed provincially under the ESA as Special Concern.

Eastern Wood-Pewee were identified within the study area during field investigations; surveys recorded singing males a total of 3 times at 2 point counts. Due to the proximity of these points it is likely there were a total of two males recorded with one record being a duplicate from the neighbouring point. Findings from the vegetation surveys found occasional forested habitats on site that would be suitable for breeding and nesting by this species (i.e., FODM4-10, FODM5-2, FODM7-2, FODM7-7, FODM9-4, and FOMM9-1). As the Eastern Wood-Pewee is not area sensitive, the fragmented forested areas available within the study area may provide suitable habitat for this species.

Grasshopper Sparrow

The Grasshopper Sparrow is a grassland species which will nest in hayfields, pastures and occasionally agricultural grain fields (MNRF 2017c). This species prefers large habitats greater than 5 ha in size (COSEWIC 2013b). Grasshopper Sparrow is listed provincially under the ESA as Special Concern. Suitable habitat for this species is not present in size required to support the species within the study area. As such, there is a low probability that this species is utilizing the site.

Great Egret

Great Egrets use various types of wetlands and breed in mixed waterbird colonies in trees or shrubs near wetlands or waterbodies. They will hunt in smaller wetlands such as streams, rivers and ponds (Cornell Lab of Ornithology 2015). This species is provincially ranked as S2B. No Great Egrets were observed during field investigations and no suitable habitat exists within the study area, as such, there is a low probability that this species is utilizing the site.

Hooded Warbler

Hooded Warblers generally nest in shrubby understories in open deciduous or mixed forests. Nests are often in forest gaps or selectively logged areas (COSEWIC 2012a). This species is ranked federally as Threatened but is not listed provincially. Findings from the vegetation surveys found occasional forested habitats on site that could be suitable for breeding and nesting by this species (i.e., FOD4-10, FODM5-2, FODM7-2, FODM7-7, FODM9-4, FOMM9-1) though only small edges of these forested communities fall within the study area. As such, there is a low probability that Hooded Warblers are utilizing the study area for their life processes.

Short-eared Owl

Short-eared Owl Warblers generally nest in open habitats such as grasslands and marshes and occasionally agricultural fields (COSEWIC 2008a). This species is listed provincially under the ESA as Special Concern. Findings from the vegetation surveys found very limited suitable habitat for this species, though agricultural management practices could affect the availability of breeding habitat for this species. As such, there is a low probability that this species is utilizing the site.

Red-headed Woodpecker

Preferred habitat of this woodpecker includes open woodlands, riparian habitat and oak savannah; oak and American Beech are preferred foraging trees. The presence of this species depends largely on the presence of suitable foraging trees as well as an abundance of cavity trees which are used as nesting sites (COSEWIC 2007c). Anthropogenic habitats will also be utilised such as orchards, pastures, urban parks and golf courses. The Red-headed Woodpecker is listed under the ESA as Special Concern.

During field investigations, no Red-headed Woodpeckers were identified within the study area. Based on vegetation surveys, very limited open woodland and riparian habitats areas are present which may provide foraging habitat for this species. Due to the variability of habitats utilised by this species and the presence of these habitats onsite there is a moderate probability of this species using the study area for its life processes.

Wood Thrush

Wood Thrush breed in mature or second growth deciduous and mixed wood forests (COSEWIC 2012c). They prefer forests with dense understory and large continuous areas of forest however they are not reliant on this. Habitat fragmentation due to human development and over grazing by White-tailed Deer are the main threats to this species (COSEWIC 2012c). Wood Thrush are listed under the ESA as Special Concern.

Wood Thrush were identified within the study area during field investigations; single male Wood Thrush were recorded singing at 2 point counts. Due to the proximity of these points it is likely this was the same bird heard from neighbouring points. Findings from the vegetation surveys found occasional forested habitats on site that would be suitable for breeding and nesting by this species (i.e., FODM4-10, FODM5-2, FODM7-2, FODM7-7, FODM9-4, FOMM9-1). As the Wood Thrush is area sensitive, the fragmented forested areas available within the study area are unlikely to provide suitable habitat for this species.

Western Chorus Frog

The Western Chorus Frog is primarily a lowland terrestrial species. In grasslands, marshes or wooded wetland areas, it is found on the ground or in low shrubs and grass. Like all other frogs, the Western Chorus Frog requires both terrestrial and aquatic habitats in close proximity. For breeding and tadpole development, it requires seasonally dry temporary ponds devoid of predators. The species hibernates in its terrestrial habitat, under rocks, dead trees or leaves, or

in loose soil or animal burrows, even though these sites are sometimes flooded (COSEWIC 2008c).

Within the study area, numerous upland habitat ecosites are present; however, wetland habitats were limited. Breeding ponds were not observed though they could be present on site earlier in the spring. As such, there is limited potential for this species to be utilizing the site to carry out life history functions.

Northern Map Turtle

Northern Map Turtles prefer rivers and lakes with shallow, soft-bottoms with emergent rocks, banks and logs for basking. This species hibernates in deep, slow-moving sections of these rivers and lakes (COSEWIC 2012b). The Northern Map Turtle is listed under the ESA as Special Concern.

Within the study area, only one small area of Etobicoke Creek meets the habitat requirements of this species though no objects for basking were observed. Due to very limited suitable habitat within the study area, there is limited potential for this species to be utilizing the site to carry out life history functions.

Snapping Turtle

Snapping Turtles prefer slow-moving waters with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges and slow streams and wetlands (COSEWIC 2008b). Individuals can also exist in developed areas (e.g., golf course ponds, irrigation canals); however, it is unlikely that populations persist in such habitats. The Snapping Turtle is listed under the ESA as Special Concern.

Within the study area, only one small area of Etobicoke Creek meets the habitat requirements of this species though no objects for basking were observed. Due to very limited suitable habitat within the study area, there is limited potential for this species to be utilizing the site to carry out its life processes.

Eastern Milksnake

Eastern Milksnakes are habitat generalists but prefer open habitats, including rock outcrops and meadows. They require suitable microhabitats for egg laying, hibernation, and thermoregulation. Eastern Milksnakes are well known for occupying barns, sheds, and houses in rural landscapes. At the landscape scale, the abundance of Eastern Milksnakes appears to correlate with regions where forest cover is relatively high (COSEWIC 2014). This species is ranked federally as Special Concern but is not listed provincially.

There are several areas of open fielded habitat were recorded during the vegetation surveys. Further to this, there are several rural residences and outbuilding suitable for the species. As such, there is potential for this species to be utilizing the study area to carry out its life processes.

Monarch Butterfly

Monarch is very widely distributed across North America and found in a wide variety of habitats. Populations fluctuate dramatically, but have been generally declining likely due to habitat destruction on the hibernation grounds in Mexico, as well as pesticide use and other factors on the vast breeding grounds. Monarchs require Milkweeds to lay their eggs, and will use a variety of other flowers for adult food (COSEWIC 2010b).

This species may be utilizing the limited habitat in ditches or small plots of undeveloped land within the study area for feeding and or egg laying. No Milkweed was observed during the field investigations but the habitats were not surveyed exhaustively.

Animal Movement Corridors

Animal movement corridors are habitats that link two or more wildlife habitats that are critical to the maintenance of a population of a particular species or group of species particularly in highly fragmented landscapes (MNR 2000; MNRF 2015). These corridor habitats serve a key ecological function to enable wildlife to move between areas of significant wildlife habitat or core natural areas with a minimum of mortality (MNR 2000; OMNRF 2015). Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNR 2000). These corridors may include valleylands, dense vegetated riparian buffer areas, and hedgerows, and are potentially used by a variety of wildlife species including migratory and breeding birds, reptiles, and amphibians. The SWH Criterion Schedules for Ecoregion 6E outlines two wildlife habitat meeting the criteria for animal movement corridor habitat. Based on a review of ecosites and wildlife present, amphibian movement corridor habitat is considered potentially present in the Project study area.

Amphibian movement corridors may be present within the study area. These corridors are found in all ecosites that potentially support significant amphibian breeding habitat. Given the Project study area has a section of Etobicoke creek, watercourses, swamps, and moist forests with vernal pools (SWDM2-2, SWDM3-3, FODM7-2, FODM7-7, and FODM9-4 ecosites) which may provide breeding habitat for amphibians, there are likely linkages between these areas on site.

4.0 PRELIMINARY IMPACT ASSESSMENT

The proposed McLaughlin Road improvements, construction of Spine Road and the Highway 410 interchange are expected to have minimal long-term impact on the natural environment due to the existing ROW and traffic in the area; however, there is potential for direct and indirect effects on the terrestrial environment during construction activities especially construction of the new east-west Spine Road. These impacts may be associated with disturbance to significant natural features (i.e., woodlands, wetland, and wildlife habitat) and flora and fauna populations.

Similarly, the impacts on aquatic communities resulting from changes to surrounding land use usually occur as a result of effects on habitat rather than direct impacts on the biotic communities. This is particularly true for headwater tributaries as reported in the Project area, where recreational fishing is not a factor (AMEC 2014). Much effort is devoted to predicting the effects of land use change on aquatic habitats and to preventing harmful effects. The various disciplines represented in previous studies in the vicinity of this Project–hydrogeology, hydrology, fluvial geomorphology, water quality, terrestrial ecology–have evaluated the ability to meet targets that are intended to protect and/or enhance aquatic habitats. Details of these evaluations are included in the *Mayfield West Phase 2 Environmental Impact Study and Management Plan* (AMEC 2014) in their respective sections.

The potential impacts specific to the candidate and known natural heritage features present within the Project study area may include:

- Loss of natural and cultural vegetation along exiting ROW, potential ROW expansion areas and the location of the new east-west Spine Road;
- Loss of pervious surfaces leading to increased runoff;
- Disturbance, damage, or harm to wildlife species protected under the MBCA, the FWCA, and/or the ESA;
- Potential Project encroachment on wetland features resulting in impacts to wetland hydrology (such as discharge and recharge potential) adjacent to the Project footprint;
- Loss of marginal habitat associated with raptor wintering activities adjacent to the Project footprint. May result in decreased roosting areas, foraging perches, and prey populations along the roadside edges;
- Loss and disturbance to bat maternity colonies through destruction and/or noise disturbance in forested habitats/treed areas within and adjacent to the Project footprint;
- Increased human presence near bat maternal roost sites may cause females to drop young for their protection or abandon young altogether if stressed;
- Increased sediment runoff associated with road construction and maintenance activities may introduce sediment or other deleterious materials to downstream watercourses, waterbodies, and/or wetlands;
    - Contaminants entering downstream waterbodies may reduce their viability in providing overwintering habitat to turtle species;

    - Contaminants entering downstream watercourses (specifically Etobicoke Creek or Fletchers Creek) or the associated wetlands (Figure 3-1) may impact fish species which have been identified by TRCA as being of conservation concern due to their sensitivity to habitat alteration, chemical pollution, siltation, and increased flow velocities (AMEC 2014); and
    - Thermal impacts to headwater tributaries providing contributing habitat to Redside Dace.

- Potential increased noise and light disturbance to wildlife adjacent to the Project footprint;
- Potential increased dust generation and deposition on vegetation resulting in effects on photosynthesis, respiration, and transpiration;
- Potential increase in invasive species colonization within disturbed areas;
- Potential changes in water quality within the Project study area that may adversely impact waterfowl nesting habitat;
- Increased road mortality on birds, turtles, and amphibian associated with construction vehicles, increased road width, and increased traffic flows;
- Potential loss of amphibian breeding habitat adjacent to the Project footprint. Impacts may also include increased sedimentation and reduced water levels of wetland areas, which may lead to changed composition of pond substrate and nutrients;
- Potential impacts to amphibian breeding habitat and movement corridors through loss of tree cover and increase vehicle traffic; and
- Potential for direct loss of habitat for species of Conservation Concern. The footprint of the Project along with associated shoulders, banks, and ditches will result in loss of habitat. Indirect loss of habitat may occur through changes in hydrology, introduction of non-native plant species, introduction of sediments and other contaminants, and salt spray and runoff.

The potential Project impacts discussed above should be further evaluated during the detailed design stage for the Project. The intent of this preliminary effects assessment is to only provide considerations for further effects evaluation based on significant natural features present within the Project study area, environmental consideration relative to road widening and construction projects, and regulatory considerations for wildlife protected under various federal and provincial legislation.

5.0 PRELIMINARY ENVIRONMENTAL MITIGATION MEASURES

The following list includes preliminary mitigation measures relative to potential direct and indirect effects identified in Section 4.0. Recommended design consideration and general mitigation measures are as follows:

- Temporarily store, handle and dispose of all materials used or generated (e.g., organics, soils, construction waste and debris, etc.) during site preparation, construction, and clean-up in a manner that prevents their entry to nearby drainage features;
- Apply standard erosion and sediment control (ESC) measures (e.g., silt fence, silt curtain, sedimentation basins) consistent with Ontario Provincial Standards and Specifications (OPSS), to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment;
    - ESC measures should be implemented prior to commencement of works, and maintained through all phases of the Project, until vegetation is re-established or all disturbed ground is stabilized by erosion protection materials; and
    - The ESC plan should include: regular inspection and maintenance, specifications to meet the needs of Redside Dace habitat protection (where applicable), and removal of non-biodegradable ESC materials once the site is stabilized.
- Ensure a Spill Management Plan (including spill kit materials, instructions regarding their use, education of contract personnel, and emergency contact numbers) is present on-site at all times for implementation in the event of an accidental spill;
- Minimizing dust production to the extent practical by implementing dust suppression methods and thereby minimizing the zone of influence. Primary dust suppression methods can include road watering in cases where watering will not promote entry of chemicals in to nearby wetlands or waterways;
- Prevent introduction of new invasive species by washing down equipment prior to transporting to site and limiting travel of equipment and vehicles to and from the Project study area;
- All disturbed areas of the work site shall be stabilized and re-vegetated promptly, and/or treated with appropriate erosion protection materials;
- Disturbance and removal of existing trees and vegetation should be minimized where possible and confined to the footprint of the Project;
- In the event forest/woodland habitat requires removal for road widening, removal of habitat must occur outside critical periods for the bat species, which encompasses the summer active period of April 1 to September 30 or at least the maternity period of approximately June 1 to July 31;
- Comply with the *Migratory Bird Convention Act*, 1997 (MBCA) regulations and guidelines for vegetation clearing recommended by Environment Canada. In order to minimize the potential for incidental take of nesting migratory birds, vegetation clearing and any proposed work activities in migratory bird habitat should be undertaken outside of the

active breeding season. Clearing is to be avoided from April 1 to August 30 (as indicated for the Project area - nesting zone C2 - by ECCC), although these timing constraints should not be perceived as absolutes. This period represents the core breeding period, although some species may nest earlier or later. Ultimately, the objective from a compliance perspective is to not circumvent the MBCA. As such, due diligence measures should be implemented and documented for any nest searching efforts, including record control, to ensure compliance with the MBCA. If clearing (or other work) in migratory bird habitat is required during the active breeding season, a nest survey must be conducted by a qualified avian biologist immediately (i.e. within 2 days) prior to commencement of the works to identify and locate active nests of species protected under the MBCA;

- Road widening should be designed so that there are no barriers to herpetiles moving between significant habitats. Suitable ecopassages may be required to allow movement (see Section 6.0 for further discussion);
- Where possible, the installation of roadside ditches are culverts should be avoided to minimize impacts to wetland habitat;
- Vertical facings suitable for nesting by bird species (i.e., soil piles, excavation areas) should be covered using tarps, or plastic sheets, or any other means of preventing nesting within the construction zone. Such barriers should be installed prior to April 1 and shall remain in place until August 30, or until the completion of rehabilitation works. Alternatively, vertical facings should be maintained daily at a 45° angle or less to deter nesting;
- Where feasible, works will be conducted during daylight hours, unless otherwise necessary, to avoid potential effects of artificial night lighting on crepuscular and nocturnal species;
- Minimize sources of unnecessary noise or encroachment of worker activities into nearby habitats in order to limit the extent of the Project zone of influence when possible;
- All heavy equipment and tools used on-site shall be maintained in good working condition;
- Construction personnel shall avoid idling of vehicles when not necessary for construction activities;
- Equipment and vehicles shall be turned off when not in use unless required for construction activities and/or effective operation; and
- The MNRF should be consulted to gain further direction relative to any technical and process requirements under the ESA, and to obtain guidance on any additional mitigation measures that may be required during construction and operation phases of the Project.

The approved Mayfield West Phase 2, Stage 1 EIS/EIR includes Figure 8, which is the Features Based Water Balance summary and figure for the “Southeast Wetland (TRCA)” in section 5.6.3.3. The EIS/EIR includes a summary of the Headwater Drainage Feature Assessment for the secondary plan area, and Appendix B of the report which is the headwater drainage feature classification map

6.0 CONCLUSIONS AND RECOMMENDATIONS

The majority of the study area is developed lands in the form of residential and agricultural buildings with a high concentration of agricultural fields. As such, the majority of lands to be impacted by the proposed Project have been created by human disturbance and are classified as cultural. Additionally, existing vegetative communities were found to contain a relatively high proportion of non-native and invasive plant species. Project activities may result in disturbance in the form of exhaust emissions, dust, and vegetation removal. General construction mitigation measures should be employed to minimize impacts.

With respect to the aquatic environment, the impacts of infrastructure (roads, sewers, water supply) crossings of watercourses are largely mitigatable and significant impacts to aquatic habitat as a result of the proposed works are not anticipated. Applying standard mitigation measures will reduce the risk of impacting contributing habitat to Redside Dace at the drainage features at locations C1 through C8, T1, and T2 (Figure 1-2a). MNRF and DFO should be consulted during the planning and design phases so that risks can be prevented and mitigated to the extent possible in compliance of the ESA and SARA, respectively. A DFO Request for Review should be submitted for the project during Detailed design, as Redside Dace are federally-protected, and the installation of culverts would trigger a review process. However, federally, contributing habitat to Redside Dace is not regulated.

There are areas of PSW throughout the study area within the woodlots and along Etobicoke Creek. These wetlands are part of the larger Etobicoke Creek Headwater Wetland Complex and Upper Fletchers Creek Wetland Complex. The treed areas associated with these PSWs are also designated Significant Woodlands. These woodlands are a relatively significant feature in context of the Project area landscape. The severe fragmentation limits suitable interior forest habitat and speaks to the limited functionality of these lands as wildlife habitat however they are a relatively significant feature in context of the Project area landscape. These ecosites have the potential to host features such as vernal pools, standing snags, and deadfall/logs, which are excellent sources of wildlife habitat as well as potentially providing wildlife corridors and linkages to habitats outside the Project area. Woodlots, both natural and cultural, should be delineated and marked in the field prior to construction so that disturbance to these areas can be minimized or avoided. Potential causes for disturbance include: placement of lay down areas, vegetation removal/trimming, and other disruptive activities all of which will be considered during Detail Design.

Where possible, the Town should mitigate effects of the Project on barriers to wildlife movement from culvert and bridge extension, repair or replacement. Further investigation of wildlife passage at new and modified culverts and bridges should be completed during Detail Design to ensure there are no significant impacts. The key objectives of this assessment are to maintain existing passage opportunities. The Ontario Ministry of Transportation (MTO) provides guidelines and recommendations for facilitating wildlife movement and maintaining ecological integrity during highway planning (MTO 2006; MTO 2015).

Wildlife passage across crossing structures is influenced by a wide variety of factors, including culvert height, culvert width, light penetration, ground cover, nearby habitat, noise conditions, and the presence of watercourses (Donaldson 2005; Sott 2012; Foresman 2003; Jackson 2003;

Reed et al. 1997; MTO 2006; MTO 2015). Different factors tend to affect some species more than others and some species may prefer conditions that prevent crossing by others. For example, crossings designed for snakes include grates which allow for more sunlit crossings (Jackson 2003), whereas specialized rodent and salamander crossings consist of narrow pipes which reflect the darker, more confined surroundings preferred by these species (Cavallaro et al. 2005). Knowledge of how crossing orientation, substrates, hydrologic conditions, and surrounding habitat influence passage by various wildlife groupings can inform the relative pre-construction diversity and frequency of animal passage through each culvert.

Standard drainage culverts of a diameter of 1.0 m to 1.5 m may be adequate for medium-sized animals, whereas those with a diameter of 0.5 m to 1.0 m are likely adequate for small animals (MTO 2015). McDonald and St. Clair (2004) found that small mammals used structures that were 0.3 m to 3 m in diameter and, in other studies, a cross-sectional area of 2 to 4 square feet (0.2 to 0.4 m^2) for the structure entrance has been recommended (Clevenger and Huijser 2011, Goosem et al. 2001). Generally, the literature advises that smaller cross-sectional areas and openness ratios are more appealing for small animals (Clevenger and Huijser 2011).

'Openness ratio' is a measure of the "see thoroughness" of a wildlife crossing feature and takes into account the straight-line length of the crossing. The 'openness ratio' is expressed as "the ratio between the cross-sectional area of the structure opening and the length of the structure that must be traversed by wildlife" (MTO 2006). Despite inconclusive applicability of 'openness ratio' for small wildlife such as rodents and reptiles, openness thresholds for different animal size-classes that have been used for other roadway projects have included the following (Gunson and Seburn 2010):

- 0.05 for smaller wildlife species that are adapted to nocturnal and/or tunnel like conditions
- 0.1 for common reptiles and amphibians
- 0.25 movement corridors for turtles

The openness ratio of each culvert will change at an inverse proportion to the change in crossing length. Where crossing length increases, a smaller openness ratio may continue to favor passage by small animals that prefer darker, narrower crossings.

Favorable vegetation structure and availability of cover are also known to contribute to crossing use by wildlife (Clevenger and Huijser 2011). McDonald and St. Clair (2004) found that vegetation cover was significantly more important than structure dimension in determining frequency of use by small mammals. Small mammals will use a variety of underpass designs as long as the vegetation and substrate cover is sufficient. Vegetation restoration applications after execution of the Project will promote conditions that allow wildlife to easily find and enter the culvert openings if required.

Mitigation measures in the form of wildlife crossing specifications will be applied to each culvert based on the ecological characteristics of the crossing feature location. Please refer to section 10.1.8 "Road Crossings" and Figure. 19 "IP-1 Implementation Principle for the Natural Heritage System" within the approved March 2019 EIS/EIR, which addresses the terrestrial connectivity

and location of the at-grade wildlife crossings. In addition to 'openness ratio' or minimum crossing height, a variety of other wildlife crossing specifications may be implemented to optimize the effectiveness of wildlife passage. Such specifications include the use of vegetation placement at culvert inlets and outlets to create a funnelling effect, and providing suitable substrates to encourage crossing by a variety of species. Improving passage can also include removing crossing barriers, such as culvert grading, log jams or fencing in the vicinity of the culvert inlet and outlet.

Two wildlife crossings of the Spine Road have been identified by the Urbantech team. Currently the TRCA/CVC have requested that both at grade and below grade crossings be considered. Urbantech anticipates that given the planned development grades, at grade crossings will be required.

Within the Fletchers Creek subwatershed, of primary concern is the presence of occupied Redside Dace habitat downstream of the Project area. Correspondence from MNRF (Appendix A) specified that some of the Fletchers Creek tributaries within the vicinity of the Project will be contributing habitat for Redside Dace. As recommended by MNRF, the *Comprehensive Fisheries Compensation Plan Addendum* for Block 51-2, Mount Pleasant North West Brampton (Savanta et al. 2016) has been reviewed as supporting documentation. For further information on the definition of habitat, with respect to Redside Dace, refer to Section 29.1 of O. Reg. 242/08 under the *Endangered Species Act, 2007*.

At this time, contributing habitat does not require an Overall Benefit authorization; however, the MNRF will likely provide a Letter of Advice. Ongoing consultation with the MNRF and DFO will be required to ensure the appropriate Redside Dace permitting/clearance are acquired under the ESA and SARA, respectively, and suitable mitigation measures specific to Redside Dace contributing habitat are implemented. Additionally, consultation with MNRF will be required to ensure that any newly regulated SAR potentially interacting with the Project are considered.

7.0 CLOSURE

This existing condition report has been prepared based on a review of secondary source information, agency consultations, and field investigations and is based on the proposed Project footprint at the time of the report. This existing condition report is intended to support detailed design and should be used for focusing future field investigations relative to significant natural heritage features within the footprint of the Project. This report does not include any process requirements relative to the ESA and/or further consultations with the MNRF to ensure compliance with the ESA. This report is intended to guide further consultations with the MNRF relative to SAR and to support further SAR surveys, if required.

Regards,
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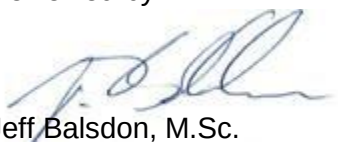

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APPENDIX A

CORRESPONDENCE

Ministry of
Natural Resources
and Forestry
Aurora District Office
50 Bloomington Road
Aurora, Ontario L4G 0L8

Ministère des
Richesses naturelles
et des Forets

Telephone: (905) 713-7400
Facsimile: (905) 713-7361

Ontario

February 6, 2017

Erin Hellinga
Environmental Biologist
Amec Foster Wheeler
900 Maple Grove Road, Unit 10
Cambridge, ON N3H 4R7
519-650-7132
Erin.hellinga@amecfw.com

Re: McLaughlin Road and Spine, Caledon

Dear Erin Hellinga,

In your email dated January 12, 2017 you requested information regarding the above location.

Species at risk recorded in the vicinity include Butternut (endangered), Redside Dace (contributing habitat to occupied habitat in Fletchers Creek south of Wanless Drive), Barn Swallow (threatened), Bobolink (threatened), Eastern Meadowlark (threatened), Eastern Wood-pewee (special concern) and Wood Thrush (special concern). There is potential for endangered bats (i.e., Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-colored Bat) in cavities.

Absence of information provided by MNRF for a given geographic area, or lack of current information for a given area or element, does not categorically mean the absence of sensitive species or features. Many areas in Ontario have never been surveyed and new plant and animal species records are still being discovered for many localities. Appropriate inventory work is needed depending on the undertakings proposed. Approval from MNRF may be required if work you are proposing could cause harm to any species that receive protection under the *Endangered Species Act 2007*.

Species at risk information is highly sensitive and is not intended for any person or project unrelated to this undertaking. Please do not include any specific sensitive information in reports that will be available for public record. As you complete your fieldwork in these areas, please report all information related to any species at risk to our office. This will assist with updating our database and facilitate early consultation regarding your project.

If you have any questions or comments, please do not hesitate to contact ESA.aurora@ontario.ca or Bohdan.Kowalyk@Ontario.ca.

Sincerely,

B. Kowalyk

Bohdan Kowalyk, R.P.F.
Technical Specialist, Aurora District, Ontario Ministry of Natural Resources and Forestry

Hellinga, Erin

From: Heaton, Mark (MNRF) [mailto:mark.heaton@ontario.ca]
Sent: February-23-17 3:21 PM
To: Smith, Neal <neal.smith@amecfw.com>
Subject: RE: McLaughlin Road and the Spine Road as part of the Mayfield West Phase 2 project

Hello Neal

Some of the Fletcher's Creek tributaries will be contributing habitat for Redside Dace and regulated. See attached CFCP for Block 51-2 – Figure 4. Tributaries F22 and F22b extend north of Mayfield. F17 may also extend north of Mayfield.

Bobolink and Meadowlark areas and Butternut locations were identified in Phase 1 of Mayfield West – check the Town's mapping in their reports. This may impact the east-west connector.

Regards

Mark Heaton
OMNRF Aurora

From: Smith, Neal
Sent: January-16-17 12:08 PM
To: 'mark.heaton@ontario.ca.
Cc: Hellinga, Erin <Erin.Hellinga@amecfw.com>
Subject: McLaughlin Road and the Spine Road as part of the Mayfield West Phase 2 project

Hi Mark, was great seeing you last week.

Mark, Amec Foster Wheeler has been retained by the Town of Caledon (Kant Chawla) to complete the EA and Preliminary Design for McLaughlin Road and the Spine Road as part of the Mayfield West Phase 2 project. The

McLaughlin and Spine study area is bound by Chinguacousy Road to the west, Hurontario to the east, Mayfield Road to the south, and Old School Road to the north.

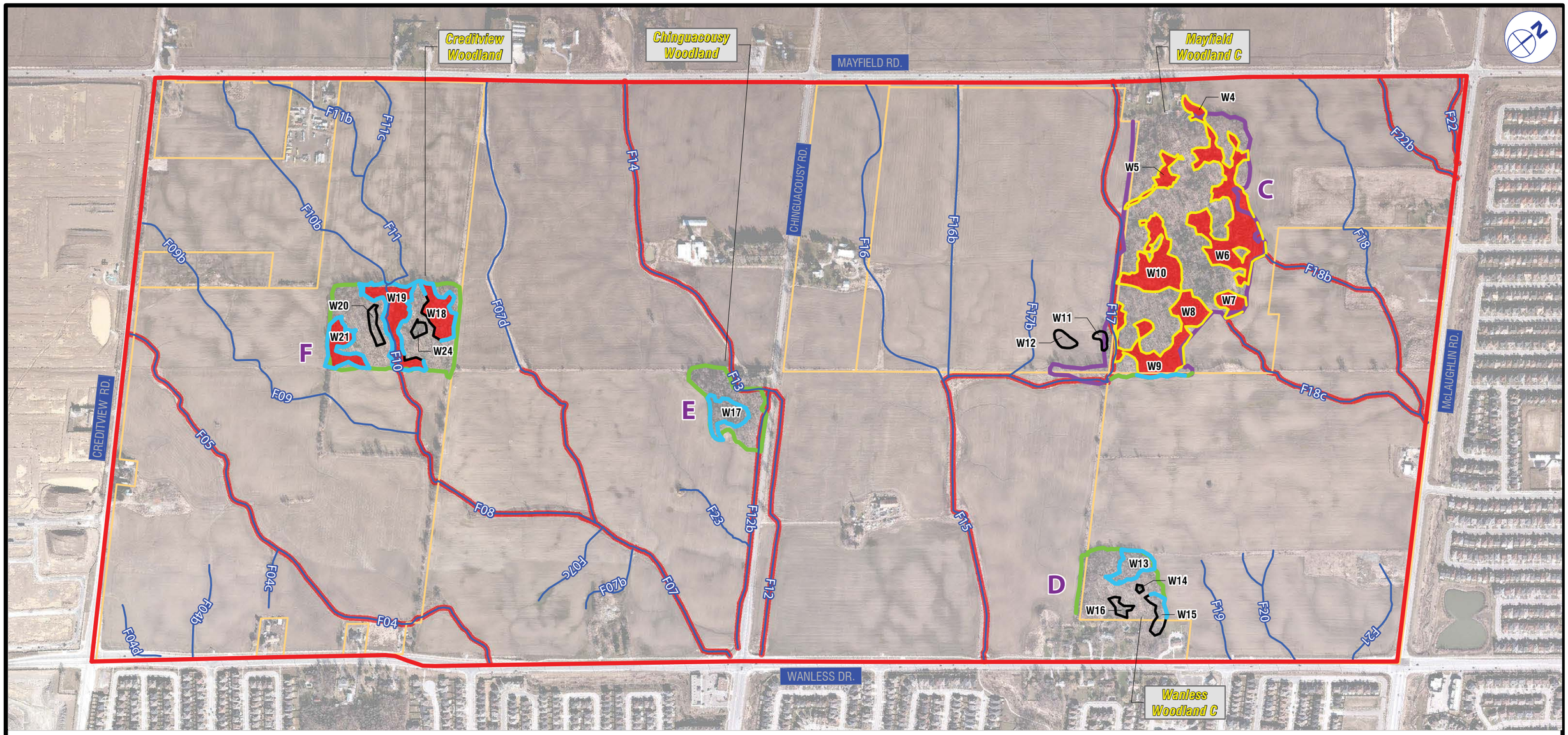
We need your input on compliance with the Endangered Species Act, 2007 as there are records of Redside Dace, Bobolink/Eastern Meadowlark, and Butternut in the vicinity of the study area. Specifically what we need to know is:

1. Are the drainage features within the study area (as shown in the figure attached to the original correspondence) considered 'contributing' Redside Dace habitat and if so, will a permit under the ESA be required for the proposed work? (Note: these features are tributaries to Fletchers Creek which is known to be 'occupied' by Redside Dace.)
2. Will permitting under the ESA be necessary for the destruction of agricultural fields which have potential to provide Bobolink/Eastern Meadowlark habitat?
3. Will a species-specific search for Butternut be required within the study area? (Note: the two wood lots on the south side of the proposed Spine Road will not be impacted.)

I've attached the original correspondence to MNRF (with a figure attached) for your reference/use. Should you require further information related to this project or if you have any questions please do not hesitate to contact me or Erin.

Thanks

Neal Smith, C.E.T
Senior Technologist, Transportation, Amec Foster Wheeler Environment and Infrastructure
3215 North Service Road, Burlington, ON L7N 3G2, Canada
T +1 (905) 335 2353 X 1223 F + 1 (905) 335 1414 M +1 (905) 220-1322
neal.smith@mecfw.com



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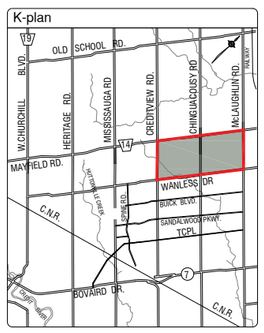

LEGEND

E **Natural System Integration Unit**

- **C** Mayfield Woodland C (W4, W5, W6, W7, W8, W9, W10, W11, W12)
- **D** Wanless Woodland C (W13, W14, W15, W16)
- **E** Chinguacousy Woodland (W17)
- **F** Creditview Woodland (W18, W19, W20, W21, W24)

- Sub-Area 51-2 Boundary
- Participating Landowners
- F15 Stream Reach
- Wetland Numbers (MNR, 2007) DRAFT West Upper Fletchers Creek Wetland
- 2009 & 2011 Agency Staked Wetlands
- 2009 & 2011 Agency Staked Woodlands
- 2012 Agency Staked Wetlands
- 2012 Agency Staked Woodlands
- Existing Redside Dace Habitat as interpreted from Ontario Regulation 242/08, 29.1(1)v (Formerly "Contributing" Habitat)

Block 51-2 CFCP Addendum

Figure 4
EXISTING REDSIDE DACE HABITAT WITHIN BLOCK 51-2

April 2016

Document Path: S:\8103 - SAV 6257 Mt Pleasant Block 51-2\GIS\mxd\2014 10 07 CFCP Figures\Figure 4 Existing Redside Dace Habitat Within Block 51-2.mxd Date Revised: April, 2016

APPENDIX B

BREEDING BIRD SURVEY POINT COUNT STATIONS

Photo 1: 2017-05-24, drainage feature C1 looking downstream.

Photo 2: 2017-05-24, drainage feature C2 looking downstream.

Photo 3: 2017-05-24, drainage feature C3 looking downstream.

Photo 4: 2017-05-24, drainage feature C4 looking downstream.

a

Photo 5: 2017-05-24, drainage feature C5 looking downstream.

Photo 6: 2017-05-24, drainage feature C6 looking downstream.

Photo 7: 2017-05-24, culvert inlet at C7a.

Photo 8: 2017-05-24, drainage feature C7b looking downstream.

Photo 9: 2017-05-24, drainage feature T1 looking downstream.

Photo 10: 2017-05-24, drainage feature T2 looking downstream.

Photo 11: 2017-05-24, drainage feature C8 looking downstream.

Photo 12: 2017-05-26, drainage feature C8 looking downstream.

Photo 13: 2017-05-24, drainage feature C8 looking upstream.

Photo 14: 2017-05-26, drainage feature C8 looking upstream.

Photo 15: 2017-05-24, drainage feature C12 looking downstream.

Photo 16: 2017-05-26, drainage feature C12 looking downstream.

Photo 17: 2017-05-24, drainage feature C12 looking upstream.

Photo 18: 2017-05-26, drainage feature C12 looking upstream.

Photo 19: 2017-05-24, drainage feature C14 looking downstream.

Photo 20: 2017-05-26, drainage feature C14 looking downstream.

Photo 21: 2017-05-24, drainage feature C14 looking upstream.

Photo 22: 2017-05-26, drainage feature C14 looking upstream.

Photo 23: 2017-05-24, roadside drainage at D1 at north end of culvert under private driveway.

Photo 24: 2017-05-24, roadside drainage at D2 looking south.

Photo 25: 2017-05-26, roadside drainage at D3, looking south

Photo 26: 2017-05-24, roadside drainage at D4, looking west.

Photo 27: 2017-05-24, roadside drainage immediately downstream of D4, looking at culvert passing under Highway 410.

Photo 28: 2017-05-24, roadside drainage at D5, looking north

Photo 29: 2017-05-24, roadside drainage at D6, looking south

Photo 30: 2017-05-24, south end of culvert at D6 which crosses under the roadway between Highway 410 and Snelcrest Drive.

APPENDIX C

TREE INVENTORY REPORT FOR THE WIDENING OF MCLAUGHLIN ROAD AND CONSTRUCTION OF EAST-WEST SPINE ROAD
(Rev A dated September 13, 2017)

Memorandum

To: The Corporation of the Town of Caledon **Date:** September 13, 2017

From: Amec Foster Wheeler Environment & Infrastructure

Ref: TPB166090

Re: **Tree Inventory Report for the Widening of McLaughlin Road and Construction of East-West Spine Road**

INTRODUCTION

Overview of Project

The Corporation of the Town of Caledon (the Town) has initiated a Schedule 'C' Municipal Class Environmental Assessment (MCEA) study, as per the *Environmental Assessment Act, 1990*, for the widening of McLaughlin Road and the construction of the new east-west Spine Road (the Project). The Project will include the update of Phases 1 and 2, which were completed as a part of the Mayfield West Phase 2 – Transportation Master Plan (MW2-TMP; Paradigm 2016) work and the completion of the remaining Phases 3 and 4. The MW2-TMP was undertaken as a part of the preparation of the Secondary Plan for development within lands north of Mayfield Road, east of Chinguacousy Road, south of the Etobicoke Creek, and west of Hurontario Street in the Town of Caledon to guide the provision of fully integrated transportation infrastructure and services. The Town carried out the MW2-TMP in accordance with the Phases 1 and 2 of the MCEA process to formulate a comprehensive transportation strategy focusing on a sustainable, connected, and pedestrian/cyclist friendly community. The MW2-TMP identifies a need for the widening of McLaughlin Road, from Mayfield Road north approximately 1,700 metres (m), and the construction of the east-west Spine Road, reaching from Hurontario Street to Chinguacousy Road.

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) has been retained by the Town to complete the Schedule 'C' MCEA study for the Project within the Secondary Plan area. The MCEA process entails:

- McLaughlin Road extending north approximately 1,700 m from Mayfield Road, generally along the current alignment; and
- An east–west Spine Road that will connect Chinguacousy Road and McLaughlin Road along with a connection to the Highway 410 interchange with Valleywood Boulevard and Hurontario Street.

Objective of Study

The objective of this study was to provide an inventory of trees including species identification and count of trees. The tree inventory study area included the right-of-way boundary of McLaughlin Road and the east–west Spine Road (i.e., 18 m beyond the project center line, as determined by the preliminary design), and the expanded study area along Highway 410 and surrounding the proposed interchange at the northeast end of the Project footprint (Figure 1).

The tree inventory has been developed to provide the technical site-specific information to support the future preparation of a Tree Compensation Plan in concordance with local Conservation Authority's guidelines.

The level of detail of the inventory is intended to support preliminary design only.

METHODOLOGY

A desktop review of available information and aerial imagery was completed prior to the tree inventory to: 1) identify previously mapped trees within the study area, 2) identify data gaps relative to tree occurrences in previously surveyed areas, and 3) identify trees requiring inventory within previously non-surveyed areas. Amec Foster Wheeler undertook the tree inventory on May 24, July 6, and July 19, 2017. All trees greater than 10 centimetres (cm) diameter at breast height (DBH) within the tree inventory study area, as defined above, were included in the inventory. The inventory included the tree location, tree species, and general information on tree health. Tree measurements were only conducted for the purposes of determining whether the tree was greater than 10 cm DBH. Previously inventoried trees were identified in the field using pre-determined geo-rectified tree field maps. The locations of trees not previously identified on the tree field maps were determined using geographic positioning systems (GPS) with an error of approximately 5 m for trees within the right-of-way.

The conditions of trees were assessed in terms of the tree's overall health. A tree was considered healthy unless obvious signs of disease, distress, or decline were noted.

RESULTS

A total of 247 trees (271 stems) were recorded within the study area, including 21 tree species, one (1) shrub species, two (2) tree species identified only to genus, and several unidentified tree snags (Table 1). All of these species are either secure/very common or non-native based on provincial, national, and global rankings (S5, N5, and G5, and SNA, NNA, GNR respectively); with the exception of White Ash (*Fraxinus americana*) which is listed provincially as apparently secure (S4; Table 1). White Ash is widespread in southern and central Ontario, but is recently declining in southwestern Ontario due to the Emerald Ash Borer (EAB; MNR, 2013). EAB was first detected in Canada in 2002 and since its arrival, has killed millions of ash trees and continues to spread into new areas with considerable economic and ecological impacts (CFS, 2013). The majority of trees surveyed in the tree inventory were determined to be healthy; however, 2 of 4 White Ash trees identified showed evidence of EAB or decline (Table 2).

Table 1: Species Identified in Tree Inventory

Common Name	Latin Name	Provincial S-Rank[1]	National N-Rank[2]	Global G-Rank[3]
Manitoba Maple	*Acer negundo*	S5	N5	G5
Norway Maple	*Acer platanoides*	SNA	NNA	GNR
Silver Maple	*Acer saccharinum*	S5	N5	G5
Sugar Maple	*Acer saccharum*	S5	N5	G5
Horse Chestnut	*Aesculus hippocastanum*	SNA	NNA	GNR
Shagbark Hickory	*Carya ovata*	S5	N5	G5
White Ash[4]	*Fraxinus americana*	S4	NNR	G5
Eastern Red Cedar	*Juniperus virginiana*	S5	N5	G5
Common Apple	*Malus pumila*	SNA	NNA	G5
Norway Spruce	*Picea abies*	SNA	NNA	G5
Blue Spruce	*Picea pungens*	SNA	NNA	G5
Spruce sp.	*Picea sp.*	--	--	--
Austrian Pine	*Pinus nigra*	SNA	NNA	GNR
Scotch Pine	*Pinus sylvestris*	SNA	NNA	GNR
Eastern Cottonwood	*Populus deltoides*	S5	NNR	G5T5
Trembling Aspen	*Populus tremuloides*	S5	N5	G5
Bur Oak	*Quercus macrocarpa*	S5	N5	G5
Red Oak	*Quercus rubra*	S5	NNR	G5
European Buckthorn	*Rhamnus cathartica*	SNA	NNA	GNR
Willow sp.	*Salix sp.*	--	--	--
Eastern White Cedar	*Thuja occidentalis*	S5	N5	G5
American Basswood	*Tilia americana*	S5	N5	G5
American Elm	*Ulmus americana*	S5	NNR	G5?
Siberian Elm	*Ulmus pumila*	SNA	NNA	GNR

[1] NHIC Provincial S-Rank: S4 – Apparently Secure, S5 – Secure, SNA – Not Applicable (not native)
[2] National N-Rank: N5 – Secure, NNR – Unranked, NNA – Not Applicable (not native)
[3] Global G-Rank: G5 – Very common, G5? – Tentatively assigned very common
[4] Widespread in southern and central Ontario, but declining in southwestern Ontario due to EAB.

Table 2: Tree Inventory Results

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
1	White Ash	592258	4841455	Healthy
2	Scotch Pine	592271	4841421	Healthy
3	Scotch Pine	592276	4841417	Healthy
4	Scotch Pine	592278	4841414	Healthy
5	Scotch Pine	592280	4841412	Healthy
6	White Ash	592286	4841407	Healthy
7	Scotch Pine	592298	4841399	Healthy
8	Common Apple	592352	4841361	Healthy
9	Siberian Elm	592376	4841344	Healthy
10	Bur Oak	592386	4841331	Healthy
11	Bur Oak	592399	4841317	Healthy
12	Bur Oak	592432	4841286	Healthy
13	Shagbark Hickory	592712	4841976	Healthy
14	Red Oak	592716	4841972	Healthy
15	Shagbark Hickory	592718	4841964	Healthy
16	Bur Oak	592728	4841964	Big DBH 80+ cm, Healthy
17	Bur Oak	592945	4842736	Healthy
18	White Ash	592959	4842719	Dying
19	Bur Oak	592972	4842680	Healthy
20	Bur Oak	592986	4842665	Healthy
21	White Ash	592993	4842683	EAB evidence, nearly dead
22	Bur Oak	593012	4842666	Healthy
23	Bur Oak	593023	4842657	Healthy
24	Bur Oak	593037	4842615	Healthy
25	Bur Oak	593069	4842580	Healthy
26	Norway Maple	593642	4842045	Healthy
27	Silver Maple	594108	4843573	UTMs approximate, no access, Healthy
28	Silver Maple	594108	4843573	UTMs approximate, no access, Healthy
29	Silver Maple	594108	4843573	UTMs approximate, no access, Healthy
30	Willow species	594108	4843573	UTMs approximate, no access, Healthy
31	Eastern Cottonwood	594112	4843903	Healthy
32	Eastern Cottonwood	594116	4843882	Healthy
33	Austrian Pine	594118	4843889	Healthy
34	Eastern White Cedar	593632	4842051	Healthy
35	Eastern White Cedar	593635	4842048	Healthy
36	Bur Oak	593435	4842247	Healthy
37	Norway Maple	593292	4842364	Healthy
38	Norway Spruce	593193	4842607	Healthy
39	Norway Spruce	593190	4842604	Healthy
40	Norway Spruce	593156	4842556	Healthy
41	Norway Maple	593155	4842559	Healthy

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
42	Austrian Pine	593149	4842545	Healthy
43	Blue Spruce	593146	4842571	Healthy
44	Norway Spruce	593137	4842551	Healthy
45	Austrian Pine	593122	4842567	Healthy
46	Bur Oak	593097	4842584	Healthy
47	Bur Oak	593088	4842594	Healthy
48	Bur Oak	593078	4842610	Healthy
49	Bur Oak	593077	4842626	Healthy
50	Bur Oak	593076	4842610	Healthy
51	Bur Oak	593075	4842611	Healthy
52	Bur Oak	593072	4842582	Healthy
53	Bur Oak	593072	4842609	Healthy
54	Bur Oak	593072	4842616	Healthy
55	Bur Oak	593070	4842610	Healthy
56	Bur Oak	593070	4842613	Healthy
57	Bur Oak	593069	4842610	Healthy
58	Bur Oak	593069	4842617	Healthy
59	Bur Oak	593064	4842620	Healthy
60	Bur Oak	593063	4842618	Healthy
61	Bur Oak	593057	4842593	Healthy
62	Bur Oak	593059	4842593	Healthy
63	Bur Oak	593058	4842629	Healthy
64	Eastern White Cedar	593978	4843495	Healthy
65	Silver Maple	593979	4843504	Healthy
66	Manitoba Maple	593989	4843507	Healthy
67	Manitoba Maple	593994	4843513	Healthy
68	Silver Maple	593997	4843515	Healthy
69	Spruce sp.	594007	4843526	Healthy
70	Silver Maple	594012	4843530	Healthy
71	Manitoba Maple	593972	4843502	Healthy
72	Eastern White Cedar	593970	4843503	Healthy
73	Eastern White Cedar	593970	4843506	Healthy
74	Manitoba Maple	593967	4843504	Healthy
75	Spruce sp.	593970	4843515	Healthy
76	Trembling Aspen	593974	4843509	Healthy
77	Unknown Snag	593977	4843509	Dead
78	Silver Maple	593962	4843518	Healthy
79	Silver Maple	593955	4843536	Healthy
80	Silver Maple	593972	4843531	Healthy
81	Unknown Snag	593978	4843509	Dead
82	Unknown Snag	593977	4843514	Dead
83	Trembling Aspen	593977	4843509	Healthy
84	Norway Spruce	593991	4843524	Healthy

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
85	Norway Maple	593982	4843519	Healthy
86	Silver Maple	593983	4843559	Healthy
87	Eastern White Cedar	593982	4843530	Healthy
88	Eastern White Cedar	593983	4843529	Healthy
89	Eastern White Cedar	593984	4843529	Healthy
90	Eastern White Cedar	593985	4843528	Healthy
91	Eastern White Cedar	593986	4843528	Healthy
92	Eastern White Cedar	593987	4843528	Healthy
93	Eastern White Cedar	593986	4843528	Healthy
94	Eastern White Cedar	593987	4843530	Healthy
95	Eastern White Cedar	593989	4843531	Healthy
96	Eastern White Cedar	593990	4843532	Healthy
97	Eastern White Cedar	593991	4843532	Healthy
98	Eastern White Cedar	593991	4843534	Healthy
99	Eastern White Cedar	593991	4843535	Healthy
100	Eastern White Cedar	593992	4843537	Healthy
101	Eastern White Cedar	593990	4843536	Healthy
102	Eastern White Cedar	593989	4843536	Healthy
103	Eastern White Cedar	593988	4843537	Healthy
104	Eastern White Cedar	593988	4843538	Healthy
105	Eastern White Cedar	593989	4843539	Healthy
106	Eastern White Cedar	593990	4843540	Healthy
107	Eastern White Cedar	593988	4843540	Healthy
108	Eastern White Cedar	593987	4843534	Healthy
109	Manitoba Maple	593989	4843533	Healthy
110	Silver Maple	593992	4843525	Healthy
111	Common Apple	593998	4843536	Healthy
112	Silver Maple	594009	4843546	Healthy
113	Silver Maple	593929	4843519	Healthy
114	Scotch Pine	593957	4843544	Healthy
115	Scotch Pine	593955	4843548	Healthy
116	Silver Maple	593942	4843557	Healthy
117	Sugar Maple	593950	4843559	Healthy
118	Eastern Red Cedar	593968	4843561	Healthy
119	Eastern Red Cedar	593969	4843563	Healthy
120	Silver Maple	593957	4843565	Healthy
121	Silver Maple	593963	4843571	Healthy
122	Silver Maple	593967	4843577	Healthy
123	Silver Maple	593971	4843580	Healthy
124	Silver Maple	593975	4843586	Healthy
125	Norway Spruce	593982	4843581	Healthy
126	Manitoba Maple	593858	4843440	Healthy
127	Manitoba Maple	593898	4843495	Healthy

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
128	Manitoba Maple	593900	4843500	Healthy
129	Silver Maple	593951	4843575	Healthy
130	Horse Chestnut	593958	4843581	Healthy
131	Horse Chestnut	593954	4843585	Healthy
132	Silver Maple	593961	4843585	Healthy
133	Silver Maple	593964	4843588	Healthy
134	Silver Maple	593973	4843599	Healthy
135	Manitoba Maple	593858	4843484	Healthy
136	Manitoba Maple	593859	4843488	Healthy
137	European Buckthorn	593858	4843523	Healthy
138	Manitoba Maple	593868	4843497	Healthy
139	Unknown Snag	593866	4843500	Dead
140	Manitoba Maple	593872	4843502	Healthy
141	Manitoba Maple	593874	4843505	2 stems, Healthy
142	Manitoba Maple	593877	4843510	6 stems, Healthy
143	Manitoba Maple	593883	4843519	2 stems, Healthy
144	Manitoba Maple	593886	4843518	Healthy
145	Manitoba Maple	593884	4843526	Healthy
146	Manitoba Maple	593879	4843540	3 stems, Healthy
147	Norway Spruce	593869	4843531	Healthy
148	Norway Spruce	593867	4843533	Healthy
149	Norway Spruce	593865	4843535	Healthy
150	Norway Spruce	593864	4843538	Healthy
151	Norway Spruce	593862	4843540	Healthy
152	Norway Spruce	593860	4843542	Healthy
153	Manitoba Maple	593844	4843537	Healthy
154	Norway Spruce	593861	4843551	2 stems, Healthy
155	Norway Spruce	593862	4843554	Healthy
156	Norway Spruce	593868	4843557	Healthy
157	Norway Spruce	593868	4843559	Healthy
158	Norway Spruce	593869	4843561	Healthy
159	Norway Spruce	593869	4843561	Healthy
160	Norway Spruce	593880	4843570	Healthy
161	Norway Spruce	593882	4843571	Healthy
162	Norway Spruce	593883	4843571	Healthy
163	Norway Spruce	593884	4843572	Healthy
164	Norway Spruce	593885	4843574	Healthy
165	Norway Spruce	593891	4843580	Healthy
166	Manitoba Maple	593864	4843562	Healthy
167	Manitoba Maple	593867	4843567	Healthy
168	Manitoba Maple	593870	4843567	Healthy
169	Manitoba Maple	593872	4843570	Healthy
170	Manitoba Maple	593873	4843576	Healthy

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
171	Manitoba Maple	593875	4843572	Healthy
172	Manitoba Maple	593877	4843579	Healthy
173	Manitoba Maple	593880	4843577	Healthy
174	Manitoba Maple	593882	4843578	Healthy
175	Manitoba Maple	593879	4843582	Healthy
176	Manitoba Maple	593884	4843581	Healthy
177	Manitoba Maple	593882	4843583	Healthy
178	Manitoba Maple	593889	4843587	Healthy
179	American Elm	593890	4843588	3 stems, Healthy
180	Manitoba Maple	593898	4843592	Healthy
181	Manitoba Maple	593902	4843594	Healthy
182	Manitoba Maple	593906	4843603	4 stems, Healthy
183	Norway Spruce	593911	4843605	Healthy
184	Norway Spruce	593914	4843608	Healthy
185	Norway Spruce	593917	4843611	Healthy
186	Norway Spruce	593920	4843614	Healthy
187	Norway Spruce	593921	4843617	Healthy
188	European Buckthorn	593923	4843620	Healthy
189	European Buckthorn	593921	4843623	Healthy
190	Norway Spruce	593925	4843623	Healthy
191	European Buckthorn	593927	4843625	Healthy
192	European Buckthorn	593925	4843626	Healthy
193	Norway Spruce	593924	4843628	Healthy
194	Norway Spruce	593926	4843626	Healthy
195	European Buckthorn	593928	4843627	Healthy
196	Unknown Snag	593929	4843628	Healthy
197	European Buckthorn	593927	4843632	Dead
198	Unknown Snag	593932	4843632	Healthy
199	European Buckthorn	593930	4843637	Dead
200	Unknown Snag	593934	4843633	Healthy
201	European Buckthorn	593933	4843640	Dead
202	Manitoba Maple	593900	4843572	Healthy
203	Manitoba Maple	593898	4843575	Healthy
204	Manitoba Maple	593903	4843576	Healthy
205	Manitoba Maple	593905	4843578	Healthy
206	Manitoba Maple	593906	4843579	Healthy
207	Manitoba Maple	593909	4843582	Healthy
208	Manitoba Maple	593910	4843584	Healthy
209	Manitoba Maple	593913	4843589	Healthy
210	Eastern White Cedar	593908	4843589	Healthy
211	Eastern White Cedar	593910	4843590	Healthy
212	Eastern White Cedar	593911	4843592	Healthy
213	Eastern White Cedar	593912	4843594	Healthy

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
214	Eastern White Cedar	593914	4843595	Healthy
215	Eastern White Cedar	593915	4843596	Healthy
216	Eastern White Cedar	593916	4843598	Healthy
217	Eastern White Cedar	593918	4843599	Healthy
218	Eastern White Cedar	593919	4843601	Healthy
219	Eastern White Cedar	593920	4843602	Healthy
220	Eastern White Cedar	593922	4843604	Healthy
221	Eastern White Cedar	593923	4843606	Healthy
222	Spruce sp.	593917	4843590	Healthy
223	Manitoba Maple	593923	4843595	Healthy
224	Manitoba Maple	593917	4843594	Healthy
225	Silver Maple	593924	4843593	2 stems, Healthy
226	Manitoba Maple	593919	4843594	Healthy
227	Manitoba Maple	593919	4843592	Healthy
228	Unknown Snag	593926	4843596	Healthy
229	Silver Maple	593922	4843598	Dead
230	Spruce sp.	593922	4843601	Healthy
231	Silver Maple	593931	4843613	Healthy
232	Unknown Snag	593934	4843619	Healthy
233	Silver Maple	593933	4843620	Dead
234	American Basswood	593938	4843625	Healthy
235	Silver Maple	593941	4843628	Healthy
236	Eastern White Cedar	593925	4843588	Healthy
237	Eastern White Cedar	593922	4843590	Healthy
238	Norway Spruce	593938	4843590	Healthy
239	Norway Spruce	593950	4843601	Healthy
240	Norway Spruce	593953	4843602	Healthy
241	Norway Spruce	593957	4843604	Healthy
242	Norway Spruce	593954	4843606	Healthy
243	Norway Spruce	593956	4843609	Healthy
244	Norway Spruce	593960	4843611	Healthy
245	Norway Spruce	593963	4843615	Leaning but healthy
246	American Basswood	593970	4843612	Healthy
247	Norway Maple	593091	4842555	Healthy
248	Norway Maple	593085	4842559	Healthy
249	Bur Oak	593054	4842598	Healthy
250*	Bur Oak	592961	4842412	
251*	Bur Oak	592994	4842441	
252*	Manitoba Maple	592611	4842912	
253*	Bur Oak	592991	4842440	
254*	Shagbark Hickory	592626	4842062	
255*	Bur Oak	592632	4842056	
256*	Bur Oak	592638	4842050	

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
257*	Bur Oak	592644	4842045	
258*	Bur Oak	592700	4841988	
259*	Poplar Hedgerow	592579	4842968	Polygon centroid
260*	Bur Oak	592984	4842446	
261*	Bur Oak	592990	4842448	
262*	Colorado Blue Spruce	593695	4841957	
263*	Colorado Blue Spruce	593686	4841965	
264*	Colorado Blue Spruce	593679	4841973	
265*	Colorado Blue Spruce	593672	4841966	
266*	Green Ash	593640	4841883	
267*	Buckthorn	593618	4841900	Polygon centroid
268*	Colorado Blue Spruce	593643	4841886	
269*	Naturalized Grouping	593601	4841904	Polygon centroid
270*	Bur Oak	592990	4842451	
271*	White Cedar	593636	4841885	
272*	Bur Oak	592993	4842455	
273*	Bur Oak	593008	4842445	
274*	Bur Oak	593010	4842450	
275*	Bur Oak	593011	4842449	
276*	Bur Oak	593010	4842451	
277*	Austrian Pine	592971	4842404	
278*	Bur Oak	593012	4842452	
279*	Bur Oak	593012	4842453	
280*	Bur Oak	593013	4842454	
281*	Bur Oak	593016	4842456	
282*	Bur Oak	593024	4842467	
283*	Crimson King / Norway Maple	593027	4842472	
284*	Bur Oak	593031	4842475	
285*	Bur Oak	593033	4842479	
286*	Bur Oak	593035	4842483	
287*	Bur Oak	593037	4842484	
288*	Norway Spruce	592974	4842402	
289*	Bur Oak	593038	4842486	
290*	Bur Oak	593039	4842486	
291*	Bur Oak	593042	4842493	
292*	Bur Oak	593044	4842496	
293*	Bur Oak	593044	4842497	
294*	Bur Oak	593046	4842498	
295*	Bur Oak	593054	4842508	
296*	Bur Oak	593051	4842505	
297*	Bur Oak	593056	4842509	
298*	Bur Oak	593058	4842514	
299*	Bur Oak	592983	4842415	

Tree ID	Common Name	GPS Coordinates		Notes
		Northing	Easting	
300*	Bur Oak	593063	4842517	
301*	Bur Oak	592984	4842416	
302*	Austrian Pine Row	593060	4842553	
303*	Bur Oak	593050	4842523	
304*	Bur Oak	593050	4842525	
305*	Bur Oak	593046	4842519	
306*	Bur Oak	593043	4842516	
307*	Bur Oak	593043	4842515	
308*	Bur Oak	593039	4842511	
309*	Bur Oak	593038	4842508	
310*	Bur Oak	593034	4842502	
311*	Bur Oak	593030	4842502	
312*	Bur Oak	592989	4842423	
313*	Bur Oak	593028	4842497	
314*	Bur Oak	593025	4842492	
315*	Bur Oak	593006	4842488	
316*	Bur Oak	593011	4842485	
317*	Bur Oak	593004	4842489	
318*	Bur Oak	593002	4842492	
319*	Black Walnut	592989	4842502	
320*	Bur Oak	592984	4842508	
321*	Black Walnut	592980	4842511	
322*	Black Walnut	592976	4842514	
323*	Bur Oak	592991	4842422	
324*	Black Walnut	592972	4842517	
325*	Black Walnut	592968	4842521	
326*	Bur Oak	592991	4842425	
327*	White Spruce	592929	4842445	
328*	Bur Oak	592922	4842442	
329*	Bur Oak	592997	4842431	
330*	Black Locust	592687	4842949	
331*	Black Locust	592681	4842944	
332*	Black Locust	592674	4842938	
333*	White Birch	592643	4843000	
334*	Black Locust	592656	4842915	
335*	White Spruce	592649	4842978	
336*	Naturalized Deciduous Row	592637	4842892	Polygon centroid

* Identifies trees outside of Amec Foster Wheeler's tree inventory study area that were previously inventoried by Strybos Barron King.

There were 63 trees (IDs 1-63) inventoried along the project center line and 184 trees (IDs 64-184; including 9 unknown snags) inventoried from the additional lot at the north east of the study area. The top five most abundant tree species within the study area were Manitoba Maple (*Acer negundo*; 19.4% of all trees identified), Eastern White Cedar (*Thuja occidentalis;* 18.6 %), Norway Spruce (*Picea abies;* 16.2%), Bur Oak (*Quercus macrocarpa;* 12.1%), and Silver Maple (*Acer saccharinum;* 11.3%).

An additional 87 tree entries were recorded by Strybos Barron King (SBK) during a previous tree inventory, from outside the current study area boundaries. Four (4) of these are noted to be polygons and the number of trees within the polygons was not noted. As these trees are located outside the current study area, they were not verified or confirmed by Amec Foster Wheeler personnel. They have been included in Table 2 and Figure 2 as supplemental information.

CONCLUSIONS

The tree inventory survey established that the community is composed of a mix of young, mid-aged, and mature deciduous tree, primarily Manitoba Maple and Eastern White Cedar. Based on the findings of the tree inventory survey, compensation requirements (tree replacement) should be discussed with the relevant conservation authorities. Compensation requirements are dependent of the location of the tree being impacted by Project activities.

As explained in Toronto and Region Conservation Authority's (2017) *Draft Compensation Protocol for Loss of Ecosystem Services* (the Protocol), infrastructure projects are completed by a number of different agencies/proponents making a standard approach to land-based compensation difficult. For this reason, the Toronto and Region Conservation Authority works with proponents within the various planning processes to help ensure land-based compensation is appropriately considered and that the principles of the Protocol are addressed. Although the environmental assessment process for public projects helps to ensure investments in infrastructure minimize impacts to natural features and the functions they provide, when impacts cannot be eliminated, compensation action should be taken to ensure the public benefits provided by the *natural system* are not diminished (TRCA 2017).

To ensure compensation requirements are met, correspondence with the Toronto and Region Conservation Authority and Credit Valley Conservation Authority will be necessary with respect to activities in their respective jurisdictions.

For municipal legislation regulating the injury or destruction of trees please refer to The Corporation of the Town of Caledon's (2004) By-law No. 2000-100.

CLOSURE

This report summarizes the findings of Amec Foster Wheeler's 2017 tree inventory survey. This tree inventory was not intended to capture all tree species within the limits of the terrestrial study area; instead, the survey captured those trees with a diameter at breast height greater than 10 cm within the right-of-way of the proposed preliminary design Project footprint. With respect to compliance with local tree removal legislation, correspondence with the local regulatory agency is recommended prior to removal of any vegetation.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited

Prepared by:	Reviewed by:
DRAFT	DRAFT
Rebecca Harris, B.Sc. Terrestrial Ecologist	Jeff Balsdon, M.Sc. Senior Terrestrial Ecologist

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Canadian Forest Service (CFS). 2013. Emerald Ash Borer. Cited online: http://cfs.nrcan.gc.ca/pages/318. Last accessed July 2017.

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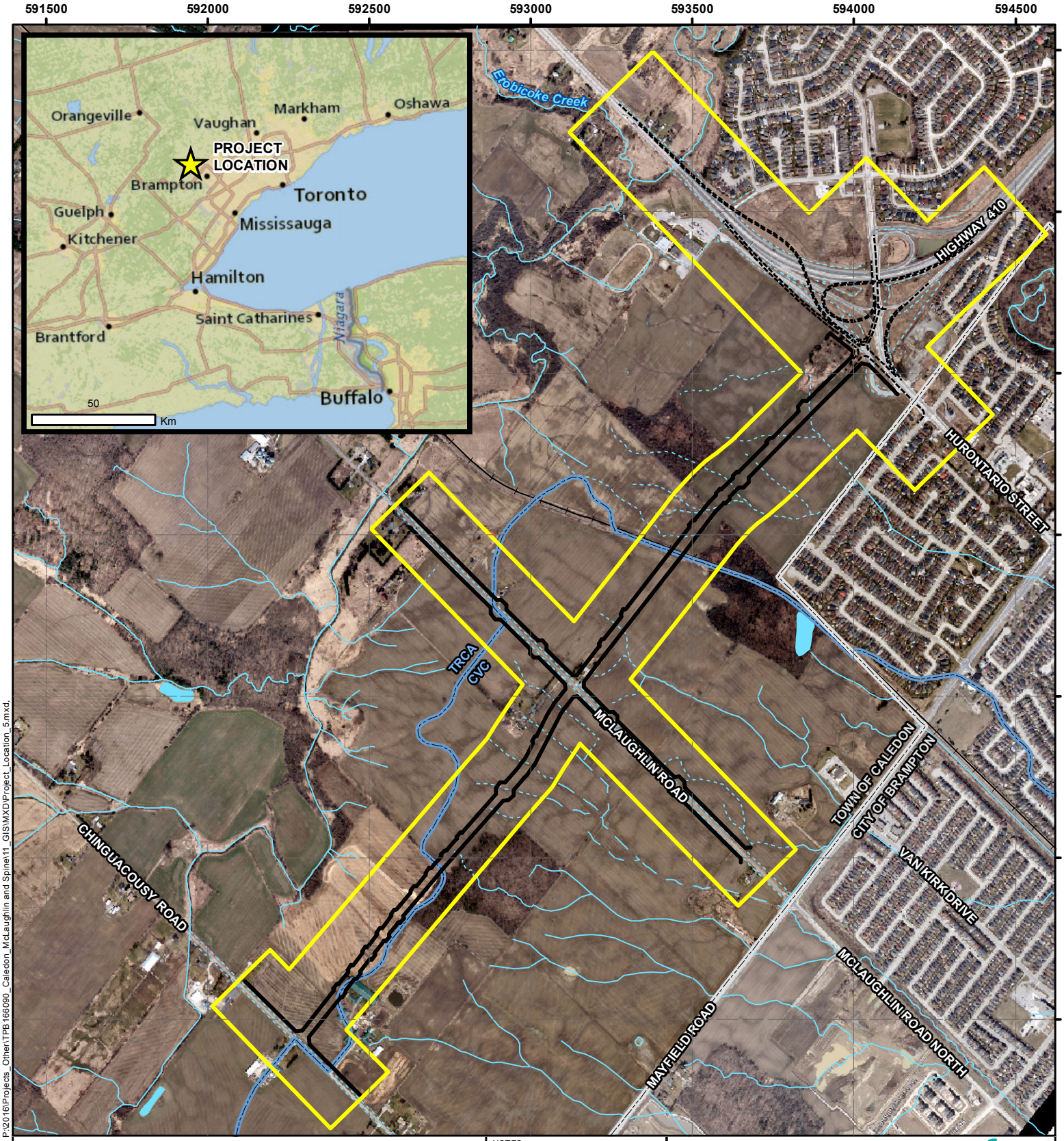
Toronto and Region Conservation Authority (TRCA). 2017. Draft Compensation Protocol for Loss of Ecosystem Services. 50 pp.

The Corporation of the Town of Caledon. 2004. By-law No. 2000-100. Cited online: http://www.caledon.ca/en/index.asp. Last accessed August 2017.

FIGURES



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LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Railway
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Conservation Authority Boundary
- Municipal Boundary

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from Land Information Ontario, MNRF.
- Watercourse information is a combination of data from Ontario Hydro Network, Ontario Base Map, MNRF constructed drains, Peel Region, and Dougan and Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value of "Permanent".

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection: NAD 1983 UTM Zone 17N

0 0.2 0.4 0.6 0.8 1 Kilometres

TOWN OF CALEDON

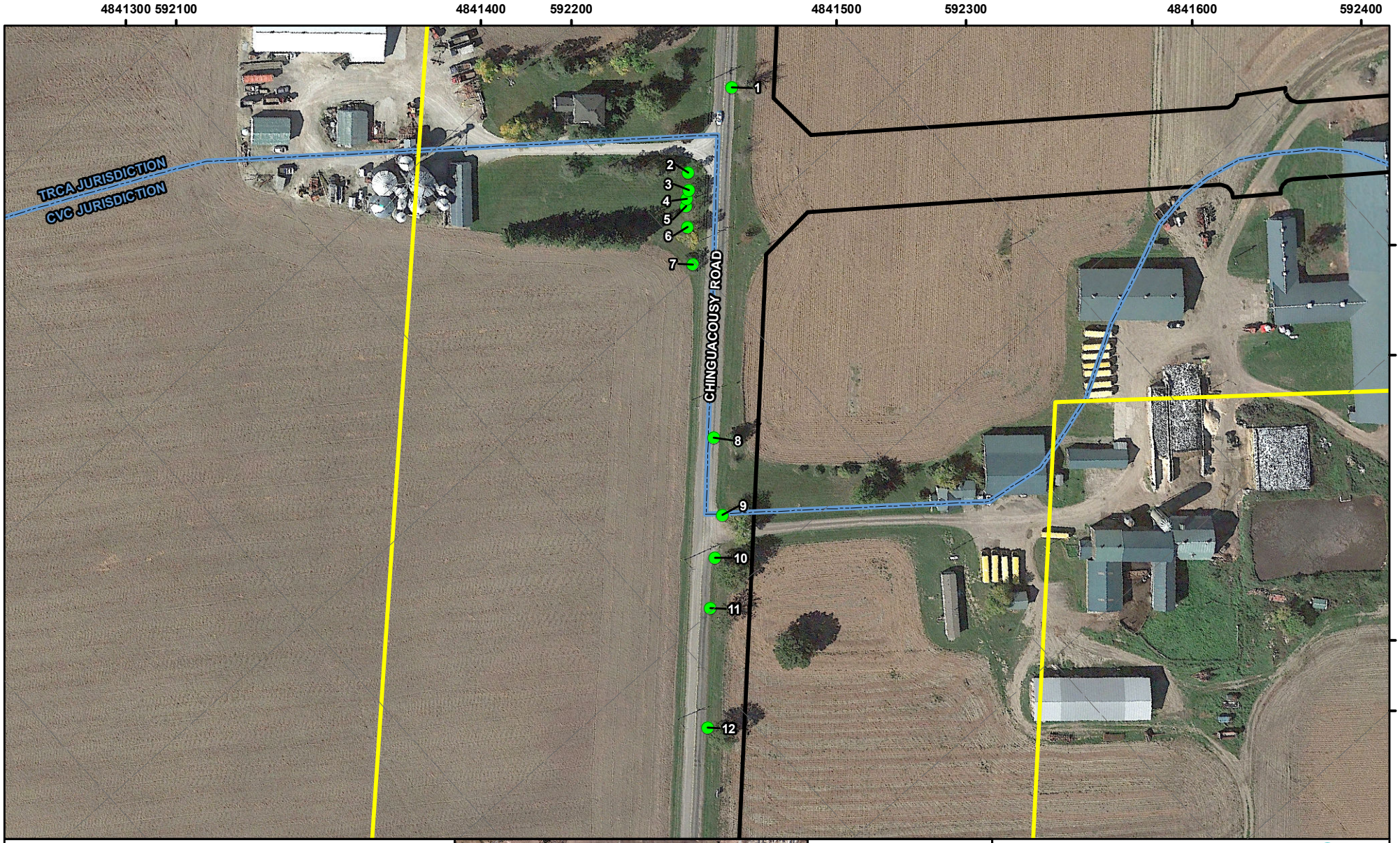
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Project Location and Study Area

DRAFT

PROJECT N°: TPB166090	**FIGURE: 1**
SCALE: 1:16,000	DATE: August 2017



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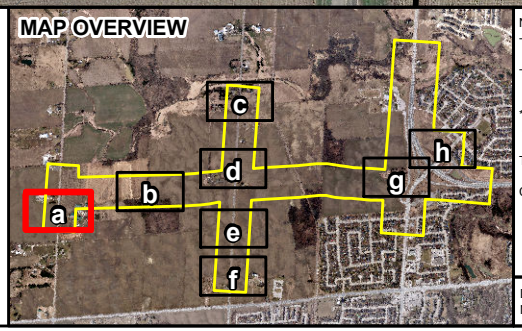
LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

- Trees Identified / Confirmed by Amec Foster Wheeler*
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

0 50 100 150 200
Metres

TOWN OF CALEDON

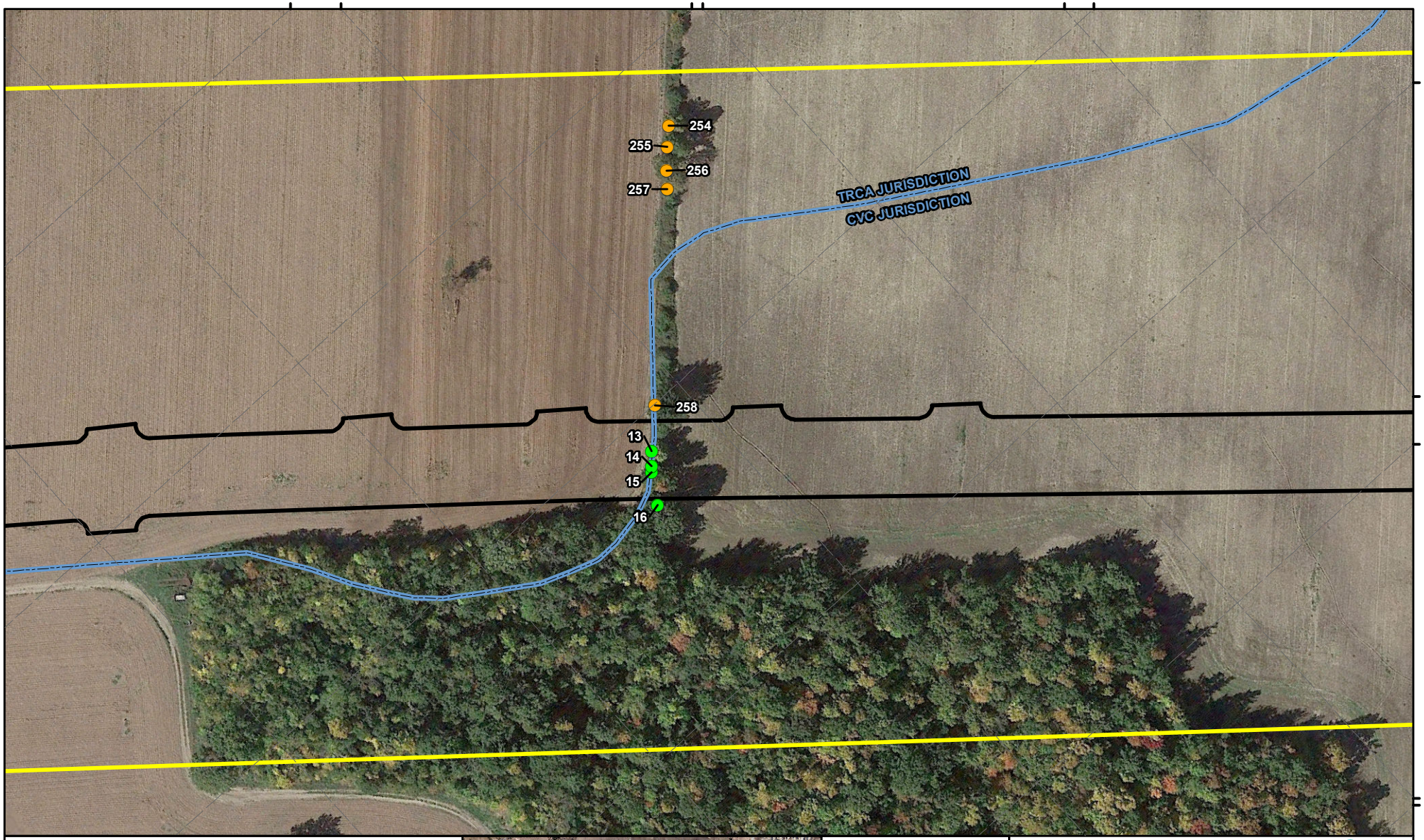
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

DRAFT

Tree Inventory

PROJECT Nº: TPB166090	**FIGURE: 2a**
SCALE: 1:2,000	DATE: August 2017



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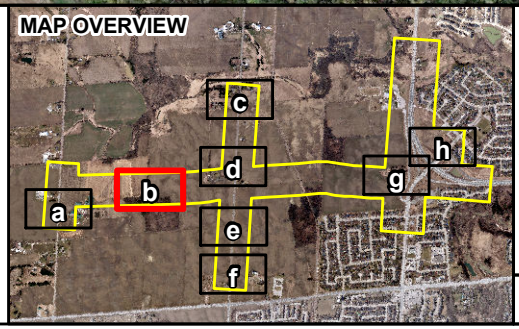
LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

- Trees Identified / Confirmed by Amec Foster Wheeler*
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King

0 50 100 150 200 Metres



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

TOWN OF CALEDON

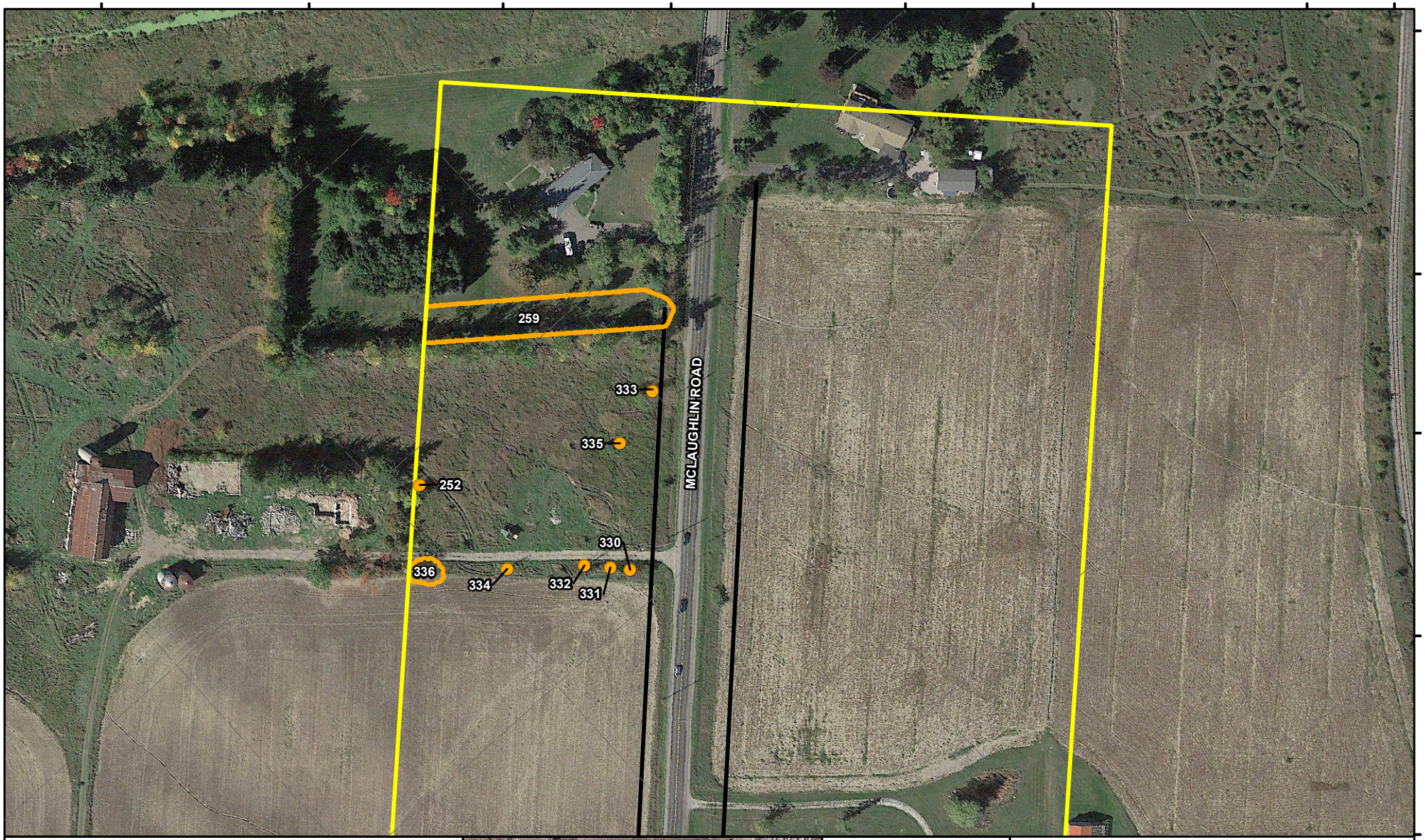
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Tree Inventory

DRAFT

PROJECT Nº: TPB166090	**FIGURE: 2b**
SCALE: 1:2,000	DATE: August 2017



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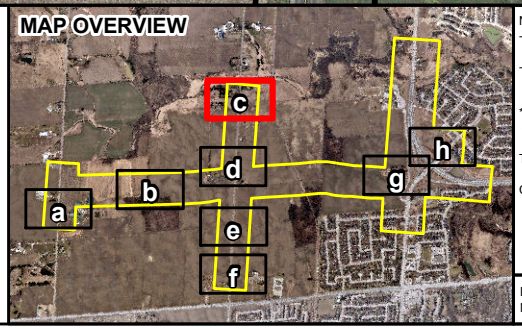
LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

- Trees Identified / Confirmed by Amec Foster Wheeler*
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King

0 50 100 150 200 Metres



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

TOWN OF CALEDON

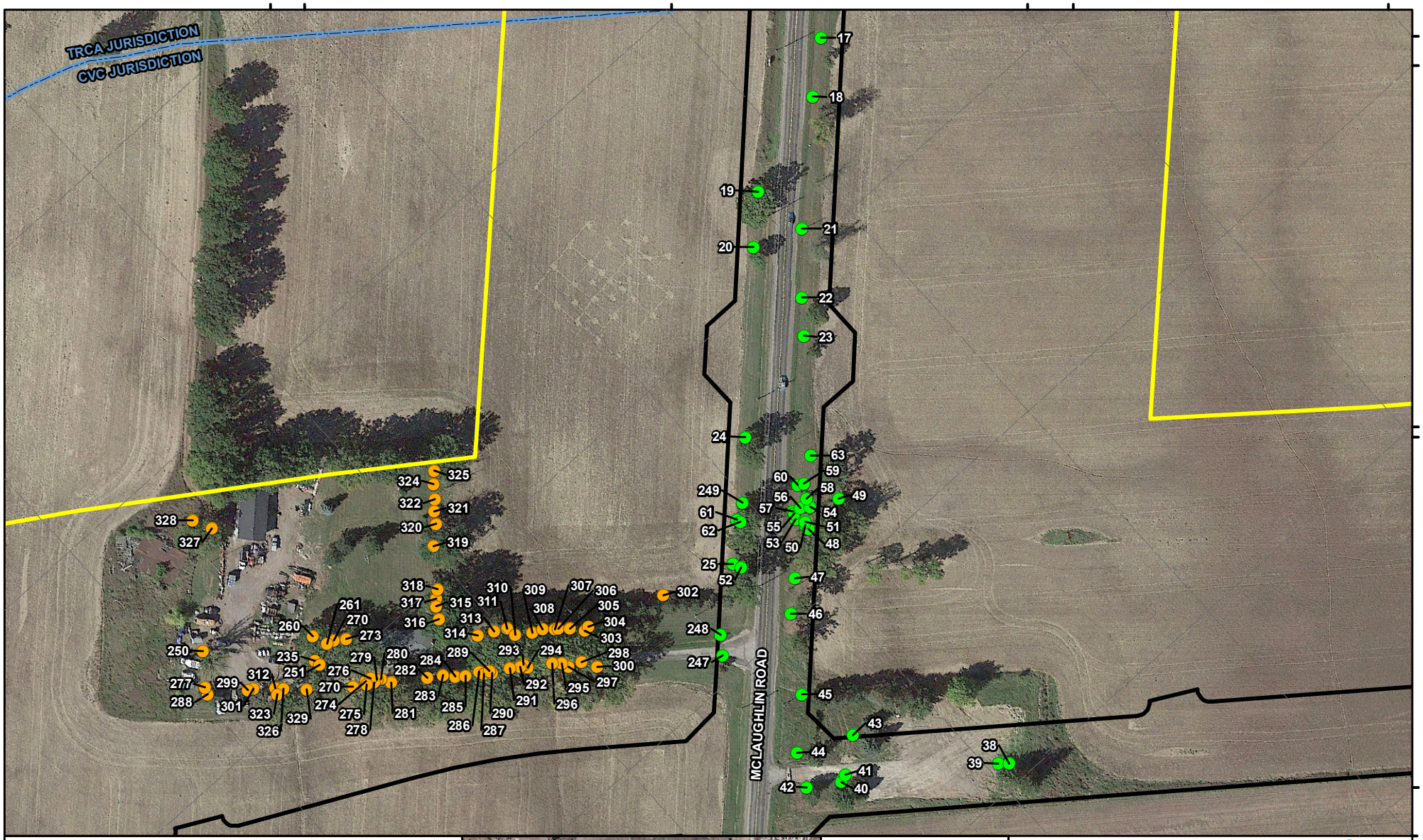
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

DRAFT

Tree Inventory

PROJECT Nº: TPB166090	**FIGURE: 2c**
SCALE: 1:2,000	DATE: September 2017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593300
TRCA JURISDICTION
CVC JURISDICTION
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LEGEND
Preliminary Road Right of Way
Preliminary Road Design
Approximate Terrestrial Study Area
Conservation Authority Boundary
Tree Inventory
Trees Identified / Confirmed by Amec Foster Wheeler*
Trees Identified by Strybos Barron King
Woodlots Identified by Strybos Barron King
MAP OVERVIEW
a
b
c
d
e
f
g
h
NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.
*Position accuracy within +/- 5 m as obtained with a handheld GPS.
TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority
Datum & Projection:
NAD 1983 UTM Zone 17N
0
50
100
150
200
Metres
TOWN OF CALEDON
amec foster wheeler
McLAUGHLIN ROAD AND SPINE ROAD CLASS EA
DRAFT
Tree Inventory
PROJECT Nº: TPB166090
FIGURE: 2d
SCALE: 1:2,000
DATE: August 2017
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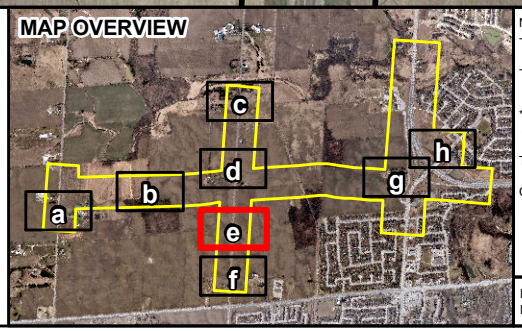
LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

- Trees Identified / Confirmed by Amec Foster Wheeler*
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

0 50 100 150 200
Metres

TOWN OF CALEDON

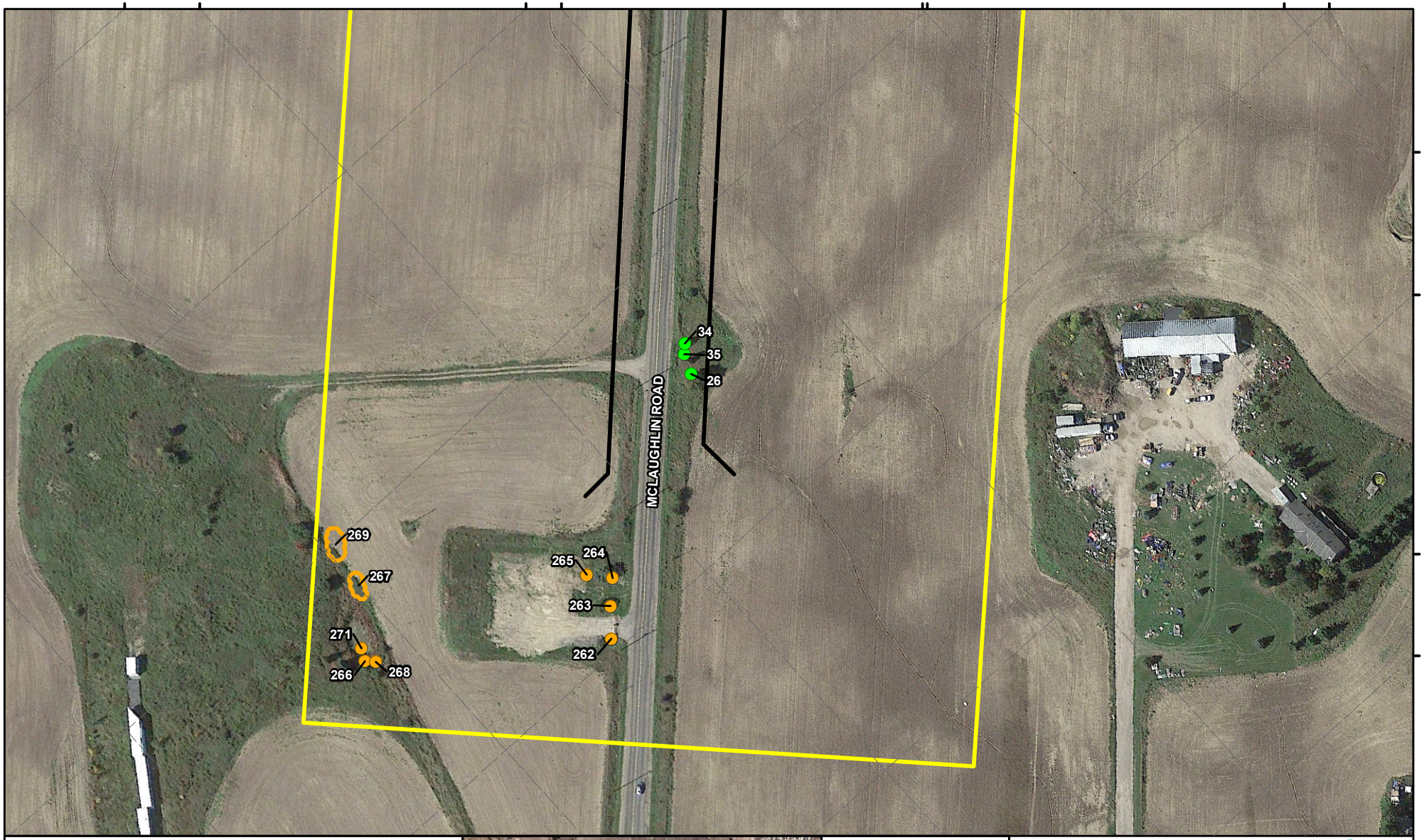
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Tree Inventory

DRAFT

PROJECT Nº: TPB166090	**FIGURE: 2e**
SCALE: 1:2,000	DATE: August 2017



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LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

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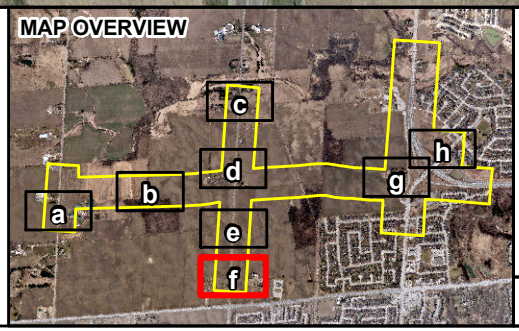
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

0 50 100 150 200
Metres

TOWN OF CALEDON

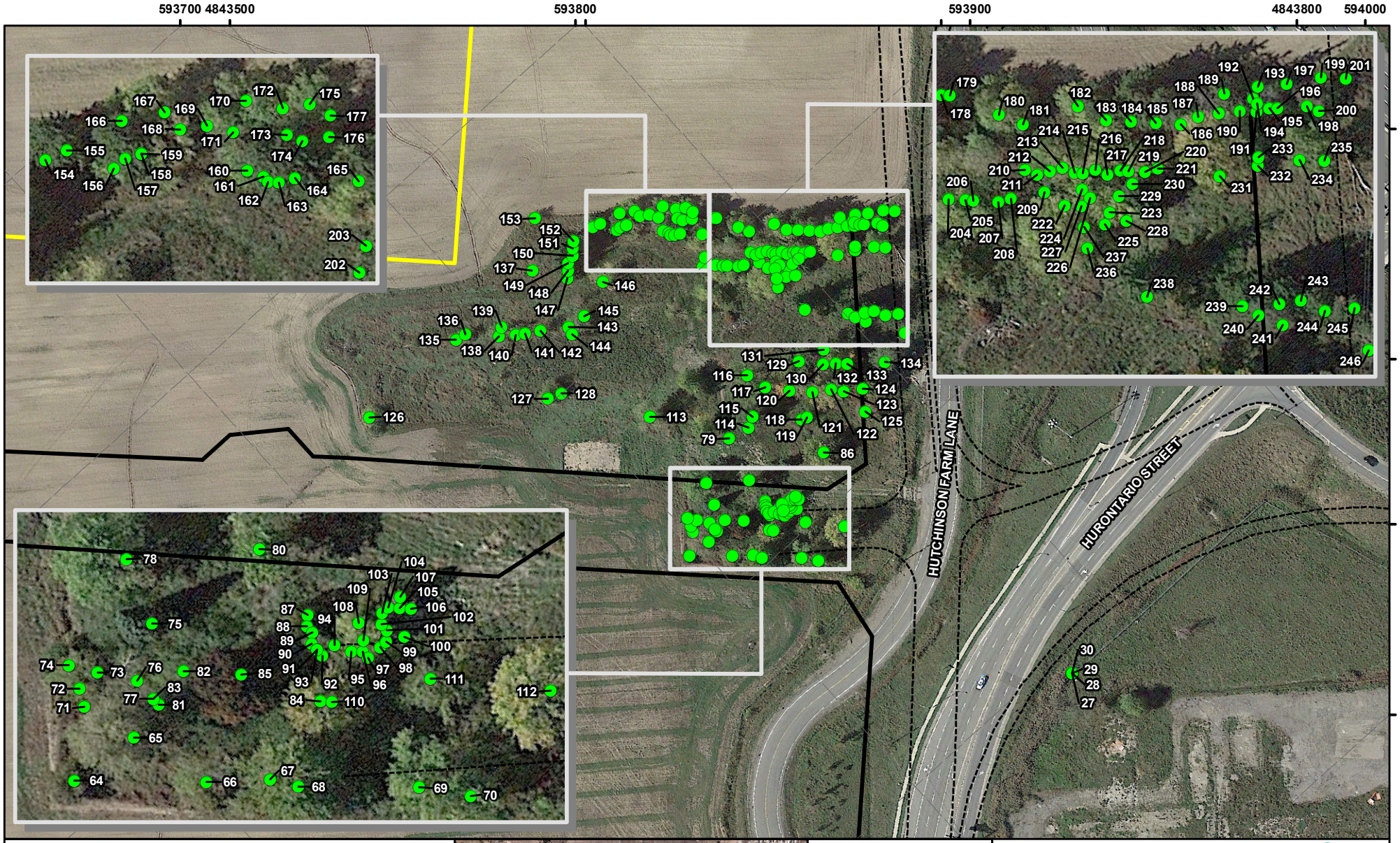
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

DRAFT

Tree Inventory

PROJECT Nº: TPB166090	**FIGURE: 2f**
SCALE: 1:2,000	DATE: August 2017



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LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

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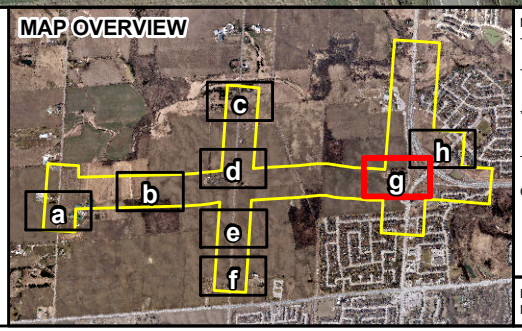
- Woodlots Identified by Strybos Barron King



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

0 50 100 150 200
Metres

TOWN OF CALEDON

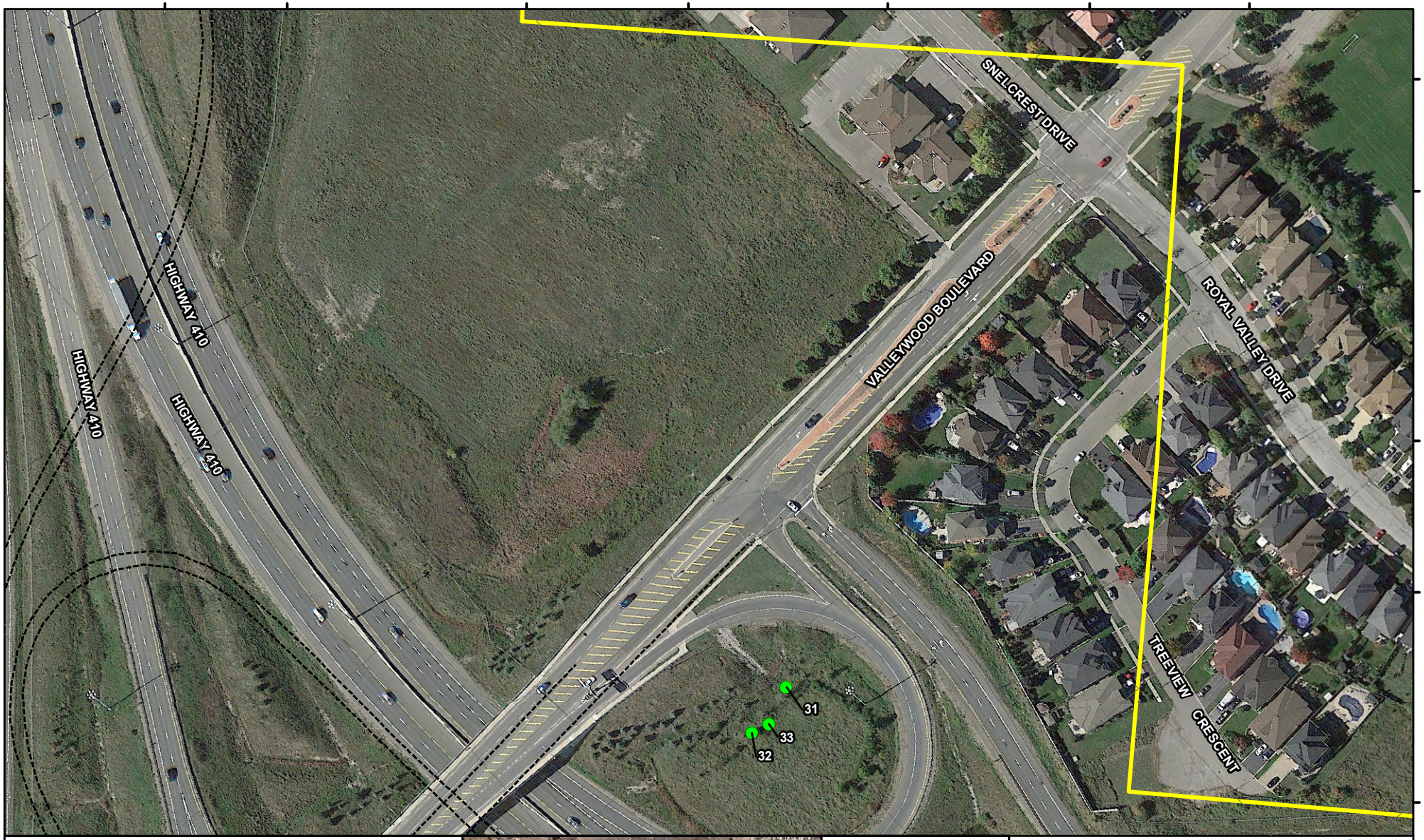
amec foster wheeler

McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

DRAFT

Tree Inventory

PROJECT Nº: TPB166090	**FIGURE: 2g**
SCALE: 1:2,000	DATE: August 2017



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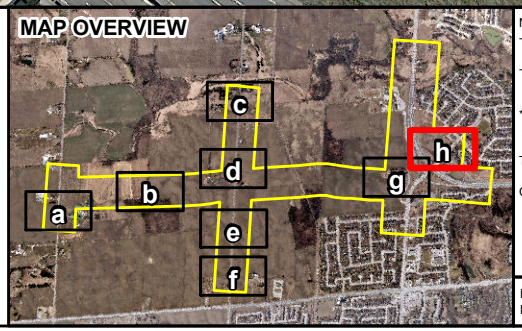
LEGEND

- Preliminary Road Right of Way
- Preliminary Road Design
- Approximate Terrestrial Study Area
- Conservation Authority Boundary

Tree Inventory

- Trees Identified / Confirmed by Amec Foster Wheeler*
- Trees Identified by Strybos Barron King
- Woodlots Identified by Strybos Barron King

0 50 100 150 200 Metres



NOTES:
- Background imagery from Town of Caledon, 2016 and Google Earth, 2016.
- Roads extracted from Land Information Ontario, MNRF.

*Position accuracy within +/- 5 m as obtained with a handheld GPS.

TRCA: Toronto and Region Conservation Authority
CVC: Credit Valley Conservation Authority

Datum & Projection:
NAD 1983 UTM Zone 17N

TOWN OF CALEDON

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McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

DRAFT

Tree Inventory

PROJECT Nº: TPB166090	**FIGURE: 2h**
SCALE: 1:2,000	DATE: August 2017

APPENDIX D

COMPILED WILDLIFE SPECIES LIST

Compiled Plant Species List

Scientific Name	Common Name	Global Rank	Provincial Rank
Acer negundo	Manitoba Maple	G5	S5
Acer platanoides	Norway Maple	GNR	SNA
Acer saccharinum	Silver Maple	G5	S5
Acer saccharum ssp. saccharum	Sugar Maple	G5	S5
Acer X freemanii	Freeman's Maple	GNA	SNA
Achillea millefolium ssp. millefolium	Common Yarrow	G5	SNA
Alliaria petiolata	Garlic Mustard	GNR	SNA
Arctium minus ssp. minus	Common Burdock	GNR	SNA
Arisaema triphyllum	Jack-in-the-pulpit	G5	S5
Aster sp.	Aster sp.	--	--
Betula pendula	European White Birch	GNR	SNA
Calamagrostis canadensis	Canada Bluejoint	GNR	SNA
Carex crinita	Fringed Sedge	G5	S5
Carex gracillima	Graceful Sedge	G5	S5
Carex lupulina	Hop Sedge	G5	S5
Carex radiata	Eastern Star Sedge	G5	S5
Carex rosea	Rosy Sedge	G5	S5
Carex spicata	Spiked Sedge	GNR	SNA
Carex sp.	Sedge sp.	--	--
Carya ovata	Shagbark Hickory	G5	S5
Cichorium intybus	Chicory	GNR	SNA
Circaea canadensis	Broad-leaved Enchanter's Nightshade	G5T5	S5
Cirsium arvense	Canada Thistle	GNR	SNA
Cornus stolonifera	Red-osier Dogwood	G5	S5
Crataegus sp.	Hawthorn sp.	--	--
Dactylis glomerata	Orchard Grass	GNR	SNA
Daucus carota	Wild Carrot	GNR	SNA
Elaeagnus angustifolia	Russian Olive	GNR	SNA
Erigeron philadelphicus	Philadelphia Fleabane	G5	S5
Eurybia macrophylla	Large-leaved Aster	G5	S5
Fagus grandiflora	American Beech	G5	S4
Fragaria virginiana	Common Strawberry	G5	SU
Fraxinus americana	White Ash	G5	S4
Fraxinus pennsylvanica	Green Ash	G5	S4
Geranium robertianum	Herb Robert	G5	S5
Geum sp.	Avens sp.	--	--
Glyceria striata	Fowl Mannagrass	G5	S5
Hydrophyllum virginianum	Virginia Water-leaf	G5	S5
Impatiens capensis	Spotted Touch-me-not	G5	S5
Leucanthemum vulgare[2]	Ox-Eye Daisy	GNR	SNA
Linaria vulgaris	Butter-and-eggs	GNR	SNA
Lonicera tatarica	Tartarian Honeysuckle	GNR	SNA
Lonicera sp.	Honeysuckle sp.	--	--

Scientific Name	Common Name	Global Rank	Provincial Rank
Lysimachia ciliata	Fringed Loosestrife	G5	S5
Malus pumila	Common Apple	G5	SNA
Myosotis sylvatica	Common Forget-me-not	G5	SNA
Onoclea sensibilis	Sensitive Fern	G5	S5
Ostrya virginica	Eastern Hop-hornbeam	G5	S5
Parthenocissus inserta	Thicket Creeper	G5	S5
Phalaris arundinacea	Reed Canary Grass	GNR	S5
Phleum pratense	Timothy	GNR	SNA
Phragmites australis	Common Reed	G5T5	SNA
Picea pungens	Colorado Blue Spruce	G5	SNA
Pinus nigra	Austrian Pine	GNR	SNA
Pinus strobus	Eastern White Pine	G5	S5
Pinus sylvestris	Scots Pine	GNR	SNA
Podophyllum peltatum	Mayapple	G5	S5
Populus deltoides	Eastern Cottonwood	G5T5	S5
Populus grandidentata	Large-tooth Aspen	G5	S5
Populus tremuloides	Trembling Aspen	G5	S5
Prunus virginiana	Choke Cherry	G5	S5
Quercus alba	White Oak	G5	S5
Quercus macrocarpa	Bur Oak	G5	S5
Quercus rubra	Red Oak	G5	S5
Ranunculus acris	Tall Buttercup	G5	SNA
Rhamnus cathartica	Common Buckthorn	GNR	SNA
Rhus radicans ssp. rydbergii	Western Poison-ivy	G5	S5
Rhus typhina	Staghorn Sumac	G5	S5
Rubus occidentalis	Black Raspberry	G5	S5
Salix sp.	Willow sp.	--	--
Solanum dulcamara	Bittersweet Nightshade	GNR	SNA
Solidago altissima	Tall Goldenrod	GNR	S5
Solidago caesia	Blue-stemmed Goldenrod	G5	S5
Symphyotrichum lanceolatum	White Panicled Aster	G5T5	S5
Symphyotrichum lateriflorum	Calico Aster	G5T5	S5
Syringa vulgaris	Common Lilac	GNR	SNA
Taraxacum officinale	Common Dandelion	G5	SNA
Thuja occidentalis	Eastern White Cedar	G5	S5
Tilia americana	Basswood	G5	S5
Toxidendron radicans	Poison-ivy	GNR	S5
Trifolium pratense	Red Clover	GNR	SNA
Trilliums sp.	Trillium sp.	--	--
Typha angustifolia	Narrow-leaved Cattail	G5	SNA
Typha latifolia	Broad-leaved Cattail	G5	S5
Ulmus americana	White Elm	G5	S5
Ulmus pumila	Siberian Elm	GNR	SNA
Verbascum thapsus	Common Mullein	GNR	SNA
Vicia cracca	Cow Vetch	GNR	SNA

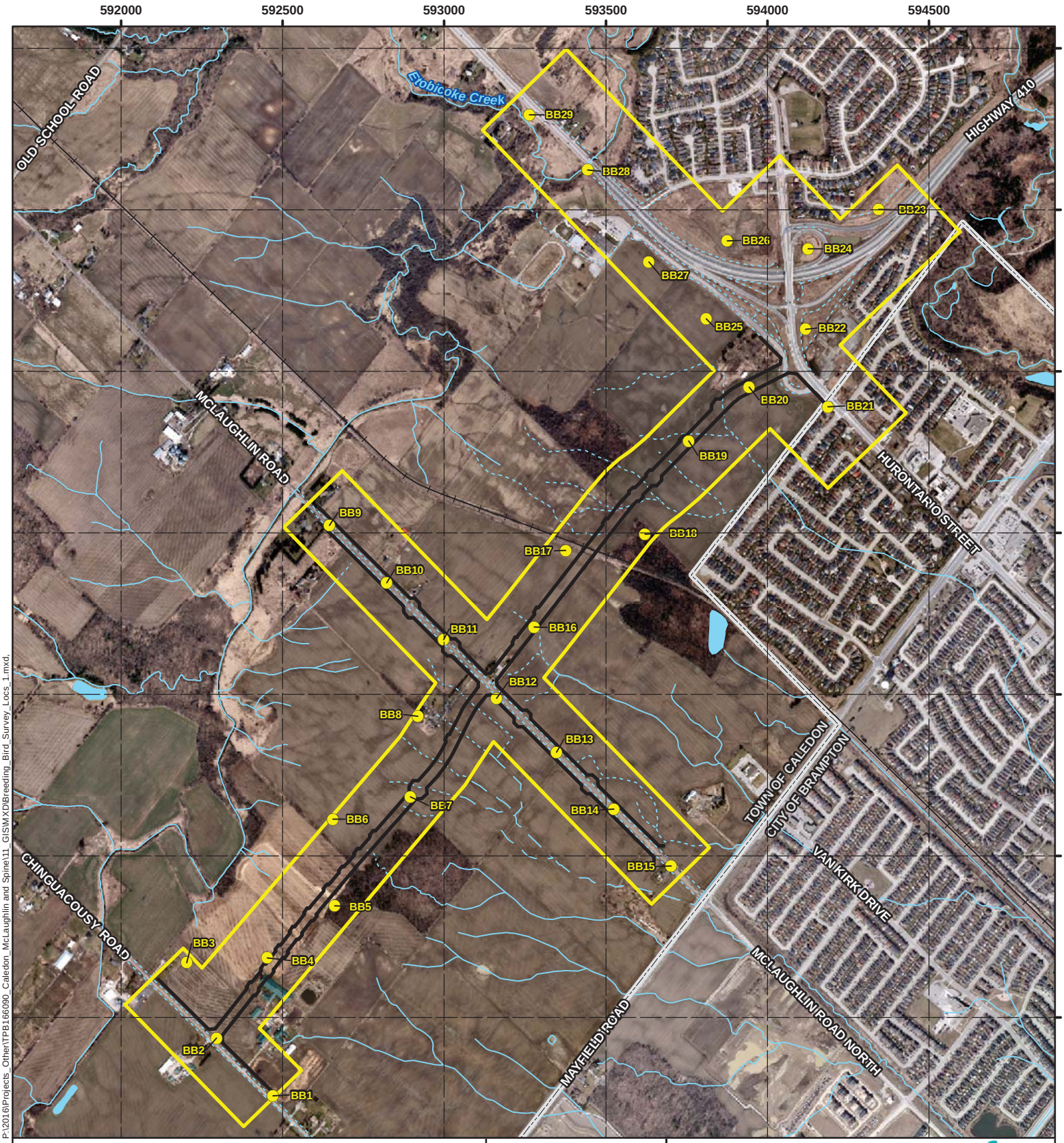
Scientific Name	Common Name	Global Rank	Provincial Rank
Viola sp.	Violet sp.	--	--
Vitis riparia	Riverbank Grape	G5	S5

Global Rank: G4 Apparently Secure; G5 Secure; T rank applies to a subspecies or variety; NR Not Ranked (not yet assessed); NA Not Applicable (not suitable target for conservation activities); U Unrankable (data deficient)

Provincial Rank S2 Very Rare; S4 Common and Apparently Secure; S5 Very Common and Demonstrably Secure; SNA Not Applicable/Provincially non-native, not suitable target for conservation activities; U Unrankable (data deficient)

APPENDIX E

COMPILED PLANT SPECIES LIST



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LEGEND

- Breeding Bird Survey Locations
- Proposed Road Right of Way
- Approximate Terrestrial Study Area
- Railway
- Ephemeral Watercourse
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Municipal Boundary

0 0.2 0.4 0.6 0.8 1 Kilometres

NOTES:
- Background imagery from Town of Caledon, 2016
- Roads, municipal boundary, waterbody and railway extracted from LIO, MNRF.
- Watercourse information in a combination of data from OHN, OBM, MNRF constructed drains, Peel Region, and Dougan Associates. Watercourses outside of the terrestrial study area that did not have permanency information were assigned a default value iof "Permanent."

Datum & Projection: NAD 1983 UTM Zone 17N

N W E S

TOWN OF CALEDON

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McLAUGHLIN ROAD AND SPINE ROAD CLASS EA

Breeding Bird Survey Locations

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PROJECT N°: TPB166090 | **FIGURE:** Appendix D

SCALE: 1:16,000 | DATE: July 2017

APPENDIX F

RESULTS OF THE BREEDING BIRD SURVEYS

Compiled Wildlife Species List

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Birds							
Accipiter cooperii	Cooper's Hawk	L4	S4	G5			1,4,7
Accipiter striatus	Sharp-shinned Hawk	L3	S5	G5			1,7
Actitis macularius	Spotted Sandpiper	L4	S5	G5			1,4,7
Agelaius phoeniceus	Red-winged Blackbird	L5	S4	G5			1,4,5,6,7
Aix sponsa	Wood Duck	L4	S5	G5			1,4,5,7
Ammodramus savannarum	Grasshopper Sparrow [α]	L2	S4B	G5	SC		1,5,7
Anas platyrhynchos	Mallard	L5	S5	G5			1,4,5,6,7
Anthus rubescens	American Pipit		S4	G5			5,7
Antrostomus vociferus	Eastern Whip-poor-will [α]	L2	S4B	G5	THR	THR	7
Archilochus colubris	Ruby-throated Hummingbird	L4	S5B	G5			1,4,7
Ardea alba	Great Egret	L3	S2B	G5			4
Ardea Herodias	Great Blue Heron	L3	S4	G5			1,4,5,6,7
Asio flammeus	Short-eared Owl [α]	LX	S2N, S4B	G5	SC	SC	5,7
Bartramia longicauda	Upland Sandpiper	L2	S4B	G5			1,5,7
Bombycilla cedrorum	Cedar Waxwing	L5	S5B	G5			1,4,5,7
Bonasa umbellus	Ruffed Grouse	L3	S4	G5			1,7
Branta Canadensis	Canada Goose	L5	S5	G5			1,4,6,7
Bubo virginianus	Great Horned Owl	L4	S4	G5			1,4,5,7
Buteo jamaicensis	Red-tailed Hawk	L5	S5	G5			1,4,5,7
Buteo lineatus	Red-shouldered Hawk [α]	L2	S4B	G5			4
Butorides virescens	Green Heron	L4	S4B	G5			1,4,5,7
Cardinalis cardinalis	Northern Cardinal	L5	S5	G5			1,4,5,6,7
Cathartes aura	Turkey Vulture	L5	S5B	G5			4,5,7
Catharus fuscescens	Veery	L2	S4B	G5			4,7
Catharus guttatus	Hermit Thrush	L3	S5B	G5			4
Catharus ustulatus	Swainson's Thrush		S4B	G5			4
Certhia americana	Brown Creeper	L3	S5B	G5			1,4,7
Chaetura pelagica	Chimney Swift [α]	L4	S4B, S4N	G5	THR	THR	1,7
Charadrius semipalmatus	Semipalmated Plover		S4B, S4N	G5			4
Charadrius vociferus	Killdeer	L4	S5B, S5N	G5			1,4,5,7
Chordeiles minor	Common Nighthawk	L3	S4B	G5	SC	THR	1,7
Circus cyaneus	Northern Harrier [α]	L2	S4B	G5			1,7
Cistothorus palustris	Marsh Wren	L2	S4B	G5			1,7
Cistothorus platensis	Sedge Wren	L3	S4B	G5			1,5,7
Coccyzus americanus	Yellow-billed Cuckoo	L3	S4B	G5			1,5,7
Coccyzus erythropthalmus	Black-billed Cuckoo [α]	L3	S5B	G5			1,5,7
Colaptes auratus	Northern Flicker [α]	L4	S4B	G5			1,4,5,7
Columba livia	Rock Pigeon	L+	SNA	G5			1,4,5,7

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Contopus virens	Eastern Wood-Pewee α	L4	S4B	G5	SC		1,4,5,7,9
Corvus bracyrhynchos	American Crow	L5	S5B	G5			1,4,5,6,7
Cyanocitta cristata	Blue Jay	L5	S5	G5			1,4,5,7
Dolichonyx oryzivorus	Bobolink α	L2	S4B	G5	THR		1,4,5,7,8,9
Dryocopus pileatus	Pileated Woodpecker	L3	S5	G5			1,4,5,7
Dumetella carolinensis	Gray Catbird	L4	S4B	G5			1,4,5,7
Empidonax alnorum	Alder Flycatcher	L3	S5B	G5			1,7
Empidonax minimus	Least Flycatcher	L3	S4B	G5			1,4,7
Empidonax traillii	Willow Flycatcher α	L4	S5B	G5			1,4,5,7
Eremophila alpestris	Horned Lark	L3	S5B	G5			1,4,5,7
Falco sparverius	American Kestrel α	L4	S4	G5			1,4,5,7
Fulica Americana	American Coot	L2	S4B	G5			1,4,7
Gallinago delicate	Wilson's Snipe	LX	S5B	G5			1,7
Gallinula chloropus	Common Gallinule	L2	S4B	G5			1,7
Geothlypis philadelphia	Mourning Warbler	L3	S4B	G5			1,4,5,7
Geothlypis trichas	Common Yellowthroat	L4	S5B	G5			1,4,5,7
Haemorhous mexicanus	House Finch	L+	SNA	G5			1,4,7
Haemorhous purpureus	Purple Finch	L4	S4B	G5			4,7
Hirundo rustica	Barn Swallow	L4	S4B	G5	THR		1,4,5,7,9
Hydroprogne caspia	Caspian Tern	L3	S3B	G5			4
Hylocichla mustelina	Wood Thrush α	L3	S4B	G4	SC		1,4,5,7,9
Icterus galbula	Baltimore Oriole α	L5	S4B	G5			1,4,5,7
Icterus spurius	Orchard Oriole	L5	S4B	G5			1,7
Larus argentatus	Herring Gull	L4	S5B, S5N	G5			4
Larus delawarensis	Ring-billed Gull	L4	S5B, S4N	G5			4,5,7
Lophodytes cucullatus	Hooded Merganser	L3	S5B, S5N	G5			7
Megaceryle alcyon	Belted Kingfisher α	L4	S4B	G5			1,4,5,7
Megascops asio	Eastern Screech-Owl	L3	S4	G5			1,5,7
Melanerpes carolinus	Red-bellied Woodpecker	L4	S4	G5			1,4,5,7
Melanerpes erythrocephalus	Red-headed Woodpecker α	L3	S4B	G5	SC	THR	7
Meleagris gallopavo	Wild Turkey	L3	S5	G5			1,7
Melospiza georgiana	Swamp Sparrow	L4	S5B	G5			1,5,7
Melospiza lincolnii	Lincoln's Sparrow		S5B	G5			
Melospiza melodia	Song Sparrow	L5	S5B	G5			1,4,5,7
Mimus polyglottos	Northern Mockingbird	L5	S4	G5			1,4,7
Mniotilta varia	Black-and-white Warbler	L2	S5B	G5			1,4,7
Molothrus ater	Brown-head Cowbird	L5	S4B	G5			1,4,5,7
Myiarchus crinitus	Great Crested Flycatcher	L4	S4B	G5			1,4,5,7
Nycticorax nycticorax	Black-crowned Night-Heron	L3	S3B, S3N	G5			4
Oreothlypis ruficapilla	Nashville Warbler	L3	S5B	G5			1,7
Oxyura jamaicensis	Ruddy Duck		S4B, S4N	G5			1,7

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Pandion haliaetus	Osprey	L3	S5B	G5			1,7
Parkesia noveboracensis	Northern Waterthrush	L3	S5B	G5			1,4,7
Passer domesticus	House Sparrow	L+	SNA	G5			1,4,6,7
Passerculus sandwichensis	Savannah Sparrow α	L4	S4B	G5			1,4,5,7
Passerina cyanea	Indigo Bunting	L4	S4B	G5			1,4,5,7
Petrochelidon pyrrhonota	Cliff Swallow	L5	S4B	G5			4,5,7
Phasianus colchicus	Ring-necked Pheasant	L+	SNA	G5			1,7
Pheucticus ludovicianus	Rose-breasted Grosbeak α	L4	S4B	G5			1,4,5,7
Picoides pubescens	Downy Woodpecker	L5	S5	G5			1,4,5,7
Picoides villosus	Hairy Woodpecker	L4	S5	G5			1,4,5,7
Pipilo erythrophthalmus	Eastern Towhee α	L3	S4B	G5			7
Piranga olivacea	Scarlet Tanager	L3	S4B	G5			1,4,7
Podilymbus podiceps	Pied-billed Grebe	L3	S4B, S4N	G5			1,7
Poecile atricapillus	Black-capped Chickadee	L5	S5	G5			1,4,5,7
Polioptila caerulea	Blue-gray Gnatcatcher	L4	S4B	G5			1,7
Pooecetes gramineus	Vesper Sparrow α	L3	S4B	G5			1,4,5,7
Porzana Carolina	Sora	L3	S4B	G5			1,7
Progne subis	Purple Martin	L4	S4B	G5			6,7
Quiscalus quiscula	Common Grackle	L5	S5B	G5			1,4,5,7
Rallus limicola	Virginia Rail	L3	S5B	G5			1,7
Regulus calendula	Ruby-crowned Kinglet		S4B	G5			4
Regulus satrapa	Golden-crowned Kinglet	L3	S5B	G5			7
Riparia riparia	Bank Swallow α	L3	S4B	G5	THR		1,4,7
Sayornis phoebe	Eastern Phoebe	L5	S5B	G5			1,4,5,7
Scolopax minor	American Woodcock	L3	S4B	G5			1,4,5,7
Seiurus aurocapilla	Ovenbird	L2	S4B	G5			1,4,5,7
Setophaga americana	Northern Parula	L2	S4B	G5			4
Setophaga caerulescens	Black-throated Blue Warbler	L3	S5B	G5			4
Setophaga citrina	Hooded Warbler α	L2	S4B	G5		THR	7
Setophaga coronata	Yellow-rumped Warbler	L3	S5B	G5			4
Setophaga fusca	Blackburnian Warbler	L3	S5B	G5			1,4,7
Setophaga magnolia	Magnolia Warbler	L3	S5B	G5			4,7
Setophaga pensylvanica	Chestnut-sided Warbler	L3	S5B	G5			1,4,7
Setophaga petechia	Yellow Warbler	L5	S5B	G5			1,4,5,7
Setophaga pinus	Pine Warbler	L4	S5B	G5			1,7
Setophaga ruticilla	American Redstart	L3	S5B	G5			1,4,5,7
Setophaga virens	Black-throated Green Warbler	L3	S5B	G5			1,4,7
Sialia sialis	Eastern Bluebird	L4	S5B	G5			7
Sitta canadensis	Red-breasted Nuthatch	L4	S5	G5			1,4,7
Sitta carolinensis	White-breasted Nuthatch	L4	S5	G5			1,4,5,7
Sphyrapicus varius	Yellow-bellied Sapsucker	L3	S5B	G5			4

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Spinus tristis	American Goldfinch	L5	S5B	G5			1,4,5,6,7
Spizella pallida	Clay-colored Sparrow	L3	S4B	G5			1,7
Spizella passerina	Chipping Sparrow	L5	S5B	G5			1,4,5,7
Spizella pusilla	Field Sparrow [α]	L3	S4B	G5			1,4,7
Stelgidopteryx serripennis	Northern Rough-winged Swallow	L4	S4B	G5			1,4,7
Sturnella magna	Eastern Meadowlark [α]	L3	S4B	G5	THR		1,4,5,7,8,9
Sturnus vulgaris	European Starling	L+	SNA	G5			1,4,5,6,7
Tachycineta bicolor	Tree Swallow	L4	S4B	G5			1,4,5,7
Thryothorus ludovicianus	Carolina Wren	L4	S4	G5			4
Toxostoma rufum	Brown Thrasher [α]	L3	S4B	G5			1,4,5,7
Troglodytes aedon	House Wren	L5	S5B	G5			1,4,5,7
Troglodytes hiemalis	Winter Wren	L3	S5B	G5			5,7
Turdus migratorius	American Robin	L5	S5B	G5			1,4,5,6,7
Tyrannus tyrannus	Eastern Kingbird [α]	L4	S4B	G5			1,4,5,7
Vermivora cyanoptera	Blue-winged Warbler [α]	L3	S4B	G5			7
Vireo gilvus	Warbling Vireo	L5	S5B	G5			1,4,5,7
Vireo olivaceus	Red-eyed Vireo	L4	S5B	G5			1,4,5,7
Vireo solitaries	Blue-headed Vireo	L3	S5B	G5			1,7
Zenaida macroura	Mourning Dove	L5	S5	G5			1,4,5,6,7
Zonotrichia albicollis	White-throated Sparrow	L3	S5B	G5			4,5,7
Zonotrichia leucophrys	White-crowned Sparrow		S4B	G5			4
Mammals							
	Unknown Shrew Species						5,7
	Unknown Bat Species						4,5,7
Blarina brevicauda	Northern Short-tailed Shrew	L3	S5	G5			2
Canis latrans	Coyote	L4	S5	G5			2,4,5,7
Castor canadensis	Beaver	L4	S5	G5			2,4,5,7
Condylura cristata	Star-nosed Mole	L3	S5	G5			2
Didelphis virginiana	Virginia Opossum	L4	S4	G5			2,4,7
Eptesicus fuscus	Big Brown Bat	L4	S4	G5			2*
Erethizon dorsatum	Porcupine	L2	S5	G5			2,7
Glaucomys sabrinus	Northern Flying Squirrel	L2	S5	G5			2
Lasionycteris noctivagans	Silver-haired Bat		S4	G3G4			2*
Lasiurus borealis	Eastern Red Bat	LX	S4	G3G4			2*
Lasiurus cinereus	Hoary Bat	LX	S4	G3G4			2*
Lepus americanus	Snowshoe Hare	LX	S5	G5			2
Lepus europaeus	European Hare	LX	SNA	G5			2,4
Mamota monax	Woodchuck	L5	S5	G5			2,4
Mephitis mephitis	Striped Skunk	L5	S5	G5			2,4,7
Microtus pennsylvanicus	Meadow Vole	L4	S5	G5			2,4
Mus musculus	House Mouse	LX	SNA	G5			2

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Mustela ermine	Ermine	L3	S5	G5			2
Mustela frenata	Long-tailed Weasel	LX	S4	G5			2,4
Myotis leibii	Eastern Small-footed Myotis		S2S3	G4	END		2*,9
Myotis lucifuga	Little Brown Myotis	L4	S4	G3	END	END	2*,9
Myotis septentrionalis	Northern Long-eared Myotis		S3	G1G2	END	END	2*,9
Napaeozapus insignis	Woodland Jumping Mouse	L2	S5	G5			2
Neovison vison	American Mink	L4	S4	G5			2,4
Odocoileus virginianus	White-tailed Deer	L4	S5	G5			2,4,5,7
Ondatra zibethicus	Muskrat	L4	S5	G5			2,4
Parascalops breweri	Hairy-tailed Mole	L3	S4	G5			2
Perimyotis subflavus	Tri-colored Bat		S3?	G2G3	END	END	2*,9
Peromyscus leucopus	White-footed Mouse	L4	S5	G5			2
Peromyscus maniculatus	Deer Mouse	L4	S5	G5			2
Procyon lotor	Raccoon	L5	S5	G5			2,4,5,7
Rattus norvegicus	Norway Rat	LX	SNA	G5			2
Sciurus carolinensis	Eastern Gray Squirrel	L5	S5	G5			2,4,5,6,7
Sorex cinereus	Common Shrew	L3	S5	G5			2
Sorex fumeus	Smoky Shrew		S5	G5			2
Sorex hoyi	Pygmy Shrew		S4	G5			2
Sylvilagus floridanus	Eastern Cottontail	L4	S5	G5			2,4,5,7
Synaptomys cooperi	Southern Bog Lemming		S4	G5			2
Tamias striatus	Eastern Chipmunk	L4	S5	G5			2,4,5,7
Tamiasciurus hudsonicus	Red Squirrel	L4	S5	G5			2,4,7
Vulpes vulpes	Red Fox	L4	S5	G5			2,4,7
Zapus hudsonius	Meadow Jumping Mouse	L3	S5	G5			2,4,5,7
Amphibians							
Ambystoma hybrid	Jefferson 'Complex' Salamander	L1					4
Ambystoma maculatum	Spotted Salamander	L1	S4	G5			4
Anaxyrus americanus	American Toad	L4	S5	G5			3,4,5,7
Hyla versicolor	Gray Treefrog	L2	S5	G5			3,4,5,7
Lithobates catesbeiana	American Bullfrog	L2	S4	G5			4
Lithobates clamitans	Green Frog	L4	S5	G5			3,4,5,6,7
Lithobates pipiens	Northern Leopard Frog	L3	S5	G5			3,4,5,6,7
Lithobates septentrionalis	Mink Frog	L2	S5	G5			3
Lithobates sylvatica	Wood Frog	L2	S5	G5			3,4,5,7
Notophthalmus viridescens	Red-spotted Newt	L2	S5	G5T5			3
Plethodon cinereus	Eastern Red-backed Salamander	L3	S5	G5			3,4
Pseudacris crucifer	Spring Peeper	L2	S5	G5			3,4,5,7
Pseudacris maculate	Western Chorus Frog (Great Lakes / St. Lawrence –Canadian Shield population)	L2	S3	G5TNR		THR	3,4,5

Scientific Name	Common Name	Conservation Rank					Source
		L-Rank	S-Rank	G-Rank	ESA Status	SARA Status	
Reptiles							
Chelydra serpentina	Snapping Turtle	L3	S3	G5	SC	SC	3,4,7
Chrysemys picta marginata	Midland Painted Turtle	L3	S4	G5T5			3,4
Emydoidea blandingii	Blanding's Turtle	L1	S3	G4	THR	THR	3
Graptemys geographica	Northern Map Turtle	L2	S3	G5	SC	SC	3
Lampropeltis Triangulum	Eastern Milksnake	L3	S4	G5		SC	3,5,7
Nerodia sipedon	Northern Watersnake	LX	S5	G5T5			4
Storeria dekayi	DeKay's Brownsnake	L4	S5	G5			3,5,7
Storeria occipitomaculata	Red-bellied Snake	L3	S5	G5			3,5,7
Thamnophis sirtalis sirtalis	Eastern Gartersnake	L4	S5	G5T5			3,4,7
Trachemys scripta	Pond Slider	L+	SNA	G5			3
Invertebrates							
Danaus plexippus	Monarch		S2N, S4B	G4	SC	SC	4,5,7

[1] Shaded species are those observed/reported during AMEC 2017 site investigations

Source
1 - Second (2001-2005) Atlas of the Breeding Birds of Ontario (Cadman et al. 2007)
2 - Atlas of the Mammals of Ontario (Dobbyn 1994; Species reported in the vicinity during 1970 – 1993); Bat data supplemented by Bat Conservation International (*) (BCI 2016).
3 - Ontario Reptile & Amphibian Atlas (Ontario Nature 2016)
4 - Appendix 1 DRAFT Fletchers Creek Restoration Study Characterization Report (Credit Valley Conservation, 2012)
5 - Mayfield West, Phase 2 Secondary Plan Comprehensive Environmental Impact Study and Management Plan (AMEC 2014)
6 – Natural Heritage Existing Conditions Report Mayfield Road from Chinguacousy Road to Heart Lake Road Class Environmental Assessment (Genivar Inc., 2014)
7 – Environmental Impact Statement/Environmental Implementation Report for the Mayfield West Phase 2 Landowners Framework Plan (Hensel Design Group Inc., 2016)
8 – NHIC species occurrences (MNRF 2017b)
9 – MNRF SAR Correspondence (Appendix A)

**SARA* = Species at Risk Act
***ESA* = Endangered Species at Risk Act
[α] Indicates "priority species" as listed by Ontario Partners in Flight 2008

Global Rank: G1 Critically Imperiled; G2 Imperiled; G3 Vulnerable; G4 Apparently Secure; G5 Secure; T rank applies to a subspecies or variety; NR Not Ranked
Provincial Rank: S1 Extremely Rare; S2 Very Rare; S3 Rare to Uncommon; S4 Common and Apparently Secure; S5 Very Common and Demonstrably Secure; SNA Not Applicable/Provincially non-native, not suitable target for conservation activities; S#B Breeding; S#N Non-breeding
SARA/*ESA* Designation: END Endangered, THR Threatened, SC Special Concern

APPENDIX G

AQUATIC PHOTO APPENDIX

Photo 1: 2017-05-24, Agricultural Field (AG).

Photo 2: 2017-05-24, Agriculture with Cultural Treed Hedgerow (CUH1-A).

Photo 3: 2017-05-24, Dry-Moist Old Field Meadow (CUM1-1).

Photo 4: 2017-05-24, Exotic Cool-season Grass Meadow (CUM1-b).

Photo 5: 2017-05-24, CUM1-b with Dry-Fresh Hawthorn-Apple Deciduous Forest (FOD4-H) in background.

Photo 6: 2017-05-24, Native Deciduous Cultural Savannah (CUS1-A1).

Photo 7: 2017-05-24, Residential Property (CVR; house removed).

Photo 8: 2017-05-24, Fresh-Moist White Pine Hardwood Forest (FOMM9-2).

Photo 9: 2017-05-24, Swamp Maple Mineral Deciduous Swamp (SWD3-3).

Photo 10: Red-winged Blackbird nest in Roadside ditch.

APPENDIX H

TERRESTRIAL PHOTO APPENDIX

Breeding Bird Point Count Survey Results

Bird Species		Breeding Bird Survey Station														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
American Crow	*Corvus brachyrhynchos*		X	X	X		X	X		X						X
American Goldfinch	*Spinus tristis*	X	X	X		X	X	X	X	X		X	X	X	X	X
American Robin	*Turdus migratorius*	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Baltimore Oriole*	*Icterus galbula*		X					X	X			X				
Barn Swallow	*Hirundo rustica*		X	X	X	X	X	X	X	X	X	X	X			X
Belted Kingfisher*	*Megaceryle alcyon*										X					
Black-capped Chickadee	*Poecile atricapilla*	X	X	X		X			X							
Blue Jay	*Cyanocitta cristata*	X		X	X	X	X	X	X	X		X	X			
Brown Thrasher*	*Toxostoma ater*					X										
Brown-headed Cowbird	*Molthrus ater*	X		X						X	X					X
Canada Goose	*Branta canadensis*			X								X				
Cedar Waxwing	*Bombycilla cedrorum*		X							X			X		X	X
Chipping Sparrow	*Spizella passerina*	X	X					X	X			X	X			
Common Grackle	*Quiscalus quiscula*	X		X		X		X		X	X	X				
Common Yellowthroat	*Geothlypis trichas*															
Downy Woodpecker	*Picoides pubescens*					X										
Eastern Bluebird	*Sialia sialis*								X			X	X			
Eastern Kingbird*	*Tyrannus tyrannus*					X	X		X			X				
Eastern Wood-pewee*	*Contopus virens*					X	X									
European Starling	*Sturnus vulgaris*	X	X	X	X				X	X	X	X		X		X
Gray Catbird	*Dumetella carolinensis*				X											
Great Blue Heron	*Ardea herodias*															
Great Crested Flycatcher	*Myiarchus crinitus*				X	X	X									
Herring Gull	*Larus argentatus*	X			X										X	X
Horned Lark	*Eremophila alpestris*	X	X	X	X	X	X	X	X		X	X	X	X	X	X
House Finch	*Haemorhous mexicanus*									X						X
House Sparrow	*Passer domesticus*	X	X	X	X	X					X	X				
House Wren	*Troglodytes aedon*															
Indigo Bunting	*Passerina cyanea*			X		X										
Killdeer	*Charadrius vociferus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lincoln's Sparrow	*Melospiza lincolnii*					X	X									
Mallard	*Anas platyrhynchos*		X													
Mourning Dove	*Zenaida macroura*		X	X						X	X				X	
Northern Cardinal	*Cardinalis cardinalis*				X						X					
Northern Flicker*	*Colaptes auratus*		X													
Pileated Woodpecker	*Dryocopus pileatus*					X										
Red-bellied Woodpecker	*Melanerpes carolinus*						X									
Red-breasted Nuthatch	*Sitta canadensis*						X									
Red-eyed Vireo	*Vireo olivaceus*								X							
Red-tailed Hawk	*Buteo jamaicensis*					X	X	X				X		X	X	
Red-winged Blackbird	*Agelaius phoeniceus*	X	X	X			X		X	X	X	X	X	X	X	X
Ring-billed Gull	*Larus delawarensis*			X	X	X	X	X		X	X	X		X	X	X
Rock Pigeon	*Columba livia*														X	X
Rose-breasted Grosbeak*	*Pheucticus ludovicianus*					X										
Savannah Sparrow*	*Passerculus sandwichensis*	X	X	X	X		X	X	X	X	X		X	X	X	
Song Sparrow	*Melospiza melodia*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spotted Sandpiper	*Actitis macularius*															

Bird Species		Breeding Bird Survey Station														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Swamp Sparrow	*Melospiza georgiana*															
Turkey Vulture	*Cathartes aura*									X		X				
Veery	*Catharus fuscescens*															
Vesper Sparrow*	*Pooecetes gramineus*						X	X	X				X	X		
Warbling Vireo	*Vireo gilvus*									X						
White-breasted Nuthatch	*Sitta carolinensis*								X							
Wood Thrush*	*Hylocichla mustelina*					X	X									
Yellow Warbler	*Setophaga petechia*					X										
Yellow-bellied Sapsucker	*Sphyrapicus varius*															

* Indicates “priority species” as listed by Ontario Partners in Flight 2008

(Cont'd) Breeding Bird Point Count Survey Results

Bird Species		Breeding Bird Survey Station													
		16	17	18	19	20	21	22	23	24	25	26	27	28	29
American Crow	*Corvus brachyrhynchos*		X								X			X	
American Goldfinch	*Spinus tristis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Robin	*Turdus migratorius*	X	X	X	X	X	X			X	X	X		X	X
Baltimore Oriole*	*Icterus galbula*	X	X											X	
Barn Swallow	*Hirundo rustica*	X	X		X						X			X	
Belted Kingfisher*	*Megaceryle alcyon*													X	
Black-capped Chickadee	*Poecile atricapilla*	X	X	X										X	X
Blue Jay	*Cyanocitta cristata*	X	X	X	X		X								X
Brown Thrasher*	*Toxostoma ater*		X	X											
Brown-headed Cowbird	*Molthrus ater*		X	X	X	X	X	X		X	X			X	X
Canada Goose	*Branta canadensis*				X						X	X			
Cedar Waxwing	*Bombycilla cedrorum*		X	X		X	X							X	X
Chipping Sparrow	*Spizella passerina*														
Common Grackle	*Quiscalus quiscula*				X	X		X	X	X				X	
Common Yellowthroat	*Geothlypis trichas*													X	
Downy Woodpecker	*Picoides pubescens*			X											
Eastern Bluebird	*Sialia sialis*														
Eastern Kingbird*	*Tyrannus tyrannus*											X			
Eastern Wood-pewee*	*Contopus virens*														
European Starling	*Sturnus vulgaris*	X	X		X	X	X		X	X	X	X		X	
Gray Catbird	*Dumetella carolinensis*														
Great Blue Heron	*Ardea herodias*											X			
Great Crested Flycatcher	*Myiarchus crinitus*														
Herring Gull	*Larus argentatus*														
Horned Lark	*Eremophila alpestris*	X	X	X	X	X					X	X	X		
House Finch	*Haemorhous mexicanus*									X					
House Sparrow	*Passer domesticus*	X					X	X		X				X	
House Wren	*Troglodytes aedon*			X	X	X									
Indigo Bunting	*Passerina cyanea*														
Killdeer	*Charadrius vociferus*	X			X	X	X	X			X		X		
Lincoln's Sparrow	*Melospiza lincolnii*														
Mallard	*Anas platyrhynchos*								X	X	X		X		X
Mourning Dove	*Zenaida macroura*					X	X	X	X	X	X	X			
Northern Cardinal	*Cardinalis cardinalis*		X	X	X	X			X		X			X	X
Northern Flicker*	*Colaptes auratus*							X							X
Pileated Woodpecker	*Dryocopus pileatus*														
Red-bellied Woodpecker	*Melanerpes carolinus*														
Red-breasted Nuthatch	*Sitta canadensis*														
Red-eyed Vireo	*Vireo olivaceus*														
Red-tailed Hawk	*Buteo jamaicensis*		X												
Red-winged Blackbird	*Agelaius phoeniceus*	X	X		X	X	X	X	X	X	X	X	X	X	X
Ring-billed Gull	*Larus delawarensis*	X	X	X	X	X	X		X	X		X	X		
Rock Pigeon	*Columba livia*						X	X							
Rose-breasted Grosbeak*	*Pheucticus ludovicianus*			X											

Bird Species		Breeding Bird Survey Station													
		16	17	18	19	20	21	22	23	24	25	26	27	28	29
Savannah Sparrow*	*Passerculus sandwichensis*	X			X	X				X	X	X	X		
Song Sparrow	*Melospiza melodia*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spotted Sandpiper	*Actitis macularius*					X						X	X		
Swamp Sparrow	*Melospiza georgiana*											X			
Turkey Vulture	*Cathartes aura*													X	
Veery	*Catharus fuscescens*			X											
Vesper Sparrow*	*Pooecetes gramineus*	X	X												
Warbling Vireo	*Vireo gilvus*														
White-breasted Nuthatch	*Sitta carolinensis*														
Wood Thrush*	*Hylocichla mustelina*														
Yellow Warbler	*Setophaga petechia*													X	X
Yellow-bellied Sapsucker	*Sphyrapicus varius*			X											

* Indicates “priority species” as listed by Ontario Partners in Flight 2008