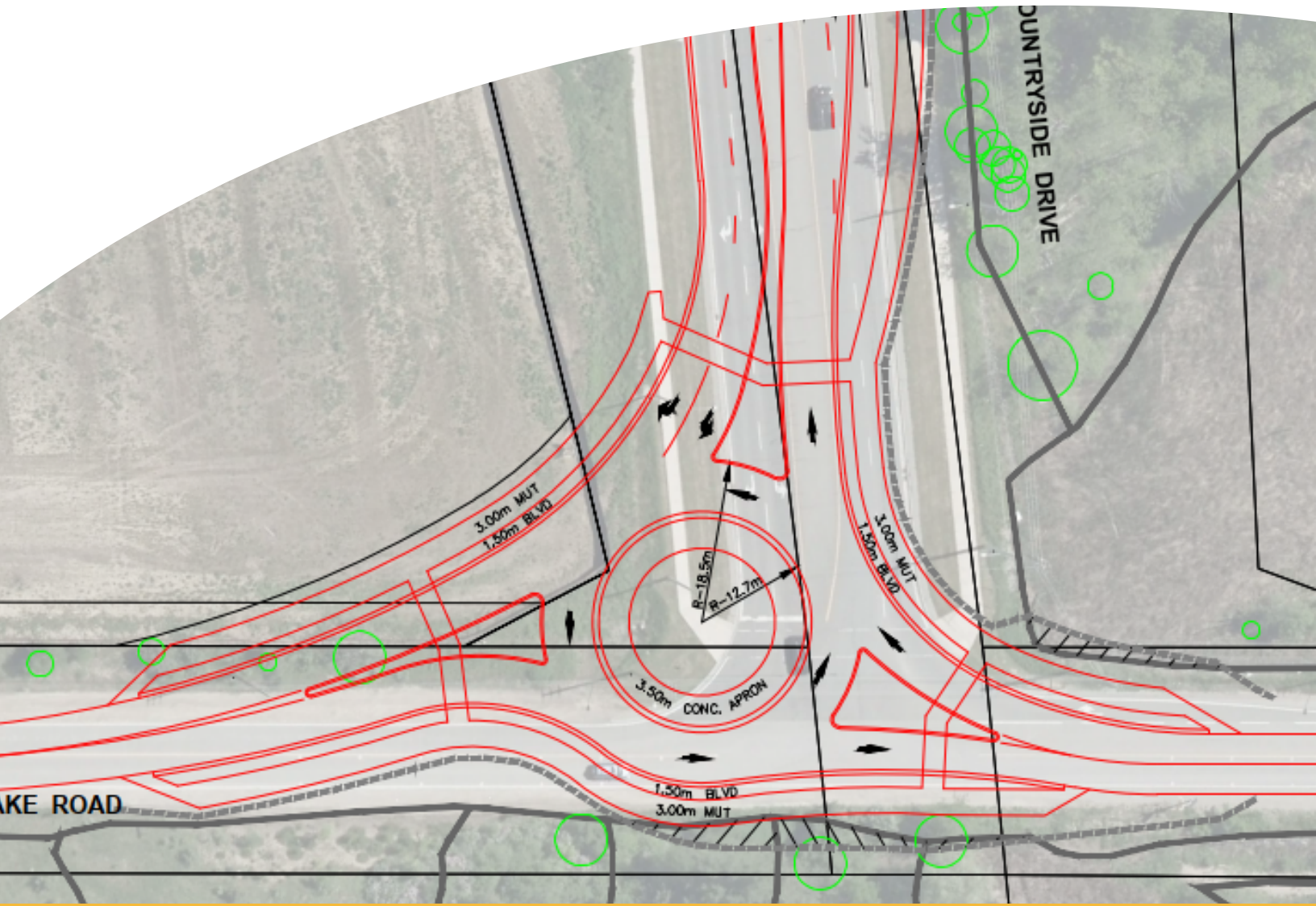


Heart Lake Road at Countryside Drive

Schedule B Class Environmental Assessment

Project Study Report - Volume I (Report)

December 2022





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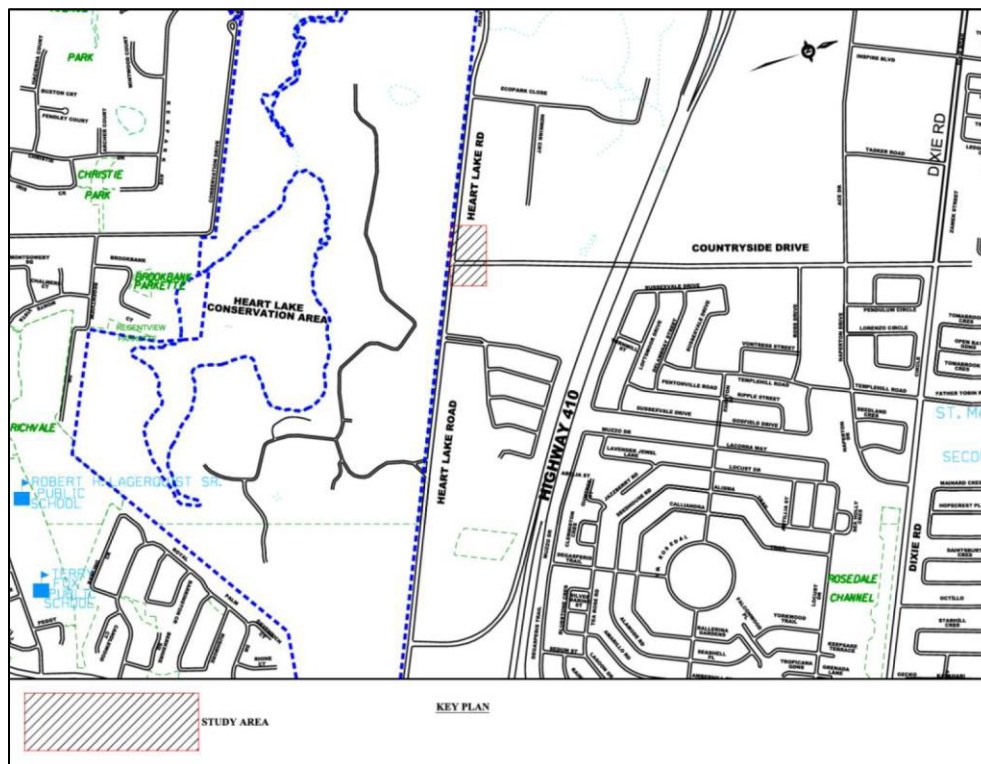
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Executive Summary

The City of Brampton initiated a Schedule 'B' Class Environmental Assessment (Class EA) for improvements to the intersection of Heart Lake Road and Countryside Drive. The City identified the need for improvements to this intersection as part of an overall operational and safety improvement for the Heart Lake Road Corridor. In 2019, the City completed a "Function and Design Review of Heart Lake Rd." which identified improvements were required at Heart Lake Road and Countryside Drive, which served as background for this Class EA.

The study limits for the Heart Lake Road at Countryside Drive Class Environmental Assessment are illustrated in the following key plan.



This study was managed and directed by a number of advisory groups and teams who were part of various meetings throughout the project. They included:

- Project Team: City of Brampton staff and consultants.
- Technical Advisory Committee: City of Brampton, Region of Peel, TRCA, project consultants and various utility companies.
- Stakeholders Group: City of Brampton, TRCA, MTO, local property owners and developers and interested citizens.

A Natural Environment Report was completed for this project which highlights the key policy, regulatory and legislative requirements to ensure that recommended improvements are in conformity with the existing policy framework.

The study area is near and adjacent to a sensitive environmental area, including the Heart Lake Conservation Area. Several significant natural features have been identified in the area as follows:

- Significant Wetlands
- Significant Woodlands
- Significant Wildlife Habitat
- Significant Habitat for Endangered and Threatened Species
- Significant Area of Natural and Scientific Interest.

The recommendation of the Natural Environment Report is that the intersection improvements avoid significant natural heritage features south of Countryside Drive and west of Heart Lake Road to the greatest extent feasible and have due regard for extant wildlife crossing structures and wildlife movement patterns.

An Archaeological Stage 1 Assessment was completed for the Study Area. There were several areas identified that do not require any further archaeological assessment, but based on the recommended alternative, there are some small areas that require further Stage 1 or Stage 2 assessments, prior to any construction occurring. A Cultural Heritage Assessment completed in and adjacent to the Study Area, found that 10881 Heart Lake Road, and the Heart Lake Road Corridor is a Built Heritage Resource.

A Drainage Study recommends that a Low Impact Development (LID) drainage alternative be utilized for the Heart Lake Rd and Countryside Drive intersection improvements, to address water quality and quantity impact mitigation given the proximity of wetlands and natural habitat. A preliminary design has been developed, but as part of detail design the actual details of the design must be confirmed and reviewed by the TRCA.

A Geotechnical Investigation found that subsurface conditions are adequate to construct a new road base structure. However, given the high-water table in the area, additional investigations should be undertaken prior to construction to ensure that the groundwater table is not unduly impacted. A Phase 1 Environmental Site Assessment did not find any historical evidence of ground or groundwater contamination, but as part of subsequent preconstruction geotechnical work during detail design, additional soil sampling should be undertaken to determine if any excavated soil will conform to Ontario Regulation 406/19.

To determine what improvements are required at the Heart Lake Rd and Countryside Drive intersection, a traffic study was undertaken that found the following:

- A sight distance review confirmed there is more than adequate approach and departure sight distance available. However, even with the adequate sight distance available a high frequency of collisions is occurring. The reported collisions were determined to be attributed to aggressive driver behavior. This resulting situation correlates with the poor operations during the peak hours stemming from a lack of gaps within the traffic stream along Heart Lake Road leading to drivers taking increased risk and more aggressive maneuvers. Based

upon these findings it alludes the current intersection traffic control warrants improvement.

- The intersection of Heart Lake Road/Countryside Drive was found to fall just short of meeting threshold criteria for the consideration of traffic signal control under base year traffic conditions. Under projected 2031 and 2041 traffic conditions the intersection meets the signal justification criteria.
- Under traffic signal control the intersection is predicted to operate at acceptable levels of service and well within capacity under 2041 traffic conditions. In addition to traffic signal control to mitigate the poor operations, roundabout control was investigated. It was determined Heart Lake Road/Countryside Drive would be suitable for roundabout implementation.
- Three roundabout configurations were investigated where it was determined a single-lane roundabout with single lane entry on the northbound and southbound approaches along with dual lane entry on the westbound approach would operate at acceptable levels of service and well within capacity under 2041 traffic conditions.

Based on the traffic study and the various investigations, a Problem/Opportunity Statement was developed for the project as follows:

Improve the safety and operations of the Heart Lake Road and Countryside Drive intersection including meeting the traffic demand of increasing population and growth while incorporating traffic calming and wildlife mortality reduction recommendations for the Heart Lake Road Corridor.

Three alternative design concepts were developed to address the project.

- Do Nothing.
- Signalized Intersection with turn lanes.
- Roundabout.

Each of these alternatives were evaluated based on various criteria as follows:

- Natural Environment.
- Planning Objectives.
- Social and Cultural Environment.
- Economic Development.
- Engineering and Technical.

The roundabout design concept was evaluated as the best solution for the Heart Lake Road at Countryside Drive intersection. In summary this ranking reflects the fact that a roundabout has minimal impacts on the wetlands, will slow down all traffic, opportunities to enhance the visual landscape, and results in less idling/congestion and has lower maintenance costs once the roundabout is constructed (i.e., no traffic signal operating or maintenance costs).

The roundabout alternative was presented at a virtual Public Information Centre from April 14, 2022, to May 13, 2022. Although there was some apprehension of a roundabout being the appropriate solution, it appeared that many of the commenters were unfamiliar with roundabouts and their advantages for this project.

As a result, a roundabout is the Recommended Design for the Heart Lake Road at Countryside Drive Schedule B Class EA, and contains the following features:

- Central Island Radius of 12.7 m, and Inscribed Circle Diameter of 18.5 m;
- 3.5 m concrete apron, with approaching lane widths of 3.5 m;
- 1.5 m boulevard between the back of curb and the 3.0 m Multi-Use Trail;
- The proposed Multi-Use Trail to be installed around the roundabout to tie into proposed Multi-Use Trail on Countryside Drive, and proposed future cycle lanes on Heart Lake Road;
- Property acquisition required on north-east corner of intersection;
- Proposed Roundabout to avoid or minimize impacts on the wetlands in the area to be confirmed during detail design;
- The entry into the roundabout from Countryside Drive to consist of two lanes to accommodate WB to NB (right turning) traffic onto Heart Lake Road, and a WB to SB (left turning) traffic onto Heart Lake Road; and

1.2 The Class Environmental Assessment (EA) Process

All municipalities in Ontario are subject to the provisions of the Environmental Assessment Act (EAA) and its requirements to follow the Environmental Assessment Process for most public works projects. The Ontario Municipal Engineers Association (MEA) Municipal Class Environmental Assessment document provides municipalities with a five-phase planning procedure approved under the EAA to plan and undertake all municipal road, sewage, stormwater management, water, and transit projects. The Class EA document also serves as a public statement of the decision-making process followed by municipalities in the planning and implementation of needed infrastructure.

An important part of the Class EA process is incorporating climate change considerations. Climate change and related extreme weather events are of concern to many segments of society and sectors of the economy. Two approaches for considering and addressing climate change include:

1. Reducing a project's impact on climate change, and
2. Increasing the projects and local ecosystems resilience to climate change.

Potential impacts of climate change on the project can often be addressed by addressing the following questions:

1. How vulnerable is the project to a changing climate during its construction, operation, decommissioning or post closure?
2. Does the project directly or indirectly contribute to the vulnerability or resilience of surrounding ecosystems to climate change?
3. Are there potential impacts that climate change may exert on the proposed project that may pose a risk to the environment?
4. Are there alternative methods of carrying out the proposed project that could reduce negative impacts of climate change on the project, thereby reducing the risk to the local environment?
5. Could the project, with the impacts of future climate change factored in, result in disruption to lands or waters associated with Indigenous cultural resources?

Based on the MEA Class EA document, projects are classified as either Schedule "A", "A+", "B", or "C" projects according to their environmental significance and the effects they may impose on the environment, as well as their relative financial costs. The main difference between the classifications/schedule types is the degree to which each project may adversely affect the existing environment. Schedule "A" and "A+" projects have minimal adverse effects, while Schedule "C" projects have the potential for significant environmental effects. Accordingly, each of these classifications requires a different level of review to complete the requirements of the Class EA, and thus comply with the EAA. **Figure 1.2** illustrates the process followed in the planning and design of projects covered by a Class EA. The Class EA process incorporates Phases considered essential for compliance with the requirements of the EAA, including public consultation, which is summarized below:

Phase 1

- Identify the problem or opportunity.

Phase 2

- Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, select the project Schedule, and establish the preferred solution.
- Mandatory public and agency contact, normally in the form of a Notice of Commencement for Schedule B and C projects and as a Public Information Centre (PIC) for Schedule C projects. Notice of Study Commencement is the first mandatory point of contact.

Phase 3

- Examine alternative methods of implementing the preferred solution based on the environment, public and government agency input, anticipated environmental effects, and methods of mitigating negative effects.
- Mandatory public and agency contact, normally in the form of a PIC for Schedule C projects or as a Notice of Completion for Schedule B projects. This is the second mandatory point of contact.

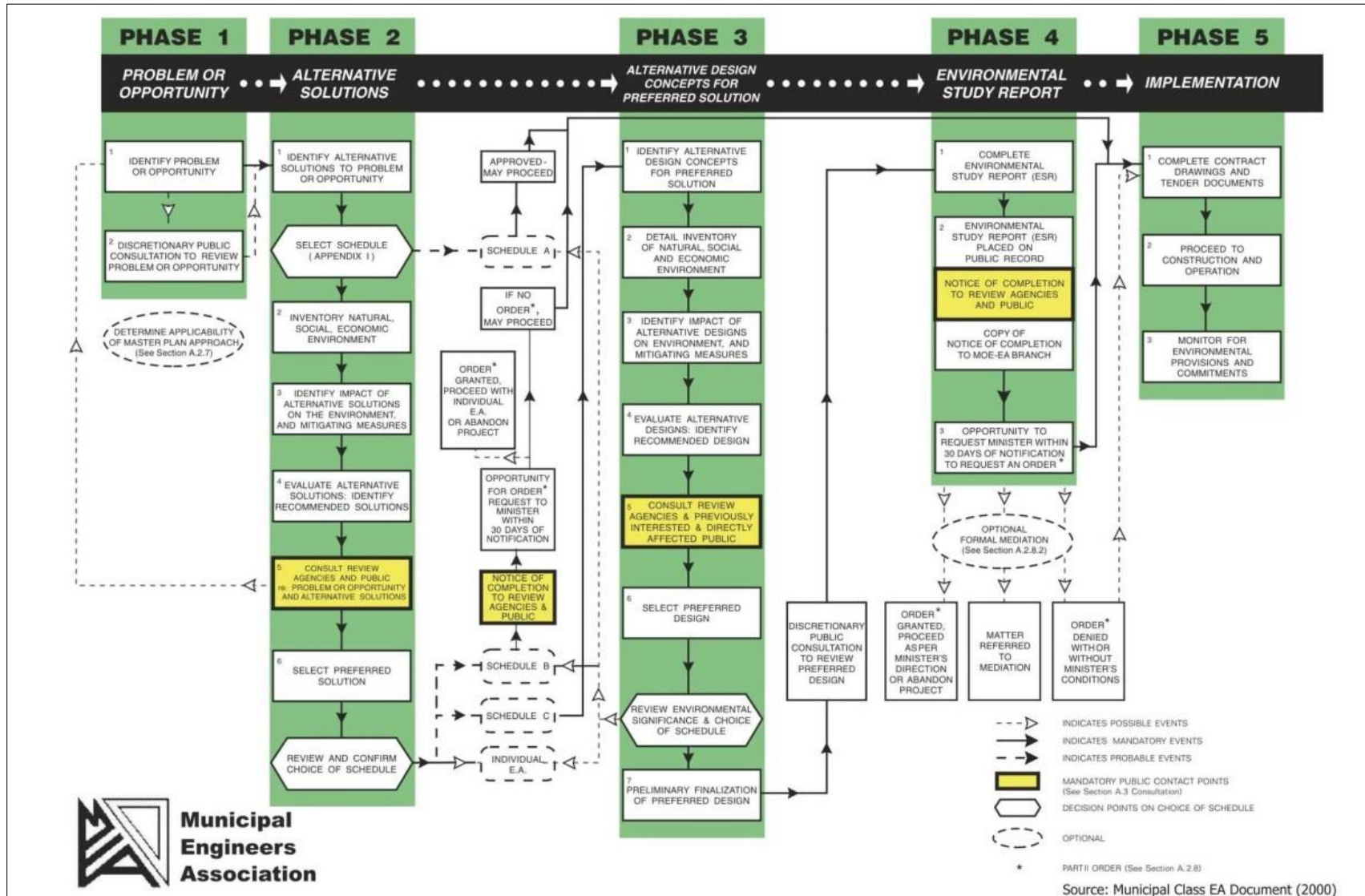
Phase 4

- Mandatory Notice of Completion of ESR (Schedule C projects only). This is the third mandatory contact point for Schedule C projects and carries a mandatory requirement to include notification of the provision on how to submit a Section 16 Order Request.
- Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design, and consultation process followed in the project and make such documentation available for scrutiny by review agencies and the public.

Phase 5

- Complete contract drawings and documents; proceed to construction and operation and monitor construction and operation (as required) for adherence to environmental provisions/commitments. This phase is optional and typically completed closer to construction.

Figure 1.2: Class Environmental Assessment (EA) Process



Public and agency consultation is an important part of the planning process. The proponent is encouraged to resolve all concerns with the public prior to issuing a Notice of Completion and commencing the public review period. This applies to addendums and full projects. However, if members of the public or review agencies feel that significant outstanding issues have not been addressed during the Class EA process they may request the Minister of the Environment, Conservation and Parks (MECP) to require a proponent to comply with Section 16 of the EA Act (which addresses individual EA's), before proceeding with a proposed undertaking – this is what is known as a “Section 16 Order”.

Additional details on the Section 16 Order process, where to send requests, timelines, and factors for the Minister making a decision can be found in Section 11.0 of this Project Study Report.

Based on the size and scope of the Heart Lake Road and Countryside Drive intersection improvement project, it was determined that it was a Schedule B project under the Municipal Class Environmental Assessment Guidelines. Schedule B projects are only subject to Phase 1 and 2 of the Class EA guidelines, prior to Phase 5 which is the Implementation Phase. However, this Heart Lake at Countryside Drive Class EA project has been planned with somewhat of a “Hybrid” process, undertaking portions of Phase 3, and also the writing of this detailed “Project Study Report” that is similar to an Environmental Study Report required under Phase 4 of the Class Environmental Assessment process. By going somewhat beyond the normal requirements of a Schedule B project, the City of Brampton is ensuring an extensive planning process has been undertaken and issues have been comprehensively studied and addressed.

1.3 Project Team Organization and Advisory Groups

The City of Brampton retained MTE Consultants Inc. (MTE) as their Prime Consultant to assist in completion of this Class EA Study. The following City and MTE staff were involved with the day-to-day management of the project:

- Ghazanfar Mohammad; City of Brampton Project Manager
- Caleb Blain, City of Brampton
- Dave Hallman, MTE Project Manager
- Jim Redman, MTE

Originally Soheil Nejatian of the City of Brampton was the City of Brampton Project Manager. However, early in the process, Ghazanfar Mohammad became the City Project Manager, and was involved with the project to completion.

Several specialty experts provided reports or studies for various aspects of this project:

- Phase 1 Environmental Site Assessment: - MTE Consultants (MTE)
- Traffic and Collision Report – Paradigm Transportation Services Limited (PTSL)
- Natural Environment – Beacon Environmental (Beacon)

- Archaeological Stage 1 Investigation – Archaeological Research Associates (ARA)
- Heritage Investigation – ARA
- Street Lighting – Mighton Engineering
- Geotechnical Investigation – MTE
- Storm Drainage Analysis - MTE

In addition, there were a number of meetings with various groups made up of the City, Region, Toronto Region Conservation (TRCA), MTO, utilities, developers, and residents, as follows:

City of Brampton Project Team

A Project Team was formed by the City of Brampton and a virtual meeting was held on October 21, 2021. Details of this meeting can be found in Appendix B. Members of the Project Team for this project are listed below.

Ghazanfar Mohammad	City of Brampton – Project Manager
Caleb Blain	City of Brampton
Bishnu Parajuli	City of Brampton
Bill Allison	City of Brampton
Jake Mete	City of Brampton
Nelson Cadette	City of Brampton
Anthony Obtinario	City of Brampton
Kevin Minaker	City of Brampton
Harsh Padhya	City of Brampton
Shane Bierness	City of Brampton
Brian Lakeman	City of Brampton
David Monaghan	City of Brampton
Julia Zalecki	City of Brampton
Cengiz Cakmak	City of Brampton
Robin Martin	City of Brampton
Nelson Melendez	City of Brampton
Kenneth Dzogan	City of Brampton
John Allison	City of Brampton
Carmen Caruso	City of Brampton
Adrian Soo	Paradigm Transportation Solutions

Dave Hallman	MTE Consultants Inc.
Samir Dhavantari	MTE Consultants Inc.
Jim Redman	MTE Consultants Inc.
Pierre Raimbault	MTE Consultants Inc.

Technical Advisory Committee (TAC)

A TAC committee was formed and a virtual meeting was held on November 22, 2021. Details of this meeting can be found in Appendix B. Members of the TAC for this project are listed below.

Ghazanfar Mohammad	City of Brampton – Project Manager
Caleb Blain	City of Brampton
Bishnu Parajuli	City of Brampton
Shane Beirnes	City of Brampton
Dave Hallman	MTE Consultants Inc.
Samir Dhavantari	MTE Consultants Inc.
Jim Redman	MTE Consultants Inc.
Dan Westerhof	Beacon Environmental
Suzanne Bevan	TRCA
Emma Benko	TRCA
Jason Solnik	TRCA
Brennan Paul	TRCA
Dilnesaw Chekol	TRCA
Mohammad Hassan	Region of Peel
Sandy Lovisotto	Region of Peel
Jolene Fonseca	Region of Peel
Grace Mulcahay	Region of Peel
Sabbir Saiyed	Region of Peel
Syeda Banuri	Region of Peel
William Toy	Region of Peel
Jason De Luca	Region of Peel
Nedeen Wajdi-Houjeily	Hydro-One
Ryan Gulyas	Rogers

Joel Lacombe	Alectra
Dave Robinson	Alectra
Peter Rutowski	Allstream
Rachel Marrozo	Enbridge
Lori Waite	Enbridge
Darryl Dimitroff	Enbridge
Michael Aruta	Hydro One
Ryan Figueiredo	Rogers

Stakeholders Group (SHG)

A Stakeholder Group was formed based on people indicating their interest in being advised of the project from the Notice of Commencement, and/or just general enquiries. A SHG committee was formed and a virtual meeting was held on February 25, 2022. Details of this meeting can be found in Appendix B. Members of the SHG for this project are listed below.

Ghazanfar Mohammad	City of Brampton – Project Manager
Caleb Blain	City of Brampton
Bishnu Parajuli	City of Brampton
Ken Dzogan	City of Brampton
Carmen Caruso	City of Brampton
Dave Hallman	MTE Consultants Inc.
Jim Redman	MTE Consultants Inc.
Kevin Kelly	MTO
Graham Routledge	MTO
Mike Marinelli	MTO
Kamran Yousaf	MTO
Emma Benko	TRCA
Shirin Varzgani	TRCA
Leslie Marlowe	Berkshire Axis
Josh Marlowe	Berkshire Axis
Trevor Boston	Resident
Lori Leckie	Heart Lake Turtle Troopers
Christina Cicconetti	Heart Lake Turtle Troopers

Leo O'Brien	Friends of Heart Lake
David Angelakis	DG Group/RJ Burnside
R Tyler	DG Group
Trevor Boston	Resident of the Area
Mark Denardis	GWD Planners
Dominic Crupi	Lakeside Garden Gallery
Suzanne Bevan	TRCA
Kathy Villarroel	Lakeside Garden Gallery
Olti Merteri	City of Brampton
Nelson Lee	Schaeffer's
Ted Lagakos	MTO

1.4 Data Collection

A large part of the study involved the collection and review of existing information to determine the need for potential improvements within the identified Study Area to develop and evaluate alternative solutions and design concepts.

As part of the data collection phases, stakeholder consultation was undertaken throughout the study process. Target participants included property owners within the Study Area, the general public, technical agencies, and stakeholder/interest groups. Information related to land use, traffic operations, the natural and social environment, existing utilities, and other engineering related components was gathered. For ease of reference, the details pertaining to the public and agency consultation undertaken throughout the study is found in Section 9.0 – Public and Agency Consultation.

A list of background documents, including historical planning documents utilized in the development of the study recommendations and preparation of this ESR are as follows:

- Municipal Class Environmental Assessment, October 2000, as amended in 2007, 2022 and 2015.
- Function and Design Review of Heart Lake Road Corridor, City of Brampton/Stantec Consulting, 2019 (Appendix A).

The Function and Design Review Study examined the entire Heart Lake Road Corridor from Mayfield Road to Sandalwood Parkway. The report made a number of recommendations for the corridor including that Heart Lake Road, between Mayfield Road and Bovaird Drive be classified as a collector road.

Three categories of alternative solutions were screened and evaluated, including:

- Active Transportation.
- Traffic Calming; and

- Wildlife Mortality Mitigation.

An evaluation process was carried out to determine potential feasible alternatives that could be carried forward for more detailed evaluation. The evaluation was based on a comparative evaluation of each alternative considering multi-modal transportation, social and cultural environment, and natural environment criteria. All alternatives were presented at a Public Information Centre for review and comment. Comments received during this study were reviewed and considered by the project team and assisted in identifying short-term and long-term recommendations.

Following the evaluation process, the **short-term alternatives** recommended over a 2-year horizon include the following:

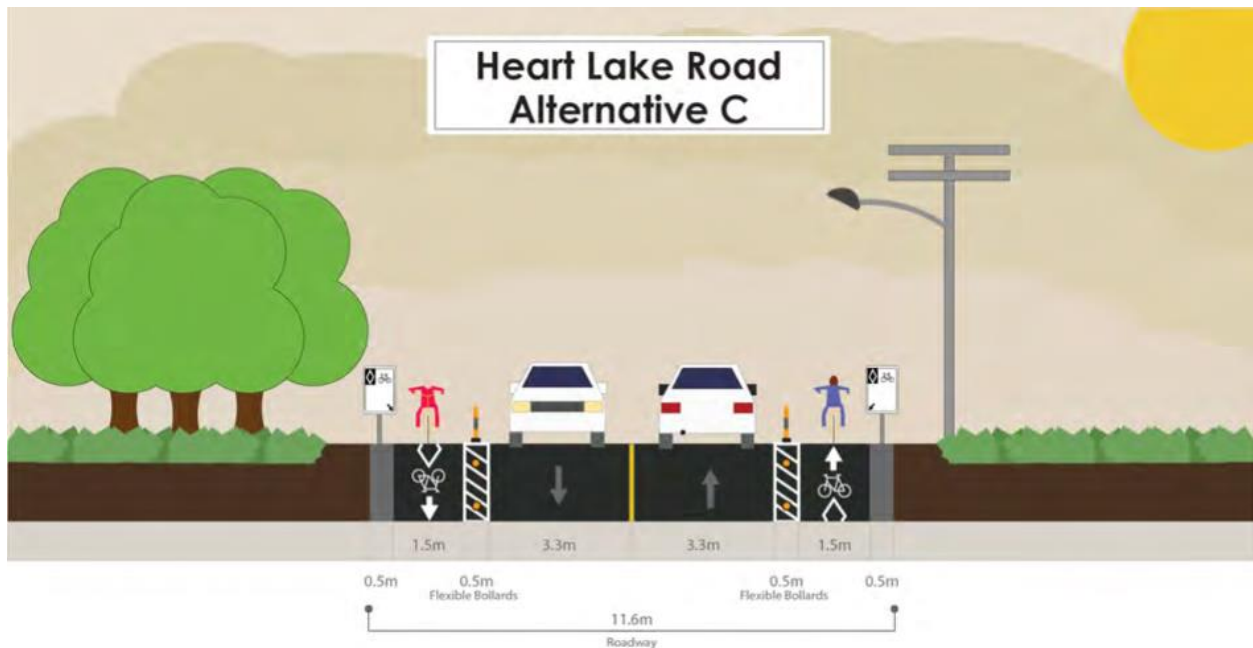
- Wildlife mortality mitigation:
 - Maintain existing solar powered flashing amber lights;
 - Maintain and re-paint optical speed bars;
 - Install (2) additional eco-passages tunnels at the two “hotspots” where passages are not already installed;
 - Permanently install wildlife directional fencing; and
 - Implement turtle nesting mounds.
- Traffic calming measures:
 - Re-classify the road as a collector road;
 - Lower speed limit to 50 km/h;
 - Implement speed cushions between Mayfield Road and the Highway 401 SB off-ramp; and
 - Install a traffic circle at the Conservation Area entrance.
- Transportation Improvements:
 - Narrow roadway to include 3.3 m traffic lanes; and
 - Consider implementing a hybrid multi-use trail through Heart Lake Conservation Area with connections to the existing boulevard path at Heart Lake Road / countryside Drive.

Some but not all these recommendations have been implemented.

The **long-term alternatives** recommended in the next 5 to 10 years, as development occurs and needs increase, include further study of the following:

- Installation of a roundabout at the intersection of Countryside Drive; and
- Implement the following alternative (Figure 1.3) with separated bike lanes on Heart Lake Road.

Figure 1.3: Two Lanes with Separated Bike Lane



The Function and Design Review indicated that the Long-Term Alternatives would be subject to further study under the Municipal Class Environmental Assessment planning and design process, which is approved under the Environmental Assessment Act. In addition, the study recommended that the TRCA should continue to be consulted as part of future planning and design activities.

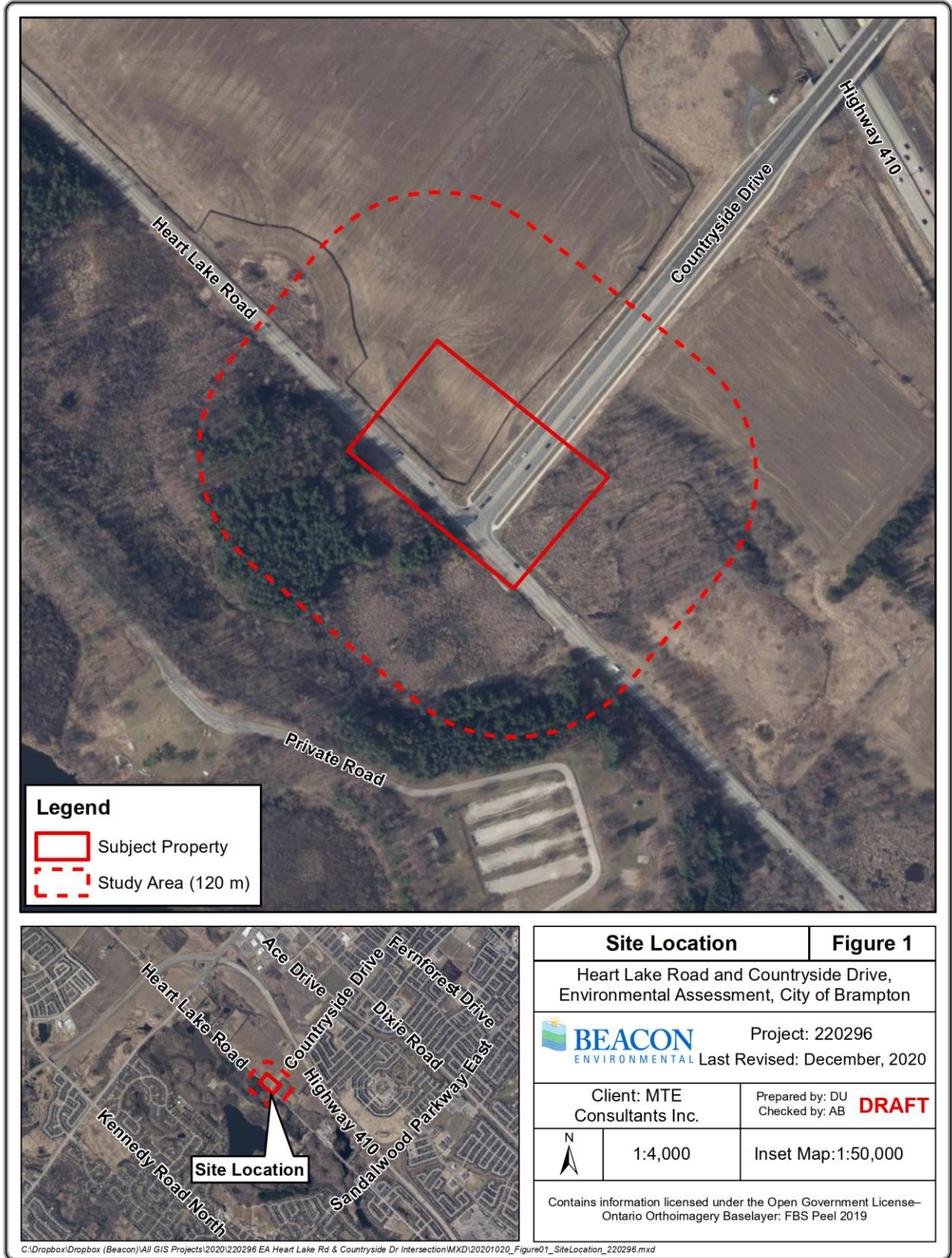
This Heart Lake Road at Countryside Drive Class EA Study examines Heart Lake Road at Countryside Drive intersection improvements in detail. It examines other alternative design concepts and evaluates them. In addition, the design concepts incorporate the ability to separate bicycle lanes into the recommend intersection improvement.

2.0 Existing & Future Conditions

2.1 Natural Environment

Beacon Environmental Limited (Beacon) was retained on behalf of the City of Brampton to provide input for the Natural Environment component of the Heart Lake Road and Countryside Drive Environmental Assessment (EA). The Study Area for this EA includes the Subject Property, which is the area included as part of the proposed intersection improvement, as well as 120 metres (m) from the Subject Property (refer to **Figure 2.1.1**).

Figure 2.1.1: Site Location



The lands north of Countryside Drive primarily contain agricultural fields slated for development, while privately-owned lands to the south contain forest and wetland communities. The Heart Lake Conservation Area, which contains a variety of upland species and the Heart Lake Provincially Significant Wetland (PSW) complex, is located west of Heart Lake Road, and is owned and operated by the Toronto and Region Conservation Authority (TRCA). These natural areas within the Study Area are part of the City's Natural Heritage System (NHS) as depicted on Schedule D of the City of Brampton Official Plan and represent Core Areas that are part of the Region of Peel Greenlands System.

The Natural Environment Report (Appendix C) identifies, describes, and evaluates natural heritage features associated with the Study Area. This information is intended to support the decision-making process regarding options for upgrades to the Heart Lake Road and Countryside Drive intersection.

This report explores and evaluates the Study area using the framework of key federal, provincial, and local environmental policies, legislation, and regulations that are directly relevant to this Natural Environment Report and land use planning for the Subject Property. Key legislation, policies and regulations that have been reviewed and considered in preparing this report include the following:

- Federal Fisheries Act;
- Ontario Endangered Species Act;
- Migratory Birds Convention Act;
- Provincial Policy Statement
- Region of Peel Official Plan;
- City of Brampton Official Plan;
- Conservation Authorities Act – Ont. Reg. 166/06; and
- Toronto and Region Conservation Authority Living City Policies.

The Natural Environment Report is intended to highlight key policy, regulatory and legislative requirements as they relate to environmental planning for the Subject Property to ensure that land use planning within the Subject Property is in conformity with the existing policy framework.

2.1.1 Vegetation

Vegetation communities on the Subject Property were classified and mapped on October 22, 2020. A floristic survey was completed concurrently. Surveys were conducted in accordance with the methodology of the Ecological Land Classification for Southern Ontario: First Approximation and Its Application (Lee et al. 1998) by an ecologist certified by the MNR in the Ecological Land Classification (ELC) system. Privately-owned lands were assessed from within the road right-of-way.

To classify the ecological communities within the Subject Property, publicly accessible lands were walked, and discrete units of natural and semi-natural communities were

delineated as polygons on an aerial photograph of the property. Information on site conditions, soils, vegetation composition and structure of each community was recorded, including dominant species, percent cover, and relative abundance of species in each height class. Vegetation community data provided by TRCA was ground truthed. Vegetation communities not previously assessed by the TRCA were subject to a full assessment to the extent feasible given land access restrictions.

Additionally, a list of vascular plants encountered during the field investigation was compiled; each species was assigned a local, provincial, and national conservation designation as well as identified as regionally native, introduced, or invasive. Significant records from the TRCA were also considered.

2.1.2 Tree Inventory

An inventory and assessment of all trees with a diameter at breast height (DBH) of 10 centimetres (cm) or more was completed on October 22, 2020, by an Arborist Certified by the International Society of Arboriculture (ISA) in accordance with City of Brampton standards. All trees adjacent to roads within and adjacent to the Subject Property were assessed and the following information was collected for each tree:

- Species;
- DBH (cm);
- Crown Diameter (m); and
- Condition rating based on health and structure (good, fair, poor, or dead).

Each tree was assigned a condition rating of good, fair, poor, or dead, based on the following criteria:

- Poor – Severe dieback, significant lean, missing leader, major defects, significant decay and/or disease presence;
- Fair – Moderate dieback and/or lean, limb defects, multiple stems, moderate foliage damage from stress;
- Good – Healthy vigorous growth, minor visible defects, or damage; or
- Dead – No live growth.

Tree condition was assessed based on presence and severity of external flaws, damage, evidence of pests or diseases, structural condition, dead or dying branches, or other decline indicators.

Trees were tagged, with metal numbered labels, using a staple gun. The location of each of the trees was recorded using a survey-grade Arrow Gold GNSS Receiver and incorporated into Geographical Information Systems (GIS) and AutoCAD platforms.

Additionally, a mid-aged Dry - Fresh Sugar Maple - Beech Deciduous Forest (FOD5-2) community east of Countryside Drive was classified and mapped east of the MAS2-1. This community had not been included with TRCA's EL data. This forest canopy is greatly dominated by Sugar Maple, with American Beech and Red Oak, as associates. Sugar Maple also dominates the subcanopy, with American Beech as an occasional

associate. The understory or undergrowth is dominated by European buckthorn with Sugar Maple as an occasional associate. Large-leaved Aster and Common White Snakeroot are abundant in the ground layer. Soils consisted of silty sand, with no mottling observed. Groundwater and bedrock were not encountered.

A total of 32 species of vascular plants were catalogued during the botanical inventory and vegetation community classification surveys conducted by Beacon within the ELC community FOD5-2 community. Additionally, the TRCA provided flora data known to the Study Area that included 31 species. Altogether, 62 vascular plants have been recorded in the Study Area, of which 61 were identified to the species level, and of this identified group, 53 (87%) are native to Ontario and 8 (13%) are introduced species. One plant (e.g., a sedge) could not be identified to the species level due to the timing of the surveys. An annotated list of flora recorded within the Study Area is contained in Appendix A of the report in Appendix C.

Most species recorded have a high range of habitat tolerances, as evidenced by the high proportion of species with a low coefficient of conservatism (CC) values. Species with narrow habitat tolerances (i.e., with CC values ≥ 7), of which five were recorded: one was found within ELC community FOD5-2 and four were recorded by TRCA in the Heart Lake Conservation Area. None of the species recorded during surveys are of global, national, or provincial significance. SAR flora, including and not limited to Butternut, were not observed. Although, 12 species of local significance (i.e., ranked L1-L3 by the TRCA) were in the Study Area. These species are listed and mapped on Figure 2.1.2.2. Please note that the occurrence numbers used to label species are listed, with the exception for Running Strawberry-bush, which was recorded by Beacon in the western edge of ELC community FOD5-2.

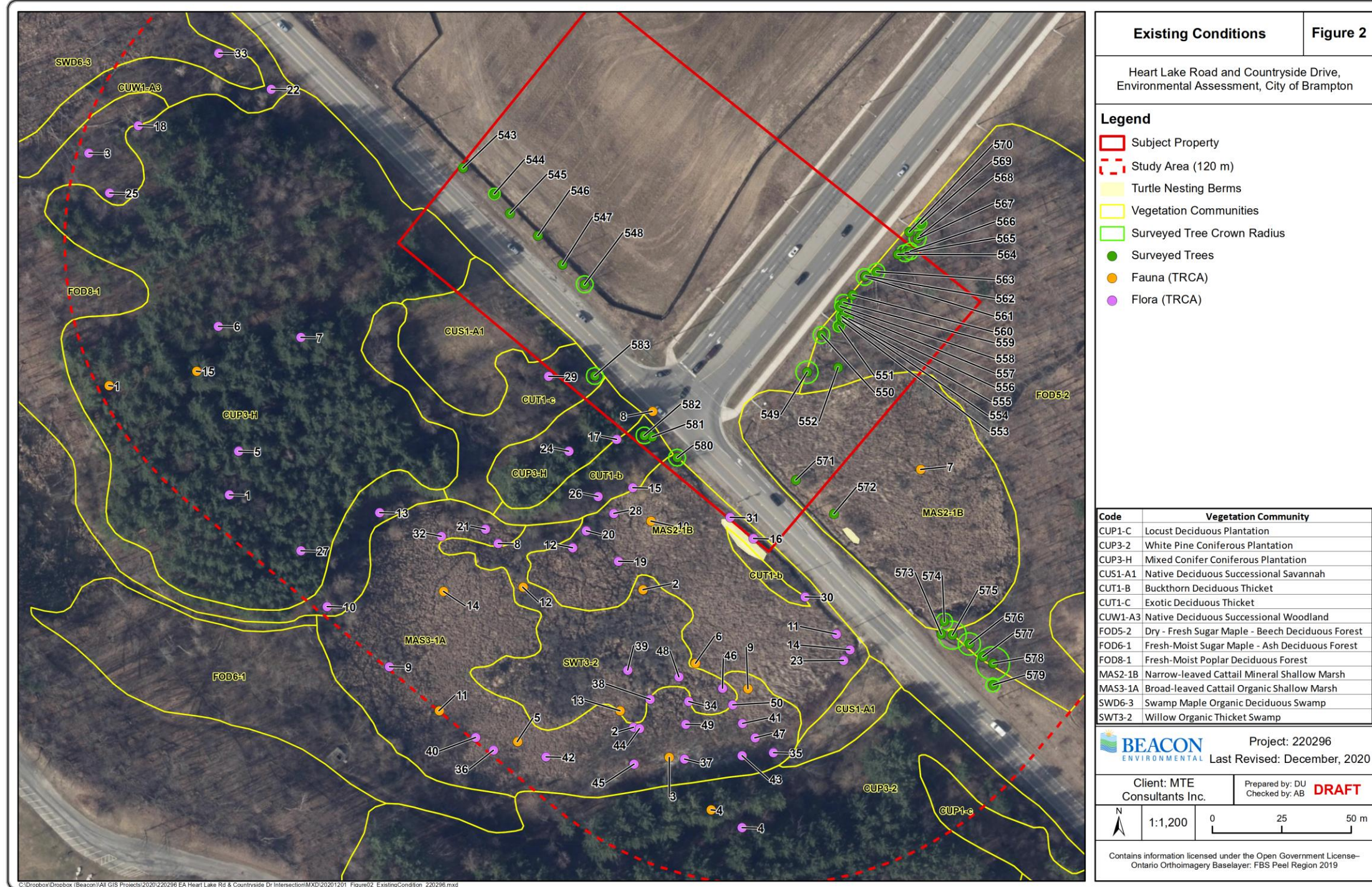
Additionally, through the background review, one vascular plant and one non-vascular plant listed by the Natural Heritage Information Centre (NHIC) as having provincial ranks of S2, meaning they are considered imperiled because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation. These two species are Honey Locust and Narrow-leaved Beard Moss, neither of which were recorded in the Study Area by Beacon or the TRCA.

Tree Inventory - a total of 41 roadside trees measuring between 10 cm DBH and 82 cm DBH were inventoried and assessed on and adjacent to the Subject Property.

The majority of trees are Red Oak and Sugar Maple. Most trees inventoried are in good condition and ten were dead. Appendix B presents the limitations and detailed methodology of the tree assessment.

Tree locations are shown on Figure 2.1.2.2 and the detailed results of the tree inventory is presented in Appendix C of the Natural Inventory Report found in Appendix C.

Figure 2.1.2.2: Existing Conditions



2.1.3 Wildlife

Beacon did not complete any terrestrial wildlife surveys in the Study Area in 2020, although incidental records of terrestrial species were noted during other surveys. The characterization of the terrestrial wildlife will be completed through background resources, as described in Section 3.1 of the report included as Appendix C.

Table 2.1.3.1: Fauna Records from TRCA for Study Area

Species	Common Name	Breeding Status	Call Code ¹	S-Rank ²	L-Rank ³	Occurrence Number (Fig. 2)
<i>Vireo olivaceus</i>	Red-eyed Vireo	Probable	n/a	S5	L4	1
<i>Melospiza georgiana</i>	Swamp Sparrow	Possible	n/a	S5	L4	2
<i>Vireo olivaceus</i>	Red-eyed Vireo	Probable	n/a	S5	L4	3
<i>Accipiter cooperii</i>	Cooper's Hawk	Confirmed	n/a	S4	L4	4
<i>Pseudacris crucifer crucifer</i>	Spring Peeper	Probable	3	S5	L2	5
<i>Lithobates sylvatica</i>	Wood Frog	Probable	2	S5	L2	6
<i>Lithobates sylvatica</i>	Wood Frog	Probable	1	S5	L2	7
<i>Storeria occipitomaculata occipitomaculata</i>	Red-bellied Snake	Probable	n/a	S5	L3	8
<i>Pseudacris crucifer crucifer</i>	Spring Peeper	Probable	1	S5	L2	9
<i>Lithobates sylvatica</i>	Wood Frog	Probable	1	S5	L2	10
<i>Setophaga ruticilla</i>	American Redstart	Probable	n/a	S5	L4	11
<i>Geothlypis trichas</i>	Common Yellowthroat	Probable	n/a	S5	L4	12
<i>Melospiza georgiana</i>	Swamp Sparrow	Probable	n/a	S5	L4	13
<i>Ceryle alcyon</i>	Belted Kingfisher	Possible	n/a	S4	L4	14
<i>Setophaga pinus</i>	Pine Warbler	Possible	n/a	S5	L4	15

¹Call Count as per the Marsh Monitoring Protocol (Bird Studies Canada 2009):

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

²Provincial Rank (NHIC): S4=Apparently Secure, S5=Secure

³Local Rank (TRCA):

- L2= Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.
- L3= Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.
- L4 = Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.

During a vegetation survey on October 22, 2020, a single Eastern Garter snake was noted on the edge of the Native Deciduous Successional Savannah (ELC community CUS1-A1) near Heart Lake Road. This species is ranked as L4 by TRCA, meaning it is able to withstand some disturbance and is generally secure in rural matrix but of concern in urban matrix.

Also, during the vegetation survey conducted in 2020, it was noted that the Dry - Fresh Sugar Maple - Beech Deciduous Forest (FOD5-2) community east of Countryside Drive contained an abundance of suitable habitat for bat maternity roosts as described in the *Survey Protocol for Species at Risk Bats within Treed Habitats Little Brown Myotis, Northern Myotis & Tri-Colored Bat* (Guelph District MNRF 2017). The community contains numerous mature snags, contains a relatively open understory, and is adjacent to a marsh. At the time of writing, no further bat habitat assessment was completed or planned.

The terrestrial wildlife within the Study Area can be further characterized through the background data for the Study Area provided by the TRCA. Their species record for the Study Area are included in Table 2.1.3.1 and are mapped on Figure 2.1.3.

One L3 fauna species and five L2 fauna species are noted in the Study Area. Although, the TRCA records do not include species that are of global, national, or provincial significance.

Additionally, the TRCA has been studying road mortality on Heart Lake Road south of Countryside Drive and have found that turtle mortalities are very high for the section of Heart Lake Road east of Countryside Drive. In response to that, a wildlife crossing structure (open-bottom box culvert) and directional wildlife fencing have been installed, as shown in Photograph 2 below. In addition to this, as illustrated on Figure 2, two turtle nesting berms exist on either side of Heart Lake Road south of Countryside Drive have also been installed.

Table 2.1.3.3: Endangered, Threatened or Special Concern Species Likelihood of Presence

Species	Endangered Species Act Status	Species at Risk Act Status	Likelihood of Presence
Eastern Small-footed Myotis (<i>Myotis leibii</i>)	Endangered	Endangered	Low
Little Brown Myotis (<i>Myotis lucifugus</i>)	Endangered	Endangered	High
Northern Myotis (<i>Myotis septentrionalis</i>)	Endangered	Endangered	Low
Tricoloured Bat (<i>Perimyotis subflavus</i>)	Endangered	Endangered	Very Low
Eastern Wood-Pewee (<i>Contopus virens</i>)	Special Concern	Special Concern	High
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	Special Concern	Threatened	Low
Snapping Turtle (<i>Chelydra serpentina</i>)	Special Concern	Special Concern	Confirmed (White et al., 2018)
Wood Thrush (<i>Hylocichla mustelina</i>)	Special Concern	Threatened	Medium

Through the review of the resources identified and surveys completed by Beacon, 20 species that are identified as Endangered, Threatened or Special Concern under the provincial ESA were identified as having previously been recorded within 5 km of the Study Area.

Following the characterization of existing conditions within the Study Area an assessment of the presence of potentially suitable habitat for these species was completed. Through this assessment, it was determined that of these 20 records, eight species could be present in the Study Area based on the habitats present and the occurrence of one has been confirmed. Species records greater than 20 years old were assumed to not be present in the Study Area.

2.1.4 Aquatics

An aquatic ecologist visited the subject property on October 8, 2020, with the intention of completing a habitat assessment of the mapped watercourse that crosses Heart Lake Road east of the Subject Property. However, an aquatic habitat assessment was not undertaken as it was determined that no channel or fish habitat were present.

2.1.5 Summary

The purpose of this Natural Environment Report is to describe and evaluate baseline conditions of the aquatic and terrestrial environment within the Study Area by means of a background review and field investigations. Significant natural heritage features identified in the Study Area are summarized below in Table 2.1.5. Based on the Region of Peel's mapping, the Heart Lake Conservation Area and adjacent woodlands and wetlands on within the Study Area, are Core Areas of the Region's Natural Heritage System and also part of the City of Brampton's Natural Heritage System.

Table 2.1.5: Summary of Significant Natural Heritage Features

Natural Heritage Feature	Assessment	Present in the Study Area
Significant Wetlands	The wetlands within the Study Area form part of the Heart Lake PSW complex.	Yes
Significant Woodlands	The treed vegetation communities within the Study Area are considered Significant Woodlands.	Yes
Significant Wildlife Habitat	Candidate and confirmed SWH on the Subject Property and within the Study Area as per the criteria provided by the MNR (2015) and Region of Peel (NSEI, 2009) includes Forest and Wetland Communities.	Yes
Fish Habitat	No fish habitat was located within the Study Area.	No
Significant Habitat for Endangered and Threatened Species	The potentially suitable habitat that was identified in the Study Area for Endangered and Threatened species is associated primarily with the forested and wet habitats within and adjacent to the Subject Property.	Yes
Significant Area of Natural and Scientific Interest	The Study Area overlaps with two Provincially Significant Candidate ANSIs: the Brampton Buried Esker Earth Science ANSI and the Heart Lake Forest and Bog Life Science ANSI. These two ANSIs are coincident with the Heart Lake Conservation Area.	Yes

It is recommended that intersection improvements avoid significant natural heritage features south of Countryside Drive and west of Heart Lake Road to the greatest extent feasible and have due regard for extant wildlife crossing structures and wildlife movement patterns.

2.2 Socio-economic Environment

2.2.1 Existing Land Use

The City of Brampton Official Plan States (Section 4.5) “Movement of people and goods by various modes is one of the most important aspects of life in Brampton. A significant proportion of our daily lives is spent travelling from our homes to our places of work, to our schools, and to our recreation and social activities.”

Overall, the City is committed to delivering and maintaining an efficient transportation system, consistent with the City’s ‘Six Pillars’ Strategic Plan to promote a “Modern Transportation System”. The plan envisages the harmonious integration of all modes and elements of transportation with a long-term vision to provide a “Balanced Transportation System” that is accessible to all members of the Brampton community including persons with disabilities. The Strategic Plan sets out the following goal:

"To provide a safe, convenient, economical, efficient, sustainable and energy conserving Transportation System for the movement of people and goods which supports the Official Plan land use designations and encourages the appropriate development of the City Centre, the Central Commercial Corridor and other activity centres, while protecting established neighbourhoods, and promoting orderly growth."

The Transportation broad objectives in the City of Brampton Official Plan are the following:

- a) To develop a balanced, integrated, and accessible multi-modal transportation system which provides for the safe, economic, and efficient movement of people, including persons with disabilities, as well as goods and services;
- b) To ensure the provision of adequate and accessible road, transit, pedestrian, and bicycle links within Brampton and between Brampton and adjacent municipalities;
- c) To promote the development of an efficient transportation system and land use patterns that foster strong live-work relationships and encourage greater use of public transit;
- d) To promote a high standard of environmental management and aesthetic quality in the routing, design and construction of transportation and associated structures, including green infrastructure and stormwater management practices in the right-of-way of new and retrofitted existing roads; and,
- e) To work cooperatively with the Region of Peel, neighbouring municipalities and other regional municipalities, the Province, and its agencies (e.g., Metrolinx) to develop an integrated transportation plan.

The land use in and near the Heart Lake Road at Countryside Study area is a mix of rural, residential, soon to be developed lands, Highway 410 and natural environment areas including the Heart Lake Conservation Area (HLCA) west of Heart Lake Road.

Assuming Heart Lake Road runs north south, the SW quadrant of the study area consist of the Heart Lake Conservation Area (HLCA) owned by Toronto Region Conservation. It is a popular recreation area with picnic sites, boat rentals, a pool and hiking trails. It is especially popular in the summer months, but the hiking trails are popular year-round. The

access to HLCA is located on Heart Lake Road approximately 600m south of the Heart Lake Road at Countryside Drive intersection. The HLCA occupies 169 hectares and contains two kettle lakes, the headwaters for Spring Creek, a Provincially Significant Wetland Complex and one of the largest individual blocks of forest in the Etobicoke Creek watershed.

The NW quadrant of the intersection is mainly open space but also forms part of the HLCA and contains several hiking trails.

The NE quadrant of the intersection is slated for residential development and construction is ongoing.

The SE quadrant is currently agricultural with some significant wetlands especially adjacent to the road allowances for both Countryside Drive and Heart Lake Road. This quadrant is also proposed for residential development

Highway 410 is approximately 460m east of Heart Lake Road. The Countryside Drive Road Allowance is under the jurisdiction of the Ministry of Transportation (MTO) due to its proximity of the Countryside Drive overpass with Highway 410.

2.3 Cultural Heritage Environment

2.3.1 Archaeological Stage 1 Assessment

Archaeological Research Associates Ltd. carried out an Archaeological Stage 1 assessment for the proposed Heart Lake Road and Countryside Drive Intersection Improvements project in the City of Brampton. The assessment was carried out as part of a Schedule 'B' Municipal Class Environmental Assessment in accordance with the *Environmental Assessment Act*. The Stage 1 Archaeological Assessment is Found in Appendix D and documents the background research and potential modelling involved in the investigation and presents conclusions and recommendations pertaining to archaeological concerns.

The Stage 1 assessment was conducted in October 2020. The investigation encompassed the project lands within the Project Study Area. All field observations were made from accessible public areas; accordingly, no permissions were required for property access. At the time of assessment, the study area comprised the roadway platforms, shoulders, ditches, culverts, and sidewalks associated with Heart Lake Road and Countryside Drive, as well as adjacent natural areas.

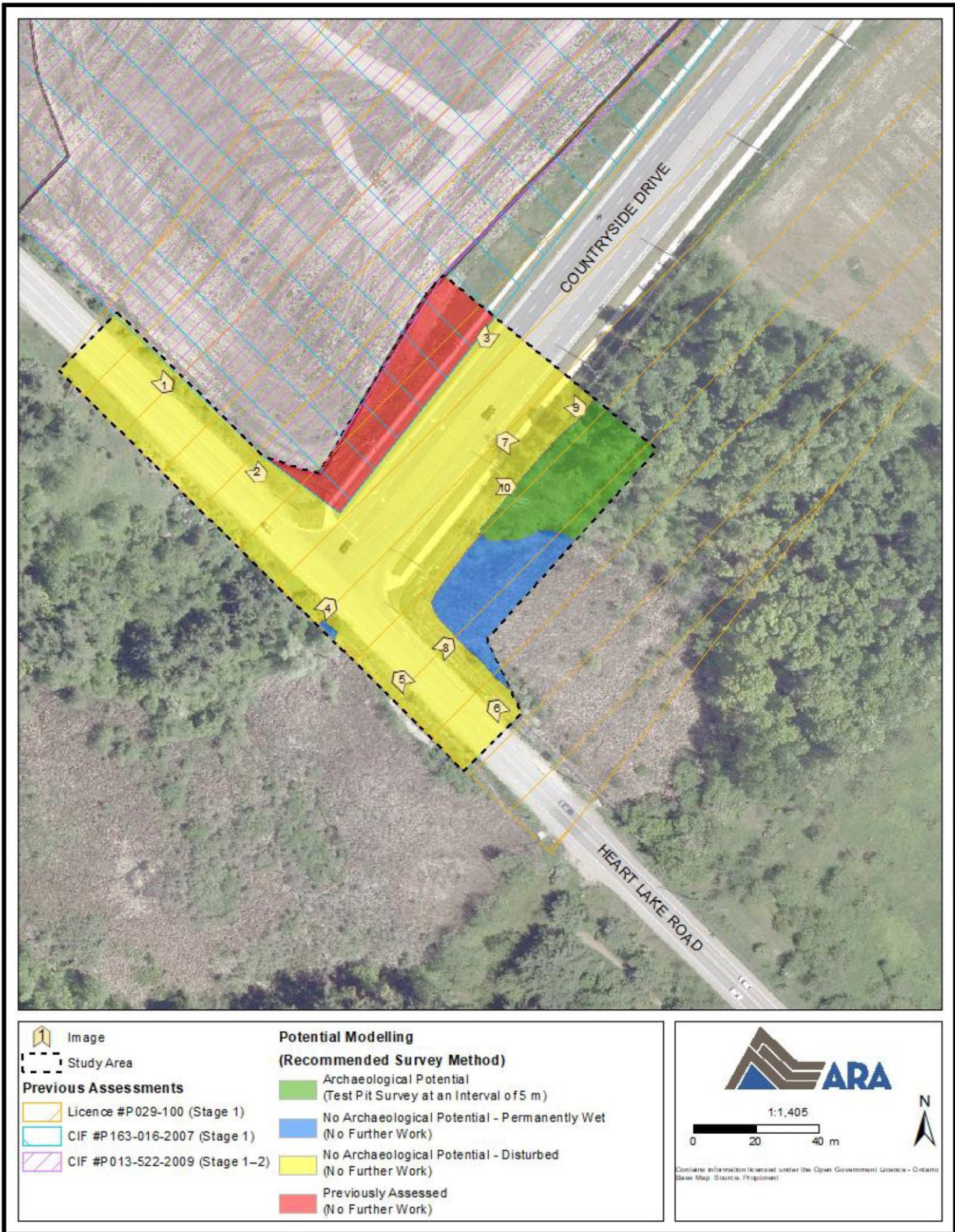
The Stage 1 assessment determined that the study area comprised a mixture of areas of archaeological potential, areas of no archaeological potential and previously assessed lands of no further concern. It is recommended that all identified areas of archaeological potential be subject to a Stage 2 property assessment in accordance with Section 2.1 of the 2011 *Standards and Guidelines for Consultant Archaeologists*.

Figure 2.3.1 illustrates the results of the Stage 1 Assessment. Most areas were found to have no archaeological potential, except for portions of the southeast corner of the intersection that has not been disturbed. In addition, there are areas that have not been investigated that may be impacted by the preferred intersection alternative. If any areas (such as the northeast corner) that have not been investigated, are impacted by the final

design and the construction of the intersection, these areas must undergo a Stage 1 Archaeological Assessment. If the areas noted as having potential.

The identified areas of no archaeological potential and previously assessed lands of no further concern do not require any additional assessment. Given that there are still outstanding archaeological concerns within the project lands, no ground alterations or development of any kind may occur until any required Stage 1 or Stage 2 assessments are complete, a recommendation that the lands require no further archaeological assessment is made, and the associated report has been entered into the Ontario Public Register of Archaeological Reports.

Figure 2.3.1: Potential Modelling and Recommendations



2.3.2 Cultural Heritage Assessment Report (CHAR)

In August 2020, Archaeological Research Associates Ltd. (ARA) carried out a Cultural Heritage Assessment Report (CHAR), for the proposed Heart Lake Road and Countryside Drive Intersection Improvement project in the City of Brampton. The assessment was carried out as part of a Schedule 'B' Municipal Class EA in accordance with the Environmental Assessment Act.

The purpose of the Cultural Heritage Assessment is to identify and evaluate the cultural heritage resources within the project location that may be impacted by the proposed Heart Lake Road and Countryside Drive Intersection Improvement project. This assessment was conducted in accordance with the aims of the Environmental Assessment Act, R.S.O. 1990, Provincial Policy Statement (2014) and the Ontario Heritage Act, R.S.O. 1990, c. O.18, and the City of Brampton Official Plan. A complete copy of the Cultural Heritage Assessment Report is found in Appendix E.

Heart Lake Road and Countryside Drive are presently considered Minor Arterial Roads as outlined in Schedule B of the City of Brampton Official Plan. Currently Heart Lake Road is a two-lane road with a rural cross section (i.e., partly paved shoulders and open ditches) which intersects with Countryside Drive which has an urban cross-section (i.e., five-lane road, curbs, sidewalks, streetlights).

The Cultural Heritage Assessment Report approach included:

- Background research concerning the project and historical context of the project location;
- Consultation with City of Brampton staff regarding heritage matters in the project location;
- Identification of any designated or recognized properties within the limits of the project location;
- On-site inspection and creation of an inventory of all properties with potential Built Heritage Resources and Cultural Heritage Landscapes within the project location;
- A description of the location and nature of potential cultural heritage resources;
- Evaluation of each potential cultural heritage resource against the criteria set out in Ontario Regulation 9/06, and 10/06, where applicable, for determining cultural heritage value or interest;
- Evaluation of potential project impacts; and
- Provision of suggested strategies for the future conservation of identified cultural heritage resources.

As a result of consultation and field survey, a Built Heritage Resources was identified:

- 10881 Heart Lake Road (BHR1) and the Heart Lake Road Corridor (CHL1).

Figure 2.3.2.1 shows the Built Heritage Resources identified, and Figure 2.3.2.2 shows identified Cultural Heritage Landscapes.

Figure 2.3.2.1: BHR Assessment Results Map

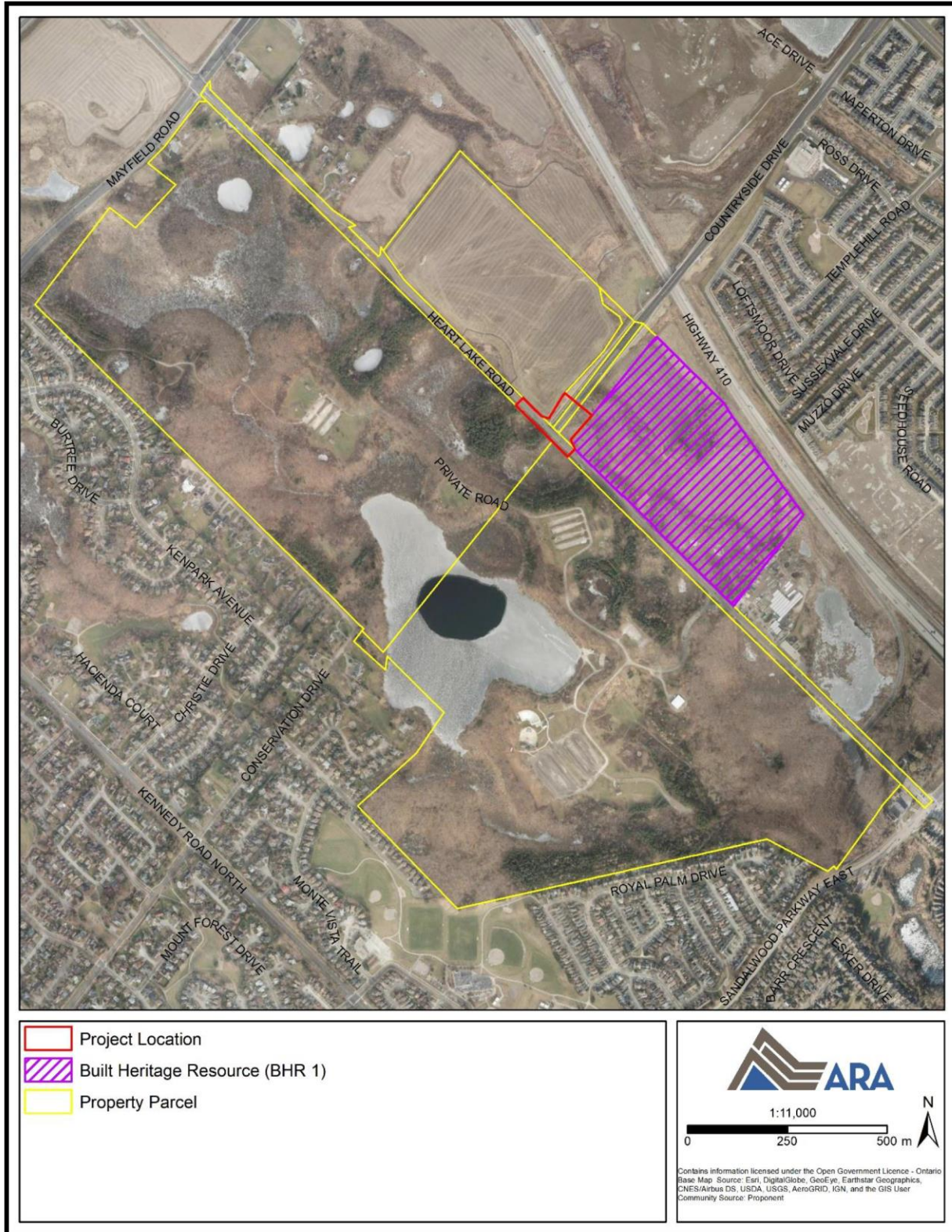
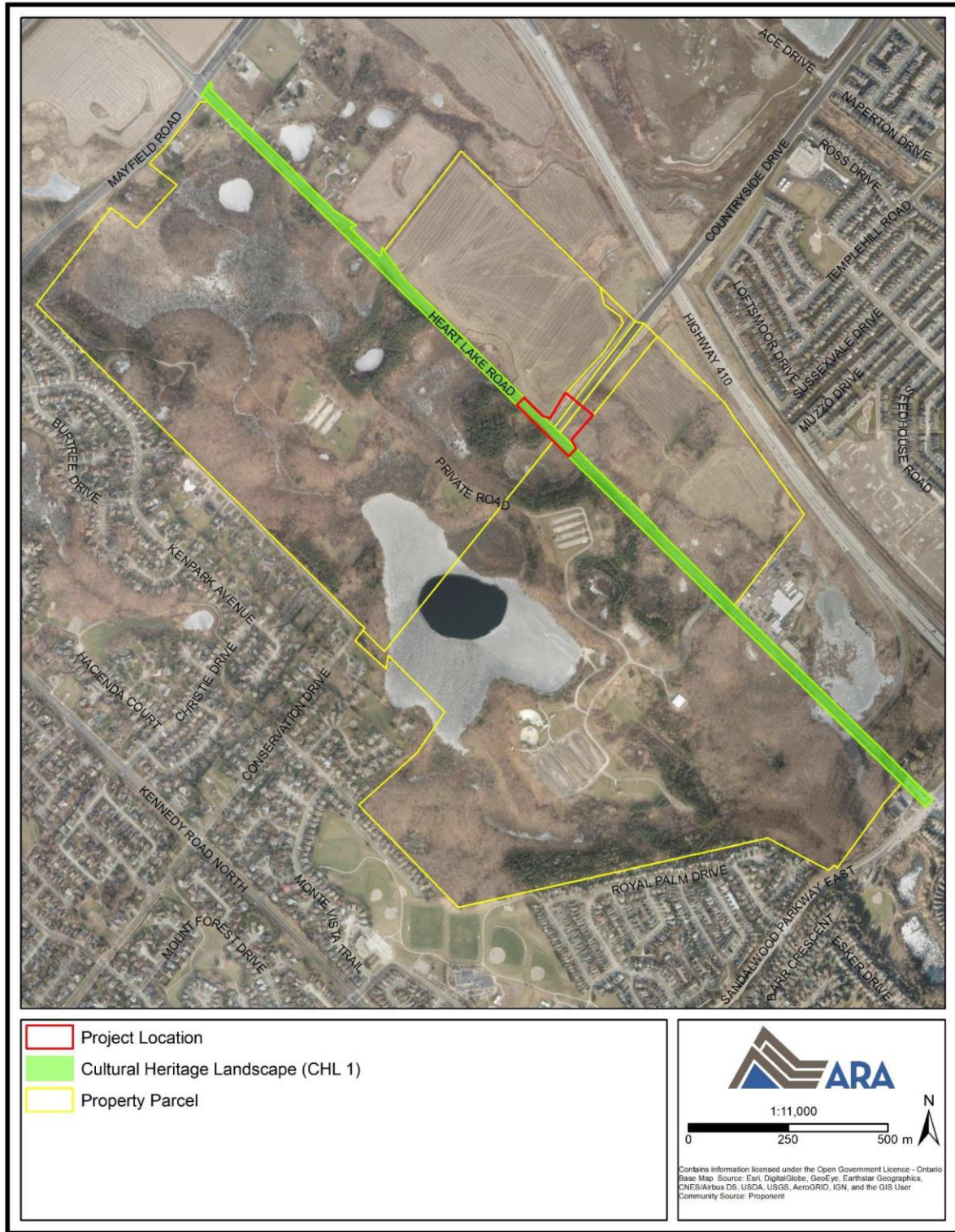


Figure 2.3.2.2: CHL Assessment Results Map



Although detailed designs or plans for the intersection improvements were not available at the time of the investigation, it is not anticipated that the heritage attribute BHR1 will be directly impacted. CHL-1 is located within the project location and may be impacted by the proposed intersection improvements. There may also be some indirect impacts to the identified resources during construction activities. Some of these indirect impacts may, in fact, prove to be positive as efforts can be undertaken to interpret cultural heritage resources (i.e., with plaques or public art).

As a result of the Cultural Heritage Assessment Report, the following mitigation strategies are recommended:

- That intersection improvements and any construction staging areas should avoid the use of land which is part of BHR1 at 10881 Heart Lake Road.
- That should project-related activities be expected to impact the BHR1, a qualified heritage consultant should be contracted to complete a property specific Heritage Impact Assessment and provide detailed mitigation options to address potential impacts of the proposed design on the resources.
- That the design alternatives and planned intersection improvements should consider the heritage attributes of CHL 1, specifically the rural cross section of the road, including the width of the road, two lanes of traffic, and ditching; wood utility poles along the roadside; natural setting of the roadscape, and linear corridor views along Heart Lake Road.
- That following the development of the preferred design alternative a Heritage Impact Assessment should be prepared for the Heart Lake Corridor (CHL 1), a potential significant cultural heritage landscape, to evaluate the impacts and suggest mitigation measures. This study should be undertaken by a qualified heritage consultant.
- That public consultation may result in additional potential cultural heritage resources being identified. These potential cultural heritage resources should be reviewed by a qualified heritage consultant to:
 - Determine their cultural heritage value or interest, and
 - Evaluate potential project impacts, and 3) suggest strategies for future conservation of any identified cultural heritage resources;
- That should the intersection improvement activities or the project location expand beyond the scope examined in this report, a qualified heritage consultant should be retained to determine the potential impacts and suggest mitigation measures.
- That should intersection and road improvements create seating areas and/or transit stops, this may provide an opportunity to interpret some of the identified cultural heritage resources (i.e., with plaques, public art).

2.4 Utilities

The main utility within the Study Area is the overhead hydro line and street lighting on the east side of Heart Lake Road. There is also overhead Hydro Lines on the south side of Countryside Drive, and street light poles of the north side. These hydro poles also contain overhead communications cables such as Bell and Rogers.

Other communications utilities did not advise of any fibre optic cables etc. within the study area.

The Region of Peel has a large transmission watermain on the west side of Heart Lake Road which services some of the proposed developments. However, it appears the watermain stops north of Countryside Drive and doesn't currently extend through the intersection of Countryside Drive. There are no sanitary sewers on either Heart Lake Road or Countryside Drive.

Countryside Drive is currently drained by means of a storm sewer on the north side, outletting eventually into the wetlands on the southeast corner of the intersection. Heart Lake Road is currently drained by means of roadside ditches.

2.5 Drainage

The objective of the Storm Drainage Analysis is to analyze the surface runoff at the Heart Lake Road and Countryside Drive intersection under existing conditions, and the impacts on surface flow per the following proposed intersection improvement alternatives:

- Option A – Signalized Intersection
 - Assume that existing storm conveyance infrastructure will be replaced or rehabilitated; and
 - Re-graded intersection and approaches and new major system flow paths.
- Option B – Roundabout
 - Cut into developer lands to the northeast of the intersection; and
 - Storm drainage infrastructure improvements including:
 - Reconfiguration of ditches along the east side of Heart Lake Road.
 - Culvert replacement; and
 - New major system flow paths

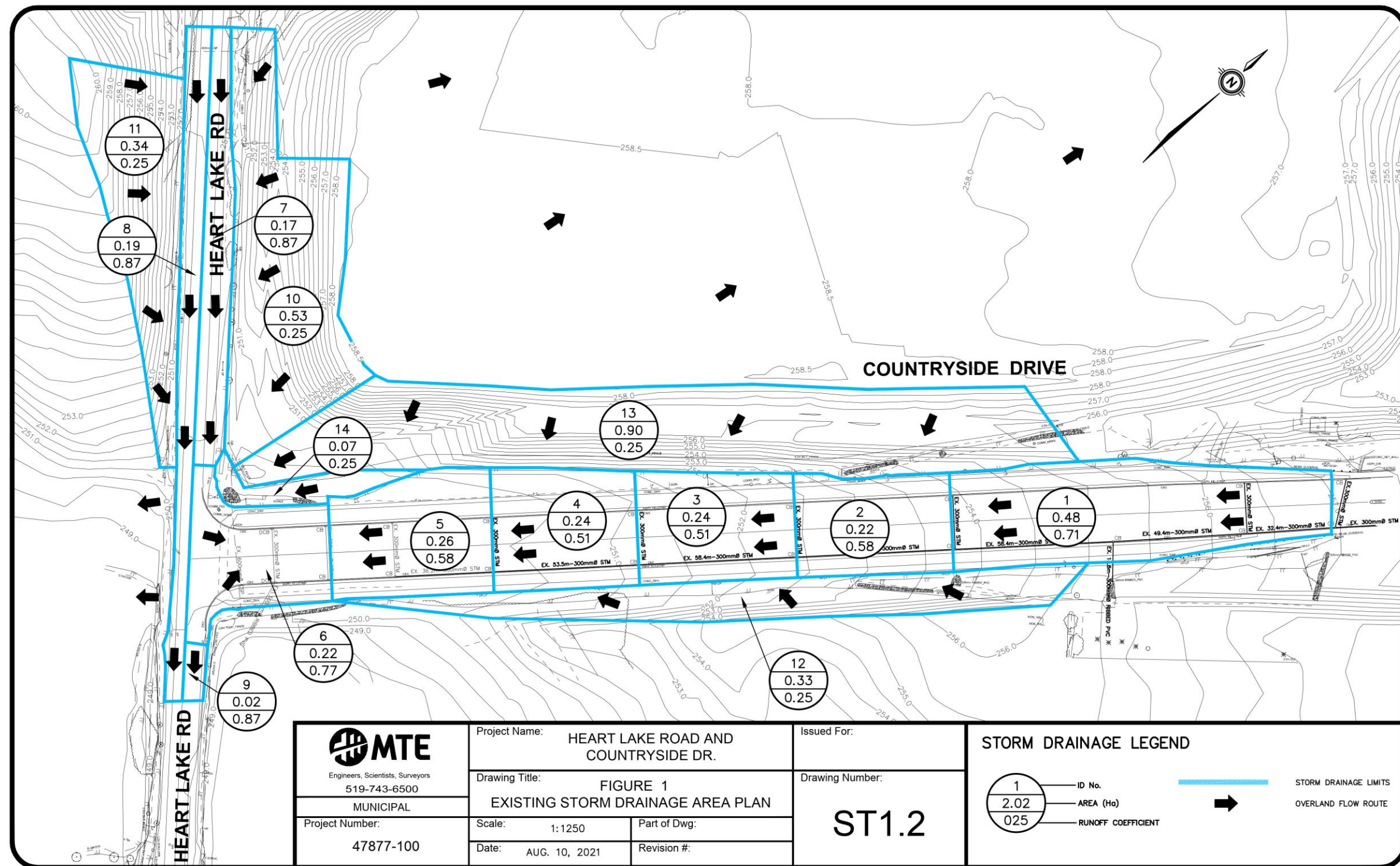
Appendix F contains a Storm Drainage Analysis memorandum completed by MTE Consultants.

2.5.1 Methodology

Drawings 2.5.1.1, 2.5.1.2, and 2.5.1.3 summarize the delineated sub-catchment areas, infrastructure and major system flow paths for existing conditions, and proposed conditions for a new signalized intersection and a new roundabout at the Heart Lake Rd and Countryside Drive intersection. Overall, the proposed roundabout design slightly increases the intersection drainage area footprint by 0.3 ha.

The City of Brampton Stormwater Design Standard was used for the methodology to estimate the peak runoff rate for each catchment. The Rational Formula was used to estimate existing peak runoff.

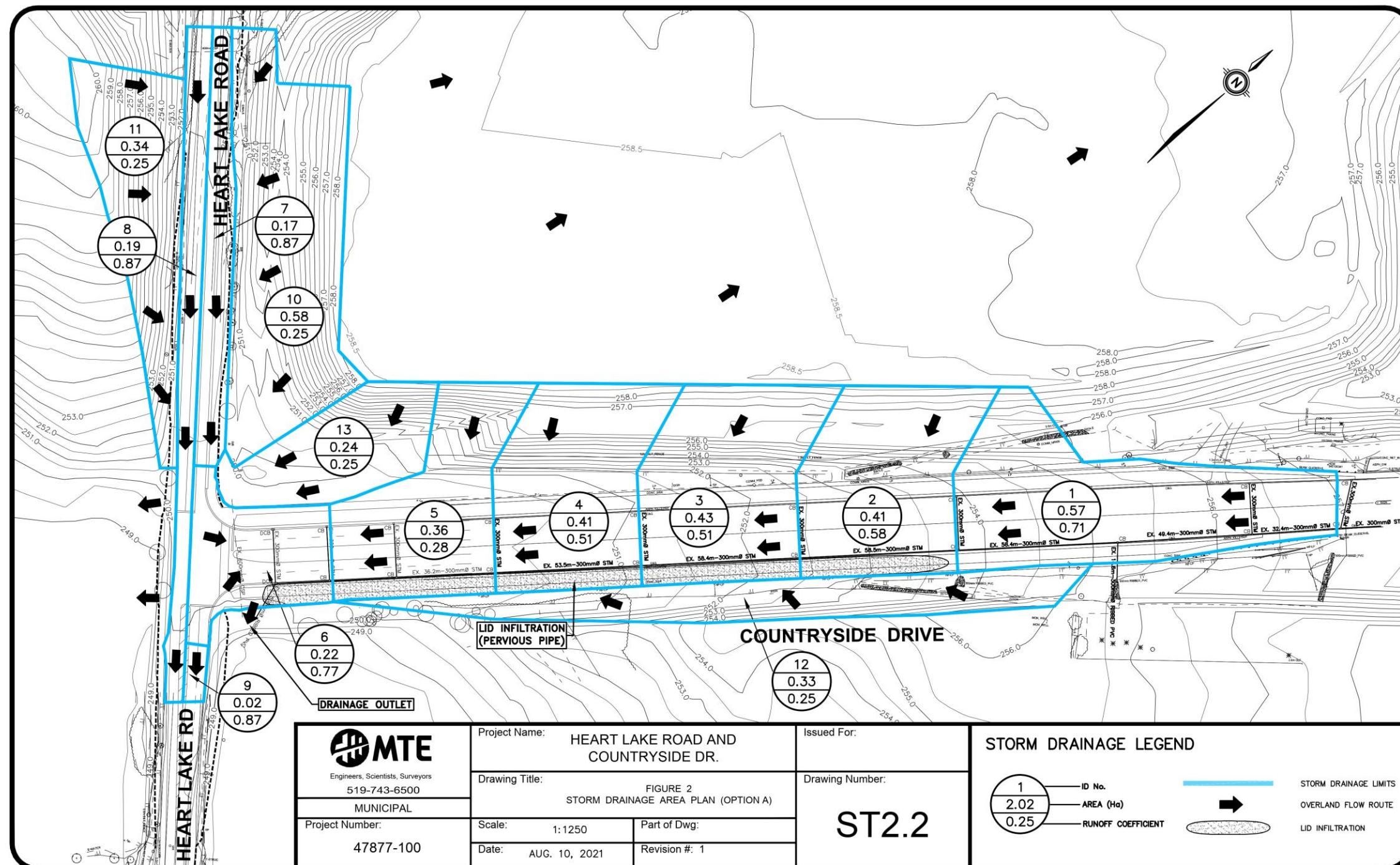
Figure 2.5.1.1: Existing Storm Drainage Area Plan



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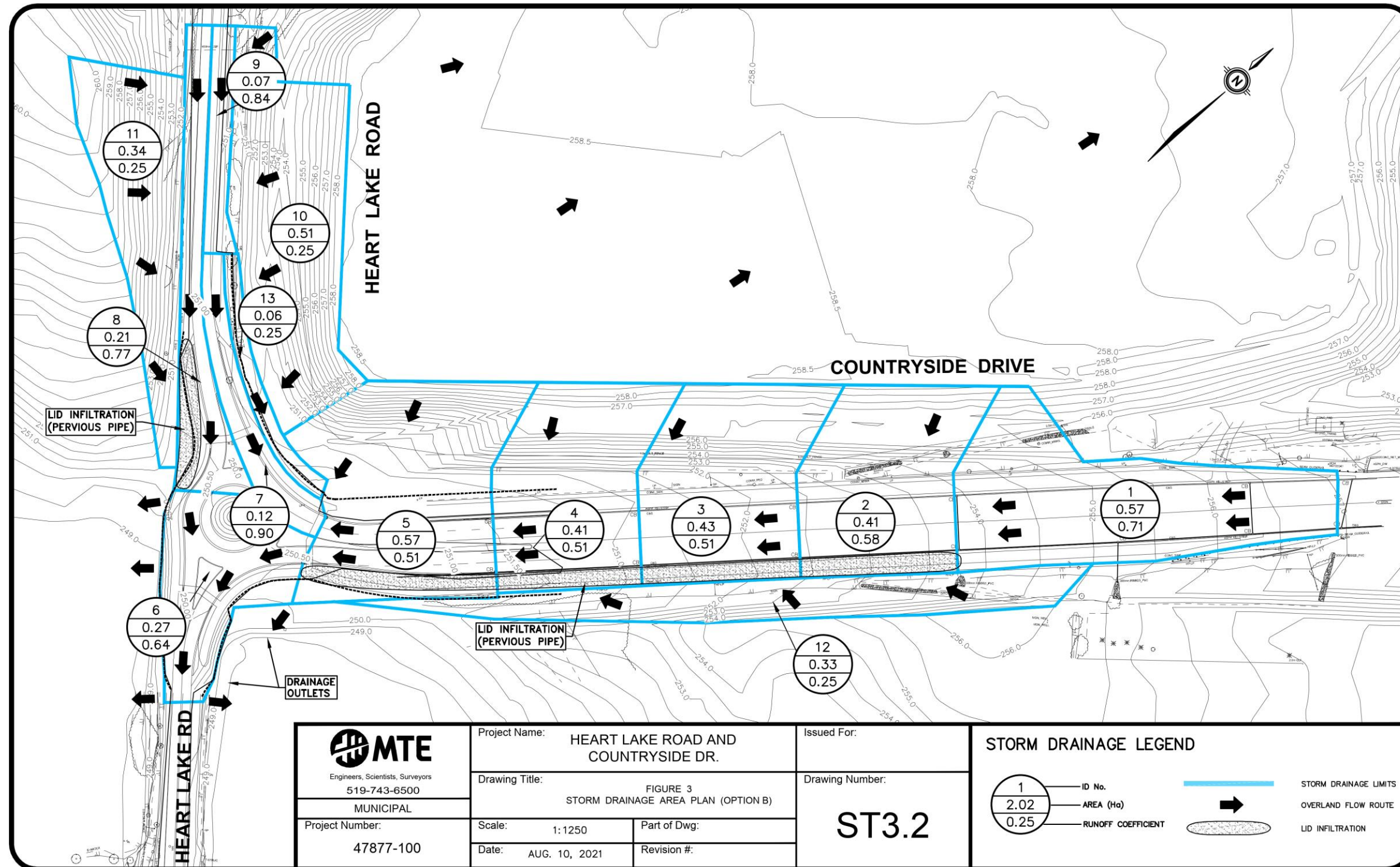
Figure 2.5.1.2: Storm Drainage Area Plan



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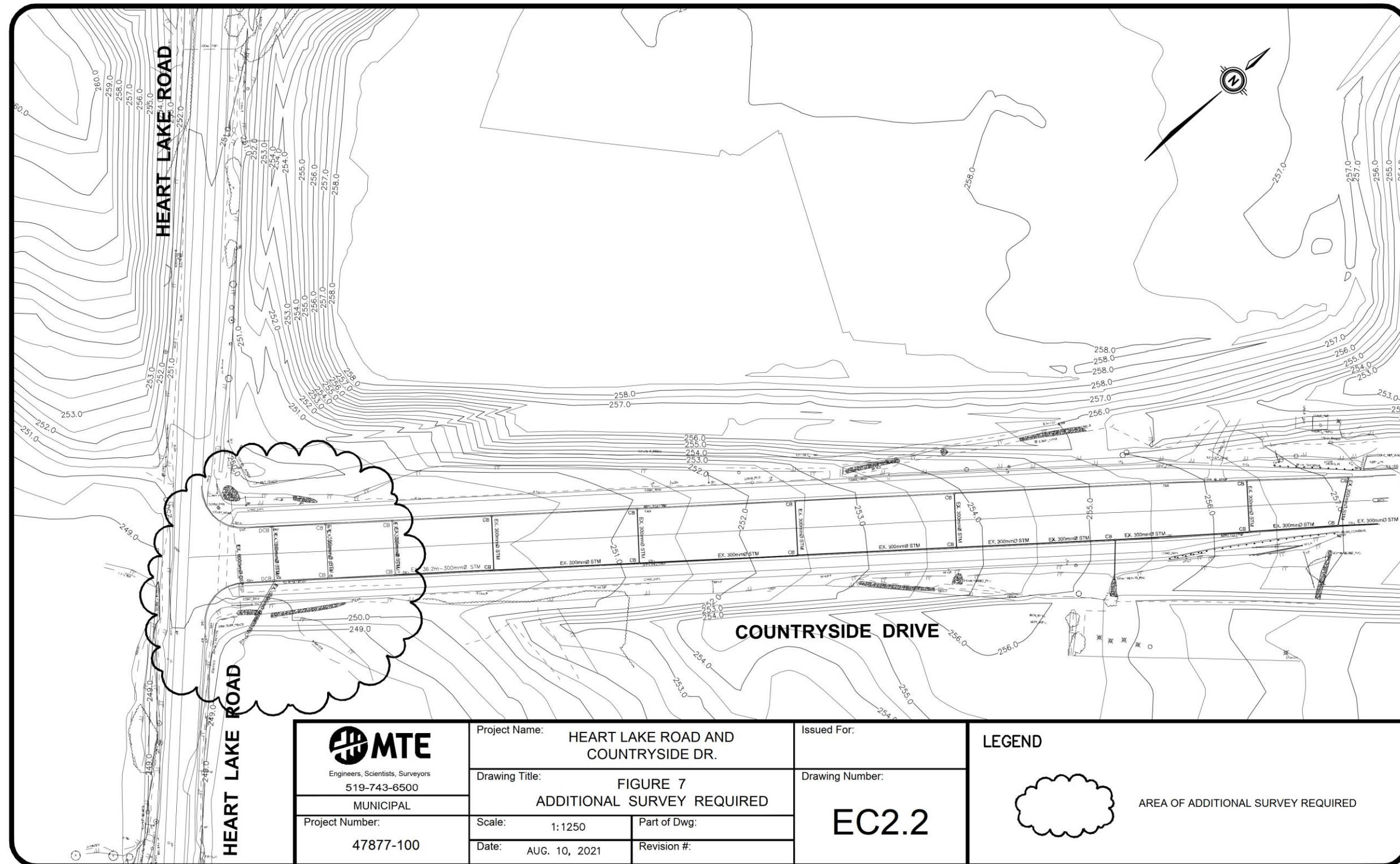
Figure 2.5.1.3: Storm Drainage Area Plan (Option B)



February 25, 2022 — 3:54 p.m. — Plotted By: praimbault

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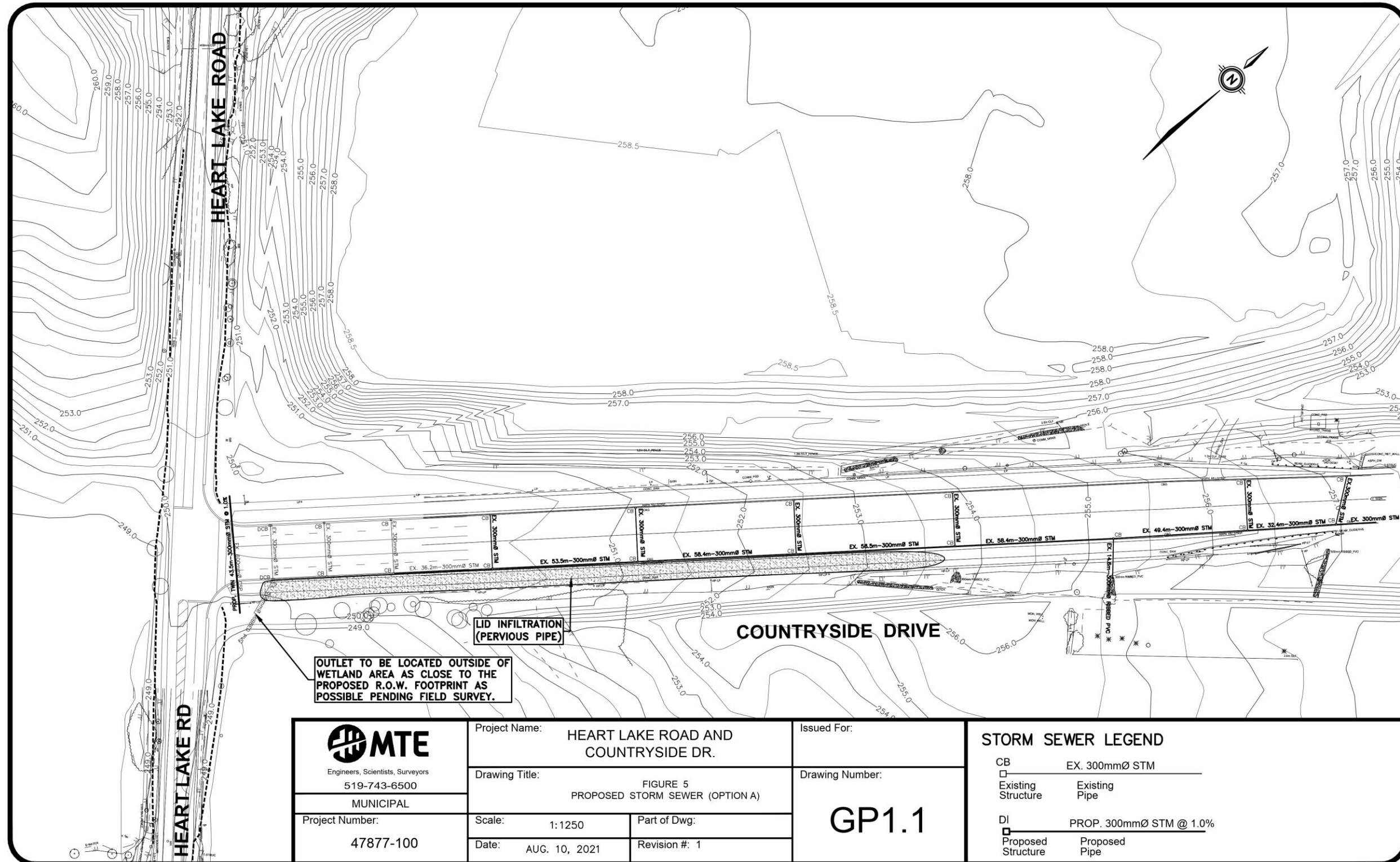
Figure 2.5.1.4: Existing Storm Sewers



September 21, 2021 — 1:13 p.m. — Plotted By: praimbault

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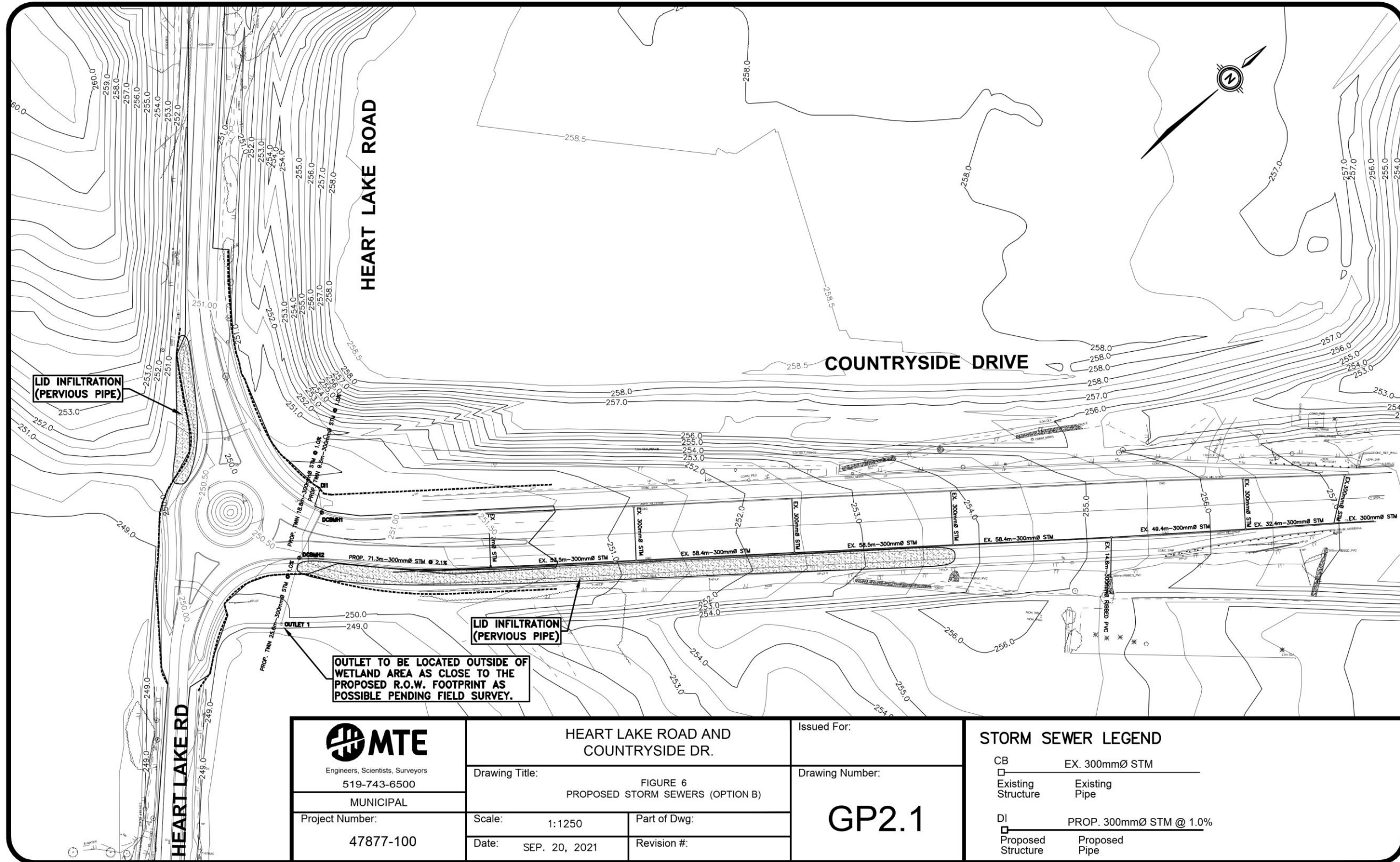
Figure 2.5.1.5: Signalized Intersection Proposed Storm Sewers



February 25, 2022 — 3:54 p.m. — Plotted By: praimbault

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Figure 2.5.1.6: Roundabout Proposed Storm Sewers



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2.5.2 Design

The basis of the design for storm drainage was not to exceed the existing peak runoff and to advance opportunities to offset any increase in the footprint of the intersection using best practices including directing drainage to ditches, enhancing ditches and LID. The existing culvert crossing Countryside Drive would also be replaced.

Figure 2.5.1.4 shows the existing storm drainage infrastructure, while Figures 2.5.1.5 and 2.5.1.6 show the proposed drainage infrastructure for a new signalized intersection and new roundabout respectively.

As shown in Figure 2.5.1.2, there is no change in the drainage catchment areas between existing conditions and a new signalized intersection given that the road profile and cross-section are mostly unchanged. The improvements over the existing drainage conditions mainly consist of like for like replacement of existing drainage infrastructure (see Figure 2.5.1.5) with sheet flow along the west side of Heart Lake Road uncontrolled flowing west into the wooded area and wetland per the major system flow paths. The only significant change in the proposed drainage infrastructure is the addition of curb and gutter along Heart Lake Road at the intersection approaches and proposed LID and new outlet along the south side of Countryside Drive (Figure 2.5.1.5).

The storm drainage catchments for a proposed roundabout follow the proposed grading of the intersections with the low points at the east and south sides of the intersection just outside the roundabout lanes per Figure 2.5.1.3. Surface flow to the west side of the intersection is directed south with overflow into the wooded area to the west; mitigation measures can include capturing and directing flows to the ditch to the southeast or diverting part of the flows into an LID feature at the bump-out upstream to address water quality (i.e., road salt conductivity) concerns. The drainage outlets area summarized in Table 2.5.1.2:

Table 2.5.1.2: Roundabout Proposed Drainage Outlets

Subcatchment Area	Outlet
1, 2, 3, 4 and 5	Proposed twin 300 mm diameter culvert via existing/replaced 300 mm diameter storm sewer along Countryside Drive (potential LID infiltration).
7,9,10,13	Twin 300 mm box culvert via realigned ditch and DCBMH
6, 8 and 11	Surface flow to downstream ditch/wetland with potential LID capture in area 8.

The roundabout option has significant changes in stormwater management that includes curb and gutter at all approaches, a new culvert cross east of the intersection, proposed stormwater capture using LID along the west side of Heart Lake Road and south side of Countryside Drive, new outlets to the southwest ditch and regrading and enhancement of the existing ditches.

The location of the main outlet at the southeast corner of the intersection will be constructed outside the wetland boundary with flows directed to the existing ditch area.

The geotechnical report (Appendix G) indicated the presence of groundwater approximately 2 m below ground in the vicinity of the lowest point of the proposed LID on Countryside Drive and dry conditions along the northwest portion of the intersection, however seasonal groundwater fluctuations will need to be monitored to determine the extent that the infiltration trench for LID can be installed while maintaining 1 m separation from the water table. Much of the proposed LID infrastructure is proposed to be installed along Countryside Drive and Heart Lake Road where the road is at a higher elevation than the wetland areas downstream; the proposed locations and design will be determined during detailed design.

The Rational Method calculation results based on the overall drainage area are discussed below. The overall peak runoff generated by the sub-catchment areas delineated for the existing and proposed conditions are summarized in Table 2.5.2.2:

Table 2.5.2.2: Overall Peak Runoff Rate Results Based on Total Drainage Area

Return Period	I (mm/h)	C1*	Peak runoff Rate (m ³ /s)		
			Ex	Option A	Option B
2Yr	79.43	1.00	0.474	0.474	0.479
5Yr	104.99	1.00	0.626	0.626	0.633
10Yr	121.93	1.00	0.727	0.727	0.735
25Yr	143.48	1.10	0.941	0.941	0.951
50Yr	159.52	1.20	1.141	1.141	1.154
100Yr	175.36	1.25	1.307	1.307	1.321

*Adjustment factor added for higher intensity storms per Region of Peel

The rational formula calculations indicate that the peak runoff generated by a new signalized intersection is unchanged given the nominal changes in the configuration of the impervious and pervious surfaces of the right-of-way from the existing conditions. Under the 100-year event, approximately 0.1 m³/s of peak flow will be conveyed overland with ponding possible at the low-point located at the double-inlet catchbasins.

While the amount of surface conveyance indicates that the surface ponding will likely not impede road accessibility under the 100-year event, LID is recommended along Countryside Drive to allow for more infiltration of flows to reduce the impacts of runoff under a major storm event. Impacts to the downstream eco-passage crossing Heart Lake Road are expected to be mostly unchanged compared to existing conditions.

A proposed roundabout has a minor overall increase in post-development surface runoff by 14 L/s under the 100-year return period with the 300 m² increase in the drainage footprint of the intersection. The major system flow paths indicate better management of surface flow compared to the existing conditions and a new signalized intersection with surface grading, curb and gutter, replacement of the current culvert under Countryside Drive and redesign and improvement of the ditches along the northeast and southeast of the intersection.

The 100-year event is conveyed by both the storm sewer and overland into the proposed culvert. Under the 100-year event, approximately 0.1 m³/s of peak flow will be conveyed overland down Countryside Drive to the intersection at Heart Lake Road with ponding possible at the low-point located at the proposed double-inlet catchbasins that outlet to the culvert. The amount of surface conveyance is likely well within the road capacity and will not impede emergency access under a major storm event; however, LID is recommended along Countryside Drive to allow for more infiltration of flows to reduce the impacts of runoff under a major storm event. Along Heart Lake Road, surface flow is directed southbound into the ditches, however there is an opportunity for additional infiltration at the northwest section of the roundabout using LID to offset the increased drainage area footprint and limit the drainage impacts to the wetland. Impact to the downstream eco-passage is unknown with the projected minor increased runoff but is not expected to be significant with upstream flow mitigation efforts.

2.5.3 Stormwater Quality Control Measures

The only evidence of any form of existing stormwater quality control are perforated outlets along the south side of Heart Lake Road at the east end of the study area for the drainage area upstream and another at the southeast corner of the intersection at Countryside Drive based on the provided as-built data.

TRCA's water balance requirement states that 5 mm of runoff from impervious surfaces must be retained and infiltrated and achieve an enhanced level of treatment (80% TSS) prior to discharge to the wetlands. As previously mentioned, perforated pipe systems are proposed to address both stormwater quantity and quality target. The design will be based on the design of perforated pipe systems.

Preliminary calculations for the areas to be directed to the perforated pipe system indicated a volume retention/treatment target of 71 cubic meters. The total length of LID measures under a preliminary design was approximately 213 m with a total potential infiltration volume of approximately 285 cubic meters.

LID pre-treatment design will include catchbasins located with curb inlets directing road drainage into boulevard areas where catchbasins will be located or a forebay-type configuration before flows enter the catchbasins similar to these used for bioretention cells.

The design calculations also indicate the volume retained/infiltrated will exceed the target volume by an order of magnitude of 3 to 4 times resulting in keeping flow volumes at or below existing peak flows that will mitigate potential impacts on the wildlife corridor downstream.

2.5.4 Impacts on the Wildlife Corridor

A wildlife corridor exists downstream to the south from the construction limit. As noted, the anticipated volume retention using LID in conjunction with pre-treatment of flows prior to entering the LID measure was calculated to be sufficient to mitigate the impacts of a 14 L/s increase in flows that in turn, would mitigate any impacts on the wildlife corridor.

2.5.5 Recommendations

There appear to be more opportunities to control/mitigate surface flows and protect water quality and flows directed toward the wildlife corridor under a roundabout alternative, compared to a new signalized intersection that maintains the status quo for storm drainage.

Key recommendations are summarized below:

1. Hydrogeotechnical review is required to confirm the soil infiltration rate and groundwater levels that will affect the LID approach.
2. An erosion and sediment control plan is required to detail mitigation measures during construction to protect the wetlands and wildlife corridor during construction.
3. The proposed LID alternatives for water quantity and quality impact mitigation are to be reviewed by the TRCA and modified for functionality. A roundabout alternative offers a greater opportunity to direct drainage to LID infrastructure to mitigate flow volume and water quality impacts.
4. Flow monitoring upstream of the wildlife corridor should be conducted to establish the base flow.
5. TRCA to review any additional field studies completed as part of detail design.
6. The forebay type/configuration will be determined as part of detail design and will be reviewed with the TRCA.
7. As part of additional geotechnical investigations during detail design, the LID facilities will be designed to have 1m clearance between the seasonal groundwater level determined by a groundwater monitoring/measurement program instituted as part of detail design.

Appendix F also contains correspondence from, and to the TRCA (dated April 22, 2022) outlining how TRCA comments have or will be addressed as part of detail design.

2.6 Geotechnical Investigation

2.6.1 General

MTE Consultants conducted a geotechnical investigation for the potential reconstruction of the intersection at Heart Lake Road and Countryside Drive. A copy of the Geotechnical Investigation is found in Appendix G and should be referred to for additional details. In general, it has been assumed that the intersection improvements would consist of a full reconstruction of the existing pavement structure.

The purpose of the geotechnical investigation is to determine the soil and groundwater conditions and provide geotechnical engineering recommendations for site preparation,

excavations and dewatering, pavement structure design and construction, and pavement drainage requirements. In addition, soil was sampled from the investigated locations for laboratory chemical analysis for preliminary soil management discussion purposes.

Prior to the geotechnical investigation being completed, the Phase I Environmental Site Assessment (ESA) for the project was completed (Section 2.7). The findings of the Phase I ESA were used to: determine potential locations for the boreholes, to develop the preliminary soil sampling and analysis work plan, and to determine the general environmental quality of the on-site soil for preliminary soil management discussion purposes.

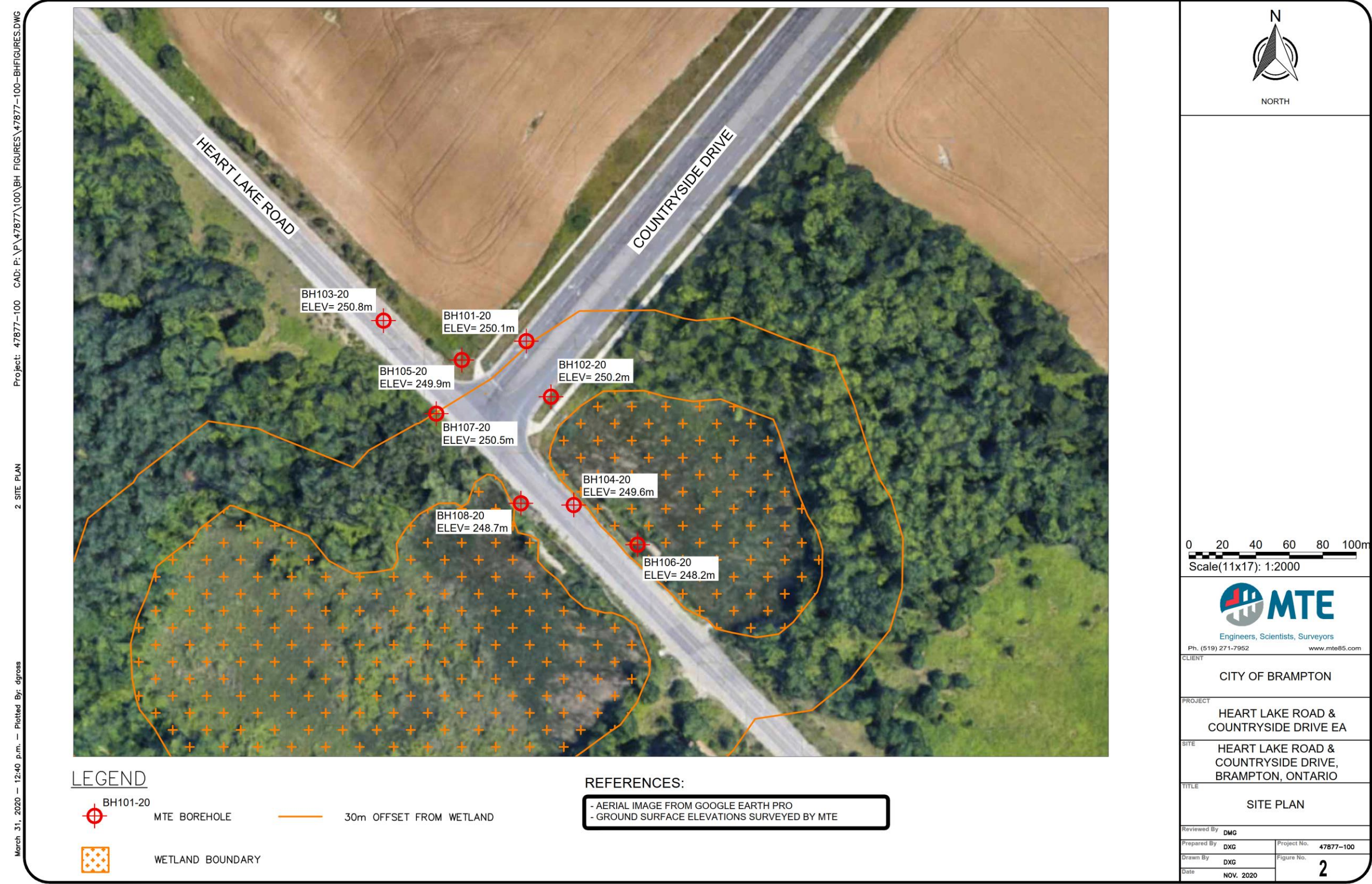
Based on the findings of the Phase I ESA, no evidence of actual contamination in connection with the Project Area or surrounding properties was identified. However, fill materials of unknown quality may have been imported for use during the construction of Heart Lake Road and Countryside Drive, due to the lower elevation of the adjacent wetland areas.

The fieldwork for this investigation involved the drilling of eight (8) boreholes to depths of 1.2 to 3.7 m. The locations of the boreholes are shown on Figure 2.6.1.

The subsurface stratigraphy at the site generally comprises pavement structure and/or fill, overlying native glacial till, silt and sand, silty sand and gravel, and peat deposits. Saturated soil conditions were encountered within the native soils throughout the site at depths ranging from 0.9 to 2.4 m.

Based on the results of this geotechnical investigation, full reconstruction of the pavement structure is feasible for the site. However, the encountered groundwater and peat soils will affect design and construction. The following are the geotechnical and environmental recommendations pertaining to excess soil management, site preparation, excavations and dewatering, pavement structure design and construction, and pavement drainage requirements.

Figure 2.6.1: Geotechnical Site Plan



Project: 47877-100 CAD: P:\47877\100\BH FIGURES\47877-100-BHFIGURES.DWG
 2 SITE PLAN
 March 31, 2020 - 12:40 p.m. - Plotted By: dgross

2.6.2 Preliminary Excess Soil Management

The MECP has finalized their On-Site and Excess Soil Management regulatory package, including Ontario Regulation 406/19 (“Regulation”) and Rules for Soil Management and Excess Soil Quality Standards (“Rules”).

If soils are contaminated, such material must be transported using MECP licensed haulers. It is recommended that additional soil sampling and analysis between and beyond the boreholes should be completed as part of detail design better define the spatial extent of these impacts.

In addition, SAR and/or EC (salt use related) impacted soils exceeding all of the referenced Standards were identified at variable depths. The detection of elevated levels of SAR and EC is an indication of de-icing road salt impacts. However, they are not considered as contaminants of concern in accordance with O.Reg. 153/04, as amended.

If soils are encountered during the construction activities that appear to have been environmentally impacted and not addressed herein, these soils should be segregated into separate stockpiles and inspected to determine appropriate sampling, handling and/or disposal requirements.

2.6.3 Site Preparation

The existing asphaltic concrete within the proposed work area should be removed. The existing granular base and subbase soils only marginally failed the OPSS 1010 specification for Granular ‘B’ Type 1 soils due to high fines content, therefore MTE recommends reusing the material within the road allowance as subgrade or subbase soil.

The existing fill materials that are environmentally suitable are generally considered geotechnically suitable to be left below the new road structure in the reconstruction areas; however, topsoil/organics were encountered within the fill at depths ranging from 0.4 to 1.2 m in 3 boreholes.

Any areas with excessive organic content and/or topsoil must be subexcavated and if the subgrade is wet and unstable, additional granular subbase will be required. The surficial topsoil fill encountered in the boreholes should also be removed from any road reconstruction areas. Surficial topsoil fill must be removed from any road widening area.

Due to the peat deposit encountered, it is not recommended to construct the proposed intersection upgrades in the vicinity of this borehole (south portion of the intersection) and recommends constructing the intersection upgrades to the north and east where possible.

2.6.4 Excavations and Dewatering

Temporary excavations at this site must comply with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The pavement structure and fill encountered at the site are classified as Type 3 soils. Temporary side slopes through this material must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from the base of the excavation. The deposit of peat would be classified as Type 4 soil and temporary side slopes through this material must be cut at an inclination of 3.0 horizontal to 1.0 vertical or less from the base of the excavation, exclusive of groundwater effects.

The glacial till soils encountered at the site are classified as Type 2 soils and temporary side slopes can be cut near vertical at 1.2 m above the base of excavation and then at an inclination of 1.0 horizontal to 1.0 vertical or less above this level, exclusive of groundwater effects. Where wet to saturated conditions are encountered, excavation side slopes should be expected to slough to flatter inclinations, potentially 3.0 horizontal to 1.0 vertical or flatter.

Minor groundwater inflow should be expected where/if excavations extend into the saturated glacial till encountered at a depth of 2.0 m and the saturated seams encountered within the glacial till at depths of 2.4 m and 2.1 m. Minor groundwater inflow should also be expected where/if excavations extend into the saturated silt and sand encountered at depths of 1.5 m and 0.9 m. It is envisioned that conventional sump pump techniques will be suitable to control the groundwater inflow.

Moderate groundwater inflow should be expected where/if excavations extend into the saturated silty sand and gravel deposit encountered at a depth of 2.3 m. It is expected that extensive pumping may be required to handle the groundwater infiltration if excavations extend to 2.3 m or below in this area.

A saturated seam was also encountered within the peat deposit at a depth of 1.2 m. Excavations in this area should be avoided due to the peat deposit.

It will be necessary to flatten or support the excavation side slopes where groundwater seepage is occurring to ensure stability. Every excavation that a worker may be required to enter shall be kept reasonably free of water.

It should be noted that an Environmental Activity and Sector Registry (EASR) or Permit to Take Water (PTTW), issued by the Ministry of Environment, Conservation and Parks, will be required if the dewatering system/sumps result in a water taking of more than 50,000 L/day to 400,000 L/day, respectively.

2.6.5 Curbs, Gutter, and Sidewalks

The concrete for curbs, gutters and sidewalks should be proportioned, mixed, placed and cured in accordance with the requirements of OPSS and shall meet the following specific requirements as per The Corporation of the City of Brampton's Scope of Work Specifications and Drawings document:

- Minimum compressive strength = 32 MPa at 28 days.
- Maximum water to cement (w/c) ratio = 0.45.
- Coarse aggregate = 19.0 mm nominal max. size; and
- Maximum slump = 45 mm (for curb) / 70 ± 20 mm (for sidewalk).
- Air entrainment = 6.5 ± 1.5%

2.6.6 Empirical Pavement Assessment

To determine if the City of Brampton's minimum pavement design would be suitable for the subject roadways an assessment was completed in accordance with the guidelines provided by the Ontario Ministry of Transportation (MTO) publication MTO MI-183 The assessment was completed for a 25-year design life.

Based on the pavement assessment, the required design Structural Number (SN) for Heart Lake Road would be 120 mm. The City of Brampton specified pavement design for an arterial roadway without a transit route would provide a SN of 112 mm and as such, is considered to be insufficient for the reconstruction.

2.6.7 Pavement Construction

A full reconstruction of the pavement structure is proposed at the intersection of Heart Lake Road and Countryside Drive and would involve removing the existing pavement structure materials, reusing the granular pavement structure soils as subbase soils, and placement of new Granular 'B' subbase soils (if needed), Granular 'A' base soils and asphaltic concrete.

The existing fill materials are suitable to be left below the road structure following a proof roll and inspection. Areas with excessive organic content and/or topsoil must be subexcavated.

The City of Brampton specified pavement design for an arterial roadway was deemed insufficient for Heart Lake Road. Based on the pavement assessment, the required SN for Heart Lake Road would be 120 mm. The following pavement design provides an adequate SN for the roadway.

Table 2.6.7.1: Pavement Design for Heart Lake Road

Pavement Component	Heart Lake Road
HL3 (High Stability) Surface Hot Mix Asphalt	50 mm
HL8 Binder Hot Mix Asphalt	100 mm
OPSS 1010 Granular 'A' Base	150 mm
OPSS 1010 Granular 'B' Subbase	450 mm
Structural Number	125 mm

The City of Brampton specified pavement design for an arterial roadway was deemed insufficient for Countryside Drive. Based on the pavement assessment, the required SN for Countryside Drive would be 126 mm. The following pavement design provides an adequate SN for the roadway;

Table 2.6.7.2: Pavement Design for Countryside Drive

Pavement Component	Countryside Drive
HL3 (High Stability) Surface Hot Mix Asphalt	50 mm
HL8 Binder Hot Mix Asphalt	110 mm
OPSS 1010 Granular 'A' Base	150 mm
OPSS 1010 Granular 'B' Subbase	450 mm
Structural Number	129 mm

2.6.8 Pavement Drainage

Adequate subsurface drainage is considered critical to the performance and lifespan of pavement. The pavement subgrade should be sloped at a minimum of 3% to promote drainage, and the pavement granular courses and asphalt should be sloped at a minimum of 2% to promote rainwater drainage.

Where curbs are not constructed on the roadways, adequate ditches should be constructed to promote drainage of the pavement structure. Ditches should be constructed with an invert 500 mm below the top of subgrade.

Where curbs are constructed, continuous pavement subdrains should be constructed to drain the pavement structure, to remove excess subsurface water to improve overall pavement serviceability and increase the pavement life.

2.7 Phase I Environmental Site Assessment

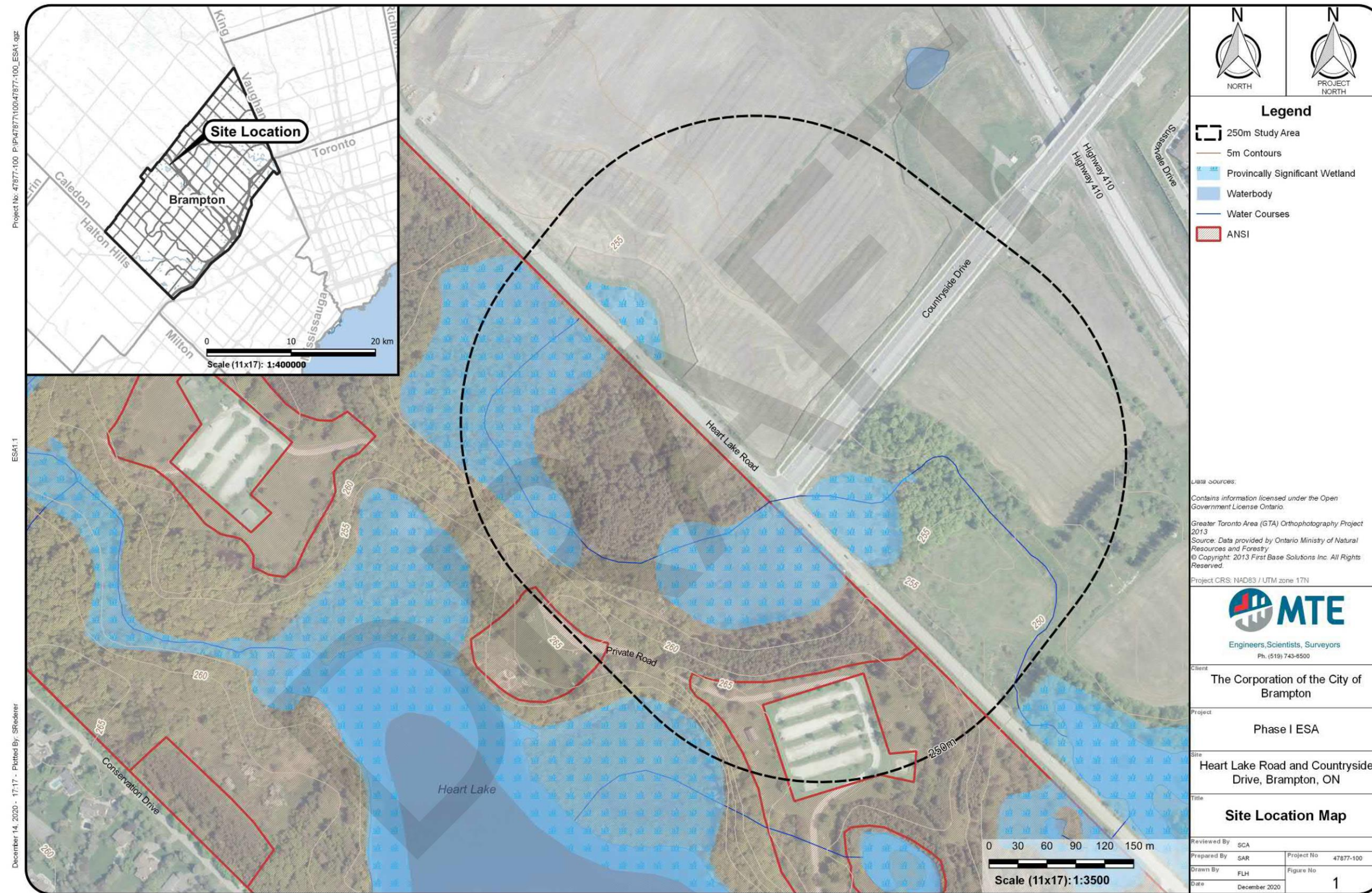
MTE Consultants Inc. (MTE) completed a Phase I Environmental Site Assessment (ESA) for the intersection at Heart Lake Road and Countryside Drive in Brampton, Ontario (the “Site” or the “Intersection”). A complete copy of the Heart Lake Road at Countryside Drive Phase 1 Site Environmental Assessment is found in Appendix H.

Based on a review of historical aerial photographs, the Site has been used as an intersection since at least 1946. The Intersection is owned by the Corporation of the City of Brampton. The Phase I ESA was completed for due diligence purposes in advance of reconstruction of the Intersection.

MTE reviewed information for the Site and properties within 250 m of the Intersection (representing the “Phase I Study Area”), including aerial photographs, geology and hydrogeological records and mapping, Ministry of the Environment, Conservation and Parks (“MECP”) database records and previous reports.

Figure 2.7.1 illustrates a number of features of the site.

Figure 2.7.1: Site Location Map



Based on the records review, the Site has been a municipal intersection right-of-way since at least 1946. There is no evidence of any former buildings at the Site. The Site is owned by the Corporation of the City of Brampton and first received surface treatment in 1987

Based on the findings of this Phase I ESA, no evidence of actual contamination in connection with the Site or surrounding properties was identified. However, the following potential environmental concerns were identified on the Site:

- **Potential Importation of Fill of Unknown Quality:** Fill materials of unknown quality may have been imported to the Site for use during the construction of Heart Lake Road and Countryside Drive, due to the lower elevation of the wetland areas adjacent to Site.

Based on the above, it was determined that soil sampling should be completed in advance of road reconstruction activities to assess soil quality for potential excess soil management, which would be legislated under Ontario Regulation 406/19. This should be completed in conjunction with a detailed design geotechnical investigation for the Site.

3.0 Traffic Analysis

The City of Brampton (the City) conducted a function and design review of the Heart Lake Road corridor between Sandalwood Parkway East and Mayfield Road in November 2019. The study recommended various improvements for the Heart Lake Road corridor including upgrades to the Heart Lake Road/Countryside Drive intersection. A roundabout was proposed for further investigation as part of an overall traffic calming scheme for the Heart Lake Road corridor. A copy of the Function and Design Review can be found in Appendix A.

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake and complete the transportation engineering analysis to investigate and determine the feasibility of implementation of potential improvements, including but not limited to a roundabout at the intersection of Heart Lake Road/Countryside Drive. A copy of Paradigms Transportation and Traffic Analysis Report is contained in Appendix I. It contains details of the analysis and procedures followed.

The conclusions of the Transportation and Traffic Analysis are as follows:

- Under base year conditions intersections within study area are characterized by acceptable delays and demands within capacity. Exceptions are noted at the intersections of Heart Lake Road with Countryside Drive, the Highway 410 Southbound Off-Ramp, and Sandalwood Parkway.

At these locations several critical movements are identified. Specifically, at the subject focus intersection of Heart Lake Road/Countryside Drive, the westbound left turn movement is reported to operate over-capacity. The poor operations are noted to be further exacerbated under future 2031 and 2041 traffic conditions.

- A review of the five-year collision history (2015 to 2019 inclusive) indicates there were no fatal collisions recorded. However, Heart Lake Road at Countryside Drive

and at Sandalwood Parkway were identified as two locations with a high collision frequency. The majority of reported collisions were found to be single motor vehicle collisions related to driver error/behaviour and not a function of the roadway or intersection design.

At the intersection of Heart Lake Road/Countryside Drive the reported number of correctible collisions to warrant the consideration of traffic signal control are just short of meeting the threshold criteria.

- A sight distance review was conducted for the Heart Lake Road/Countryside Drive intersection where it was confirmed there is more than adequate approach and departure sight distance available. However, it is noted even with the adequate sight distance available a high frequency of collisions was occurring. The reported collisions were determined to be attributed to aggressive driver behavior. This resulting situation correlates with the poor operations during the peak hours stemming from a lack of gaps within the traffic stream along Heart Lake Road leading to drivers taking increased risk and more aggressive maneuvers. Based upon these findings it alludes the current intersection traffic control warrants improvement.
- The intersection of Heart Lake Road/Countryside Drive was found to fall just short of meeting threshold criteria for the consideration of traffic signal control under base year traffic conditions. Under 2031 and 2041 traffic conditions the intersection meets the signal justification criteria.
- Under traffic signal control the intersection is predicted to operate at acceptable levels of service and well within capacity under 2041 traffic conditions. In addition to traffic signal control to mitigate the poor operations, roundabout control was investigated. It was determined Heart Lake Road/Countryside Drive would be suitable for roundabout implementation.
- Three roundabout configurations were investigated where it was determined a single-lane roundabout with single lane entry on the northbound and southbound approaches along with dual lane entry on the westbound approach would operate at acceptable levels of service and well within capacity under 2041 traffic conditions. The feasibility of implementing an appropriately sized facility within the right-of-way will need to be confirmed from a detailed design perspective.

4.0 EA Phase 1: Problem Statement

Under Phase 1 of the Class EA process, the problem (deficiency) or opportunity must be identified. A “Problem Statement” is prepared which describes, the various issues needing to be addressed by the Class EA study. In essence, the Problem Statement outlines the need and justification for the overall project and establishes the general parameters, scope, and potential opportunities for the study.

Most everyone who regularly uses the Heart Lake at Countryside intersection experience speeding traffic and lack of gaps in traffic on Heart Lake Road making it difficult to enter onto Heart Lake Road from Countryside Drive. Based on the traffic analysis, and the

findings of the 2019 Function and Design Review, the following Problem Statement was developed for the Heart Lake Road at Countryside Drive Class EA study:

Improve the safety and operations of the Heart Lake Road and Countryside Drive intersection including meeting the traffic demand of increasing population and growth while incorporating traffic calming and wildlife mortality reduction recommendations for the Heart Lake Road Corridor.

5.0 EA Phase 2: Development & Evaluation of Alternative Solutions

Under Phase 2 of the Class EA process, all reasonable solutions to the problem (i.e., planning alternatives) are identified and described, including the “Do Nothing” alternative. Planning alternatives are alternative solutions to the problem or opportunity in the transportation network. Planning alternatives are identified by taking into consideration factors such as the existing environment, as well as public and agency input and establishing a preferred solution. The Environmental Assessment Act (EAA) requires that all reasonable planning alternatives to the undertaking be considered during the decision-making process.

Solutions to address the Problem Statement that have been considered in the project planning and various background studies include:

5.1 Do Nothing

The Class EA process explicitly requires consideration of a “Do Nothing” alternative, which represents the effect on the transportation network of choosing to not complete any network improvements. In practical terms, 2031 and 2041 projected traffic conditions represented by “doing nothing” would, at minimum, result in additional delays to commuters, goods movement, emergency vehicles, etc., in addition to potential increased collisions and safety issues. Delays to goods movement would have a negative impact, particularly on the industrial and commercial base in the area which depends on timely shipments of goods; as well as industries and the larger economy in the City of Brampton and Region of Peel. As population in this area of the City expands, existing issues and problems will continue to be magnified.

5.2 Non-Structural Improvements

This alternative refers generally to using alternative modes to accommodate travel demands e.g., public transit, cycling, and walking. The background traffic information and counts received from the City of Brampton have considered these improvements as part of the overall system planning process and included growth in PM peak hour mode share. However, even with these improvements, the existing capacity deficiencies are not addressed and would worsen significantly in the mature state. While non-structural improvements are a critical component of addressing long-term transportation needs, alone they are not sufficient to address all long-term needs, specifically at the Heart Lake Road and Countryside Drive intersection.

5.3 Intersection Improvements

This alternative solution includes improvements to the Heart Lake Road at Countryside Drive intersection and other ancillary improvements, based on the traffic study completed for this project, and findings from the 2019 Function and Design Review Study. To be considered as part of the intersection improvements could be drainage and culvert improvements (i.e., new storm sewers, curb, and gutter), auxiliary lane construction, utility relocations, and enhancements for pedestrians and cyclists.

5.4 Summary and Recommended Alternative Solution

Based on the above discussion, the Recommended Solution is considered to be Intersection Improvements at Heart Lake Road and Countryside Drive.

Other improvements to existing adjacent roads will continue to be implemented, however the traffic studies for this project have shown the need for improvements to the Heart Lake Road and Countryside Drive intersection, even with other road improvements outside the study area being completed by the City and other jurisdictions.

6.0 Development & Evaluation of Alternative Design Concepts for the Preferred Solution

6.1 Alternative Design Concepts Considered

Including the required “DO-NOTHING” alternative, there are three main Alternative Design Concepts for this project:

- Do Nothing;
- Signalized Intersection with Turn Lanes (Figure 6.1.1); and
- Roundabout (Figure 6.1.2).

A 30% design has been completed on each Alternative Design Concept, and Figures 6.1.1 and 6.1.2 illustrate the preliminary 30% design. Some of the features of each design concept are highlighted below:

Signalized Intersection with Turn Lanes:

The cross-section of Countryside Drive stays mainly unchanged, with four lanes remaining, but a 3.0m Multi-Use Trail is proposed in the location of the existing sidewalk to accommodate cyclists. Due to the turn lane (and shadow lane on the south leg) of Heart Lake Road, there will be some intrusion into the wetlands at the south-east corner (201 s.m.), as well as on the west side into some wetlands and wooded areas. A multi-use trail will be constructed on the east side of Heart Lake Road through the intersection, which is in keeping with the preferred cross-section developed for the rest of Heart Lake Road as part of the Function and Design Review Study completed by the City of Brampton (Figure 1.4 in Section 1.0).

Roundabout

It is noted that several roundabout design iterations were completed to minimize the impacts on the various wetlands at the intersection. Figure 6.1.2 illustrates a roundabout design that minimizes wetland impacts but does require property be purchased on the north-east corner of the intersection, in order to construct the roundabout and meet the traffic and design criteria. Some of the features of the roundabout design include a 3.0 m multi-use trail on all sections of the roundabout to accommodate cyclists and pedestrians, and which can be tied into the pedestrian/cyclist features that will be constructed when the rest of Heart Lake Road is constructed. The roundabout has a n 18.5 diameter and a 3.50 m. concrete apron.

6.2 Development of the Recommended Design Concept

Each of the alternative design concepts were evaluated for how they meet the Problem Statement and project needs. Each design concept was evaluated based on the following evaluation criteria:

- Natural Environment;
- Planning Objectives;
- Social and Cultural Environment;
- Economic Development; and
- Engineering and Technical Factors.

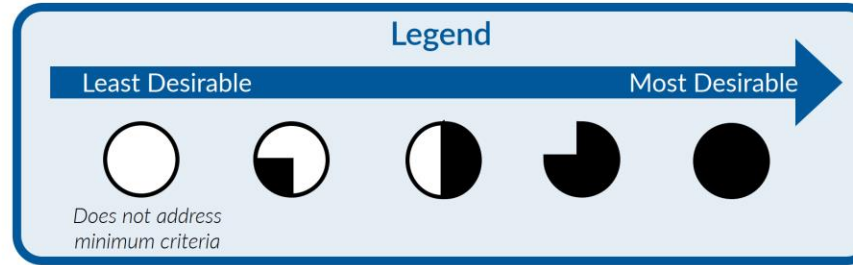
An evaluation Matrix was developed and presented at a virtual Public Information Centre held from April 14, 2022, to May 13, 2022. Table 6.2 is the evaluation matrix which provides a summary and details of the evaluation. Each design concept was evaluated and given a circle or score ranging from a blank circle (0 score) to a full circle (score of 4).

The roundabouts design concept was evaluated with an overall score of 15, making it the highest ranked design concept. In summary this score reflects the fact that a roundabout has minimal impacts on the wetlands, will slow down all traffic, it can enhance the visual landscape, results in less idling/congestion and has lower maintenance costs once the roundabout is constructed (i.e., no traffic signal operating or maintenance costs).

As a result, the roundabout was presented to the public as the Preferred Solution. Comments received from the agencies and public regarding the preferred Roundabout solution can be found in Section 9.0.

Table 6.2: Evaluation Matrix

Heart Lake Road at Countryside Drive Environmental Assessment Evaluation Matrix



Evaluation Criteria	Do Nothing	Signalized Intersection with Turn Lanes	Roundabout
Natural Environment			
<ul style="list-style-type: none"> 1. Minimize impacts to Designated Natural Areas, vegetation, wildlife, aquatic features 2. Minimize impacts to wetlands 3. Minimize impacts to surface water and groundwater 4. Minimize air quality impacts and effects on climate change 	<ul style="list-style-type: none"> 1. No impacts to existing Natural Areas, vegetation, wildlife or aquatic features, but Heart Lake Road traffic will continue at speed limit, increasing chance of wildlife strikes 2. No impacts to designated wetlands 3. No change in runoff/ surface drainage 4. Traffic volumes will continue to increase, resulting in increase delays / congestion 	<ul style="list-style-type: none"> 1. a) Traffic with green light will continue at speed limit increasing chance of wildlife strikes b) Wildlife fencing and erosion controls to be installed 2. Some intrusions into designated wetlands (271m²) 3. Least pavement drainage/surface water runoff 4. Traffic delays/congestion resulting in vehicles idling at red lights 	<ul style="list-style-type: none"> 1. a) All traffic will slow down to navigate roundabout, which should reduce wildlife strikes b) Wildlife fencing and erosion controls to be installed 2. Minimal intrusion into designated wetlands (45m²) 3. More pavement resulting in more drainage/surface water runoff 4. Less traffic delays due to vehicles not having to stop at red lights, less vehicle starting/stopping
	● 4	◐ 1	◑ 3
Planning Objectives			
<ul style="list-style-type: none"> 1. Adhere to Transportation Master Plan 2. Adhere to Official Plan 3. Adhere to Active Transportation Master Plan 4. Adhere to Region Official Plan Policies 	<ul style="list-style-type: none"> 1. Does not implement required improvements per Transportation Master Plan 2. Other transportation improvements will be required to adhere to the Official Plan 3. Does not adhere to Active Transportation Master Plan 4. Other transportation improvements will be required to adhere to Official Plan Policies 	<ul style="list-style-type: none"> 1. Adheres to Transportation Master Plan 2. Adheres to Official Plan 3. Adheres to Active Transportation Master Plan 4. Adheres to Region Official Plan Policies 	<ul style="list-style-type: none"> 1. Adheres to Transportation Master Plan 2. Adheres to Official Plan 3. Adheres to Active Transportation Master Plan 4. Adheres to Region Official Plan Policies
	○ 0	● 4	● 4

October 20, 2021



Evaluation Criteria

Do Nothing

Signalized Intersection
with Turn Lanes

Roundabout

Social and Cultural Environment

1. Improve visual aesthetics
2. Preserve archaeological and cultural heritage features
3. Preserve the agricultural setting, community character and public realm
4. Minimize traffic noise
5. Minimize disruption due to construction
6. Minimize impacts to existing accesses in the area

1. Visual aesthetics will remain the same, no opportunities to enhance landscape
2. No impacts to archaeological/ heritage features
3. No impacts to existing setting, character or public realm
4. Traffic noise will continue to increase as traffic volumes increase
5. No disruption due to construction, however, increasing congestions may cause disruption
6. No impacts to existing access, however, increasing congestion may impact access

1. Landscaping opportunities behind curb/ sidewalk/MUT
2. a) No direct impacts to archaeological/ heritage features
b) Some impact on existing rural road cross section
3. Signals contribute to urban look and setting
4. Traffic noise will not decrease
5. Least time for construction and traffic can be maintained during construction
6. No accesses impacted in the area

1. Opportunities for landscaping in center island and behind sidewalk/MUT
2. a) No direct impacts to known archaeological features
b) Disrupt existing linear views
c) Changes the existing cross section
d) Additional Stage 1/2 Archaeological investigation required in property purchase area
3. Opportunity to enhance the public realm, and all traffic must slow to navigate roundabout
4. Traffic noise will decrease due to less stop/starts of traffic
5. Most time for construction and traffic can be maintained during construction
6. No accesses impacted in the area

2

2

3



Economic Development

1. Beneficial to business/ community with respect to travel time
2. Minimize capital and construction costs
3. Minimize property impacts/ requirements
4. Minimize operating and maintenance costs

1. Travel time will not be reduced, and will increase as traffic volumes increase
2. No construction or capital costs
3. No additional property required
4. Operating and maintenance costs do not change

1. More delays than with a roundabout due to stopped traffic stopped for red lights
2. Road improvements and signal installation have lowest capital/construction costs - est. \$1.15 million
3. No additional property required
4. Operating and maintenance costs include powering and maintaining signals





1. Roundabout provides more free flowing traffic, and results in less traffic delays/congestion
2. Highest Capital Costs due to additional pavement, curb, signage and line markings - est. \$1.57 million
3. Approximately 550 sm of property is required on NE corner, which can be obtained through the subdivision approvals
4. No signal power and maintenance costs





3

2

2

October 20, 2021

Evaluation Criteria	Do Nothing	Signalized Intersection with Turn Lanes	Roundabout
 Engineering and Technical			
<ol style="list-style-type: none"> Congestion and collisions will continue Create an Active Transportation Friendly Environment (Cyclists, pedestrians etc.) Accommodate future travel demands Improve transportation mode choice including transit Accommodate emergency services Minimize impacts to utilities in the corridor 	<ol style="list-style-type: none"> Is safe for all travel modes No additional sidewalks or cycling facilities Future travel demands not accommodated Transportation mode choice not improved Fire trucks can be accommodated, but may experience congestion in future No utility relocations required 	<ol style="list-style-type: none"> Safe for all travel modes Sidewalks, cycle facilities provided. Motorist must stop at red light and be aware of pedestrians. Future travel demands accommodated (20 years) All transportation modes accommodated including transit Fire Truck can use priority signal to enhance access through intersection Utility relocations will be required, but somewhat less than Roundabout 	<ol style="list-style-type: none"> Safe for all travel modes. Roundabout reduces severity of collisions (i.e. less conflict points and sideswipes vs head-on or "T bone" collisions) Sidewalks, cycle facilities provided. Requires pedestrians to be sure motorists are aware of their presence. Cyclists can use Roundabout or multi-use path at Roundabout Future travel demands accommodated (20 years). Roundabout results in less delays/congestion All transportation modes accommodated including transit Fire trucks can navigate roundabout within acceptable response times - less congestion Utility relocations required will be slightly more than signalized due mainly to additional street lighting
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> 1</div> <div style="text-align: center;"> 4</div> <div style="text-align: center;"> 3</div> </div>			

 Overall Evaluation Score			
	Does not meet planning objectives nor active transportation requirements, and will result in increased congestion.	Meets Planning and Engineering/ Technical objectives; some intersections encroach into natural areas; idling traffic will continue/ increase; and noise and urban look will increase.	Meets Planning and Engineering/ Technical objectives; visual/ landscaping can be enhanced; less idling/ congestion; lower lifecycle cost due to very low maintenance with no intrusions into wetlands; Pedestrians/ cyclists may be initially unfamiliar with Roundabouts.
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> 10</div> <div style="text-align: center;"> 13</div> <div style="text-align: center;"> 15</div> </div>			

October 20, 2021

7.0 Description of the Recommended Design

Based on the detailed studies and the public and Agency feedback (see Section 9.0) the Recommended Design is to construct a roundabout at the intersection of Heart Lake Road and Countryside Drive as illustrated in Figure 7.0. The Recommended Roundabout Alternative is described as follows:

- Central Island Radius of 12.7 m;
- Inscribed Circle Diameter of 18.5 m;
- 3.5 m concrete apron;
- Approaching lane widths of 3.5 m;
- 1.5 m boulevard between the back of curb and the 3.0 m Multi-Use Trail;
- Install a new 3.0 m Multi-Use Trail on Countryside Drive in place of the existing concrete sidewalk;
- Multi-Use Trail installed around the roundabout to tie into proposed Multi-Use Trail on Countryside Drive, and proposed future cycle lanes on Heart Lake Road;
- Property acquisition required on north-east corner of intersection;
- Proposed Roundabout to avoid or minimize impacts on the wetlands in the area to be confirmed during detail design;
- The entry into the roundabout from Countryside Drive to consist of two lanes to accommodate WB to NB (right turning) traffic onto Heart Lake Road, and a WB to SB (left turning) traffic onto Heart Lake Road; and
- All other entry and exist lanes at the roundabout to consist of one lane.
- Storm Drainage to be accommodated by means of LID's, as outlined in Section 2.5. As part of detail design, pre-treatment of drainage before entering the LID's must be considered.

8.0 Project Impacts and Mitigation Measures

A number of recommendations and mitigation measures have been developed as part of the various technical studies completed for the project. Table 6.1 summarizes these recommendation and mitigation measures.

Table 6.1: Recommendations and Mitigation Measures

Storm Drainage	A Hydrogeotechnical review will be required prior to detail design to confirm the soil infiltration rate and groundwater levels that affect the LID approach;
	An erosion and sediment control plan must be completed as part of detail design and construction to protect the wetlands and wildlife corridor during construction;
	The proposed LID alternatives for water quantity and quality impact mitigation are to be reviewed by the TRCA and modified for functionality as part of detail design. Pretreatment will be required before discharging into the LID's
	Flow monitoring upstream of the wildlife corridor should be conducted to establish the stormwater base flow prior to detail design;
	Additional survey is recommended to identify potential constructability issues and confirm outlet locations.
Archaeological	All identified areas of archaeological potential that will be disturbed to be subject to a Stage 2 property assessment.
	The identified areas of no archaeological potential and previously assessed lands of no further concern do not require any additional assessment.
Cultural Heritage	That intersection improvements and any construction staging areas should avoid the use of land which is part of BHR1 at 10881 Heart Lake Road;
	If project-related activities are expected to impact the BHR1, a qualified heritage consultant should be contracted to complete property specific Heritage Impact Assessment and provide detailed mitigation options to address the proposed design on the resources.

	<p>The planned intersection improvements should consider the heritage attributes of CHL 1, specifically the rural cross section of the road, including the width of the road, two lanes of traffic, and ditching; wood utility poles along the roadside; natural setting of the roadscape, and linear corridor views along Heart Lake Road;</p>
	<p>Prior to finalization of detail design, a Heritage Impact Assessment (HIA) should be prepared for the Heart Lake Corridor (CHL 1), to evaluate the impacts and suggest mitigation measures. This study should be undertaken by a qualified heritage consultant.</p>
	<p>That should intersection and road improvements create seating areas and/or transit stops, this may provide an opportunity to interpret some of the identified cultural heritage resources (i.e., with plaques, public art).</p>
<p>Natural Environment</p>	<p>Construction works such as grading, grubbing and excavation have the potential to result in the movement of sediment into the offsite watercourses and wetlands. An Erosion and Sediment Control (ESC) plan should be prepared prior to the start of the construction phase of the development and approved by the TRCA. The plan should include but not be limited to establishment of silt fence at the construction limit. ESC measures should be regularly inspected and maintained in good working order throughout the construction period;</p> <p>A spill response plan should be prepared for works in or near the watercourses and wetlands and take necessary actions and notify appropriate personnel in the event of a spill (identification of local MECP office);</p> <p>Low impact design (LID) measures should be utilized where feasible to promote infiltration and provide stormwater quality and quantity treatment.</p> <p>Following construction, temporary ESC measures should be removed after soils are sufficiently covered and stabilized. Exposed soils should be stabilized as soon as possible through re-vegetation using native species or other appropriate methods;</p> <p>Exterior lighting fixtures adjacent to the natural area should direct light downward to the surface where it is needed and minimize up-light;</p>

	<p>Landscaping plans should utilize a diversity of local native species that are complimentary to the adjacent natural features;</p> <p>The limits of the work area should be delineated by exclusion fencing for the protection of trees and other vegetation. Silt fence may double as tree/vegetation protection fencing;</p> <p>During construction, if wildlife is encountered within the construction limits, a qualified biologist should be contacted to ensure appropriate handling and relocation; and</p> <p>The removal of trees and other vegetation from the site has the potential to disturb nesting birds. The federal Migratory Birds Convention Act protects the nests, eggs and young of most bird species from harassment, harm, or destruction. The breeding bird season in southern Ontario is generally from April 1 to August 31; therefore, the clearing of vegetation should be outside of these dates (i.e., between September 1 and March 31).</p>
Geotechnical	<p>During detail design, it is strongly encouraged to reduce the amount of excess soil to be generated, if practical.</p>
Phase 1 Environmental Site Assessment	<p>Although no evidence of actual contamination in connection with the Site or surrounding properties was identified, potential importation of fill of unknown quality may have been imported to the Site for use during the construction of Heart Lake Road and Countryside Drive, due to the lower elevation of the wetland areas adjacent to Site.</p> <p>Based on the above, soil sampling should be completed in advance of road reconstruction activities to assess soil quality for potential excess soil management, which would be legislated under Ontario Regulation 406/19. This could be completed in conjunction with a geotechnical investigation for the Site as part of detail design.</p>
Heart Lake Turtle Troopers	<p>Prior to construction, install strong exclusion fencing in combination with alternate nesting areas to keep large turtles from entering work areas</p>

	<p>Educate the work crews on the importance of protecting our declining turtle population and recognizing turtle’s nests and eggs (Heart Lake Turtle Troopers to facilitate this)</p> <p>Provide construction crews with contact resources in the event of finding a turtle, nest, or animal; Christina Cicconetti 416-606-1937, heartlaketurtletroopers@gmail.com</p>
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9.0 Public and Agency Consultation

9.1 Consultation with the Public and Review Agencies

Early and ongoing consultation with the public and agencies is a key feature of the environmental assessment planning process. Consultation is a two-way process between the proponent (City of Brampton) and interested stakeholders, which provides opportunities for information exchange and for those affected or interested parties to provide input into the project and process.

It is important to identify the various stakeholders and interested parties for a Class EA project. For this project they include:

The Proponent: It is important to keep all Departments and entities of the proponent (City of Brampton) aware of the study status and issues being addressed. Members of various City of Brampton Departments were members of the project team (See Section 1.3) directing this project, and they in turn reviewed various issues with staff of other Divisions on issues that may be of concern.

The Public: This includes individual members of the public who may be affected or impacted by the project, including property owners, developers, residents, businesses, and special interest groups (e.g., cycling interests, community associations, etc.). A Stakeholder meeting was held with members of the public who had a special interest in the project and wished to be part of the Stakeholder Group (see Section 1.3).

Review Agencies: Government Agencies that represent the policy positions of their respective departments, ministries, or authorities (e.g., Toronto Region Conservation; Ministry of Natural Resources and Forestry; Ministry of Environment, Conservation and Parks; etc.).

Municipalities (other than the Proponent): The City of Brampton is part of the Regional Municipality of Peel. Representatives of the Region of Peel were part of the Technical Advisory Committee for this project (see Section 1.3).

The various Municipal Class Environmental Assessment schedules have different mandatory points of contact. Schedule B projects have (a minimum of) two (2) mandatory points of contact. The main points of contact for this study are summarized in the subsequent sections. In addition, information and notices etc. were posted on the City of

Brampton website as part of the public notification process. The link to the City's website is <http://www.brampton.ca/Heartlake-Countryside-EA>

9.2 Notice of Study Commencement

A Notice of Study Commencement was advertised in the Brampton Guardian on October 1, 2020.

A copy of the Notice of Study Commencement was also mailed to property owners identified as owning property on Heart Lake Road as being in or within approximately 200 metres of the Study Area. Staff of various agencies and other interest groups were also mailed copies of the Notice of Study Commencement. In addition, a Notice of Study Commencement was also hand delivered to residences on Heart Lake Road between Mayfield Rd and Sandalwood Parkway.

The Notice of Study Commencement were also mailed to Indigenous Communities, namely:

- Mississaugas Of the Credit First Nation
- Haudenosaunee Confederacy
- Huron-Wendat First Nation
- Six Nations of the Grand River

No comments were received from the above noted Indigenous Groups.

A copy of the Notice of Study Commencement and mailing list is included in **Appendix J**. Of the responses received, they were mainly asking to be part of the Stakeholders Group or the Technical Advisory Committee. All requests to join a particular group or committee were granted and included in the requested groups.

9.3 Public Information Centre

A Public Information Centre (PIC) was held virtually starting April 14, 2022, to May 13, 2022. A copy of the video presentation and presentation boards can be found online at <http://www.brampton.ca/Heartlake-Countryside-EA>. Copies of the presentation and comments received, as well as the mailing list are also found in Appendix J.

The Indigenous Groups included in the mailing list for the PIC included:

- Mississaugas Of the Credit First Nation
- Haudenosaunee Confederacy
- Six Nations of the Grand River

A summary of the comments received are included in Table 9.3.1.

Table 9.3.1: Responses to All PIC Comments

Question	Responses	Proposed Responses
<p>1. How often do you use Heart Lake Road and Countryside Drive intersection?</p>	<ul style="list-style-type: none"> • Daily = 15 • Weekly = 15 • Monthly = 7 • Rarely = 5 	
<p>2. Do you support the recommendation for a Roundabout to improve safety and traffic flow in this intersection?</p>	<ul style="list-style-type: none"> • Yes = 24 • No = 18 	
<p>3. Do you believe a Roundabout would help with traffic calming and preventing wildlife injury?</p>	<ul style="list-style-type: none"> • Yes = 23 • No = 19 	
<p>4. Do you support the recommendation to add a Multi Use Trail for pedestrians and cyclists to use the intersection?</p>	<ul style="list-style-type: none"> • Yes = 31 • No = 9 • Did not answer = 2 	
<p>5. Do you have any additional comments about the Intersection Improvements at Heart Lake Road and Countryside Drive EA Study:</p>	<ul style="list-style-type: none"> • <i>Install a traffic light NOT a roundabout.</i> 	<p>Traffic signals have been considered in This project. However, a traffic signal controlled intersection has greater impacts on the wetlands as opposed to a roundabout. In addition, a roundabout typically has less serious vehicle collisions, slows traffic and results in less vehicle emissions.</p>

Question	Responses	Proposed Responses
	<ul style="list-style-type: none"> • <i>There should be a bicycle path along Heartlake for safety in particular from the intersection to Heartlake conservation entry.</i> 	<p>This project is just for the intersection. However, the intersection will be designed to accommodate future multi-use paths or cycling facilities.</p>
	<ul style="list-style-type: none"> • <i>Please advise when is the starting date and will the access (or drive thru) be closed during construction and for how long?</i> 	<p>Construction is not anticipated until at least 2024. Construction of roundabouts typically takes most if not all of a construction season. However, with a roundabout it is possible to keep traffic open on Heart Lake Road for most of the construction period with some short-term closures. Notifications of specific road closures will be posted as required.</p>
	<ul style="list-style-type: none"> • <i>A dedicated cyclist lane will improve safety for cyclists.</i> 	<p>Cyclists will be able to use the existing lanes through the roundabout, or drive on the provided multi-use paths at the roundabout</p>
	<ul style="list-style-type: none"> • <i>Instead of Roundabout, I prefer Light signals. Specifically, with Brampton drivers follow less attention to Roundabout and more to traffic light. This road will be more busier with all these construction happening.</i> 	<p>Roundabouts typically require some type of education program or notifications to ensure motorists know how to use roundabouts. The design of a roundabout inherently slows drivers down, such that they have time to make decisions. Roundabouts are becoming much more common in Southern Ontario and many drivers are becoming familiar with intersections with roundabouts.</p>
	<ul style="list-style-type: none"> • <i>Speed along Heart Lake Road is an ongoing issue. Either use of speed cameras or more police presence would be beneficial.</i> 	<p>A roundabout design is based on slowing all traffic using the intersection. However, the comment regarding speed will be forwarded to the police and is acknowledged by the City of Brampton.</p>

Question	Responses	Proposed Responses
	<ul style="list-style-type: none"> <i>I think a lot more needs to be done to deter traffic from this area. People should get off and on the 410 at Mayfield instead. This area is too sensitive for the traffic of people looking to get on and off the highway.</i> 	<p>Traffic may be able to be “encouraged” to use Highway 410 by use of signage and perhaps other traffic calming measures along Heart Lake Road.</p>
	<ul style="list-style-type: none"> <i>I would like to see better wildlife circulation such as Turtles with improved access between east and west sides of Heart Lake. I do not want to see additional car lanes here. It will harm the natural area and encourage significant automotive usage here. A roundabout is a great idea to reduce fatal collisions and improve traffic circulation at this currently horrible intersection.</i> 	<p>Some underground wildlife crossings have been installed on Heart Lake Road. A roundabout minimizes the need for additional traffic turn lanes, as well as slows traffic such that wildlife crossing Heart Lake Road can be more easily avoided.</p>
	<ul style="list-style-type: none"> <i>We have 2 turtle nesting beds located at this intersection. I am the cofounder of Heart Lake Turtle Troopers. There are significant wildlife in this area. Traffic must be calmed from Sandalwood to Mayfield along Heart Lake Road.</i> 	<p>The City will review other traffic calming measure along Heart Lake Road when Heart Lake Road is improved in accordance with the 2019 Study. The proposed roundabout does not affect the existing turtle nesting beds.</p>
	<ul style="list-style-type: none"> <i>Main problem is speed. Speed limit is 60km/hr on Heartlake but people are going 80km/he or faster. And If you’re not, the vehicle behind you will ride your bumper or pass you in the oncoming lane.</i> 	<p>Installation of a roundabout at Countryside Drive will slow traffic in that area.</p>

Question	Responses	Proposed Responses
	<ul style="list-style-type: none"> • <i>Traffic light would be my preference</i> 	<p>Roundabout at Countryside Drive intersection will slow traffic on Heart Lake Road</p>
	<ul style="list-style-type: none"> • <i>Lower speed limit</i> 	<p>This will be reviewed by the City of Brampton</p>
	<ul style="list-style-type: none"> • <i>Stop heavy trucks and vehicles on Heartlake Rd to safe our wildlife.</i> 	<p>This will be reviewed by the City of Brampton</p>
	<ul style="list-style-type: none"> • <i>There are serious issues in Brampton with motorist adherence to stopping at stop signs and maintaining the basic rules of a four way stop (who goes first, second, third, etc...). The rules of a roundabout will not be obeyed. A traffic light is required at this intersection, along with a 'no u turns allowed' sign.</i> 	<p>Roundabouts typically require some type of education program or notifications to ensure motorists know how to use roundabouts. The design of a roundabout inherently slows drivers down, such that they have time to make decisions. Roundabouts are becoming much more common in Southern Ontario and many drivers are becoming familiar with intersections with roundabouts.</p>
	<ul style="list-style-type: none"> • <i>Put in a stop light. Should have been done years ago.</i> 	<p>Roundabout at Countryside Drive intersection will slow traffic on Heart Lake Road</p>
	<ul style="list-style-type: none"> • <i>Insurance premiums are high due to accidents and such poor drivers in Brampton. People can't even figure out what to do at a 4 way stop, it would be a catastrophe at a roundabout!!! Heart Lake Road was never meant to handle anything but local traffic not the subdivisions and businesses to the North. It's being used as a raceway to 410. Politicians need to stop</i> 	<p>Roundabouts typically require some type of education program or notifications to ensure motorists know how to use roundabouts. The design of a roundabout inherently slows drivers down, such that they have time to make decisions. Roundabouts are becoming much more common in Southern Ontario and many drivers are becoming familiar with intersections with roundabouts.</p>

Question	Responses	Proposed Responses
	<p><i>issuing building permits and allowing reasoning. We need farmland.</i></p>	<p>All building permits and subdivision developments are completed in accordance with the City of Brampton's Official Plan</p>
	<ul style="list-style-type: none"> <i>This is a busy traffic area for cars turning left off of countryside onto Heart Lake and left off of heart lake onto countryside. There is way too much traffic flow for a roundabout. Especially since we don't have roundabouts really in Brampton. The drivers here are horrible, they won't use a roundabout properly and there will no doubt be accidents and dangerous situations. Put in a traffic light! Problem solved!</i> 	<p>A Roundabout will slow traffic for vehicles to navigate them, and an education program will be advertised for drivers unfamiliar with Roundabouts. A "three legged" roundabout is usually ideal for one of the first roundabouts in the area, as it results in less decisions for drivers compared to a standard "four legged" roundabout. It may take some time for all drivers to feel comfortable navigating a roundabout, but drivers will become comfortable with the roundabout. Roundabouts typically prevent the serious "T-Bone" type accidents associated with left turning movements. A traffic signal also has more impacts on the environmental components at this intersection</p>
	<ul style="list-style-type: none"> <i>Please do not replace more green space with concrete</i> 	<p>Although a roundabout typically has a greater surface area than an intersection with traffic signals and turn lanes, in this instance a roundabout alternative actually has less impact on the sensitive environmental areas (i.e. wetlands).</p>
	<ul style="list-style-type: none"> <i>I think with the business park opening up that really just a set of lights are required. I can't imagine transports being able to navigate a roundabout easily.</i> 	<p>Roundabouts can easily accommodate trucks as well as buses and fire trucks. The Brampton Fire Department has reviewed the roundabout and are satisfied with the preliminary design.</p>

Question	Responses	Proposed Responses
	<ul style="list-style-type: none"> As a resident stakeholder, I am pleased by everyone's efforts in trying to get this right. We are also requesting that the COB add some speed cushions along Heart Lake Road as a (much needed) supplementary traffic calming measure. 	<p>The City of Brampton will review additional traffic calming or "traffic slowing" measures in advance of the proposed improvements to the remaining portions of Heart Lake Road.</p>
	<ul style="list-style-type: none"> This intersection needs traffic lights not roundabout. 	<p>A roundabout will perform as well as a traffic signal, as well as help slow traffic on Heart Lake Road, and has less impacts on the adjoining wetlands.</p>
	<ul style="list-style-type: none"> People drive WAY too fast down heart lake road. It would be great to see speed cameras or speed bumps put in to protect the wildlife. My greatest concern with the round about is a disruption to the two turtle nesting beaches that are on the west and east side of heart lake road. Improving the eco fencing and ensuring the construction does not disrupt the nests is crucial. Myself and many neighbours are onboard to reduce the speeding as much as possible and make the heartlake and country side intersection safer for all 	<p>A roundabout will help slow traffic on Heart Lake Road, and since it is proposed to move the roundabout slightly north it minimizes the impacts to the wetlands and the turtle nesting areas. The construction contract will specify and fence off environmentally sensitive areas such as the turtle nesting areas.</p>
	<ul style="list-style-type: none"> Traffic light would be better. 	<p>A roundabout will perform as well as a traffic signal, as well as help slow traffic on Heart Lake Road, and has less impacts on the adjoining wetlands.</p>
	<ul style="list-style-type: none"> Stop lights are needed at this intersection rather than a roundabout. Roundabout is 	<p>Although there are larger traffic volumes on Heart Lake Road than on Countryside Drive, a roundabout slows traffic and will</p>

Question	Responses	Proposed Responses
	<i>useless when you see the number of cars on Countryside that are trying to make a turn.</i>	provide gaps for traffic entering Heart Lake Road from Countryside Drive. A roundabout also reduces serious “T-bone” type collisions
	<ul style="list-style-type: none"> • <i>They are in desperate need of traffic lights at this intersection. I drive by this intersection daily and have nearly been hit too many times to mention by people pulling out in front of me from Countryside Drive onto Heart Lake Road thinking I have a stop sign when there is no stop sign travelling north and south on Heart Lake road!! One of the most dangerous intersections in Brampton in my opinion!!</i> 	A roundabout will not only slow traffic on Heart Lake Road but will reduce the probability of serious “T-bone” collisions at the intersection. A roundabout also performs as well as a traffic signal from a volume perspective and reduces the impacts on the nearby wetlands.
	<ul style="list-style-type: none"> • <i>Stop building near conservation area</i> 	The project has been reviewed by Toronto Region Conservation. The roundabout alternative has the least impacts on the adjacent wetlands.
6. What is your preferred way to receive updates relating to the Environmental Assessment Study	<ul style="list-style-type: none"> • By letter mail = 2 • By e-mail = 15 • On my own through the cities website = 24 • Did not answer = 1 	
7. Would you like to be added to our mailing list?	<ul style="list-style-type: none"> • Yes = 12 • No = 30 	
8. Please provide your name, e-mail address, mailing address, city & postal code to receive study updates.	<ul style="list-style-type: none"> • <i>Rob Boot bob-boot@hotmail.com</i> • <i>Manny Marcos (Property Director) 416-804-7595 Heart Lake Seventh-day Adventist Church 10747 Heart Lake Road Brampton</i> 	

Question	Responses	Proposed Responses
	<p>Ontario L6Z 0B7 mannymarcos13@gmail.com</p> <ul style="list-style-type: none"> • Ramona Grybas 36 Chambers Court Brampton L6Z1J1 Ramonagrybas1@gmail.com • ethanthproductions@gmail.com • Lori Leckie 69 Barr Cres Brampton L6Z 3E3 lori.leckie@gmail.com 416-722-0079 • Sandra Fobert, sandra.fobert@gmail.com, 25 Burtree Drive, Brampton, Ontario, L6Z 3L1 • Joyce Redford, joyce.redford@gmail.com, 15 Seashell Place, Brampton L6R 3J4 • Melissa Mazzuca, Melissa.goulart18@gmail.com, 45 Barr Crescent, Brampton Ontario, L6Z 3E2 • KimGarito@gmail.com • Leo O'Brien, 72 Rawling Crescent, Brampton, L6Z1N8, Email: friendsofheartlake@rogers.com • Jamie-Lee Ball, jamielee.ball01@gmail.com, 69 Barr Crescent, Brampton, L6Z3E3 • Vera Grabowski, E-mail address - v.grabowski@sympatico.ca • 	

A number of respondents requested a written response. A written response was provided to each person as summarized in Table 9.3.2.

Table 9.3.2: Responses to Question 5 Comments

Question 5 Responses	Contact Info	Proposed Responses
<ul style="list-style-type: none"> • <i>Install a traffic light NOT a roundabout</i> 	<ul style="list-style-type: none"> ○ Rob Boot, bob-boot@hotmail.com (contact by e-mail) 	<p>Construction is not anticipated until at least 2024. Construction of roundabouts typically takes most if not all of a construction season. However, with a roundabout it is possible to keep traffic open on Heart Lake Road for most of the construction period with some short term closures. Notifications of specific road closures will be posted as required</p>
<ul style="list-style-type: none"> • <i>Please advise when is the starting date and will the access (or drive thru) be closed during construction and for how long?</i> 	<ul style="list-style-type: none"> ○ Manny Marcos (Property Director), mannymarcos13@gmail.com (contact by e-mail) 	<p>Construction is not anticipated until at least 2024. Construction of roundabouts typically takes most if not all of a construction season. However, with a roundabout it is possible to keep traffic open on Heart Lake Road for most of the construction period with some short term closures. Notifications of specific road closures will be posted as required</p>
<ul style="list-style-type: none"> • <i>Speed along Heart Lake Road is an ongoing issue. Either use of speed cameras or more police presence would be beneficial.</i> 	<ul style="list-style-type: none"> ○ Ramona Grybas, Ramonagrybas1@gmail.com (contact by e-mail) 	<p>A roundabout design will slow all traffic using the intersection. However, the comment regarding speed will be forwarded to the police and is acknowledged by the City of Brampton.</p>
<ul style="list-style-type: none"> • <i>We have 2 turtle nesting beds located at this intersection. I am the cofounder of Heart Lake Turtle Troopers. There are significant wildlife in this area. Traffic must be calmed</i> 	<ul style="list-style-type: none"> ○ Lori Leckie, lori.leckie@gmail.com (contact by e-mail) 	<p>The City will review other traffic calming measure along Heart Lake Road when Heart Lake Road is improved in accordance with the 2019 <i>Function and Design Review of Heart Lake Road Corridor</i>. The City of Brampton and</p>

Question 5 Responses	Contact Info	Proposed Responses
<p><i>from Sandalwood to Mayfield along Heart Lake Road.</i></p>		<p>TRCA are looking into the feasibility of installing a roundabout on Heart Lake Road and the entrance to the Heart Lake Conservation Area, which would further calm traffic in this area.</p>
<ul style="list-style-type: none"> <i>There are serious issues in Brampton with motorist adherence to stopping at stop signs and maintaining the basic rules of a four way stop (who goes first, second, third, etc...). The rules of a roundabout will not be obeyed. A traffic light is required at this intersection, along with a 'no u turns allowed' sign.</i> 	<ul style="list-style-type: none"> ○ Sandra Fobert, sandra.fobert@gmail.com (contact by e-mail) 	<p>The design of a roundabout inherently slows drivers down, such that they have time to make decisions. Roundabouts are becoming much more common in Southern Ontario and many drivers are becoming familiar with roundabout intersections.</p>
<ul style="list-style-type: none"> <i>Please do not replace more green space with concrete.</i> 	<ul style="list-style-type: none"> ○ Melissa Mazzuca, Melissa.goulart18@gmail.com, 45 Barr Crescent, Brampton Ontario, L6Z 3E2 (prefers lettermail) 	<p>Although a roundabout typically has a greater surface area than an intersection with traffic signals and turn lanes, in this instance a roundabout alternative actually has less impact on sensitive environmental areas (i.e. existing wetlands).</p>
<ul style="list-style-type: none"> <i>I think with the business park opening up that really just a set of lights are required. I can't imagine transports being able to navigate a roundabout easily.</i> 	<ul style="list-style-type: none"> ○ KimGarito@gmail.com (contact by email) 	<p>Roundabouts can easily accommodate trucks as well as buses and fire trucks. The Brampton Fire Department has reviewed the roundabout and are satisfied with the preliminary design.</p>
<ul style="list-style-type: none"> <i>As a resident stakeholder, I am pleased by everyone's efforts in trying to get</i> 	<ul style="list-style-type: none"> ○ Leo O'Brien, Email: friendsofheartlake@rogers.com 	<p>The City of Brampton will review additional traffic calming or "traffic slowing" measures in advance of the</p>

Question 5 Responses	Contact Info	Proposed Responses
<p><i>this right. We are also requesting that the COB add some speed cushions along Heart Lake Road as a (much needed) supplementary traffic calming measure.</i></p>		<p>proposed improvements to the remaining portions of Heart Lake Road as per the 2019 <i>Function and Design Review of Heart Lake Road Corridor</i>.</p>
<ul style="list-style-type: none"> • <i>People drive WAY too fast down heart lake road. It would be great to see speed cameras or speed bumps put in to protect the wildlife. My greatest concern with the round about is a disruption to the two turtle nesting beaches that are on the west and east side of heart lake road. Improving the eco fencing and ensuring the construction does not disrupt the nests is crucial. Myself and many neighbours are onboard to reduce the speeding as much as possible and make the heartlake and country side intersection safer for all.</i> 	<ul style="list-style-type: none"> ○ Jamie-Lee Ball, jamielee.ball01@gmail.com (contact by e-mail) 	<p>A roundabout will help slow traffic on Heart Lake Road, and since it is proposed to move the roundabout slightly north it minimizes the impacts to the wetlands and the turtle nesting areas. The construction contract will specify and fence off environmentally sensitive areas such as the turtle nesting areas.</p>
<ul style="list-style-type: none"> • <i>Stop lights are needed at this intersection rather than a roundabout. Roundabout is useless when you see the number of cars on Countryside that are trying to make a turn.</i> 	<ul style="list-style-type: none"> ○ Vera Grabowski, v.grabowski@sympatico.ca (contact by e-mail) 	<p>Although there are larger traffic volumes on Heart Lake Road than on Countryside Drive, a roundabout slows traffic and will provide gaps for traffic entering Heart Lake Road from Countryside Drive. A roundabout also reduces serious “T-bone” type collisions.</p>

10.0 Notice of Study Completion

The Project Study Report for this Schedule B Class Environmental Assessment was completed and the Notice of Study Completion was advertised on December 15, 2022, in the Brampton Guardian. The Notice of Study Completion can be found in Appendix J. This notice was also mailed and hand delivered to agencies, property owners, Stakeholders, Project Team members and persons expressing interest in the project.

Indigenous Groups mailed the Notice of Study Completion included:

- Mississaugas Of the Credit First Nation
- Haudenosaunee Confederacy
- Huron-Wendat First Nation
- Six Nations of the Grand River

10.1 Meeting with Heart Lake Turtle Troopers

On Friday September 30, 2022, an online meeting was held with representative of the Heart Lake Turtle Trooper, Graham McGregor, City of Brampton staff and MTE staff. In attendance were:

- Graham McGregor, MPP for Brampton North
- Lori Leckie, Heart Lake Turtle Troopers
- Nicole Cedrone, Heart Lake Turtle Troopers
- Christina Cicconetti, Heart Lake Turtle Troopers
- Ghaz Mohammad, City of Brampton
- Dave Hallman, MTE

The purpose of the meeting was to discuss issues of concerns regarding the significant turtle population around Heart Lake Road and impacts construction at the Heart Lake Road and Countryside Drive intersection may have on the turtle population in the area.

The Heart Lake Turtle Troopers provided the following information in an email dated October 7, 2022, that summarized their concerns. The email can be found in Appendix J.

Facts about Turtles, Nesting and Habitat:

- ✓ Turtles will migrate from winter homes to summer homes from April- June, and from summer homes to winter homes from August- October.
- ✓ Nesting female turtles will move onto land starting at the end of May and through to July to lay their eggs (peak period being the first 2 weeks of June).

- ✓ Notched turtle #102, our largest documented female snapping turtle will bypass the artificial nesting mound and breach the directional fencing to nest on the road shoulder at Heart Lake Road and Countryside Drive every year .
- ✓ June 2022, multiple snapping turtle nests reported on gravel road shoulder of Heart Lake Road surrounding Countryside Drive.
- ✓ June 2022 multiple snapping turtles and midland painted turtles were reported on Heart Lake Road surrounding Countryside Drive intersection .
- ✓ Midland Painted turtle nests recorded on Northeast corner of Heart Lake Road and Countryside Drive 2022.
- ✓ Turtles are more likely to move around for nesting and migration during or after a rainfall.
- ✓ 22 adult/ breeding age turtles were struck and killed on Heart Lake Road in 2022, this is not sustainable.
- ✓ Heart Lake Wetland Complex scores in the top 10 most important evaluated wetlands in Ontario out of nearly 1,500 evaluated wetlands.

Items the Heart Lake Turtle Troopers can do/undertake before Construction of the Heart Lake Rd/Countryside Drive Intersection and other improvements to Heart Lake Road.:

- ✓ Install upgraded directional eco fencing and additional nesting mounds with a variety of substrate to keep turtles off the roads.
- ✓ Install strong exclusion fencing in combination with alternate nesting areas to keep large turtles from entering work areas.
- ✓ Educate the work crews on the importance of protecting our declining turtle population and recognizing turtle’s nests and eggs (we would be happy to facilitate this).
- ✓ Provide contact resources for crews in the event of finding a turtle, nest, or animal; Christina Cicconetti 416-606-1937, heartlaketurtletroopers@gmail.com.

One of these items that apply directly to the intersection improvement construction at Heart Lake Road and Countryside Drive are included in the recommended mitigation measures in Section 8.0.

11.0 Submission of Environmental Study Report and Section 16 Order Requests

Hard copies of this Project Study Report (PSR) have been made available for the 30-day review period in the Clerk’s office at the City of Brampton City Hall, The PSR is also available for review on the County of Wellington’s website at:

<http://www.brampton.ca/Heartlake-Countryside-EA>

About Section 16 Orders – In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name.

When to submit a Section 16 Order request - A Section 16 Order request can be made after the proponent issues the Notice of Study Completion and within the specified review period outlined in the notice. A Section 16 Order request should only be made when issues can't be resolved through:

- The Class Environmental Assessment process;
- Discussions with the proponent; and/or
- Mediation.

How to make a Section 16 Order request - Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

Information about efforts to date to discuss and resolve concerns with the proponent;

- The outcome you are seeking from the Minister; and
- Other matters relevant to the request.

A request must:

- Focus on potential effects of the project or the class environmental assessment process;
- Not focus on decisions outside the class environmental assessment process (e.g., land-use planning decisions made under the Planning Act or issues related to municipal decision-making about the process); and
- Not raise issues unrelated to the project.

Unless otherwise stated in a request, any personal information provided will become part of the public record and will be released, if requested, to any person.

Where to send request – A completed Section 16 Order Request must be sent to the Minister of Environment, Conservation and Parks or delegate. You should also send a copy to the Director of Environmental Assessment and Permissions Branch as well as the Proponent:

Minister of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J5
Email: minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5
Email: EABDirector@ontario.ca.

The Section 16 Order Request must also be sent to the City of Brampton (Proponent) and their Consultant Project Manager:

Ghaz Mohammad, M.Eng., P.Eng, PMP
Sr. Project Engineer, Infrastructure Planning
Public Works & Engineering, City of Brampton
WPOC, 1975 Williams Parkway
Brampton, ON L6S 6E5
T: 905 874 2949
F: 905-875-2505
Email: Ghazanfar.mohammad@brampton.ca

Dave Hallman, P. Eng
Consultant Project Manager
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9
T: 905-639-2552 x1336
F: 905-639-7727
Email: dhallman@mte85.com

Timeline - Each Class Environmental Assessment establishes timelines for the Ministry's review of requests.

Minister's Decision - Minister's decisions on Section 16 Order requests are final. If a request is denied, the Proponent can implement the project subject to any conditions imposed.

If a request is granted, the Proponent can begin preparing Terms of Reference for an Individual Environmental Assessment, if they still wish to move ahead with the project.

Factors for Minister Making Decision

The Minister of the Environment, Conservation and Parks will consider the following when making a decision:

- Purpose of the Environmental Assessment Act;
- Factors suggesting the proposed project differs from other projects in the class to which the Class EA applies;

- Significance of the factors, and of the differences mentioned above;
- Any reasons given by the requester;
- Proponent's response to the request; and
- Mediator's report—if available.

The Minister will also consider:

- Extent and nature of public concern;
- Potential for significant adverse environmental effects;
- Proponent's consideration of alternatives;
- Considerations of urgency;
- Requester's participation in the planning process;
- Nature of the request;
- Implications for matters of significant provincial interest; and
- Degree to which public consultation and dispute resolution have taken place.

12.0 Project Cost Estimate

The estimated cost of the Recommended Roundabout Alternative is as follows:

Item No.	Description	Units	Unit Price	Quantity	Total Price
	Asphalt Removal	s.m	\$7.50	3500	\$26,250.00
	Stripping/Clearing & Grubbing	LS	\$33,000.00	1	\$33,000.00
	Sidewalk Removal	s.m	\$7.50	350	\$2,625.00
	Curb and Gutter Removal	l.m	\$7.50	200	\$1,500.00
	Excavation	c.m	\$13.50	5000	\$67,500.00
	Allowance for buried Peat Removal	LS	\$10,000.00	2	\$20,000.00
	Gran B	t	\$22.00	5500	\$121,000.00
	Gran A	t	\$27.50	1800	\$49,500.00
	Base Asphalt	t	\$160.00	900	\$144,000.00
	Surface Asphalt	t	\$190.00	450	\$85,500.00
	Curb and Gutter	l.m.	\$82.00	1000	\$82,000.00
	Island Concrete	s.m	\$82.00	800	\$65,600.00
	Concrete Apron	s.m	\$220.00	250	\$55,000.00
	Sidewalk	s.m	\$72.00	275	\$19,800.00
	MUT	s.m.	\$110.00	1250	\$137,500.00
	Catch Basins	ea	\$2,200.00	8	\$17,600.00
	Ditch Inlets	ea	\$2,750.00	2	\$5,500.00
	Storm Sewers	l.m	\$390.00	125	\$48,750.00

Item No.	Description	Units	Unit Price	Quantity	Total Price
	Centre Island Treatment	LS	\$55,000.00	1	\$55,000.00
	Landscaping Allowance	LS	\$75,000.00	1	\$75,000.00
	Street Lighting	Pole	\$16,500.00	8	\$ 132,000.00
	Property	s.m.	\$0.00	0	\$0.00
	Line Painting/Signage - Allowance	LS	\$55,000.00	1	\$55,000.00
	Eco-passage, Erosion/Sediment control	LS	\$50,000.00	1	\$50,000.00
	Subtotal				\$1,349,625.00
	Contingency Amount for Construction 15% including bonding/insurance and unforeseen items				\$202,400.00
	Engineering/Tendering/Contract Admin.				\$161,900.00
	Total Estimated Capital Costs (Rounded)				\$1,714,000.00

DJH:smk

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