Region of Peel

Coleraine Drive Grade Separation Municipal Class Environmental Assessment Study

Environmental Study Report

Thursday, August 15, 2024

B000738

CIMA+

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Engineering for **people**

Executive Summary

Introduction

The Region of Peel has completed a 'Schedule C' Municipal Class Environmental Assessment (Class EA) for improvements to Coleraine Drive, from Harvest Moon Drive / King Street West to Holland Drive, in the Town of Caledon. The improvements include the consideration of a grade separation at the Coleraine Drive and CP Rail crossing, currently located approximately 500 m north of Holland Drive.

The Class EA study goal is to identify a transportation solution that addresses problems and opportunities along Coleraine Drive, including improvements at the existing at-grade rail crossing, and traffic queuing and congestion that is expected to increase over time. The grade separation improvements identified by this study are being considered to better manage traffic congestion, improve goods movement and with it, Peels economic competitiveness, identify safety improvements, and improved active transportation facilities.

The study area is approximately 1 km in length, along Coleraine Drive and inclusive of the Harvest Moon Drive / King Street West intersection at the northern limits and Holland Drive intersection at the southern limits. In addition to these intersections, there are three local road intersections within the study area: at Manchester Court, at Old Ellwood Drive and at Ellwood Drive West.

Background and Planning Context

Provincial and regional planning and policy context has been considered in assessing the existing infrastructure needs of the study area. The provincial and regional policy framework guides infrastructure, land use planning, and strategic investment decisions to support regional growth and transportation objectives.

The identification of study area problems and opportunities and the assessment of the study's need and justification were carried out with due consideration of the planning framework to ensure that the final recommendations are consistent with the policies and objectives of the various levels of government.

The related planning and policy context considered includes: Long Range Transportation Plan (LRTP) and Goods Movement Strategic Plan, the Provincial Policy Statement (2020), the Region of Peels Official Plan (2021), the Bolton Transportation Master Plan Study (2015) and the Bolton Commuter Rail Service Feasibility Study (2010).

Existing Conditions

The existing land use consists of a mixture of residential and industrial/employment lands. South of the CP rail line, the land use is primarily industrial. North of the CP rail line, the land use is established by the West Bolton Secondary Plan. This planning area is a residential community comprised of two neighbourhoods with a mix of low, medium, and high-density housing, and a range of community uses such as parks and schools.

Alternative Solutions

Three alternative planning solutions were developed to address the problem statement and were presented at Public Information Centre #1. The three solutions included Do Northing, Change Grade of Rail and Change Grade of Road. Each solution had either a positive, negative, or neutral impact when considering the differing screening criterion (socio-economic environment, natural environment, and active transportation) and *Change Grade of Road* was identified as the preferred solution.

Alternative Design Concepts

With the Change Grade of Road planning solution, two design options were identified:

1) Depress the road under the rail lines (Road Under Rail), or

2) Raise the road over the rail lines (Road Over Rail).

Alternative design concepts were generated for these options.

The intersection of Harvest Moon Drive / King Street West and Coleraine Drive was also identified in need of improvement to accommodate future traffic needs. To facilitate improvements at the intersection, two improvement design concept alternatives were identified for the intersection:

- Retain Signalization yet with improvements
- Convert intersection into a roundabout

Evaluation of Alternatives

The Coleraine Drive alternatives were evaluated using criteria focusing on Transportation, Natural Environment, Stormwater Management, Healthy Communities, Socio-Economic Environment and Constructability / Engineering.

For Coleraine Drive, Alternative 2 – Road Over Rail is the preferred alternative. In summary, both alternatives have similar impacts regarding mitigating operational issues (Transportation), vegetation and tree impacts (Natural Environment), and noise and air quality impacts (Healthy Communities). While the Road Over Rail is less desirable atheistically and would result in shadow impacts (Socio-Economic Environment), the

Road Under Rail has significant disadvantages by requiring large drainage/stormwater management requirements, including pumping, and groundwater impacts (Stormwater Management), as well as a large construction staging requirement, including temporary relocation of rail tracks. The large construction staging requirements and impacts result in a significant increased cost for Alternative 1 – Road Under Rail ($56M) compared to Alternative 2 – Road Over Rail ($36M).

The Coleraine Drive and Harvest Moon / King Street West Intersection alternatives were evaluated using criteria focusing on Traffic Operations, Traffic Safety, Pedestrian and Cyclist Accommodation, Natural Environment, Socio-Economic Environment and Constructability/Engineering. Alternative 2 – Roundabout is the preferred alternative.

In summary, a signalized intersection will be easier to construct and will work reasonably well in terms of traffic operations; however, signalized intersections typically experience accidents of a higher severity than a roundabout, it will create more off-peak delay, and provides little discouragement to drivers exceeding posted speed limits. A roundabout will be more difficult to construct and will result in slightly more property impact at the intersection; however, it will result in less environmental impact, provide notably more safety benefits when compared to a signalized intersection by reducing the severity of collisions, provides more streetscaping/landscaping potential, would result in less off-peak delay and less utility impacts. A roundabout is also currently used at the Emil Kolb Parkway and King Street intersection (the next intersection north of Harvest Moon Drive / King Street West) and so drivers in the area are already familiar with the intersection type.

Consultation

An extensive stakeholder consultation and engagement program was undertaken to assist the planning and decision-making process. Throughout the study, the public, internal Region staff, external agencies and organizations, and Indigenous Communities were engaged to provide input. Key milestones of the consultation program included:

- Notice of Study Commencement and Introductory PIC was published in the local newspaper on March 21st, 2017, and mailed to area property owners, agencies, and other stakeholders.
- Public Information Centre #1 (in-person meeting) held on October 8th, 2019.
- Virtual Public Information Centre #2 (online project portal) held from December 16th, 2021, to January 21st, 2022.

- Presentations and meetings with regional, municipal and public authorities/organizations, including Region staff, Town of Caledon staff and members of the Emergency Services.
- Meetings with a Technical Advisory Committee (TAC) that included members of Region of Peel Real Estate, Region of Peel Public Health, Region of Peel Sustainable Transportation, Toronto and Region Conservation Authority (TRCA) and Canadian Pacific Rail.
- Meetings with impacted property owners.
- Individual Meetings with TRCA; and
- Mississaugas of the Credit First Nation and Huron Wendat First Nation consultation, including review of Stage 1 Archaeological Assessment.

A dedicated website was established through the Region's website at the beginning of the project. Study notices and Public Information Centre materials (e.g., Notices, display material, Q&As) were made available on the website as the study progressed.

Study website: https://www.peelregion.ca/pw/transportation/construction/environmental-assessment/coleraine-drive.asp

Written comment responses were received during the various commenting periods following each PIC, and feedback was facilitated at each PIC using either the website, the PIC portal (if PIC was virtual) or directly with the project team.

Project Description

The proposed grade separation between Coleraine Drive and CP Rail will include cross-section improvements and vertical grade changes on Coleraine Drive both north and south of the crossing. An overall plan of the proposed improvements in illustrated in **Figure E-1** The alignment of Coleraine Drive will remain on the existing tangent alignment and the number of through lanes (four) will also remain the same as existing. The grade separation will require a structure at the CP rail crossing and a structure at the proposed Ellwood Drive West and Grapevine Road connection. The grade separation will require a relocation of the Manchester Court intersection and the realignment of Manchester Court on its approach to Coleraine Drive. The existing intersections of Coleraine Drive at Ellwood Drive West and Old Ellwood Drive will require closure. While an objective of the study was to keep property requirements to a minimum, some property acquisition is required along property frontages adjacent the ROW and most of the acquisition is associated with the Manchester Court realignment. No property will be required in its entirety. The existing signalised intersection of Coleraine Drive and King Street West / Harvest Moon Drive is proposed to be

reconfigured into a two-lane roundabout. The roundabout can be constructed mostly within the existing right-of-way (ROW), with property requirement only in the northwest quadrant. The roundabout is recommended to include active transportation crossings on all arms and will provide opportunities for streetscaping.

Figure E-1: Preferred Alternative

In terms of active transportation, multi-use paths will be provided on each side of the roadway through the study area and connect with existing active transportation facilities to the north of Harvest Moon Drive.

In terms of transit, the existing bus stops on Holland Drive will not be impacted by the improvements. The existing northbound and southbound bus stops at Old Ellwood Drive will be removed, as the intersection itself will be removed as part of the grade separation. In their place, new northbound and southbound bus stops are proposed at the Harvest Moon Drive / King Street West intersection.

For drainage and stormwater management; quality, quantity, and erosion controls will be provided by the existing stormwater management pond to the southwest of the Harvest Moon Drive intersection (SWMP 9). The overall increases to SWMP 9 should be confirmed in Detailed Design to ensure that the pond can accommodate the additional flows, however investigations undertaken as part of this study has indicated that this is feasible. The current storm sewer system is designed for a 5-year storm event and are recommended to be upgraded to the 10-year storm design standard. It is recommended to construct low impact development (LID) drainage features as part of the realignment of Manchester Court and Old Ellwood Drive.

For construction staging, it is anticipated that the improvements will require a multi-year timeframe and so it is recommended Coleraine Drive remain open to the extent possible throughout the duration of construction. The final construction staging strategy and plans will be confirmed in Detailed Design, however it is anticipated that the construction will occur using one or a combination of the two strategies: closure of Coleraine Drive with detours or Construction in Halves. The strategies are identified with the aim of minimizing impacts to traffic and adjacent residents, to the extent possible.

Utility relocation will be required as part of the improvements. Utilities along Coleraine Drive include Hydro One (including Acronym (Hydro One Telecoms)), municipal services (watermains / sanitary sewers etc.), Enbridge Gas, Bell and Rogers. During the information gathering process of this study, the proposal for relocating the utilities to the gap between the retaining wall and ROW boundary was shared with utility companies and no objection was made at this stage; however, it is noted that utility companies require a further level of design (i.e., Detailed Design) to confirm impacts and relocation requirements.

The proposed improvements provide several landscaping / streetscaping opportunities, the locations of which are detailed by this report. The landscaping / streetscaping will be confirmed in Detailed Design, however, can include plantings, trees, flowerbeds, planters, and benches.

Environmental Impacts and Mitigations

Anticipated impacts to the natural, socio-economic, and cultural environments, together with proposed mitigation measures, were identified to address the implementation of the proposed improvements. Anticipated impacts and proposed mitigation are provided for the following factors:

- Socio-Economic Impacts (Properties and Access, Noise, Vibration, Shadow Impacts, Air Quality, Climate Change Considerations, and Contaminated Areas)
- Cultural Heritage (Built Cultural Heritage and Archaeology)
- Natural Environment (Vegetation and Vegetation Communities, Fisheries and Aquatic Habitat, and Wildlife and Wildlife Habitat)
- Fluvial Geomorphology
- Hydrogeology (Groundwater)

Commitments to Future Work

This Environmental Study Report identifies specific items to be reviewed and confirmed during the Detailed Design phases for the Preferred Alternative. Some of these commitments will address specific concerns raised by property owners and review agencies during the EA process. Items to be addressed during Detailed Design phase, include but are not limited to, resolution of outstanding concerns and any permits and approvals.

Timing of Improvements

The Region intends to proceed to the Detailed Design phase in late 2024, followed by the required property acquisitions and utility relocations. According to the 2021 Transportation Capital Budget, the construction of the project is scheduled to begin in 2029.

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1 Introduction

The Region of Peel has completed a Municipal Class Environmental Assessment (Class EA) for improvements to Coleraine Drive, from Harvest Moon Drive / King Street West to Holland Drive, in the Town of Caledon. The improvements include the consideration of a grade separation at the Coleraine Drive and CP Rail crossing, currently located approximately 500 m north of Holland Drive.

The Class EA study goal is to identify a transportation solution that addresses problems and opportunities along Coleraine Drive, including improvements at the existing at-grade rail crossing, and traffic queuing and congestion that is expected to increase over time. The grade separation improvements identified by this study are being considered to better manage traffic congestion, improve goods movement and with it, Peels economic competitiveness, identify safety improvements, and improved active transportation facilities.

The Class EA study was carried out in accordance with the 'Schedule C' of the Municipal Class Environmental Assessment document (Municipal Engineers Association October 2000, as amended in 2007, 2011 and 2015). The Class EA process is approved under the Ontario Environmental Assessment Act and outlines the process whereby municipalities can comply with the requirements of the Ontario Environmental Assessment Act. The Environmental Study Report (ESR) documents the decision-making process carried out during the Coleraine Drive CP Rail Grade Separation EA study.

1.1 Study Area

The Class EA study area is illustrated in **Figure 1-1**. The study area is approximately 1 km in length, along Coleraine Drive and inclusive of the Harvest Moon Drive / King Street West intersection and Holland Drive intersection. In addition to these intersections, there are three local road intersections within the study area: at Manchester Court, at Old Ellwood Drive and at Ellwood Drive West.

The surrounding land use is a mixture of residential and employment/industrial, with residential subdivisions generally located north of the rail line and employment/industrial properties generally south of the rail. Further information on land use is detailed in **Section 3.1**.

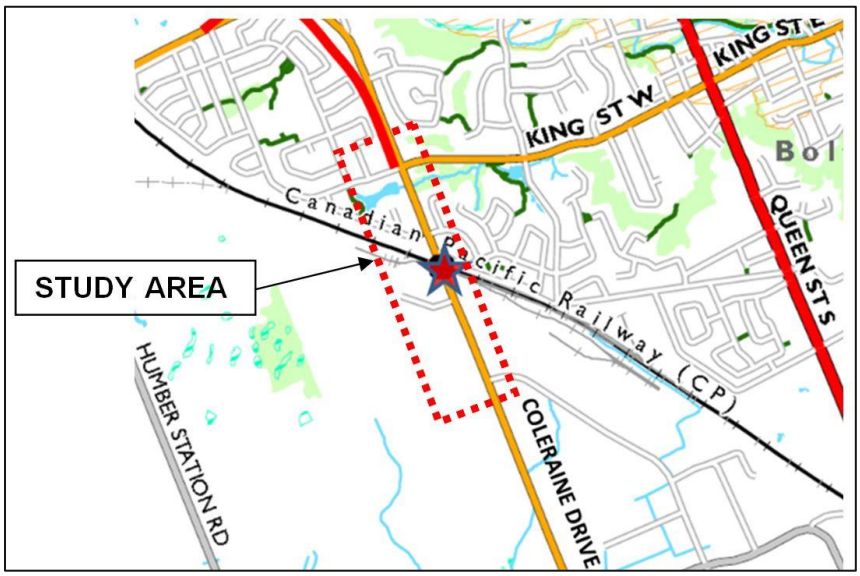

Figure 1-1 Study Area

The CP Rail crossing is located approximately 500 m north of Holland Drive and is subject to an approximate total daily volume of 16 trains[1].

1.2 Environment Assessment Process

This study follows the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment process for a Schedule C project (October 2000, as amended in 2007, 2011, and 2015). The Municipal Class Environmental Assessment is an approved planning and design process under the Ontario Environmental Assessment Act. As illustrated in **Figure 1-2**, the planning and design process is comprised of five phases. Schedule C projects are required to follow Phase 1, 2, 3, and 4 of this process.

Phase 1 Identify Problem or Opportunity;

Phase 2 Identify and Evaluate Alternative Solutions to the Problem or Opportunity;

Phase 3 Identify and Evaluate Alternative Design Concepts for the Preferred Solution;

Phase 4 Complete and File Environmental Study Report (ESR) for public review; and

[1] Peel Region Goods Movement Strategic Plan – Prioritizing Crossings for Grade-Separation Recommendation Report. 2014.

Phase 5 Future implementation of the project (Detailed Design, Construction, Operation, and Environmental Monitoring).

Transportation improvements are classified into one of the following schedules:

Schedule A Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process.

Schedule A+ Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process. However, the public is to be advised prior to implementing the project.

Schedule B Projects may have some adverse environmental impacts. The proponent must undertake a screening process, involving contact with directly affected public and technical/regulatory review agencies to ensure that they are aware of the project and that their concerns are addressed. A Project File is prepared for public review.

Schedule C Projects may have significant environmental impacts. The proponent must follow the full planning, design, and documentation process of the MEA Municipal Class EA document. An Environmental Study Report is prepared for public review.

The Coleraine Drive CP Rail Grade Separation Class EA Study has been identified as a Schedule ‘C’ project under the Municipal Class EA (**Figure 1-2**). An Environmental Study Report (i.e., this Report) is required for Schedule ‘C’ projects to document the decision-making process.

A new amendment to the Municipal Class Environmental Assessment was approved by the Ministry of Environment, Conservation and Parks (MECP) on March 3, 2023, after the Coleraine Drive CP Rail Grade Separation Class EA Study had commenced. The 2023 amendment has resulted in adjustments to some project classification criteria and outlines a process to transition ongoing Class EA studies to the new process; given the notice of commencement for the Coleraine Drive CP Rail Grade Separation Class EA Study had been issued prior to the amendments to the Municipal Class Environmental Assessment coming into effect, this study can be completed under the class environmental assessment process that was started for the project, i.e.,t Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011, and 2015).

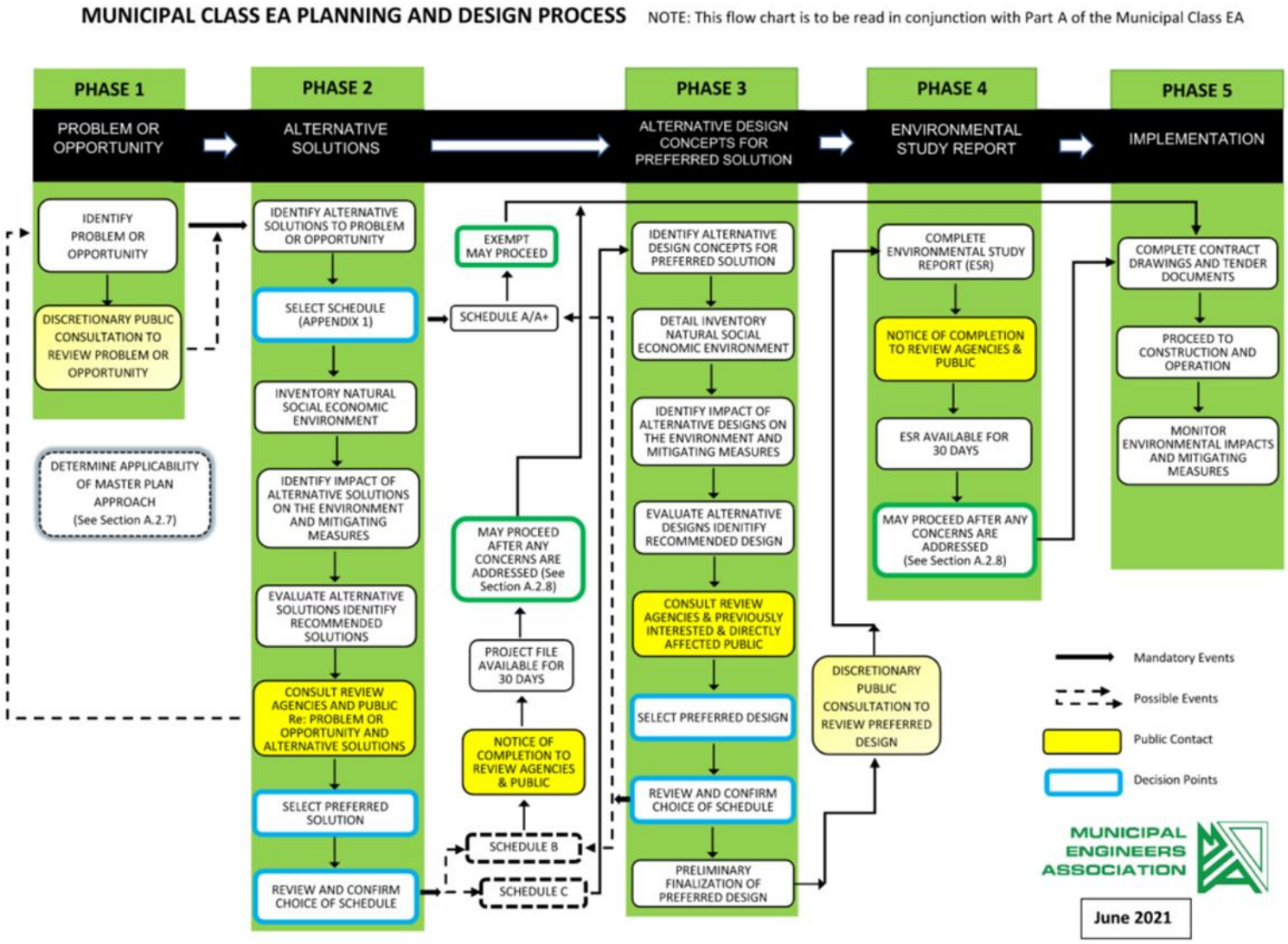

Figure 1-2: Municipal Class Environmental Assessment Planning and Design Process

1.2.1 Environmental Study Report

Phases 1, 2, 3 and 4 of the Schedule C process are documented in this Environmental Study Report, which includes:

- Study background information;
- Description of the existing environment (socio-economic environment, cultural environment, and natural environment);
- Study area problems and opportunities;
- Alternative solutions to the undertaking;
- Evaluation of alternative solutions and identification of the preferred alternative solution;
- Alternative design concepts for the preferred solution;
- Evaluation of alternative design concepts and identification of the preferred alternative design concept;
- Anticipated impacts and proposed mitigation measures;
- Public and agency consultation; and
- Supporting technical documents.

The Environmental Study Report for this study is available for a 42-calender day public review period commencing on **August 15, 2024,** and ending on **September 26, 2024.** A Notice of Study Completion was published to announce the public review period (further detailed in **Section 1.2.2)**.

1.2.2 Notice of Completion

The Environmental Study Report (ESR) for this study is available for a 42-calender day public review during which comments/concerns can be submitted. The review period was announced with the publication of the Notice of Study Completion. As detailed in the notice, interested persons may provide written comments to the project team by **September 26, 2024.** All comments and concerns should be sent directly to **Tareq Mahmood** at the Region of Peel.

Tareq Mahmood.
Project Manager
Region of Peel
Email: tareq.mahmood@peelregion.ca

The Municipal Class EA process includes an appeal provision. The Minister of the Environment, Conservation and Parks has the authority and discretion to make an Order under Section 16 of the Environmental Assessment Act.

A Section 16 Order may require that the proponent of a project going through a Class Environmental Assessment (Class EA) process:

- Submit an application for approval of the project before they proceed. This is generally referred to as an Individual Environmental Assessment (individual EA).
- Meet further conditions in addition to the conditions in the Class EA. This could include conditions for: further study, monitoring and/or consultation

The minister can also refer a matter in relation to a section 16(6) Order request to mediation.

Before making an Order, the minister must consider the factors set out in section 16(5) of the Environmental Assessment Act. If a Section 16 Order request is made, the project proponent cannot proceed with the project until the minister makes a decision on the request. If the minister makes a Section 16 Order, the proponent may only proceed with the project if they follow the conditions in the Order.

Note, Section 16 Order requests were previously known as Part II Order requests.

Reasons for Requesting an Order

A concerned party may ask the minister to make a Section 16(6) Order if:

- they have outstanding concerns that a project going through a Class EA process may have a potential adverse impact on constitutionally protected Aboriginal and treaty rights;
- they believe that an Order may prevent, mitigate or remedy this impact.

A Section 16(6) Order request cannot be made to simply delay or stop the planning and implementation of a project that is going through a Class EA process. Prior to making a Section 16(6) Order request, the concerned party should first try to resolve any concerns directly with the project proponent, in this case, the City of St. Catharines.

Timing for an Order Request

During the 42-day public comment period, anyone can review the documentation, submit any comments or concerns to the proponent, and request a Section 16(6) Order

To request a Section 16 Order for a project, on the grounds that an Order may prevent, mitigate or remedy potential adverse impacts on constitutionally protected, Aboriginal

and treaty rights, a concerned party must make the request before the public comment period is complete.

How to make a request

To submit a Section 16(6) Order request, the following information must be provided:

- name, address and email address;
- project name;
- proponent name;
- what kind of Order is being requested i.e., a request for additional conditions or a request for an individual environmental assessment;
- details about the concerns about potential adverse impacts on constitutionally protected Aboriginal or treaty rights and how the proposed Order may prevent, mitigate or remedy the identified adverse impacts;
- whether the concerned party belongs to, represents or has spoken with an Indigenous community whose constitutionally protected Aboriginal or treaty rights may be adversely impacted by the proposed project;
- whether the concerned party has raised their concerns with the proponent, the proponent's response (if any) and why the concerns could not be resolved with the proponent;
- any other information to support the request.

Section 16 Order requests are made to the Minister of Environment, Conservation and Parks and the Director of Environmental Assessment Branch:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
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
enviropermissions@ontario.ca

There is no appeal of the minister's decision with respect to a Section 16 Order. If the request for a Section 16(6) Order is denied by the minister, the proponent can proceed with the project. If the minister makes an Order, the proponent may only proceed with the project if they follow the conditions in the Order.

The above discussion is intended as an overview of the process only. For more information and specific instruction, please visit:

https://www.ontario.ca/page/class-environmental-assessments-section-16-order

1.3 Consultation Plan

An extensive Consultation Plan was implemented to ensure meaningful consultation with internal and external stakeholders as well as reviewing agencies. The Consultation Plan, organized around study phases, included public information centres, stakeholder engagement and participation of technical review/regulatory agencies at study milestones.

The Consultation Plan was led by the Coleraine Drive Grade Separation EA project team comprised of CIMA+ and the Region of Peel staff. The Region's website and printed media provided information regarding the study's progress, including notices of key study milestones.

The Plan identified stakeholders and reviewing agencies based on a precursory review of study area characteristics and potential impacts of the project. A mailing list was developed to notify potentially interested parties of opportunities for review and comment. The key stakeholders included:

- Residents
- Interested Groups
- Businesses
- Property Owners
- Elected Officials
- Indigenous Communities
- Town of Caledon
- Ministry of Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture and Sport
- Toronto and Region Conservation Authority
- Canadian Pacific (CP) Rail

- Utilities (TransCanada Pipelines, Enbridge Gas, HydroOne, Rogers, Bell Canada)

Further information on consultation is found in Section 6. The final mailing list of reviewing agencies is provided in **Appendix A**. The final mailing list of landowners is not provided to respect the Municipal Freedom of Information and Protection of Privacy Act (Government of Ontario, 2016).

To inform the general public of the study, each of the following notices were advertised by the Region of Peel in two separate issues of a local newspaper, and mailed by CIMA+ to approximately 294 stakeholders on the study mailing list:

- Notice of Study Commencement,
- Notice of Public Information Centre No. 1,
- Notice of Public Information Centre No. 2, and
- Notice of Study Completion.

Details regarding the timing and content of each notice are provided in relevant sections of this report. Copies of correspondence in response to each notice are included in **Appendix A**.

To gather public input on the study, two Public Information Centres were held toward the end of Phase 2 and Phase 3 of the Class EA study.

Individual meetings were held with several landowners whose property was directly impacted by the proposed road improvements. These meetings addressed the owners' concerns which were considered during the evaluation of solutions and mitigation measures.

A Technical Agencies Committee was established from interested representatives of regulatory and/or approving agencies on the study mailing list. Separate meetings were held with approving authorities as required to review project impacts, mitigation measures and approval requirements.

Meetings with agencies, stakeholders and the public are summarized in relevant sections of this report. Corresponding meeting notes and copies of correspondence are included in **Appendix B.**

1.4 Project Team

The core project team is comprised of staff from the Region of Peel and CIMA+ and their sub-consultants. The lead members of the project team are listed in **Table 1-1**.

Table 1-1: Project Team

Name	Role
Region of Peel	**(Proponent)**
Sally Rook	Manager, Transportation Planning
Tareq Mahmood	Project Manager
CIMA+	**(Prime Consultant)**
Stephen Keen	Project Manager
David Hiett	Deputy Project Manager
Jaime Garcia	Transportation Planner
Jennifer Haslett	EA/Land Use Planner
Hongtao Gao, P.Eng., PTOE	Road Design
Patrick Delpe, P.Eng.	Structure Design
Maxime Leroux, P.Eng.	Structure Design
Thomas Belanger, P.Eng.	Rail Design
Guy Gagnon, P.Eng.	Rail Design
Feilipe Caldeira, P.Eng	Drainage / Stormwater
Madhav Baral, P.Eng.	Drainage / Stormwater
Kevin Lukawiecki, EIT	Drainage / Stormwater
Golder Associates Ltd. (Golder)	**(Sub Consultant)**
Vimy Henderson, Ph.D, P.Eng.	Geotechnical / Pavement
Kathryn Kendra, M.Sc.	ESA/Excess Soil

Name	Role
Katherine Armstrong, M.Sc.	Noise and Air Quality
Joe Tomaselli	Noise and Air Quality
BEI	**(Sub Consultant)**
Andrew Burgess, P.Eng.	Culvert Inspection

2 Background and Planning Context

2.1 Long Range Transportation Plan (LRTP) and Goods Movement Strategic Plan

The Region of Peel is one of Ontario's fastest growing areas, with the population expected to expand by 42% by the year 2031. The Region of Peel's Long Range Transportation Plan (LRTP) (2019) was developed to address transportation challenges that the Region is likely to face in the future. This includes issues such as increased congestion due to high population growth and sustainable planning and protection of the environment. Finding innovative solutions to manage these issues is critical to maintaining the Regions quality of life.

One of these solutions was the development of the Goods Movement Strategic Plan which identified 23 action items to meet the goals of the LRTP. Action 4: Prioritize improvements to at-grade rail crossings brought attention to the potential need for grade separation at 12 locations throughout the Region of Peel. The review of these locations is documented in the Improvements to At-Grade Rail Crossings, Prioritizing Crossings for Grade-Separation: A Recommendation Report (2014). The report concluded that the two at-grade rail crossings located in Bolton, the Coleraine Drive crossing followed by the King Street crossing, should be further studied for grade separation. The report also concluded that while it was not necessary to grade separate these immediately, grade separation should be considered within the next 10 years.

The objective of this Class EA study was therefore to build on the recommendations of the Prioritizing Crossings for Grade-Separation Report and investigate grade separation improvements at the Coleraine Drive at-grade rail crossing.

2.2 Planning Context

The study and investigated improvements also align with broader plans and planning policies, including the Provincial Policy Statement (2020), the Region of Peels Official Plan (2021), the Bolton Transportation Master Plan Study (2015) and the Bolton Commuter Rail Service Feasibility Study (2010).

2.2.1 Provincial Policy Statement

The Provincial Policy Statement ("PPS"), 2020, is issued under the Planning Act and supports the planning of land uses across the province. The PPS provides policy direction for the use and management of land and infrastructure while protecting the

environment and resources, as well as to ensure opportunities for employment and residential development. Sections of the PPS that are applicable to the planning of transportation infrastructure include:

- Part IV Vision for Ontario's Land Use Planning System – The development of land should be optimized to promote efficient use of land, resources and public investment in infrastructure and public service facilities. These land use patterns promote mixed uses including residential, employment, recreation, parks and open space. The supporting transportation infrastructure is to provide choices and promote increased use of active transportation as well as transit before other modes of travel. This is in support of building livable and healthy communities.
- Part V Policies – Specifically, Section 1.6.7 Transportation Systems which outlines the policies for infrastructure and public service facilities under transportation. The policies state that "Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs." A multimodal transportation system is to provide connectivity within and among the transportation systems. Improving connections across jurisdictional boundaries should be considered where possible. Further, land use patterns should be planned to minimize the length and number of vehicle trips, as well as to support existing and future active transportation and transit services.

2.2.2 Region of Peels Official Plan (2021)

The Region's Official Plan is the primary, long range strategic land use policy document for the Region of Peel. A key purpose of the plan is to provide Regional Council with the long-term regional strategic policy framework for guiding growth and development in Peel while having regard for protecting the environment, managing the renewable and non-renewable resources, and outlining a regional structure that manages this growth within Peel in the most effective and efficient manner. More detailed information can be found here: https://www.peelregion.ca/officialplan/download/.

Specific Region of Peel Official Plan objectives and policies that guide transportation planning decisions are reflected in Chapter 5.9 of the Official Plan. Chapter 5.9, "The Transportation System in Peel", includes a collective set of policies to provide a transportation system that serves the needs of the people who reside or work in Peel or who travel through the region. To this end, the policies are intended to foster increased sustainability of the transportation system in Peel by:

- Considering all modes of travel and promoting the efficient movement of people and goods (with a focus on moving people by modes other than single-occupant automobiles);
- Maximizing the use of existing transportation infrastructure;
- Increasing travel choices to meet diverse needs;
- Minimizing the environmental and health impacts of transportation;
- Supporting economic development;
- Considering social and cultural objectives;
- Promoting the integration of transportation planning and land use planning; and
- Developing predictable and sustainable funding for a multi-modal transportation system

Specific to this study, the Official Plan documents that it is the policy of Regional Council to promote better coordination and improved efficiency of truck-rail operations for the movement of goods (Policy 5.9.7.2.9) and also support a safe an efficient railway network (Policy 5.9.7.2.6) by:

- a) Evaluating, prioritizing, and securing grade separation of railways and major roads, in cooperation with Transport Canada and the railways; and
- b) Ensuring that noise, vibration, and safety issues are addressed for development adjacent to railway corridors and terminal facilities.

2.2.3 Bolton Transportation Master Plan Study (2015)

The study identified transportation deficiencies and road network issues with Bolton, and this included identifying Coleraine Drive as the most likely alternative route for north/south and east/west trucks following the restricted truck movements in the downtown core. The report also identified the Coleraine Drive and CP rail crossing as a candidate for grade separation due to projected average daily traffic volumes.

2.2.4 Bolton Commuter Rail Service Feasibility Study (2010)

The study was a comprehensive review of the technical requirements to implement a commuter rail service between the communities of Bolton (in the Town of Caledon) and the City of Toronto. The study found that introducing the service is feasible, which supports the vision outlined in the provincial government's MoveOntario 2020 plan, as well as Metrolinx' Regional Transportation Plan (RTP) and GO 2020.

The recommended improving service on the Bolton rail line including a new Bolton GO Station near King Street and Humber Station Road in Caledon, and the study also made recommendations regarding the potential grade-separation of the existing at-grade rail/road crossings within the proposed Bolton GO Rail corridor. At Coleraine Drive (mile 21.85), the exposure indexes indicated that grade-separation was expected in the near future.

3 Existing Conditions

3.1 Land Use

The existing land use consists of a mixture of residential and industrial/employment lands. Land use surrounding the study area is illustrated in **Figure 3-1**. South of the CP rail line, the land use is primarily industrial with an agricultural area further to the south. North of the CP rail line, the land use is established by the West Bolton Secondary Plan. This planning area is a residential community comprised of two neighbourhoods with a mix of low, medium, and high-density housing, and a range of community uses such as parks and schools.

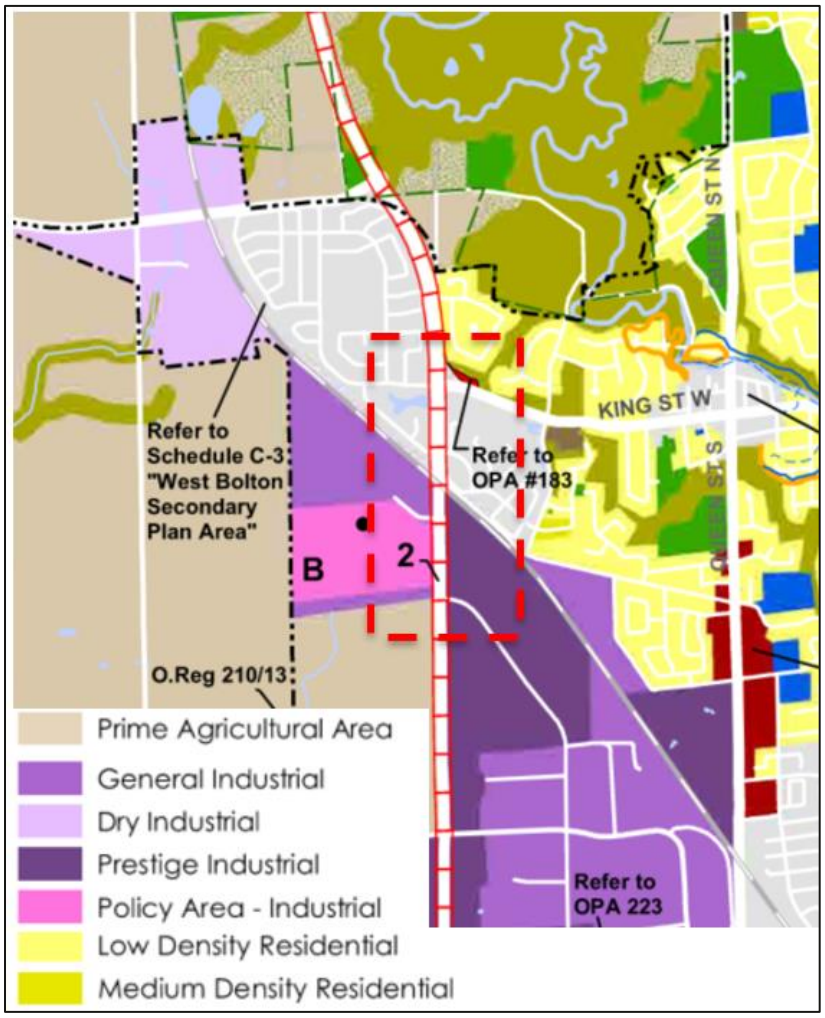

Figure 3-1: Existing Land use (Source: Town of Caledon Official Plan, 2018)

3.2 Transportation and Traffic Operations

A detailed Transportation and Traffic Operations Analysis was conducted for this study and its report included in **Appendix B**. The following sections summarise the key findings of the analysis.

3.2.1 Existing Traffic Operations

The roads within the study area under Region of Peel's jurisdiction include Coleraine Drive and King Street West. The remaining roads are under the Town of Caledon's jurisdiction. The following provides a summary of the roads within the study area, and the role they play in the regional and municipal road network.

Coleraine Drive is an arterial road aligned in the north-south direction with a 4-lane cross section plus a wide "buffer", which is occasionally used as a two-way left-turn lane to provide access to industrial developments, or as exclusive left-turn lanes at intersections. Land use along Coleraine Drive is mainly residential north of the railway, and predominantly industrial south of the railway. The posted speed limit on Coleraine Drive is 60 km/h for most of its section within the study area, and 70 km/h south of a point, approximately 100 metres south of Manchester Court.

King Street West is an arterial road aligned in the east-west direction with a two-lane urban cross section. Land use along King Street varies from commercial downtown use on the east end, to residential and rural as it connects to Coleraine Drive. The posted speed limit on King Street is 60 km/h at Coleraine Drive and reduces to 50 km/h approximately 100 m west of Station Road.

Harvest Moon Drive is a residential collector road with a two-lane urban cross section. Land use along Harvest Moon Drive is residential. The posted speed limit is 40 km/h.

Old Ellwood Drive is a collector road with a two-lane rural cross section at its west end. There are no developments along Old Ellwood Drive within the study area, however it serves as a connection between residential development east of the study area and Coleraine Drive. Old Ellwood Drive runs parallel to the railway and has a posted speed limit of 40 km/h.

Ellwood Drive West is a local road with a two-lane urban cross section. Land use along Old Ellwood Drive is residential. The posted speed limit is 40 km/h.

Manchester Court is a local road with a two-lane urban cross section. Manchester Court provides access to the industrial lands west of Coleraine Drive and does not connect to any other roads except for Coleraine Drive. There is no posted speed limit (therefore it is assumed to be 50 km/h as per the Highway Traffic Act).

Holland Drive is a collector road with a two-lane urban cross section. Land use along Holland Drive is commercial/industrial. There is no posted speed limit (therefore it is assumed to be 50 km/h as per the Highway Traffic Act).

Station Road is a collector road with a two-lane urban cross section. Land use along Holland Drive is residential, however there is no direct access to properties along the road. Station Road extends between Old Ellwood Drive and King Street West and provides access to the residential areas on the north and south sides of King Street West. North of King Street West the road is Deer Valley Drive. The posted speed limit is 40 km/h. Figure 3-2 illustrates the existing lane configuration at the intersections in the study area for which traffic operational analysis was conducted.

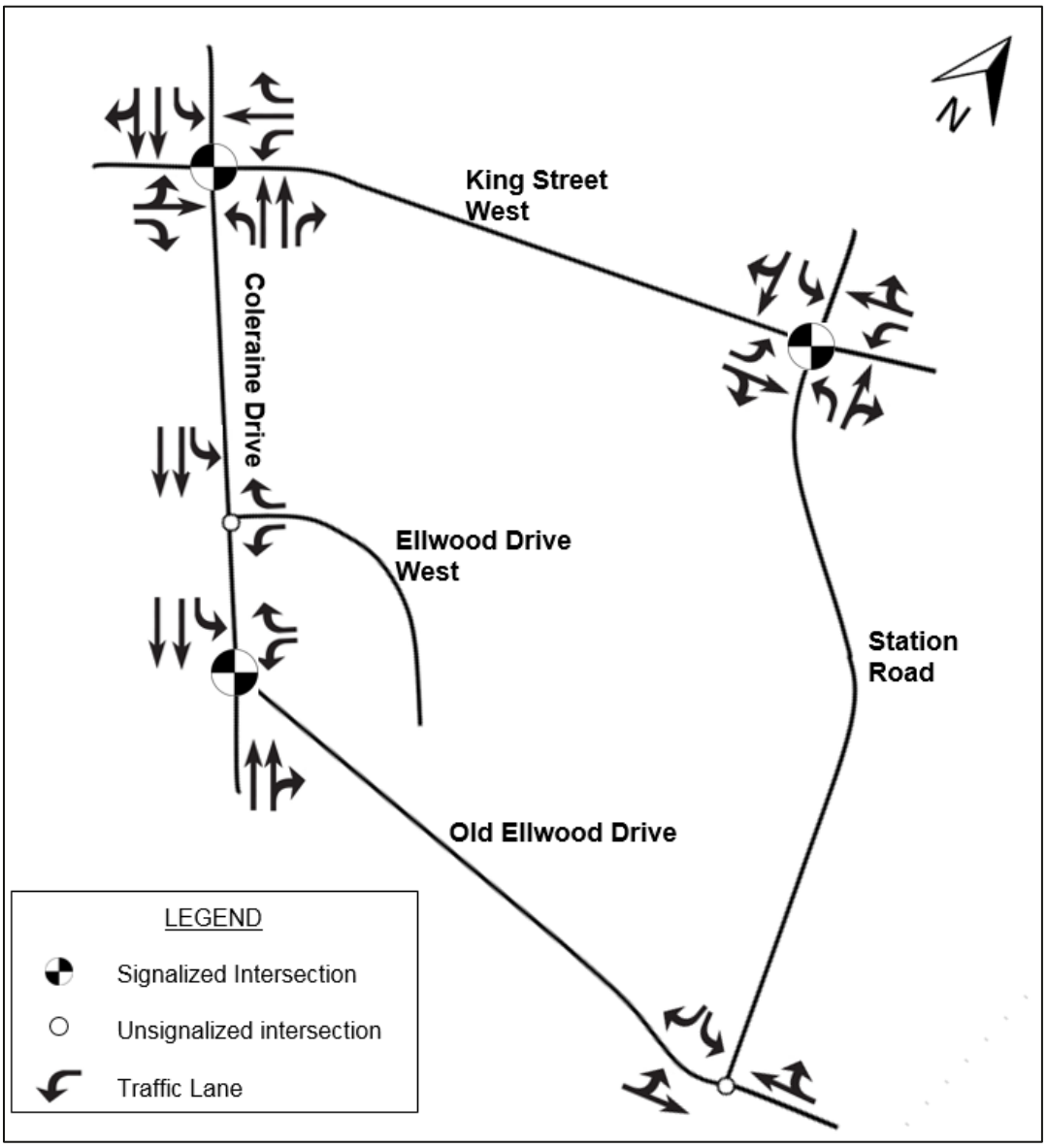

Figure 3-2: Existing Lane Configuration

For detailed information, the traffic analysis undertaken by CIMA+ is provided in **Appendix B**.

3.2.2 Future Traffic Operations

This section discusses the impacts of the proposed railway grade separation on traffic operations in the study area.

3.2.2.1 Background Traffic Growth (without Grade Separation)

Future intersection volumes, resulting from background traffic growth (i.e., future developments projected by the Region's Planning Department), were estimated based on the EMME model outputs provided by the Region for the 2041 horizon year, AM Peak Hour. The volumes for the PM Peak Hour were estimated by applying the same proportion between the 2017 AM and PM link volumes to the 2041 AM volumes from EMME. Table 3-1 summarizes the link volumes for 2017 and 2041, for each direction of travel and peak hour, along Coleraine Drive and King Street West.

Table 3-1: 2017 Existing and 2041 Projected Link Volumes

Road Section	Direction	2017 Volumes (vph)		2041 Volumes (vph)	
		AM	PM	AM	PM
Coleraine Drive south of King Street W	NB	249	1,070	349	1,500
	SB	933	336	1,824	657
King Street W between Coleraine Drive and Station Road	EB	294	433	486	716
	WB	422	338	982	787

The 2041 link volumes above were then used to estimate turning movement volumes at each intersection in the study area. This was done by applying proportions between individual turning movements, similar to the existing volumes, as well as the following assumptions:

- Volumes entering or exiting Harvest Moon Drive, Station Road/Deer Valley Drive, and Ellwood Drive West were assumed to present no growth by 2041, since no further development is expected in the residential areas to which these roads provide access; and
- Consequently, all background traffic growth originates from the north/south directions on Coleraine Drive, and from the east/west directions on King Street West.

As an example, the northbound volumes at Coleraine Drive & King Street West/Harvest Moon Drive were estimated, for the PM Peak Hour, as follows:

- The northbound left-turn (NBL) movement remained unchanged from the existing volume (363), since this movement enters the residential area via Harvest Moon Drive;
- The combined northbound through (NBT) and northbound right-turn (NBR) volumes are the difference between the northbound link volume from Table 6 and the NBL volume (1,500 – 363 = 1,137);
- Based on 2017 volumes, the NBR volume makes up 23.2% of NBR+NBT (164+543). Therefore, NBR = 0.232 x 1,137 = 264, and NBT = 1,137 – 264 = 873;
- The procedure is then repeated for the remaining directions and the calculated volumes are carried over to the remaining intersections until all future volumes have been estimated.

The resulting background traffic volumes are illustrated in **Figure 3-3**.

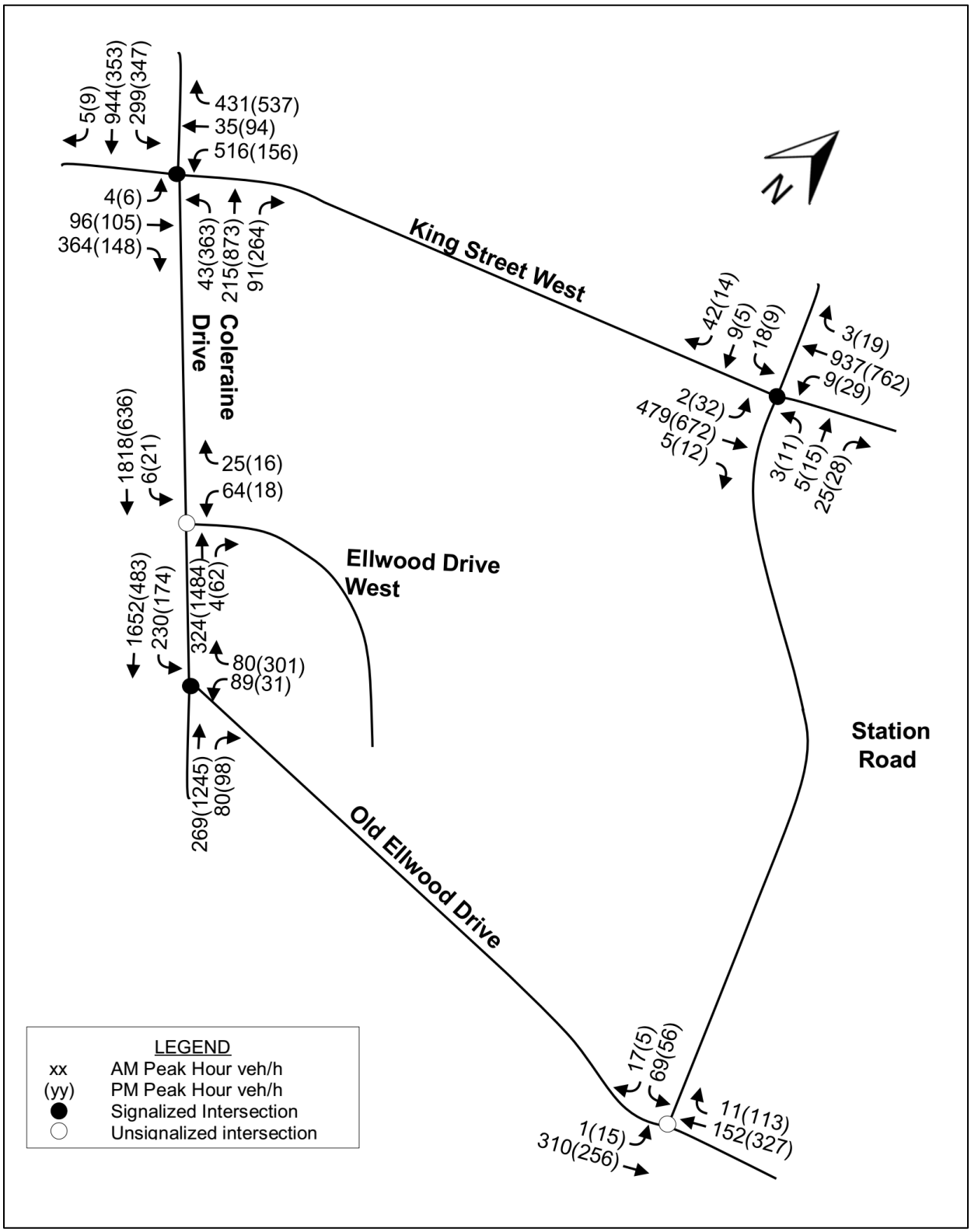

Figure 3-3: 2041 Intersection Volumes (Without Grade Separation)

3.2.2.2 Traffic Redirection with Grade Separation

With the elimination of the intersections of Coleraine Drive with Ellwood Drive West and Old Ellwood Drive, the drivers using these intersections need to find alternatives to complete their trips. Most of these traffic volumes are expected to migrate to the intersections of Coleraine Drive & King Street West/Harvest Moon Drive and King Street West & Station Road/Deer Valley Drive.

The procedure to reassign the traffic volumes resulting from the elimination of these two intersections included two steps. The first corresponds to the redirection of traffic associated with trips between Harvest Moon Drive and Old Ellwood Drive. The reason for this is that, upon reviewing existing traffic volumes (refer to Section 2.2, Figure 3), the eastbound right-turn from Harvest Moon Drive and the southbound left-turn onto Old Ellwood Drive were found to be relatively high during the AM Peak Hour (364 and 121, respectively); the same occurs in the PM peak hour, however in the opposite direction (i.e. westbound right-turn from Old Ellwood Drive and northbound left-turn onto Harvest Moon Drive: 224 and 363, respectively). It was assumed that residents from the neighbourhood located west of Coleraine Drive & Harvest Moon Drive use Old Ellwood Drive as alternative route between this neighbourhood and Highway 50, bypassing Downtown Bolton.

For this reason, there was a need to determine the volumes associated with these movements, since they should be reassigned to different movements at the intersection of Coleraine Drive & King Street West/Harvest Moon Drive, compared to general traffic. For example, the portion of the 224 vehicles turning right from Old Ellwood Drive, and then left onto Harvest Moon Drive in the PM Peak Hour should be reassigned to the westbound through movement at King Street/Harvest Moon & Coleraine Drive, and the remaining portion should be reassigned to the westbound right-turn movement.

In order to determine these proportions, Bluetooth detectors were deployed to identify vehicles travelling between Harvest Moon Drive and Old Ellwood Drive. However, the detection rate of the devices resulted very low and the Bluetooth data was inconclusive. As such, CIMA conducted a manual count during the field investigation on Thursday, March 9, 2017. The results are summarized in **Table 3-2** and were used to estimate the amount of traffic redirected to the eastbound and westbound through movements at King Street/Harvest Moon Drive & Coleraine Drive.

Table 3-2: Proportion of Traffic between Harvest Moon Drive and Old Ellwood Drive

Movement	AM Peak	PM Peak	%
Total right turns Harvest Moon → Coleraine	287	-	11%
Harvest Moon → Coleraine → Old Ellwood	32		
Total right turns Old Ellwood → Coleraine	-	210	52%
Old Ellwood → Coleraine → Harvest Moon		110	

The second step consisted in reassigning the remaining volumes (i.e. after the first step was completed) to the appropriate movements. In order to complete this, the following assumptions were used:

- All traffic turning north onto Coleraine Drive from Ellwood Drive West and from Old Ellwood Drive were reassigned to the northbound left-turn at Station Road & King Street west, then to the westbound right-turn at King Street West & Coleraine Drive;
- 50% of traffic turning south onto Coleraine Drive from Ellwood Drive West and from Old Ellwood Drive were reassigned to the northbound left-turn at Station Road & King Street west, then to the westbound left-turn at King Street West & Coleraine Drive; and
- The remaining 50% of traffic turning south onto Coleraine Drive from Ellwood Drive West and from Old Ellwood Drive were assumed to take alternative routes towards Highway 50 (i.e. proceeding eastbound on Old Ellwood Drive).

The resulting traffic volumes on Coleraine Drive due to the grade separation were used in the assessment of future-year intersection operations and are detailed in **Figure 3-4.**

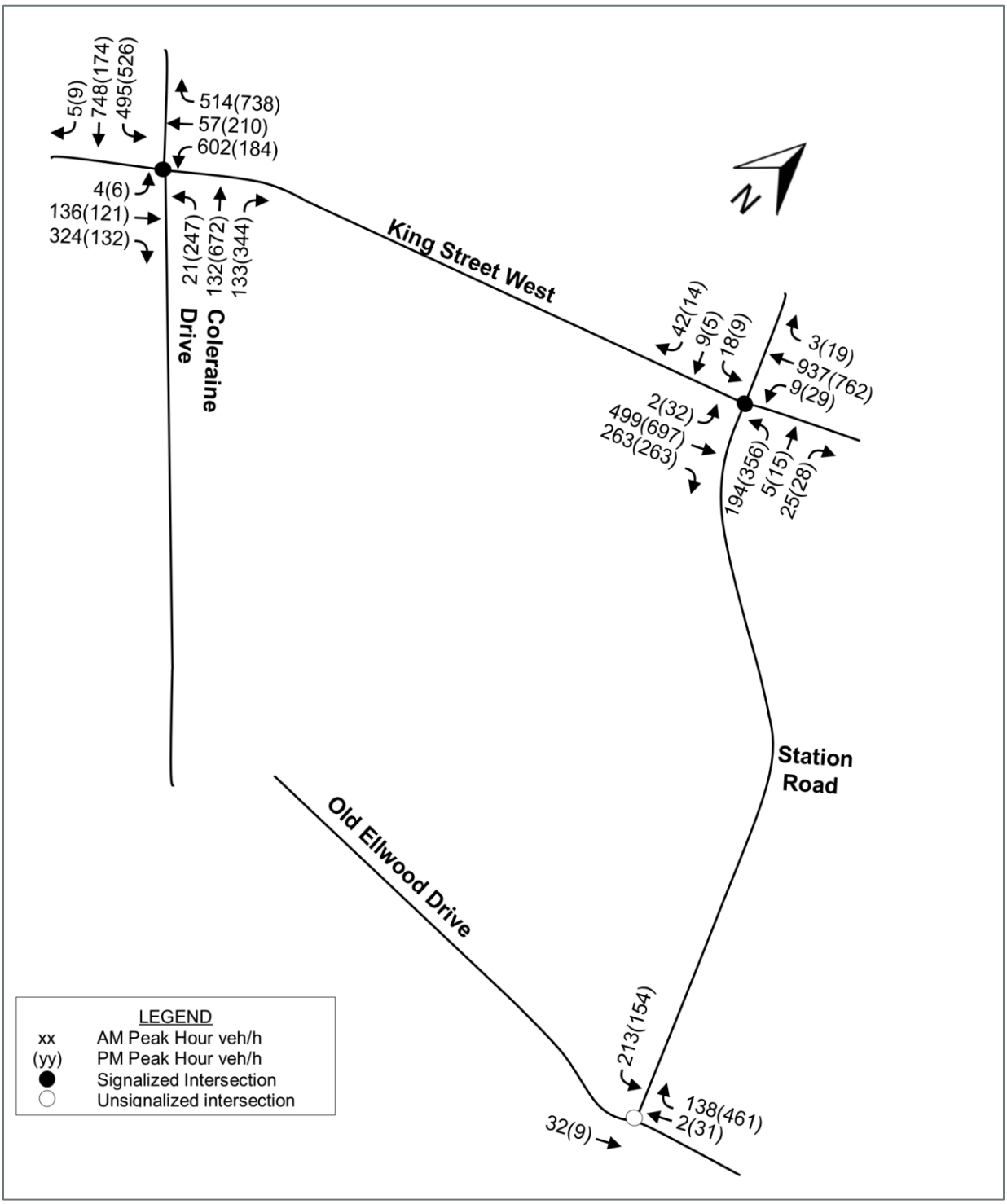

Figure 3-4: 2041 Intersection Volumes (With Grade Separation)

3.3 Traffic Safety

3.3.1 Safety Improvements Without Grade Separation

Based on the findings from the field investigation, the recommendations in Table 3-3 are provided to address safety concerns within the study area if the Coleraine Drive grade separation is not implemented.

Table 3-3: Traffic Safety Recommendations without Grade Separation

Finding	Recommendation
Railway crossing gate obstructing visibility at Old Ellwood Drive & Coleraine Drive.	Consider relocating the railway gate structure (increase offset from the road) to improve sight lines.
Uneven pavement surface at railway crossing.	Resurface pavement at and on approach to the railway crossing.
RAILWAY CROSSING AHEAD (Wc-4) warning signs installed too close to railway crossing.	Relocate signs in accordance with OTM Book 6 guidance
SCHOOL CROSSING AHEAD (Wc-2A) signs located in advance of signalized intersection (Coleraine & King/Harvest Moon).	Remove the Wc-2A signs in advance of Coleraine & King/Harvest Moon. OTM Book 6 states that “signed school crossings must not be located at pedestrian crossovers, at intersections with traffic signals, or at intersections with pedestrian signals”.
Speed limit variation over a short distance on King Street West.	Implement a uniform speed limit on King Street West between Coleraine Drive and Station Road.
Potential water hazards on Coleraine & Harvest Moon and Station & King.	No action is required.
Guide rail installed 1 metre from barrier curb and reducing sidewalk width.	All required guide rails within the study area should be installed either flush with the barrier curb or not closer than 2.5 metres from the barrier curb (4.0 metres

Finding	Recommendation
	desirable if design speed is greater than 70 km/h).
Potential vehicle conflicts at Coleraine & Old Ellwood and Coleraine & Ellwood.	Consider adding an exclusive right-turn lane on Old Ellwood Drive, and providing a raised median island on Coleraine Drive, immediately south of Ellwood Drive West.
Absence of sidewalks south of the railway and of pedestrian facilities to cross the railway.	Consider providing sidewalks along Coleraine Drive through the entire study area, as well as proper crossing facilities at the railway.
Non-AODA pedestrian pushbuttons.	Upgrade pedestrian signal pushbuttons at all intersections in the study area to meet AODA requirements.
Restricted turning sight distances at #13351 and #13371 Coleraine Drive.	Consider modifying the vertical profile of Coleraine Drive in the vicinity of Holland Drive to ensure turning sight distances at all accesses meet design guidelines.

3.3.2 Safety Improvements with Grade Separation

Based on the findings from the field investigation, the recommendations in Table 3-4 are provided to address safety concerns within the study area if the Coleraine Drive grade separation is implemented.

Table 3-4: Traffic Safety Recommendations with Grade Separation

Finding	Recommendation
Railway crossing gate obstructing visibility at Old Ellwood Drive & Coleraine Drive.	No action is required. This issue will be eliminated with the implementation of the grade separation.

Finding	Recommendation
Uneven pavement surface at railway crossing.	No action is required. This issue will be eliminated with the implementation of the grade separation.
RAILWAY CROSSING AHEAD (Wc-4) warning signs installed too close to railway crossing.	No action is required. This issue will be eliminated with the implementation of the grade separation.
SCHOOL CROSSING AHEAD (Wc-2A) signs located in advance of signalized intersection (Coleraine & King/Harvest Moon).	Remove the Wc-2A signs in advance of Coleraine & King/Harvest Moon.
Speed limit variation over a short distance on King Street West.	Implement a uniform speed limit on King Street West between Coleraine Drive and Station Road.
Potential water hazards on Coleraine & Harvest Moon and Station & King.	As part of the design efforts, review clear zone requirements and embankment hazard protection warrants for the bodies of water located at the southwest quadrants of Coleraine Drive & Harvest Moon Drive, and Station Road & King Street West; install guide rails as required.
Guide rail installed 1 metre from barrier curb and reducing sidewalk width.	All required guide rails within the study area should be installed either flush with the barrier curb or not closer than 2.5 metres from the barrier curb (4.0 metres desirable if design speed is greater than 70 km/h).

Finding	Recommendation
Potential vehicle conflicts at Coleraine & Old Ellwood and Coleraine & Ellwood.	No action is required. This issue will be eliminated with the implementation of the grade separation.
Absence of sidewalks south of the railway and of pedestrian facilities to cross the railway.	Provide sidewalks along Coleraine Drive through the entire study area. Crossing facilities at the railway are not necessary due to the grade separation.
Non-AODA pedestrian pushbuttons.	Upgrade pedestrian signal pushbuttons at all intersections in the study area to meet AODA requirements.
Restricted turning sight distances at #13351 and #13371 Coleraine Drive.	Consider modifying the vertical profile of Coleraine Drive in the vicinity of Holland Drive to ensure turning sight distances at all accesses meet design guidelines.

3.4 Cultural Heritage Resources

3.4.1 Built Cultural Heritage

A Cultural Heritage Assessment Report (CHAR) was undertaken in support of the study and is documented in **Appendix C**. The CHAR determined there is a protected heritage property and property of cultural heritage value or intersect within the study area (Shore-Wakely Stone House at 13304 Coleraine Drive), and a properties of cultural heritage value or interest adjacent the study area (13303 Coleraine Drive and 49 Wakely Boulevard).

Of these properties, 49 Wakely Boulevard is anticipated to be at risk for direct impact during the construction improvements. Mitigation measures including site plan control and communication and monitoring of vibration impacts are recommended. Further details are provided in the study's environmental mitigations, detailed in Section 8.

3.4.2 Archaeology

A Stage 1 Archaeological Assessment (AA) was conducted by Golder Associates Inc. (Golder), in accordance with the standard requirements of the *Planning Act*, R.S.O 1990, c.P.14 (Government of Ontario 1990), as required by the Town of Caledon prior to land disturbance, and the *Ministry of Heritage, Sport, Tourism, and Culture Industries' Standards and Guidelines for Consultant Archaeologists (2011)*. The Stage 1 AA Report is included in **Appendix D.**

The purpose of a Stage 1 AA is to:

- Determine the presence of known archaeological sites within the study area;
- Assess the cultural heritage value or interest of the archaeological sites; and
- Recommend appropriate strategies for those archaeological sites where mitigation of impacts will be necessary.

The Stage 1 AA consists of a background study and property inspection to review the geography, land use and historical information for the study area. The background study determined there was potential for both pre-contact Aboriginal and historical Euro-Canadian sites, but this potential has been removed for most of the study area due to deep and extensive disturbances resulting from urban and industrial development. The property inspection confirmed that the study area is a long-settled urban and industrial area, of which a significant portion has been previously disturbed by paved roads, sidewalks, landscaping, buildings, utilities, and sloped areas. No further archaeological assessment is recommended for these portions of the study area.

Several portions of the study area consist of manicured lawn and overgrown fields. These areas, as identified on **Figure 3-5** and **Figure 3-6**, appear to be relatively undisturbed and still retain archaeological potential. Stage 2 property survey completed through test pit survey at five metre intervals is recommended for these areas.

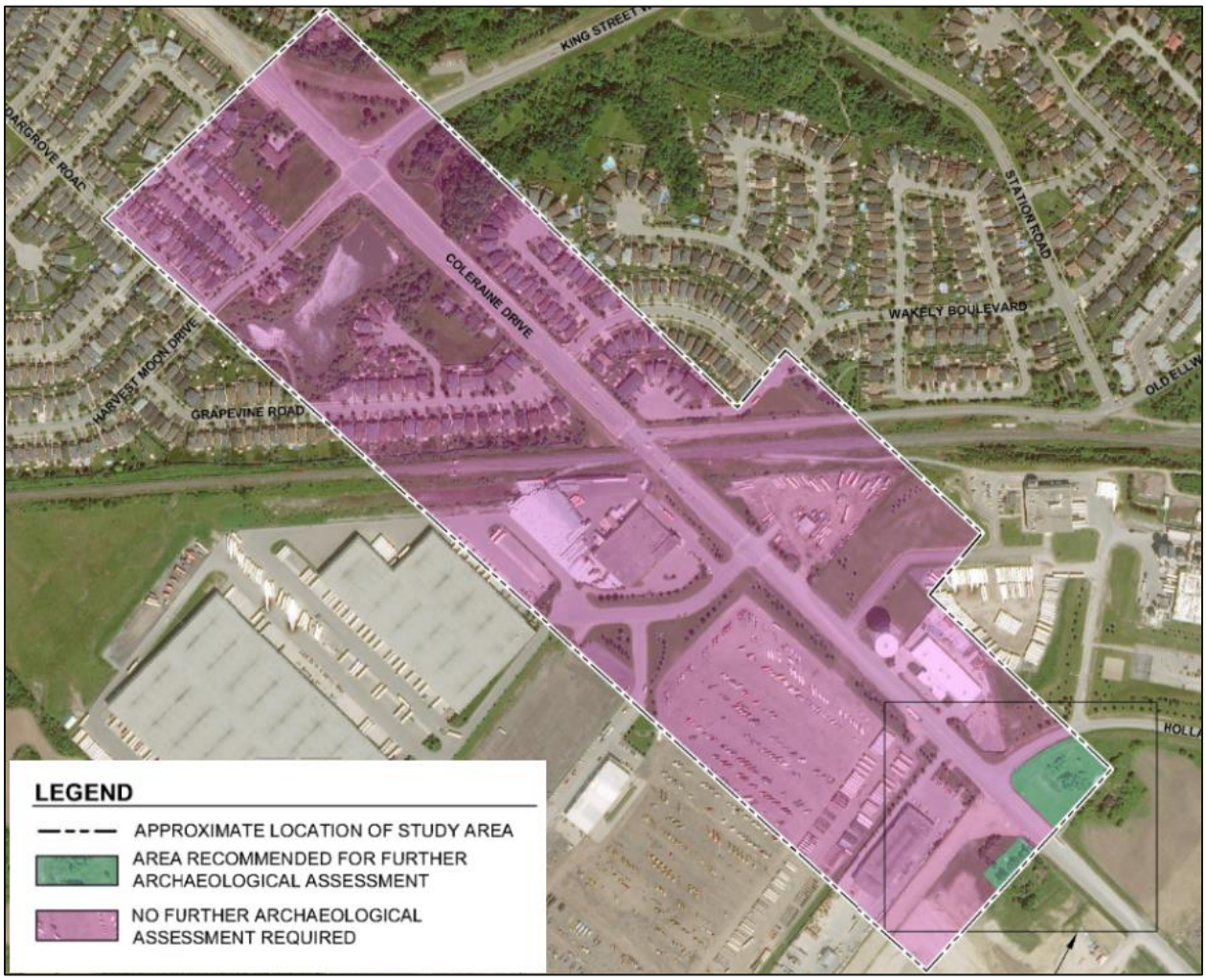

Figure 3-5: Stage 1 Archaeological Assessment – Stage 1 Results (Map 7)

Figure 3-6: Stage 1 Archaeological Assessment – Stage 1 Recommendations (Map 8)

The Shore-Wakely House property (Site AIGw-163) is located to the southwest of the Holland Drive intersection and is illustrated in **Figure 3-6** as the "Designated Heritage Site". The Shore-Wakely House property is designated and retains cultural heritage value. The improvements recommended by this study were finalised after the completion of the Stage 1 AA (further details of the proposed improvements are included in **Section 7**) and the site is outside of the anticipated construction limits as improvements extend only to the northern side of the Holland Drive intersection. Therefore, no direct impacts to the property are anticipated; however, the Stage 1 AA provides the following recommendations regarding the site that are still applicable:

- Prior to allowing construction in the area, no-go instructions must be issued by the Canadian Ture Corporation (CTC) to all personnel so that the area of avoidance is not accidentally impacted.
- The area to be avoided will be shown in all contact drawings, when applicable.
- If accidental impacts to the archaeological site are observed at any time during construction, a licensed archaeologist will be notified immediately.

3.5 Natural Environment

A Natural Heritage Evaluation was conducted in support of this study and is documented in **Appendix E**. The natural heritage evaluation was conducted to determine the presence and extent of natural heritage features and associated constraints on the proposed long-term traffic improvements and grade separation of the CP Rail line on Coleraine Drive south of Old Ellwood Drive in the Town of Caledon (the "Study Area").

The identification and description of natural features on and adjacent to the study area is necessary to assess the potential environmental impact of the development and to provide suggestions for the minimization and/or mitigation of these impacts.

A review of existing information and field verification of natural heritage features indicates that the Natural Heritage System, at the subject site, consists of the coniferous forest patch at the northeast edge of King Street West, as well as a sloped mineral cultural thicket, a small coniferous forest, and a small deciduous woodland located on the south side of the street. There are no other natural features on the subject site. Planted vegetation in the lawn and treed areas were examined separately by arborists as part of a tree inventory (See **Section 3.6**).

The Provincial Policy Statement (PPS) provides direction on which natural features and areas in Ontario should be considered significant. The Natural Heritage System in the study area does not include any wetlands, valley lands, or ANSIs.

3.5.1 Aquatic Community

A notable waterbody within the study area is the existing stormwater to the southwest of the Harvest Moon Drive intersection. An aquatic habitat assessment was completed to assess the existing conditions. Water levels were noted as being low in the outlet despite high water conditions, and this may indicate that it is dry at certain times during the summer period. The stormwater pond west of Coleraine Drive does not support fish habitat as the perched culvert draining the pond is a barrier to fish species. Presence of a viable fish habitat is also unlikely in the tributary east of Coleraine Drive; water levels

were also documented as being low and may be dry at certain times during the summer months. The stream course is also highly fragmented due to more than a century of man-made diversions.

3.5.2 Species At Risk (SAR)

A Species at Risk (SAR) screening was completed to evaluate potential for the presence of SAR in the study area. SARs were identified by the MNRF, third party data sources, or observed during the field assessment, and were included in the screening. Habitat requirements for these species were compared to the habitat available in the study area. The Natural Heritage Information Centre was also consulted for atlas squares 17PJ0058, 17PJ0057, and 17PJ0157. The Ministry of Natural Resources and Forestry (MNRF) noted records of Barn Swallow (Hirundo rustica), Chimney Swift (Chaetura pelagica), Butternut (Juglans cinera), and Little Brown Myotis (Myotis lucifugus), found within the study area. Data from the Ontario Reptile and Amphibian Atlas was compiled for the 10 km x 10 km grid square 17PJ05 that covers the study area. A record of Eastern Milksnake (Lampropeltis triangulum) was noted within the study area—this species of non-venomous snake is listed as Special Concern under SARO; a record of Blanding's Turtle (Emydidae blandingii) was noted within the study area and this species of turtle is listed as threatened under SARO and ESA; and there are also records of Snapping Turtles (Chelydra serpentina), which are listed as Special Concern under SARO.

Table 3-5 details the potential SAR habitat observed in the study area, though none of the species were observed during the field assessments.

Table 3-5: Potential Species at Risk Habitat within the Study Area

Common Name Scientific Name Rarity Rankings	Habitat Likely Present	Observed
Eastern Meadowlark *Sturmella magna* Federal – Threatened Provincial - Threatened	None. Treed and lawn fields south of Coleraine Drive provides sufficient space, but the monoculture vegetation community makes it unsuitable.	No
Eastern Wood-pewee *Contopus virens*	Potential for feeding, breeding, and rearing in FOM5.	No

Common Name Scientific Name Rarity Rankings	Habitat Likely Present	Observed
Federal – Special Concern Provincial – Special Concern		
Barn Swallow *Hirundo rustica* Federal – Threatened Provincial – Threatened	Feeding and nesting. Culvert structure provides adequate nesting opportunities and open water is ideal for feeding.	No
Chimney Swift *Chaetura pelagica* Federal – Threatened Provincial – Threatened	Feeding and potential nesting. Open water provides adequate feeding opportunities. The perimeter of FOD4 and FOC to the east of Coleraine Drive does not provide suitable habitat, but the interior of the woodland may provide suitable trees of sufficient diameter with cavities.	No
Snapping Turtle *Chelydra serpentina* Federal - Special Concern Provincial – Special Concern	Movement corridor, feeding, and nesting. Open ground is readily available. The mineral cultural thicket surrounding the stormwater pond is suitable habitat.	No
Eastern Milksnake *Lampropeltis triangulum* Provincial – Special Concern Federal – Special Concern	The upland habitats in the location of the study area may be suitable for this species.	No
Blanding's Turtle *Emydidae blandingii* Federal – Threatened Provincial - Threatened	Movement corridor and feeding. Open ground is readily available. The mineral cultural thicket surrounding the stormwater pond is suitable for temporary habitat.	No
Little Brown Myotis *Myotis lucifugus*	Feeding and roosting. The mineral thicket around the stormwater pond	No

Common Name Scientific Name Rarity Rankings	Habitat Likely Present	Observed
Federal - Endangered Provincial – Endangered	would provide suitable food supply from insects that have aquatic larval stages. The perimeter of FOD4 and FOC to the east of Coleraine Drive does not provide suitable habitat, but the interior of the woodland may provide suitable trees of sufficient diameter with cavities.	
Butternut *Juglans cinereal* Federal – Endangered Provincial - Endangered	Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. FOD4 may provide suitable conditions.	No

3.6 Tree Inventory and Assessment

A Tree Inventory and Assessment was completed in support of this study and is documented in **Appendix F**. The purpose of the Tree Inventory and Assessment Report was to record species, size, and condition of trees and groups of vegetation within the site for use in the development of a tree preservation plan for the site.

Trees were identified, numbered, measured, and assessed for condition. Tree groups were also assessed and the tree inventory and assessment table containing this information is included in **Appendix F**. Trees and shrubs were given a subjective condition rating of Excellent, Good, Fair, Poor, or Dead. Table 3-6 summarises the total trees counted and their species.

Table 3-6: Tree Inventory Summary Count of Species

Species	Count
Norway spruce	23
Littleleaf linden	16
Burning bush	1
Lilac, staghorn sumac	2

Species	Count
Blue spruce	17
Norway maple	5
Columnar European beech	1
Honey locust	7
Austrian pine	12
White spruce	7
Staghorn sumac	1
Hawthorn	1
Lilac tree	1
Red-osier dogwood and burning bush	1
Bur oak	3
Manitoba maple	7
Lilac	2
Group	12
Green ash	1
Scots pine	3
Catalpa	1
Pear	1
Ash	2
Smooth serviceberry	2
Elderberry	1
Pussy willow	1
Variegated dogwood	1
Freeman maple	2
Spirea	1
Mugho pine	1

Species	Count
Ninebark	1
Total	**137**

3.7 Drainage and Stormwater Management

A Drainage and Stormwater Management (SWM) Report was completed in support of this study and included in **Appendix G**. To enable a comprehensive understanding of the drainage requirements of the study area, the SWM analysis had to include drainage assessments for the conditions pre 2010 widening of Coleraine Drive, the conditions post 2010 widening, as well as for the proposed improvements of the grade separation.

The SWM reviewed background drawings, study reports, GIS data and guidance documents in support of the assessment of existing conditions, which includes a hydrology assessment by Falby Burnside and Associates, that was summarized in their Stormwater Management Report for the Heritage Hills subdivision (August 1997).

The drainage conditions and pattern were identified through reference of the original drainage map, provided by the Falby Burnside and Associates Stormwater Management Report for the Heritage Hills subdivision. Topography of the study area is defined by the valley / channel of the Humber River, and the confluence with Cold Creek Tributary. The catchment areas and outlets are further described in **Appendix G** and detailed in **Figure 3-7.**

There are two existing stormwater management ponds (SWMP) in or adjacent to the study area that were constructed as part of the Heritage Hills Subdivision. SWMP 1 receives drainage from Catchments 500, 600, 700 and 800 and minor drainage from Catchment 402. SWMP 1 outlets near the inlet of the 1350 mm trunk storm sewer. SWMP 9 receives drainage from Catchments 100, 200 and 300. The pond outlets across Coleraine Drive and into the creek flowing through Catchment 401, eventually entering the 1350 mm diameter interceptor storm sewer. The proposed grade separation work will only affect Catchments 401, 402, 500 and B1. There will be no anticipated changes in drainage conditions in other catchments. Proposed stormwater management and drainage conditions are detailed in **Section 7**.

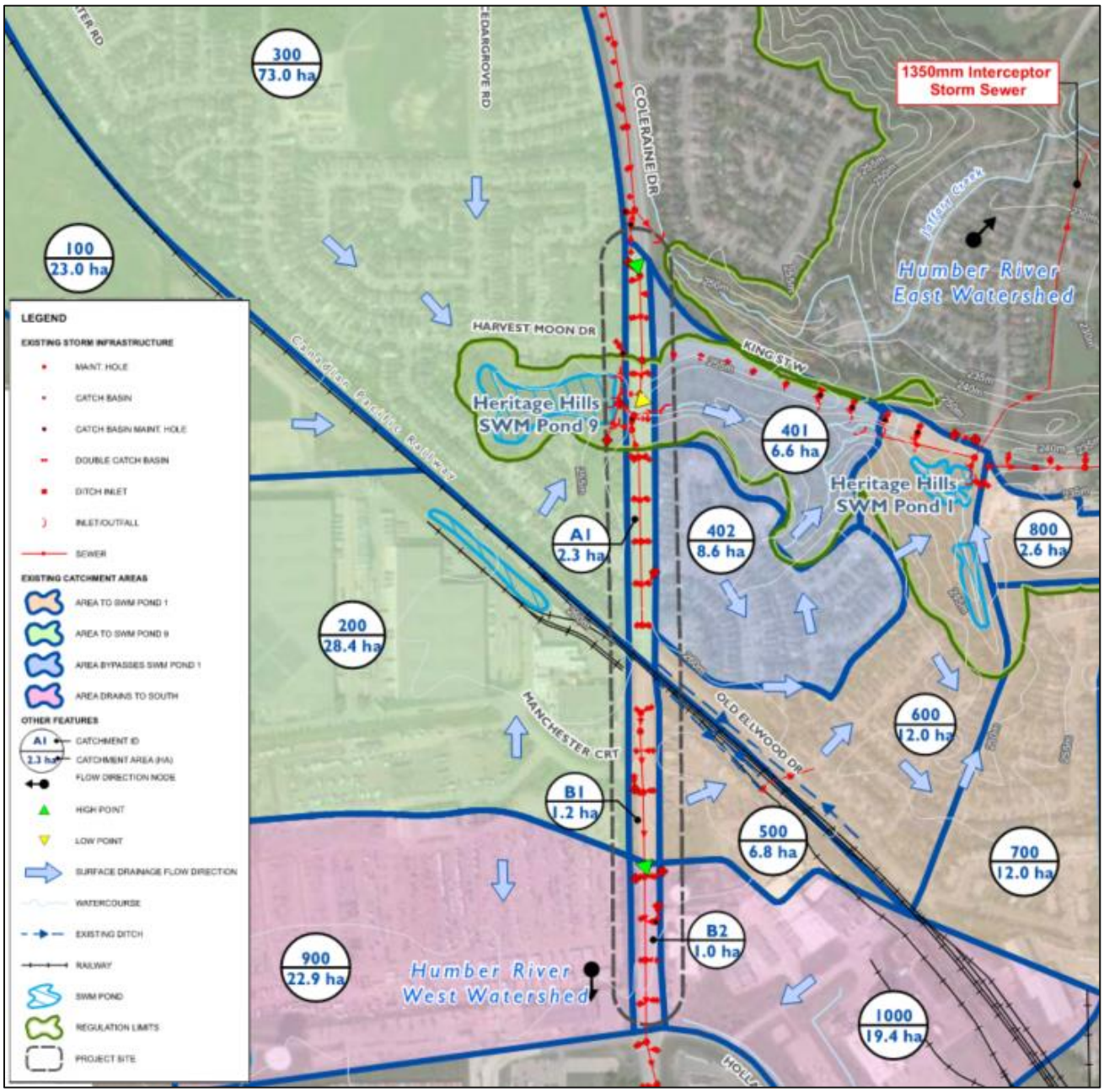

Figure 3-7: Existing Conditions Drainage Mosaic

3.8 Fluvial Geomorphology

A Fluvial Geomorphic Assessment was completed and included in **Appendix H**, to assess meander potential and channel stability. The key findings of the assessment of existing conditions are summarized below:

- The study area includes one watercourse crossing that is located 75 m south of the intersection between Coleraine Drive and Harvest Moon Drive and represents a small un-named tributary (UT-01) of the Main Humber River (1st Order stream).
- The results of the field studies and historical air photo analysis suggested that the channel is generally transitional or stressed;
- The channel appears to be in adjustment to a new flow and sediment regime. Field observations demonstrated that the stream is actively downcutting and widening. As a result, the channel is entrenched below the floodplain, meaning that the stream likely conveys flows in excess of the typical bankfull event with the potential for short-term but notable erosion along bed and banks. The construction of the up-stream SWM Pond and associated outlet controls has likely mitigated the observed erosion-sedimentation processes at the downstream channel to some extent, by reducing for example the peak magnitude of flows. However, the channel will likely continue to adjust for the foreseeable future, working to establish a new channel geometry that is in equilibrium with the changes to the new flow and sediment regime, brough about by the past land use change.
- Based on the desktop analysis, the meander belt width of the reach length at UT-01 is approximately 48 m, while the 100-year erosion limit of the channel is approximately 37 m.

3.9 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was conducted to identify potentially contaminating properties/activities within the study area, which represented an issue of potential environmental concern (i.e., are characterized by possible soil and/or groundwater contamination) and thus may have had the potential to affect the proposed construction within the Coleraine Drive ROW. The Phase I ESA was completed by Golder Associates Ltd. (“Golder Associates”), in general accordance with the Phase I Environmental Site Assessment, CSA Standard Z768-01 (2001, as reaffirmed in 2016).

A visual field assessment was conducted on March 21, 2017, to assess the current land usage in the study area and associated potential for subsurface environmental contamination. This assessment included a cursory overview, via a “drive-by” and walkthrough reconnaissance of the study area and did not constitute a complete assessment of these lands. Private properties, located within the study area, were assessed from publicly accessible lands.

The Phase I ESA identified the following potential issues of environmental concern in the study area:

- Presence of a hazardous waste generator at 2 Manchester Court on adjacent land west of Coleraine Drive, which was registered as a generator of halogenated solvent wastes in 2004.
- Presence of a hazardous waste generator at 3 Manchester Court on adjacent land west of Coleraine Drive for 15 years. A spill of 518 L of hydraulic oil occurred at the property in 2007.

The complete Phase I ESA is provided in **Appendix I**.

3.10 Municipal Services and Utilities

The following municipal services and utilities were identified within the study area:

- Rogers Buried Coaxial Cable
- Rogers Aerial Coaxial Cable
- Rogers Buried Fibre Cable
- Rogers Aerial Fibre Cable
- Enbridge Gas Pipes
- Bell Existing Conduit
- Bell Existing Buried Cable
- Overhead Hydro
- Sanitary
- Watermain

A utility composite plan has been created as part of this study and impacts to, and potential relocation needs, are further detailed in **Section 7**.

3.11 Problem and Opportunity Statement

Based on the review of the planning and policy context and existing conditions, including the detailed assessment of existing and future traffic and transportation needs presented in this report, the problems and opportunities identified for Coleraine Drive are summarized below.

3.11.1.1 Problems

- An increase in motor vehicle and train traffic is projected for 2041 which is expected to result in queues generated at the at-grade crossing extending

beyond the intersection of Coleraine Drive & King Street West/Harvest Moon Drive.

- This issue is expected to worsen as the frequency of trains during peak hours increases, particularly due to the planned extension of GO Train service to a new Bolton station.

3.11.1.2 Opportunities

- An opportunity to improve active transportation, recognize the importance of goods movement through the corridor, identify safety improvements and enhancing Peel's economic competitiveness.

4 Alternative Solutions

4.1 Description of Alternative Solutions

Three alternative planning solutions were developed to address the problem statement and were presented at Public Information Centre #1. The three solutions are detailed in **Table 4-1**.

Table 4-1: Alternative Planning Solutions

Planning Solution	Description	Example Image
1. Do Nothing	Retain Existing Conditions	
2. Change Grade of Rail	Two variations: a) Raise rail over road b) Depress rail under road	 Example of 2A: Regional Road 25, Milton.  Example of 2B: Camp Road, Australia
3. Change Grade of Road	Two variations: a) Raise road over rail b) Depress road under rail	 Example of 3A: Highway 50, Caledon  Example of 3B: Creditview Road, Brampton

4.2 Screening of Alternative Solutions

The potential alternative solutions were subject to high-level screening using criteria of Transportation, Socio-Economic Environment, Natural Environment and Active Transportation. The screening is detailed in **Table 4-2**.

Table 4-2: Screening of Potential Alternative Solutions

Criteria	Do Nothing	Change Grade of Rail	Change Grade of Road
Do Nothing	No changes to existing transportation system Does not accommodate future transportation needs	Accommodates future transportation needs	Accommodates future transportation needs
	Negative	**Positive**	**Positive**
Socio-Economic Environment	No impact to adjacent properties	Long distance required for grade change (1% max grade) Significant impact to properties adjacent to rail Temporary rail diversion needed	Moderate distance required for grade change (6% max grade) Moderate impact to properties adjacent to Coleraine Drive
	Positive	**Negative**	**Neutral**

Criteria	Do Nothing	Change Grade of Rail	Change Grade of Road
Natural Environment	No impact to natural environment	Greater impact to meadow lands adjacent to rail Some impact to natural heritage feature	Less impact to meadow lands adjacent to rail line Minimal impact to natural heritage feature
	Positive	**Negative**	**Positive**
Active Transportation	No opportunities for pedestrian or cycling facilities	Opportunity for the provision of pedestrian or cycling facilities on Coleraine Drive	Opportunity for the provision of pedestrian or cycling facilities on Coleraine Drive
	Negative	**Positive**	**Positive**

As detailed in **Table 4-2,** each solution had either a positive, negative, or neutral impact when considering the differing screening criterion. **Table 4-3** provides a summary of these impacts and through this screening analysis, the Change of Grade of Road planning solution was identified as the preferred solution.

Table 4-3: Summary of Alternative Solutions Screening

Criteria	Do Nothing	Change Grade of Rail	Change Grade of Road
Do Nothing	Negative	Positive	Positive
Socio-Economic Environment	Positive	Negative	Neutral
Natural Environment	Positive	Negative	Positive
Active Transportation	Negative	Positive	Positive
Overall	**Negative**	**Negative**	**Positive**

4.3 Preferred Solution

The preliminary preferred solution is to change the grade of the road on Coleraine Drive which will address the problem statement developed for the Coleraine Drive study area and is in support of the Region's Long Range Transportation Plan and Goods Movement Strategic Plan endorsed by Region of Peel Council.

This preliminary recommended solution considered the following:

- Change grade of the road
    - Depress the Road-under-rail grade separation, or
    - Raise road-over-rail grade separation
- Provision of pedestrian and bicycle facilities along Coleraine Drive.

Public and stakeholder response to this evaluation of Alternative Solutions is presented in **Section 6.2** of this report.

5 Alternative Design Concepts

5.1 Description of Alternative Design Concepts

5.1.1 Coleraine Drive

The study identified the preferred planning solution was Change Grade of Road and as illustrated in **Table 4-1**, there are two options with this approach: 1) Depress the road under the rail lines, or 2) Raise the road over the rail lines. Alternative design concepts were generated for these approaches and two alternatives identified:

- Alternative 1: Road Under Rail
- Alternative 2: Road Over Rail

5.1.1.1 Alternative 1 – Road Under Rail

For the alternative, Coleraine Drive will be lowered under CP Rail and would require excavation up to a maximum depth of approximately 9.0 m. The CP Rail tracks will then be accommodated on a structure over Coleraine Drive. To limit impacts, the excavation can be retained within Retained Soil System (RSS) walls (or a similar construct) and therefore will not require grading to go outside of the ROW, minimizing property impacts. The alternative allows for the continuation of four lanes on Coleraine Drive (two per direction), including any required turning lanes, and active transportation (multi-use paths) on both sides.

The proposed profile uses a maximum grade of 5% which enables the roadway to be back at existing ground before the intersections either side of the crossing (at Holland Drive, or at Harvest Moon Drive / King Street West). The proposed alternative is illustrated in **Figure 5-1**. Full exhibits are included in **Appendix J1 and J2**.

Regarding impacts on the CP Rail, significant operational challenges will be encountered during the construction. Shooflies (temporary tracks around an obstruction) must be constructed to divert rail traffic around the construction site. Due to space constraints, temporary slow orders are generally placed on trains to reflect the reduced design speed of the reconfigured track in the vicinity. Deviations from existing railway operating plans, such as reductions in siding length (a second parallel track allowing a train to pass another), removals of crossovers, or the discontinuation of temporary service to industries, are usually not accepted by the railways.

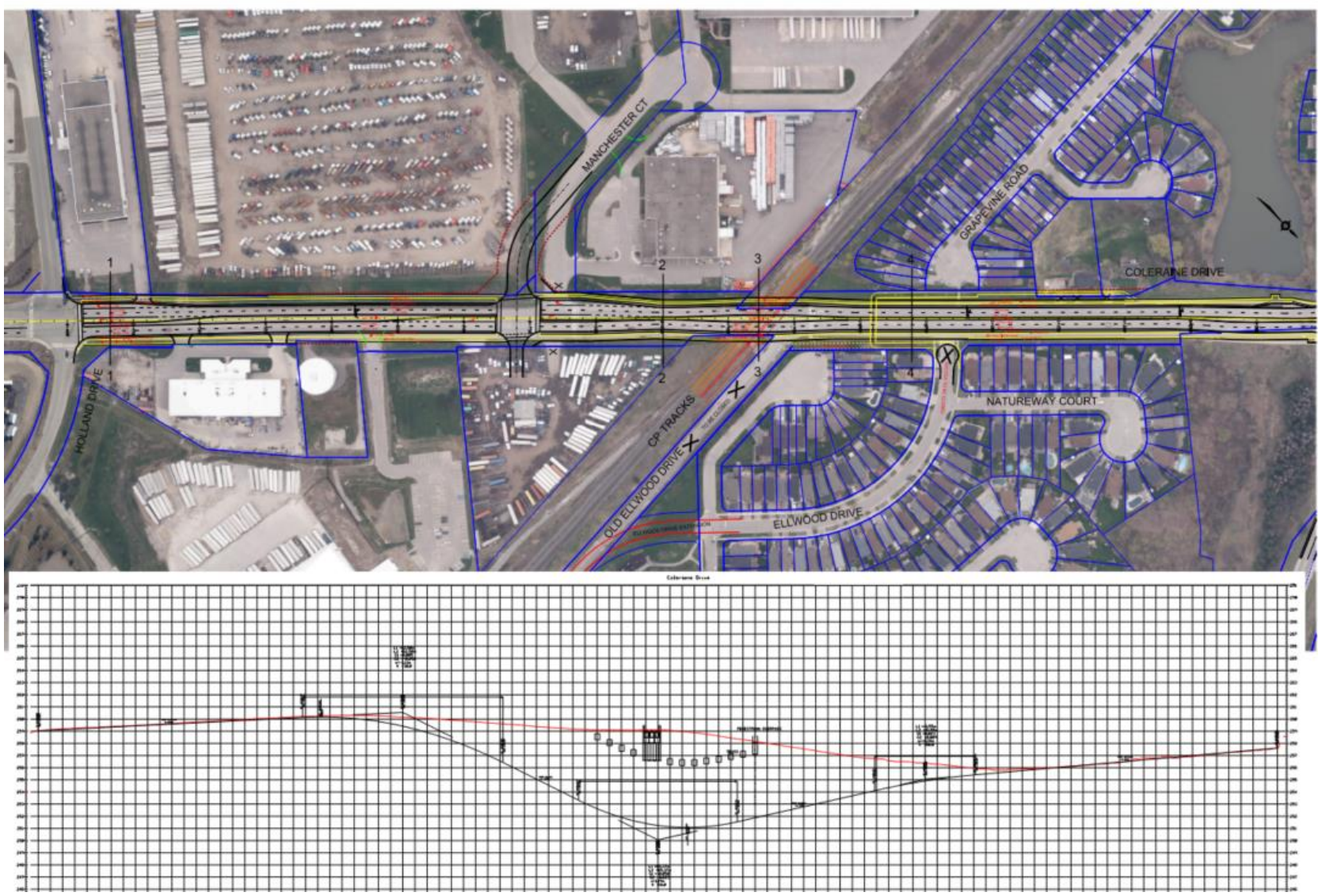

Figure 5-1: Coleraine Drive Alternative 1 - Road Under Rail

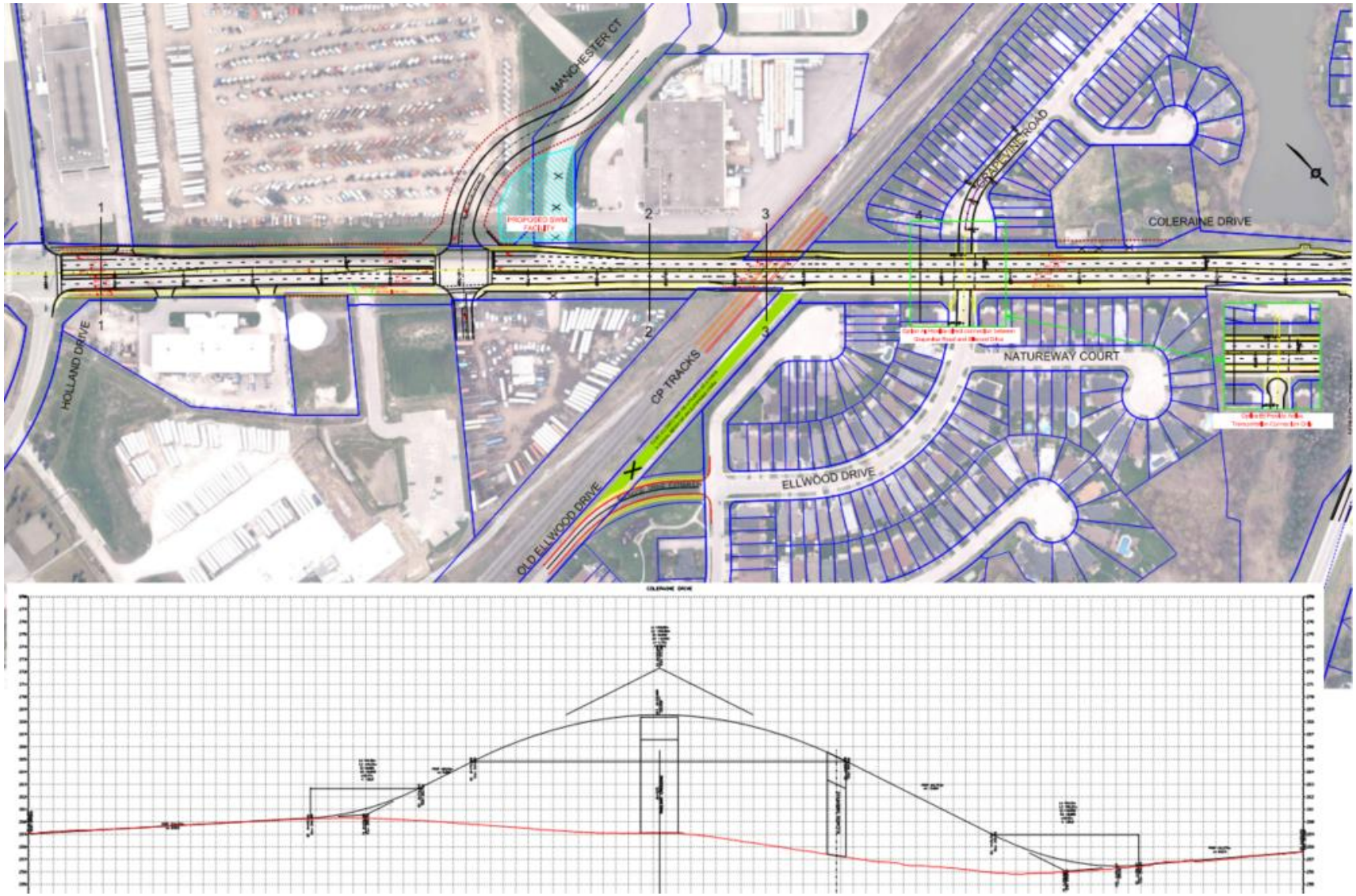

Figure 5-2: Coleraine Drive Alternative 2 - Road Over Rail

5.1.1.2 Alternative 2 – Road Over Rail

For this alternative, Coleraine Drive will be raised over CP Rail to a height of approximately 9.5 m above the original ground. To facilitate the raise, the north and south approaches to the crossing will be constructed on fill. To limit impacts outside of the existing roadway ROW, the fill can be placed within Retained Soil System (RSS) walls (or a similar construct) and therefore will not require grading to go outside of the ROW, minimizing property impacts. The alternative allows for the continuation of four lanes on Coleraine Drive (two per direction), including any required turning lanes, and active transportation (multi-use paths) on both sides.

The proposed profile uses a maximum grade of 5% which enables the roadway to be back at existing ground before the intersections either side of the crossing (at Holland Drive, or at Harvest Moon Drive / King Street West). The proposed alternative is illustrated in **Figure 5-2**.

Regarding impacts on the CP Rail, road-over-rail crossings have minimal operational impact on the railway during their construction. Bridge spans can usually be constructed without relocating track or creating the need for “slow orders” to be imposed on train traffic through the area. The staging of construction is also simpler in road-over-rail grade separation projects as, if temporary crossings of the railway are required, the cost of constructing them is negligible in the context of the overall project.

5.1.2 Harvest Moon Drive / King Street West and Coleraine Drive Intersection

Per the Transportation and Traffic Operations Analysis conducted by this study (summarised in **Section 3.2)**, the intersection of Harvest Moon Drive / King Street West and Coleraine Drive was identified in need of improvement to accommodate the future needs. To facilitate improvements at the intersection, two improvement design concept alternatives were identified for the intersection:

- Retain Signalization yet with improvements
- Convert intersection into a roundabout

5.1.2.1 Signalization Improvements

This alternative includes the retention of the existing signalization traffic control, however with the addition of dual left-turn lanes on the southbound and westbound approaches to the intersection to meet future travel demand. The improvements would require an expansion of the intersection footprint and are illustrated in **Figure 5-3**

5.1.2.2 Roundabout

This alternative includes converting the intersection into a two-lane roundabout, like the Emil Kolb Parkway and King Street roundabout (next intersection to the north) that was constructed in 2015. The roundabout improvements are illustrated in **Figure 5-3**.

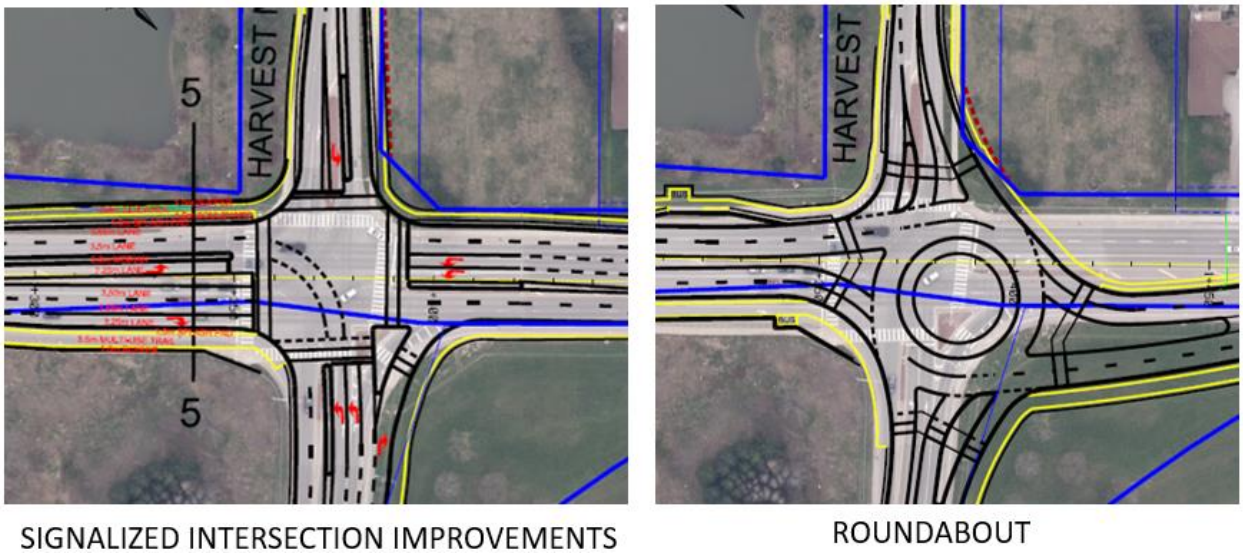

Figure 5-3: Coleraine Drive and Harvest Moon rive Intersection - Improvement Alternatives

5.2 Evaluation of Alternative Design Concepts

5.2.1 Evaluation Criteria

The alternative design concepts were assessed and evaluated following the criteria detailed in **Table 5-1** and . As the Coleraine Drive and intersection alternatives are fundamentally different, two sets of evaluation criteria were generated for their respective evaluations.

Table 5-1: Coleraine Drive Alternative Design Concepts - Evaluation Criteria

Evaluation Criteria	Measure
Transportation	
Traffic Operations	• Peak Hour / Off Peak Performance
Traffic Safety	• Potential for collisions
Natural Environment	
Environmentally Sensitive Areas	• Significant woodlands, wetlands, protection areas

Evaluation Criteria	Measure
Slope Stability	• Impacts to slope located at southeast corner of King St. and Coleraine Drive intersection.
Tree Impacts	• Removal and protection of trees
Stormwater Management	
Stormwater Management	• Quality and quantity control
Groundwater	• Dewatering for bridge construction
Climate Change	• Flooding risks
Healthy Communities	
Active Transportation	• Pedestrian and Cyclist infrastructure
Air Quality	• Vehicle emissions
Noise	• Vehicles, trains
Socio-Economic Environment	
Archaeology	• Burial sites or artifacts
Cultural and Built Heritage	• Heritage properties or structures
Property Impacts	• Property Acquisition
Land Use / Property Access	• Road Closures / Realignments
Aesthetics	• Streetscaping / Views of residents
Constructability / Engineering	
Utilities	• Relocations
Geometry	• Design Standards
Construction Staging	• Detours / Rerouting / Closures
Construction Cost	• Dollar Value

Table 5-2: Harvest Moon Drive / King Street West and Coleraine Drive Intersection – Evaluation Criteria

Evaluation Criteria	Measures
Traffic Operations	• Peak Hour • Off Peak Performance
Traffic Safety	• Potential for collisions
Pedestrian Accommodation	• Crossings • Exposure Time
Cyclist Accommodation	• Facilities • Crossings

Evaluation Criteria	Measures
	• Exposure
Natural Environment	• Environmentally Sensitive Areas • Slope Stability
Socio-Economic Environment	• Property Impacts • Speed Control • Streetscaping
Constructability/Engineering	• Utilities • Geometry • Construction Staging • Cost

5.2.2 Coleraine Drive Grade Separation Evaluation

The evaluation of the two alternative concepts for Coleraine Drive is detailed in **Table 5-5.** Under each criterion, the alternatives were assessed to identify their level of impact. The levels of impact identified were as follows:

- Very low impact
- Fairly low impact
- Medium/ambivalent impact
- Fairly high impact
- Very high impact

Table 5-3 provides a summary of the evaluation. Both the detailed and summary tables of the evaluation were presented or made available at the Public Information Centre #2.

Table 5-3: Coleraine Drive Alternative Concepts Evaluation - Summary

Criteria	Alt 1: Road Under Rail	Alt 2: Road Over Rail
Traffic Operations and Safety	Both alternatives eliminate excessive queuing and reduce number of intersections (Medium/ambivalent impact)	
Natural Environment	Both alternatives will have the same minimal impact (Medium/ambivalent impact)	
Stormwater Management and Groundwater	Complex groundwater /drainage impacts -would require pumping	Less complex groundwater / drainage impacts

Criteria	Alt 1: Road Under Rail	Alt 2: Road Over Rail
	(Very high impact)	(Fairly low impact)
Pedestrian and Cyclist Safety	Both alternatives provide equal opportunity for new and improved active transportation facilities (Medium/ambivalent impact)	
Noise / Air Quality	Both alternatives will have similar noise/air quality impacts (Medium/ambivalent impact)	
Archaeology and Cultural Heritage	Both alternatives have no cultural heritage impacts and the same impact to areas of archaeological potential (Medium/ambivalent impact)	
Access, Property and Aesthetics	Both alternatives have similar property requirements (Medium/ambivalent impact)	
	More desirable aesthetics (Fairly low impact)	Less desirable aesthetics, including shadow impacts (Fairly high impact)
Constructability	Very Complex (Very high impact)	Less Complex (Fairly low impact)
Cost	More expensive ($56M) * (Very high impact)	Less expensive ($36M) * (Fairly low impact)
Overall Recommendation	Not Recommended	**Recommended**

*Project costs were further refined during the preliminary design phase and are detailed in **Section 7**.

5.2.3 Coleraine Drive and King Street / Harvest Moon Drive Intersection Evaluation

The evaluation of the two alternative concepts for the Coleraine Drive and Harvest Moon Drive / King Street West intersection is detailed in **Table 5-5.** Under each criterion, the alternatives were assessed to identify their level of impact. The levels of impact identified were as follows:

- Very low impact / preferred
- Fairly low impact
- Medium/ambivalent impact
- Fairly high impact

- Very high impact

Table 5-4 provides a summary of the evaluation. Both the detailed and summary tables of the evaluation were presented or made available at the Public Information Centre #2.

Table 5-4: Coleraine Drive and Harvest Moon Drive / King Street West Intersection Evaluation - Summary

	Signalized	Roundabout
Key Advantages	Easier to construct. Provides slightly better operations during peak hours. (Fairly low impact)	Less impact to sensitive natural environment areas. More safety benefits, by always encouraging a slower speed. Reduces severity of collisions, although it may increase non-fatal collisions. More streetscaping potential. Less delay during off-peak hours. Less utility impacts. (Very low impact)
Key Disadvantages	Collisions are more severe as vehicles only slowed/stopped by red light. More delay during off-peak hours. Little streetscaping potential. More utility impacts. (Very high impact)	Requires more construction staging. Slightly more property impacts. (Fairly high impact)
Overall Recommendation	Not Recommended	**Recommended**

5.3 Preferred Alternative Design Concepts

For Coleraine Drive, **Alternative 2 – Road Over Rail is the preferred alternative**.

In summary, both alternatives have similar impacts regarding mitigating operational issues (Transportation), vegetation and tree impacts (Natural Environment), and noise and air quality impacts (Healthy Communities). While the Road Over Rail is less

desirable atheistically and would result in shadow impacts (Socio-Economic Environment), the Road Under Rail has significant disadvantages by requiring large drainage/stormwater management requirements, including pumping, and groundwater impacts (Stormwater Management), as well as a large construction staging requirement, including temporary tracks. The large construction staging requirements and impacts also result in a significant increased cost for Alternative 1 – Road Under Rail ($56M) compared to Alternative 2 – Road Over Rail ($36M).

In further detail of the groundwater impacts, the Road Under Rail alternative would extend up to approximately 7 m below the groundwater level, therefore permanent management of groundwater seepage will be required for this option. Water management (i.e., treatment and conveyance) measures appropriate for temporary construction excavations may not be cost-effective or practical for permanent groundwater control. The Road Under Rail alternative must also take into account the potential for internal erosion and ground loss from beneath structures and adjacent paved surfaces and must be provided with appropriate filter and drain systems to control groundwater seepage.

For the Coleraine Drive and Harvest Moon Drive / King Street West intersection, **Alternative 2 – Roundabout is the preferred alternative**.

In summary, a signalized intersection will be easier to construct and will work reasonably well in terms of traffic operations; however, signalized intersections typically experience accidents of a higher severity than a roundabout, it will create more off-peak delay, and provides little discouragement to drivers exceeding area posted speed limits.

A roundabout will be more difficult to construct and will result in slightly more property impact at the intersection; however, it will result in less environmental impact, provide notably more safety benefits when compared to a signalized intersection, provides more streetscaping/landscaping potential, would result in less off-peak delay and less utility impacts.

Table 5-5: Coleraine Drive Alternative Concepts - Evaluation

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
Traffic Operations	**Very High Impact** - With an increase in motor vehicle and train traffic projected for 2041, queues generated at the at-grade crossing are expected to extend beyond the intersection of Coleraine Drive & King Street West/Harvest Moon Drive. This issue is expected to be more intense as the frequency of trains during peak hours increases, particularly due to the planned extension of GO Train service to a new Bolton station. No opportunities to improve traffic operations and eliminate queues generated at the at-grade rail crossing.	**Very Low Impact / Preferred** - No queues generated at the rail crossing. Eliminates the potential for queues backing up to the King Street and Coleraine Drive intersection.	**Very Low Impact / Preferred** - No queues generated at the rail crossing. Eliminates the potential for queues backing up to the King Street and Coleraine Drive intersection.
Traffic Safety - Vehicular	**Very High Impact** - No opportunity to improve traffic safety.	**Very Low Impact / Preferred** - Eliminates potential vehicle conflicts at the Coleraine Drive and Old Ellwood Drive intersection and the Coleraine Drive and Ellwood Drive intersection because Old Ellwood Drive and Ellwood Drive are closed at Coleraine Drive.	**Very Low Impact / Preferred** - Eliminates potential vehicle conflicts at the Coleraine Drive and Old Ellwood Drive intersection and the Coleraine Drive and Ellwood Drive intersection because Old Ellwood Drive and Ellwood Drive are closed at Coleraine Drive.
Transportation Summary	Both Alternatives improve operations to a similar extent, by resulting in no queuing at the rail crossing and eliminates potential of queues backing up to King Street and Coleraine Drive Intersection. Both alternatives have similar safety benefits, in the reduction of intersections resulting in reduction of conflict points. **Both alternatives are the same** from the Transportation perspective.		
Natural Environment			
Environmentally Sensitive Areas	**Very Low Impact / Preferred** - No impact to the Greenlands System (Natural Areas and Corridors), Woodlands and Vegetation Protection Zone.	**Very Low Impact / Preferred** - Avoids impact to the Greenlands System (Natural Areas and Corridors), Woodlands and Vegetation Protection Zone.	**Very Low Impact / Preferred** - Avoids impact to the Greenlands System (Natural Areas and Corridors), Woodlands and Vegetation Protection Zone.
Slope Stability	**Very Low Impact / Preferred** - No impact to the slope located at the southeast corner of the King Street and Coleraine Drive intersection.	**Very Low Impact / Preferred** - Avoids impact to the slope located at the southeast corner of the King Street and Coleraine Drive intersection.	**Very Low Impact / Preferred** - Avoids impact to the slope located at the southeast corner of the King Street and Coleraine Drive intersection.
Tree Impacts	**Very Low Impact / Preferred** - No impact to trees.	**Medium/Ambivalent Impact** - Potential impact to trees on the west side of Coleraine Drive north of Grapevine Road and at the relocated Manchester	**Medium/Ambivalent Impact** - Potential impact to trees on the west side of Coleraine Drive north of Grapevine Road and at the relocated Manchester

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
		Court. There are similar impacts between each alternative. Construction management measures can be implemented during construction to minimize impacts to trees.	Court. There are similar impacts between each alternative. Construction management measures can be implemented during construction to minimize impacts to trees.
Natural Environment Summary	Both alternatives impact natural environment resources to a similar extent as there are similar potential impacts to trees, which will be recommended to be mitigated through construction management measures, and similar avoidance to the Greenlands System, Woodlands and Vegetation Protection Zone and natural slopes. **Both alternatives are the same** from the Natural Environment perspective.		
Stormwater Management			
Stormwater Management	**Medium/Ambivalent Impact** - Portions of the existing roadway north of the CP railway currently discharge to the Heritage Hills SWM Pond 5 for both water quality and quantity. Portions of the existing roadway south of the CP railway currently do not provide any stormwater management for quality and quantity. No improvements to stormwater discharge.	**Fairly High Impact -** More complex option for accommodating stormwater. Minor stormwater flow will change directions from existing southerly direction and to north with the major flow. This will increase the amount of water that needs to be attenuated/treated. Water must be pumped from the underpass to either a discharge point located within the existing pond or an existing storm sewer system. There is likely no opportunity to have the water discharge by gravity. Therefore, a pump house would be required. There is an opportunity to mitigate stormwater impacts by discharging to the existing Heritage Hills SWM Pond 5. The low point in the roadway will change from the stormwater management pond to the CP underpass. Safe pedestrian and vehicle ingress/regress will need to be considered during major storm events should the roadway be overtopped. Stormwater management analysis will need to be performed to assess the capacity of existing stormwater management pond and ensure that there is sufficient capacity to handle any new flows, whether from rerouting or an increase in impervious area, to the stormwater management pond.	**Fairly Low Impact** - Less complex option for accommodating stormwater. Minor storm drainage could remain the same as existing conditions. The new high point in the roadway caused by the roadway/bridge would change major drainage flows. The impact to downstream receiving capacities would need to be mitigated. There is an opportunity to mitigate stormwater impacts by discharging flows to the existing Heritage Hills SWM Pond 5. The low point in the roadway would remain the same, and safe pedestrian and vehicle ingress/regress not a concern in major storm events should the roadway be overtopped. Stormwater management analysis will need to be performed to assess the capacity of existing stormwater management pond and ensure that there is sufficient capacity to handle any new flows, whether from rerouting or an increase in impervious area, to the stormwater management pond. Road over rail (i.e., bridge) is more susceptible to roadway icing and freezing.

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
Groundwater	**Medium/Ambivalent Impact** - No impact.	**Fairly High Impact -** High potential groundwater impacts due to temporary dewatering during construction. Earth excavation for roadway could permanently lower groundwater table.	**Fairly Low Impact** - Potential groundwater impacts due to temporary dewatering for bridge foundation during construction.
Climate Change	**Fairly Low Impact** - No improvements to stormwater infrastructure to improve resilience.	**Fairly High Impact -** Alternative more susceptible to flooding.	**Medium/Ambivalent Impact** - Opportunity to improve resilience of stormwater infrastructure.
Stormwater Management Summary	Alternative 1 – Road Under Rail is less preferred than Alternative 2 – Road Over Rail, due to the complex stormwater management requirements, including the need for a permanent pumping system, and due to its higher potential of groundwater impacts, as a result of the deep excavations required. Also, Alternative 2 will provide the opportunity to improve the stormwater infrastructure in the area. Due to the significant impacts of Alternative 1, **Alternative 2 – Road Over Rail is preferred** from the Stormwater Management perspective.		
Healthy Communities			
Active Transportation - Pedestrians and Cyclists	**Very High Impact** - No opportunity to improve pedestrian and cyclist safety. No pedestrian facilities provided south of the rail crossings. No dedicated bicycle facilities provided along Coleraine Drive. No protected pedestrian/cyclist rail crossing.	**Very Low Impact / Preferred** - Provides dedicated pedestrian facilities along the full length of the corridor. Provides shared cycling facilities (multi-use trail) along the full length of the corridor. A grade separated trail crossing is provided across Coleraine Drive. Provides a protected crossing for cyclists and pedestrians.	**Very Low Impact / Preferred** - Provides dedicated pedestrian facilities along the full length of the corridor. Provides shared cycling facilities (multi-use trail) along the full length of the corridor. A trail crossing can be provided across Coleraine Drive by underpass from Old Ellwood Drive. Alternatively, an at-grade crossing between Ellwood Drive and Grapevine Road could be provided by way of the road connection (shared between vehicles and bicycles).
Air Quality	**Fairly High Impact -** Air quality could decrease over time due to additional vehicle delays and queuing.	**Very Low Impact / Preferred** - The grade separation will act to minimize the air quality impact of increased traffic through improved traffic flows and reduced queuing times at intersections within the local vicinity of the project. As a result, the impact is anticipated to be positive.	
Noise	**Fairly Low Impact** - Noise levels at Outdoor Living Areas (i.e., sensitive receptor locations) will increase as traffic volumes increase.	**Fairly Low Impact** - Predicted noise levels with the road under rail alterative do not exceed the expected future noise levels without the project (i.e., the noise levels will not exceed the future ‘Do Nothing’ scenario levels). Comparable noise levels are expected at Outdoor Living Areas between the two grade separation alternatives. Mitigation measures will be required to reduce potential ‘tunneling effect’.	**Fairly Low Impact** - Predicted noise levels with the road over rail alternative do not exceed the expected future noise levels without the project (i.e., the noise levels will not exceed the future ‘Do Nothing’ scenario levels). With the consideration of mitigation measures such as a localized barrier, comparable noise levels are expected at Outdoor Living Areas between the two grade separation alternatives.

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
Healthy Communities Summary	Both alternatives will help improve the air quality in the area due to the elimination of vehicles queuing at the rail crossing. The alternatives also provide the opportunity to improve the active transportation infrastructure in the area thus improving the safety of pedestrians/cyclists. Both alternatives will have a similar noise levels which will not exceed the future "Do Nothing" scenario. **Both alternatives are the same** from the Healthy Communities perspective		
Socio-Economic Environment			
Archaeology	**Very Low Impact / Preferred** - No impact.	**Fairly Low Impact** - Portions of the study area require Stage 2 Archaeological Assessment (south of Holland Drive).	**Fairly Low Impact** - Portions of the study area require Stage 2 Archaeological Assessment (south of Holland Drive).
Cultural and Built Heritage	**Very Low Impact / Preferred** - No impact.	**Very Low Impact / Preferred** - No impact to any heritage properties or properties of cultural heritage value or interest.	No impact to any heritage properties or properties of cultural heritage value or interest.
Property Impacts	**Very Low Impact / Preferred** - No impact to private property.	**Medium/Ambivalent Impact** - Property is required at the following locations: • Northwest corner of the King Street and Coleraine Drive intersection • West side of Coleraine Drive north of Grapevine Road • Adjacent to Coleraine Drive south of Manchester Court • For the Manchester Court realignment. Property requirements are the same as the road over rail alternative.	**Medium/Ambivalent Impact** - Property is required at the following locations: • Northwest corner of the King Street and Coleraine Drive intersection • West side of Coleraine Drive north of Grapevine Road • Adjacent to Coleraine Drive south of Manchester Court • For the Manchester Court realignment. Property requirements are the same as the road under rail alternative.
Land Use/ Property Access	**Very Low Impact / Preferred** - No impact to property access.	**Very High Impact** - Residential access will not be permitted onto Coleraine Drive. No potential for a direct connection between Ellwood Drive west and Grapevine Road due to geometric challenges, and so the relatively large subdivision east of Coleraine Road would only have one access (at the Station Road and Wakely Blvd Intersection). Lack of connection would also hamper emergency service response and routing. Access to commercial properties will be maintained. Some accesses will be restricted to right-in-right-out movements only. Old Ellwood Drive will be closed upstream of Coleraine Drive.	**Medium/Ambivalent Impact** - Residential access will not be permitted onto Coleraine Drive. Potential for a direct connection between Ellwood Drive west and Grapevine Road – with the existing Ellwood Drive West and Coleraine Road intersection closed, the relatively large subdivision east of Coleraine Road would only have one access (at the Station Road and Wakely Blvd Intersection). Access to commercial properties will be maintained. Some accesses will be restricted to right-in-right-out movements only. Old Ellwood Drive will be closed upstream of Coleraine Drive.

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
		Manchester Court will be realigned to accommodate the grade change of Coleraine Drive (less significant realignment then road over rail alternative).	Manchester Court will be realigned to accommodate the grade change of Coleraine Drive (more significant realignment then road under rail alternative).
Aesthetics	**Very Low Impact / Preferred** - No impact.	**Fairly Low Impact** - More desirable aesthetics as no new bridge structure is required.	**Fairly High Impact -** Less desirable aesthetics as road over rail option requires a new bridge structure located adjacent to residential properties. The close location will result in shadow impacts to adjacent properties.
Socio-Economic Environment Summary	Both alternatives will require a Stage 2 Archaeology Assessment but will not have any impact on Cultural/Built Heritage properties within the area. Similar property requirements are needed for both alternatives, however Alternative 2 will require a slightly larger requirements due to the larger realignment of Manchester Court. Alternative 1 will have significant impacts to accessibility within the local road network, due to the preclusion of a connection between Ellwood Drive West and Grapevine Road. In terms of aesthetics, Alternative 2 will be much less desirable for residents due to the bridge structure located adjacent to homes and due to shadow impacts. Overall, **Alternative 2 – Road Over Rail is preferred** from the Socio-Economic perspective.		
Constructability/Engineering			
Utilities	**Very Low Impact / Preferred** - No impact.	**Medium/Ambivalent Impact** - Requires relocation of the following utilities: • Hydro facilities on the west side of Coleraine Drive • 1050 watermain • 250 PVC sanitary pipeline Offers less available space to accommodate utility relocations. Two stage relocation may be required during construction to protect facilities (i.e., water supply).	**Fairly Low Impact** - Requires relocation of the following utilities: • Hydro facilities on the west side of Coleraine Drive • 1050 watermain • 250 PVC sanitary pipeline Offers more available space to accommodate utility relocations.
Geometry (i.e., design speed, minimum radius, maximum grade, etc.)	**Very Low Impact / Preferred** - No impact.	**Very Low Impact / Preferred** - Both alternatives conform to TAC and Municipal Standards, including accommodating trucks and active transportation facilities.	
Construction Staging	**Very Low Impact / Preferred** - No construction staging required.	**Fairly High Impact -** More complex construction staging compared to road over rail alternative, due to extensive excavation required (9 m depth) Construction staging would require the temporary rerouting of rail tracks.	**Fairly Low Impact** - Less complex construction staging compared to road under rail alternative. Construction staging would not require the temporary rerouting of rail tracks.

Criteria	Do Nothing	Alternative 1 - Road Under Rail	Alternative 2 - Road Over Rail
Transportation			
Construction Cost	**Very Low Impact / Preferred** - No cost.	**Medium/Ambivalent Impact** - Significant construction cost compared to the road over rail alternative - $56M	**Fairly Low Impact** - Lesser construction cost compared to the road under rail alternative - $36M
Constructability/Engineering Summary	Alternative 1 – Road Under Rail will be much more complex to design and construct due to the utility relocation challenges and rail rerouting. This will result in a much more expensive construction cost for Alternative 1. Therefore, from a Constructability/Engineering perspective, **Alternative 2 – Road Over Rail is preferred**.		
Summary of Evaluation			
Overall Summary	**Alternative 2 – Road Over Rail is the preferred alternative**. Both alternatives have similar impacts regarding mitigating operational issues (Transportation), vegetation and tree impacts (Natural Environment), and noise and air quality impacts (Healthy Communities). While the Road Over Rail is less desirable atheistically and would result in shadow impacts (Socio-Economic Environment), the Road Under Rail has significant disadvantages by requiring large drainage/stormwater management requirements, including pumping, and groundwater impacts (Stormwater Management), as well as a large construction staging requirement, including temporary tracks. The large construction staging requirements and impacts also result in a significant increased cost for Alternative 1 – Road Under Rail ($56M) compared to Alternative 2 – Road Over Rail ($36M).		
Overall Recommendation	**Medium/Ambivalent Impact** - Not Recommended	**Fairly Low Impact** - Not Recommended	**Very Low Impact (Preferred) - Recommended**

Very Low Impact (Preferred)	**Fairly Low Impact**	**Medium/Ambivalent Impact**	**Fairly High Impact**	**Very High Impact (Least Positive)**

Table 5-5: Harvest Moon drive / King Street West and Coleraine Drive Intersection – Evaluation

Criteria	Alterative 1 – Signalized Intersection	Alternative 2 – Roundabout
Transportation		
Peak Hour Traffic Operations	**Medium/Ambivalent Impact** - Overall level of service D in the AM peak hour, and intersection delay of 53 seconds. Overall level of service D in the PM peak hour, and intersection delay of 50 seconds.	**Fairly Low Impact** - Overall level of service E in the AM peak hour, and intersection delay of 45 seconds. Longer delays possible on Harvest Moon Drive. Overall level of service B in the PM peak hour, and intersection delay of 11 seconds.
Off-Peak Traffic Operations	**Medium/Ambivalent Impact** - Moderate wait times for side street traffic.	**Fairly Low Impact** - Low delays for all traffic movements.
Traffic Safety	**Medium/Ambivalent Impact** - Potential for high-speed turning movement and angle collisions, increasing severity.	**Fairly Low Impact** - Statistically, roundabouts tend to result in fewer injury collisions than signalized intersections and encourage slower speeds. Roundabouts reduce the severity if collisions, although it may increase non-fatal collisions.
Pedestrian Accommodation	**Medium/Ambivalent Impact** - Pedestrians have controlled crossings with audible pedestrian signals, but long exposure times (crossing up to six lanes at a time) to high-speed turning traffic.	**Medium/Ambivalent Impact** - Pedestrians have to find or create their own gap in traffic. However, crossing distances are shorter (crossing one or two lanes at a time) and pedestrians only have to look for traffic from one direction at a time.
Cyclist Accommodation	**Medium/Ambivalent Impact** - Cyclists on a multi-use path can use cross rides and not have to dismount to cross the intersection but will encounter higher-speed traffic. Cyclists in a bike lane will find left turns challenging. Can tie into the existing multi-use path on Emil Kolb Parkway.	**Medium/Ambivalent Impact** - Cyclists can claim the lane and ride with traffic, or dismount and cross at pedestrian crosswalks. If there are bike lanes, then they must terminate before and resume after the roundabout. Can tie into the existing multi-use path on Emil Kolb Parkway.
Natural Environment		
Environmentally Sensitive Areas and Slope Stability	**Fairly Low Impact** - With removal of boulevard, no impact to environmentally sensitive area on east side of Coleraine Drive at the intersection. More impact on west side of Coleraine Drive.	**Very Low Impact / Preferred** - No impact to environmentally sensitive area on east side of Coleraine Drive at the intersection. Less impact on west side of Coleraine Drive than the signalized intersection.
Socio-Economic Environment		
Property Impacts	**Fairly Low Impact** - Property impacts on northwest corner of the intersection: 70 m^2.	**Fairly High Impact** - Property impacts on northwest corner of the intersection: 320 m^2.
Speed Control	**Fairly High Impact** - Ability to control vehicle speeds only during red signal indication.	**Very Low Impact / Preferred** - Ability to control vehicle speeds at all times, allowing the area posted speed limits of 60 km/h and 40 km/h to be potentially attained.
Streetscaping Potential	**Fairly High Impact** - Some potential with decorative concrete in medians.	**Very Low Impact / Preferred** - More potential with decorative concrete in splitter islands and landscaping in central island.

Criteria	Alterative 1 – Signalized Intersection	Alternative 2 – Roundabout
Constructability/Engineering		
Utilities	**Medium/Ambivalent Impact** - Both options result in similar impact to underground utilities. Requires the relocation of 6 hydro poles.	**Fairly Low Impact** - Both options result in similar impact to underground utilities. Requires the relocation of 4 hydro poles.
Geometry	**Very Low Impact / Preferred** - Preferred intersection lane configurations (as identified in Traffic Report) can be provided. Geometry can accommodate a WB-20 design vehicle.	**Very Low Impact / Preferred** - Multi-lane roundabout can be provided as per capacity analysis. Geometry can accommodate a WB-20 design vehicle.
Construction Staging	**Fairly Low Impact** - Periodic lane closures will be necessary.	**Fairly High Impact -** Construction staging will be more difficult than for signalized intersection, and period of construction will be longer.
Construction Cost	**Medium/Ambivalent Impact** - Approximately $2.33M.	**Medium/Ambivalent Impact** - Approximately $2.10M.
Summary		
Summary	**Fairly Low Impact** - In summary, a signalized intersection will be easier to construct and will work reasonably well in terms of traffic operations; however, signalized intersections typically experience accidents of a higher severity than a roundabout, it will create more off-peak delay, and provides little discouragement to drivers exceeding area posted speed limits	**Very Low Impact / Preferred** - A roundabout will be more difficult to stage and construct and will result in more property impact at the intersection. However, it will result in less environmental impact, and it will have a number of Transportation and Socio-Economic advantages over a signalized intersection.
Recommendation	**Fairly Low Impact - Not Recommended**	**Very Low Impact (Preferred) - Recommended**

Very Low Impact (Most Positive)	**Fairly Low Impact**	**Medium/Ambivalent Impact**	**Fairly High Impact**	**Very High Impact (Least Positive)**

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5.4 Ellwood Drive West-Grapevine Road Connection

With the road over rail alternative being selected as the preferred, there is a further refinement required in terms of addressing the closure of both Ellwood Drive and Old Ellwood Drive at Coleraine Drive. There is the possibility of mitigating the loss of access for these two subdivisions by connecting Ellwood Drive to Grapevine Road, as was originally envisaged in a 1990 Class EA for the study area. The study recommended the two subdivision roads be lined up so that they could connect once the grade separation is created.

The alternative is to cul-de-sac Ellwood Drive West and provide a structural culvert for an active transportation connection only. This study identified the road connection as the preferred option due to the following reasons:

- This sub-division was purposely designed for these two roads to line up and connect in a future grade-separation condition, as determined in a Class EA (Bolton Arterial Roads Individual Environmental Assessment Study) for the area completed in 1990.
- Ensures two points of access to the subdivision east of Coleraine Drive, better providing for Emergency Service Vehicles in emergency situations. Per a meeting held with Emergency Services (September 2021), the best solution would be one that provides the most access options to the subdivision. Notes of all meetings are on file with the Region and a copy of the correspondence is included in **Appendix A**. Key correspondence is summarized in **Table 6-4.**
- Minor increases in traffic volume on Grapevine Road (30-50 vehicles in the peak hour).
- Active transportation users are accommodated on the roadway, through conventional facilities (i.e., no dedicated crossing or structure required).
- The road connection option offers adaptability for future changes, such as installing knockdown mechanisms like locked gates or bollards for active transportation only. In contrast, the cul-de-sac with active transportation provision could pose more significant structural challenges if reverting to the road connection option.

Following PIC#2, a number of residents express concern about the new connection attracting a significant number of vehicles finding this new route to be attractive. This issue was assessed in a technical memo included in **Appendix K** of this report. The analysis found that the additional traffic generated would be minor and could be mitigated with traffic calming.

6 Consultation

6.1 Key Points of Contact

External agencies, utilities, emergency service providers, residents, business owners, and Indigenous communities were contacted directly at key milestones during this Municipal Class EA to provide input to the study and feedback on the decision-making process. The key points of contact are listed in **Table 6-1**.

At the outset of the study, a direct mailing list of residents and businesses within a defined catchment area near the study area, relevant agencies, and utilities was assembled. The mailing list was updated throughout the study based on engagement and feedback received.

Members of the public were made aware of the study through notification in the local newspapers (Caledon Enterprise and Caledon Citizen) and were invited to contact the project team to join the project mailing list. Members of the public requesting to be on the mailing list received direct notification of subsequent study milestones.

A dedicated project webpage was established through the Region of Peel's website at the beginning of the study. Study updates were also communicated the Region's social media channels.

Website: https://www.peelregion.ca/pw/transportation/construction/environmental-assessment/coleraine-drive.asp

Twitter: @regionofpeel & @peelpublicworks

Various Public Information Centre (PIC) materials were made available on the website (e.g., Notices, display material, virtual PIC portal). All notices and study materials contained the project manager's contact information to facilitate direct contact from interested members of the public.

The need for formal Indigenous community engagement was explored with the MECP. In correspondence dated February 10, 2017, MECP identified Mississaugas of the Credit First Nation and the Huron Wendat Nation as potentially having interest in the study. Direct outreach with these Indigenous communities was undertaken throughout the study.

Table 6-1: Key Points of Contact

Date	Notification	Purpose
Notice of Study Commencement **March 2017**	• Notice sent to property owners / mailing list – March 21, 2017 • Newspapers – March 23 and March 30, 2017 • External Agencies and Stakeholders – March 21, 2017 and April 4, 2017 • Indigenous Communities – March 21, 2017 • EA Project Information sent to MECP – February 2, 2017	To introduce and invite participation in the study and request preliminary comments.
Public Information Centre #1 **October 8, 2019**	• Notice sent to property owners / mailing list – September 25, 2019 • Newspapers – September 26 and October 3, 2019 • External Agencies and Stakeholders – September 20, 2019 • Indigenous Communities – September 20, 2019 • Region's Twitter – October 1, 7, and 8, 2019	To notify and invite interested parties to participate in the first Public Information Centre held in person on October 8, 2019.
Public Information Centre #2 **December 16, 2021 to January 21, 2022**	• Notice sent to property owners / mailing list – December 6, 2021 • Newspapers – December 2 and December 9, 2021 • External Agencies and Stakeholders – December 16, 2021 • Indigenous Communities – December 16, 2021 • Region's Twitter – December 16, 20, 2021, January 6, 10, 12, 17, 2022	To notify and invite interested parties to view and participate in the second virtual Public Information Centre held online between December 16, 2021 to January 21, 2022.

Date	Notification	Purpose

Notice of Study Completion
August 15, 2024
	• Notice sent to property owners / mailing list – August 12, 2024
	• Newspaper:
	  ○ Caledon Citizen: August 8 and August 15, 2024
	  ○ Caledon Enterprise: August 8 to August 22, 2024
	• External Agencies and Stakeholders – August 14, 2024
	• Indigenous Communities – August 14, 2024
	• Project webpage – August 15, 2024
		To announce completion of the Class EA study and notify interested parties of the 42-calendar day review period of the Environmental Study Report.

6.2 Public Information Centre #1

The first Public Information Centre (PIC #1) was held on October 8, 2019 from 6:00 to 8:00 pm at the Albion Bolton Community Centre at 150 Queen Street South in Caledon.

The purpose of this PIC was to provide stakeholders and interested members of the public with an opportunity to view study information including project information, existing conditions, problems and opportunities, alternative planning solutions, an assessment and evaluation of alternative planning solutions, and the selection of a preliminary preferred solution.

The PIC was held in an open-house format where the public was invited to review display boards, ask questions, and discuss comments with member of the project team. Seventeen (17) people signed into the PIC.

Three (3) written comments were received via comment sheets and email correspondence during the comment period ending October 22, 2019. The PIC display materials were made available on the study website after the PIC. Public feedback received during the PIC comment period is summarized in **Table 6-2.**

Table 6-2: Public Feedback Received at PIC #1

General Feedback Received at PIC #1
Preference for Alternative 2B – depress road under rail

General Feedback Received at PIC #1
Current lack of fencing for pedestrian safety
Noise concerns related to Alternative 2A – raise rail over road
Lack of noise attenuation barriers
Lengthy construction time

Copies of the PIC notification, display material, and public comments are included in the PIC #1 Summary Report in **Appendix A**.

6.3 Public Information Centre #2

The second Public Information Centre (PIC #2) was held virtually between December 16, 2021 and January 21, 2022. A link to the virtual PIC was posted on the study website: https://www.peelregion.ca/pw/transportation/construction/environmental-assessment/coleraine-drive.asp.

The purpose of this PIC was to provide stakeholders and interested members of the public with an opportunity to view alternative design concepts, an assessment and evaluation of alternative design concepts, selection of the preferred design concept, development of the preliminary preferred alternative, and proposed mitigation measures.

The PIC was held in a virtual format where the public was invited to review display material and provide their feedback through a project portal on the Region's website. The virtual PIC included two narrated video presentations explaining the decision-making process and the preliminary preferred alternative, and interactive tools that enabled visitors to express their opinions and preferences. In addition to the narrated video presentations, static pdf copies presentations and supporting technical studies were posted on the study website, including:

- PIC Presentation
- PIC Presentation Transcript
- Technical and Environmental Assessment Presentation
- Technical and Environmental Assessment Presentation Transcript
- Evaluation Criteria and Assessment
- Preliminary Preferred Alternative
- Shadow Impact Study

- Noise Impact Study
- Zone of Influence Study – Vibration Analysis

The PIC had a total of 101 visitors and of those visitors 14 participated in the virtual PIC using the interactive tools (voting preference, crowd mapping, comment sheets). Four (4) comments were sent directly to the project via email and phone. Participants were asked to share their feedback specifically on neighbourhood enhancements near Old Ellwood Drive, road modifications on Ellwood Drive West, and the preliminary preferred alternative. Public feedback received during virtual PIC is summarized in **Table 6-3**.

Table 6-3: Public Feedback Received at PIC #2

General Feedback Received at PIC #2
General preference for natural berm along Old Ellwood Drive
General preference for a cul-de-sac on Ellwood Drive West and provision of active transportation connection
Mixed reaction to signalized intersection vs. roundabout at Harvest Moon Drive / King Street / Coleraine Drive
Support for road under rail alternative due to better aesthetics compared to road over rail alternative
Support for road over rail alternative due to lower cost

Copies of the PIC notification, display materials, and public comments are provided in the PIC #2 Summary Report in **Appendix A**.

6.4 External Agency and Stakeholder Consultation

A list of relevant agencies was assembled at the beginning of the study. External ‘agencies’ (including regulatory/review agencies, emergency service providers, utilities, school boards) and interested stakeholders received project notifications via email throughout the study informing them of project milestones (Study Commencement, PIC #1, PIC #2, Study Completion) and soliciting their comments.

The following external agencies and stakeholders were included on the study mailing list:

- Federal Agencies

    - Transport Canada
    - Fisheries and Oceans Canada
- Provincial Agencies
    - Ministry of Environment, Conservation and Parks
    - Ministry of Natural Resources and Forestry
    - Ministry of Heritage, Sport, Tourism, and Culture Industries
    - Toronto and Region Conservation Authority
- Municipal Agencies
    - Town of Caledon
    - Region of Peel
- Emergency Services
    - Ontario Provincial Police
    - Peel Regional Police
    - Peel Regional Paramedic Services
    - Caledon Fire and Emergency Services
- Utilities
    - TransCanada Pipelines Limited
    - Enbridge Gas Distribution
    - Bell Canada
    - Hydro One Networks
    - Rogers Communications Canada
- School Boards
    - Peel District School Board
    - Dufferin-Peel Catholic District School Board
- Canadian Pacific Rail
- Interested Stakeholders
    - Potentially Impacted Property Owners
    - Caledon Cycling Task Force

A Technical Advisory Committee (TAC) was established at the beginning of the study based on a predetermined list of agencies potentially interested in the project and the level of interest indicated by agencies in response to the Notice of Study Commencement. The TAC was comprised of representatives of the following agencies and committees and met twice (August 28, 2017 and May 4, 2021) throughout the study:

- Region of Peel Real Estate
- Region of Peel Public Health

- Region of Peel Sustainable Transportation
- Toronto and Region Conservation Authority
- Canadian Pacific Rail

In addition to the TAC, the Project Team met and corresponded with other agencies, as required, to provide updates on the study and seek input on specific project components. Notes of all meetings are on file with the Region and a copy of the correspondence is included in **Appendix A.** Key correspondence is summarized in **Table 6-4**.

Table 6-4: Summary of Agency and Stakeholder Correspondence

Agency	Key Correspondence
Technical Advisory Committee (TAC)	
Region of Peel, Town of Caledon, Toronto and Region Conservation Authority, Canadian Pacific Rail	• Project Team met with the TAC on August 28, 2017, to introduce the study, review functional design options, and present PIC #1 materials. • Project Team met with the TAC on May 4, 2021, to provide an update on the project, present PIC #2 materials, and review the evaluation of alternative design concepts and supporting technical studies.
Provincial Agencies	
Ministry of Environment, Conservation and Parks (MECP) (Previously Ministry of Environment and Climate Change) (MOECC)	• Project Team emailed MECP to confirm Indigenous communities with potential interest in study on February 2, 2017 • MECP provided a letter via email (dated February 10, 2017) confirming Mississaugas of the Credit First Nation and Huron Wendat First Nation may have interest in the study
Ministry of Heritage, Sport, Tourism and	• MHSTCI provided a letter via email (dated April 11, 2017) recommending screening of the project with the MHSTCI *Criteria for Evaluating Archeological Potential* to determine if an archaeological assessment is needed

Agency	Key Correspondence
Culture Industries (MHSTCI) (Previously Ministry of Tourism, Culture and Sport) (MTCS)	and completing the MHSTCI *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* to determine how the project may impact cultural heritage resources • MHSTCI provided a letter via email (dated April 27, 2018) confirming the archeological fieldwork and Stage 1 Archaeological Assessment Report recommendations are consistent with the conservation, protection, and preservation of the cultural heritage of Ontario and that the report has been entered into the Ontario Public Register of Archaeological Reports.
Ministry of Northern Development, Mines, Natural Resources, and Forestry (MNDMNRF) (Previously Ministry of Natural Resources and Forestry) (MNRF)	• Project Team emailed MNDMNRF on April 26, 2017 to confirm areas of natural significance identified or designated by MNDMNRF within 0.5 km of the study area, as well as any other environmental concerns • MNDMNRF provided a letter via email (dated December 14, 2017) listing species that have potential to occur in the study area
Toronto and Region Conservation Authority (TRCA)	• TRCA attended the study start-up meeting on February 16, 2017 and TAC meetings on August 28, 2017 and May 4, 2021 • TRCA provided a letter via email (dated April 10, 2017) indicating their areas of interest within the study area • Project Team provided technical reports (Natural Heritage Report, Drainage and Stormwater Management Report, Fluvial Geomorphic Report and Hydrogeologic Assessment Report) to TRCA for review via email on February 24, 2021 and March 5, 2021 • TRCA provided a letter via email (dated April 7, 2021) with their comments on the technical reports

Agency	Key Correspondence
	• Project Team responded to comments and provided updated Drainage and Stormwater Management Report to TRCA for review via email on July 11, 2021 • TRCA provided a letter via email (dated September 20, 2021) with additional comments to be addressed • Project Team provided Final Draft Drainage and Stormwater Management Report and responses to final comments to TRCA on January 31, 2022
Emergency Service Providers	
Ontario Provincial Police, Peel Regional Police, Peel Regional Paramedic Services, Caledon Fire and Emergency Services	• Project Team met with Emergency Service Providers on September 28, 2021, to discuss the design alternatives (road under tail and road over rail) for Coleraine Drive and the potential connection between Ellwood Drive West and Grapevine Road. Changes to local road configurations may impact emergency response times to the study area. A full connection between Ellwood Drive West and Grapevine Road is preferred from an emergency response perspective, compared with a cul-de-sac and active transportation connection, because it provides more direct access to the study area.
Stakeholders	
Canadian Pacific Rail	• On September 12, 2019, the Project Team met with CP Rail to discuss the design alternatives (road over rail and road under rail). CP Rail indicated they do not have a strong preference for either alternative, as long as capacity and track speed are maintained.
Potentially Impacted Property Owners	• Project Team met and corresponded with potentially impacted property owners throughout the study to discuss matters specific to their properties. Correspondence and meeting minutes are on file with the Region.

Agency	Key Correspondence
	• Individual meetings were held with owners and representatives of the following properties: ○ 13576 Coleraine Drive – May 2, 2017 & June 23, 2020 ○ 13584 Coleraine Drive – May 2, 2017 & June 23, 2020 ○ 3 Manchester Court – May 2, 2017 & June 25, 2020 ○ 12315 Coleraine Drive – May 16, 2017 & July 9, 2020 ○ 13371 Coleraine Drive – September 10, 2020 ○ Address Unknown (property in northwest corner of Harvest Moon Drive / Coleraine Drive intersection) – October 1, 2020

6.5 Indigenous Community Engagement

In correspondence dated February 10, 2017, the Ministry of Environment, Conservation and Parks (MECP) identified the following communities to be engaged on this project:

- Mississauga's of the Credit First Nation
- Huron Wendat

A summary of correspondence with Indigenous communities is provided in **Table 6-5**. A copy of the written correspondence is included in the consultation record in **Appendix L**.

Table 6-5: Summary of Indigenous Community Correspondence

Indigenous Community	Key Correspondence	Course of Action
Mississaugas of the Credit First Nation (MCFN)	Notice of Study Commencement (March / April 2017)	• Project Team mailed Notice of Study Commencement & Response Form on March 21, 2017 • Project Team followed up by phone on April 4, 2017 to confirm contact / mailing address

Indigenous Community	Key Correspondence	Course of Action
		• Project Team emailed Notice of Study Commencement & Response Form on April 4, 2017
	Notice of PIC 1 (September 2019)	• Project Team mailed Notice of PIC 1 on September 12, 2019 • Project Team emailed Notice of PIC 1 on September 25, 2019
	MCFN Response Letter (October 2019)	• MCFN provided a letter via email (dated October 1, 2019) to the Project Team noting: ○ At this time, MCFN has a low level of concern about the project ○ MCFN requests ongoing notification about the status of the project ○ MCFN requests a copy of all associated environmental and/or archaeological reports ○ MCFN policy to have Field Liaison Representatives on location whenever any fieldwork for environmental and/or archaeological assessments is undertaken
	Stage 1 Archaeological Assessment Report (November 2019)	• Project Team provided a copy of the Stage 1 Archaeological Assessment Report to MCFN for review via email on November 26, 2019 • No comments received from MCFN

Indigenous Community	Key Correspondence	Course of Action
	Notice of PIC 2 (December 2021)	• Project Team emailed Notice of PIC 2 on December 16, 2021
	Notice of Study Completion	• Project Team emailed Notice of Study Completion on August 14, 2024
Huron Wendat	Notice of Study Commencement (March 2017)	• Project Team mailed Notice of Study Commencement & Response Form on March 21, 2017 • Huron Wendat emailed receipt Notice of Study Commencement and requested shapefiles of study area on March 29, 2017 • Project Team emailed SID files of study area on March 30, 2017 • Huron Wendat emailed receipt of SID files and inquired about archaeological assessment for the project on April 4, 2017 • Project Team provided a response via email on April 10, 2017, noting that a copy of the Stage 1 Archaeological Assessment Report will be provided to Huron Wendat for review
	Notice of PIC 1 (September 2019)	• Project Team mailed Notice of PIC 1 on September 12, 2019 • Project Team emailed to confirm receipt of Notice of PIC 1 on September 20, 2019

Indigenous Community	Key Correspondence	Course of Action
		• Huron Wendat emailed receipt of Notice of PIC 1 on September 20, 2019 • Project Team emailed Notice of PIC 1 package on September 25, 2019
	Stage 1 Archaeological Assessment Report (November 2019)	• Project Team provided a copy of the Stage 1 Archaeological Assessment Report to MCFN for review via email on November 26, 2019 • Huron Wendat emailed receipt of the Report on November 26, 2019. No further comments were received from Huron Wendat.
	Notice of PIC 2 (December 2021)	• Project Team emailed Notice of PIC 2 on December 16, 2021
	Notice of Study Completion	• Project Team emailed Notice of Study Completion on August 14, 2024

7 Project Description

The following sections summarise the key design attributes of the Recommended Plan. Preliminary design plan and profile plates are included in **Appendix M**.

7.1 Roadway Design

7.1.1 Coleraine Drive

The proposed grade separation between Coleraine Drive and CP Rail will include cross-section improvements and profile changes both north and south of the crossing. The alignment of Coleraine Drive will remain on the existing tangent alignment and the number of through lanes (four) will also remain the same as existing.

7.1.1.1 From Holland Drive to north of the Realigned Manchester Court

Coleraine Drive along this segment (0+400 km to 0+800 km) will be subject to cross-section improvements including outside lane widening (from 3.50 m to 3.65 m) to better accommodate transit vehicles, median improvements, new multiuse paths (3.0 m in width) either side of the roadway and streetscaping. The existing auxiliary lanes (left- and right-turn lanes) at the Holland Drive and Manchester Court intersections will be retained. Manchester Court is proposed to be realigned and this is detailed further in **Section 7.1.2.3.**

Currently, there is a northbound left-turn lane immediately west of the Coleraine Drive and Holland Drive intersection to access 13352 Coleraine Drive. This configuration is undesirable, as the left-turning vehicle is required to cross four opposing lanes and any queues at the intersection would exacerbate sight line / access issues. The left-turn lane at this location is proposed to be removed and a raised concrete median (varying in width from (2.75 m to 5.5 m) will be continuous from Holland Drive to Manchester Court. As a result of the median improvements, the accesses of four properties that connect with Coleraine Drive within this segment will be modified to right-in / right-out only. All properties along this segment where contacted regarding the proposed changes and consultation included meetings with the majority of impacted business owners. Each property owner met with were understanding of the required changes. **Figure** 7-1 illustrates the proposed cross-section just north of Holland Drive intersection (0+440 km).

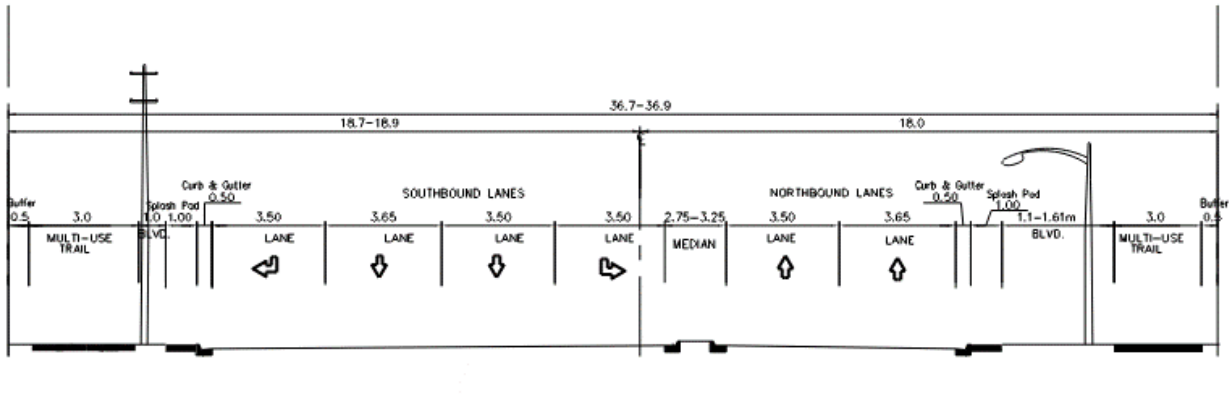

Figure 7-1 Proposed Cross-section North of Holland Drive (0+440 km)

7.1.1.2 From the Realigned Manchester Court to north of Ellwood Drive West

Coleraine Drive along this segment (0+800 km to 1+100 km) is raised up and over both the CP Rail and Ellwood Drive. Required structures are further detailed in **Section 7.5**. Similar to the segment prior, the roadway will be subject to cross-section improvements including outside lane widening (from 3.50 m to 3.65 m) to better accommodate transit vehicles, median improvements and new multiuse paths (3.0 m in width) either side of the roadway. At the realigned Manchester Court intersection, the improvements will retain the existing southbound left-turn lane however will also include a new southbound right-turn lane to Manchester Court.

As Coleraine Drive nears the CP rail crossing, the cross-section is narrowed to the essential needs to reduce cross-section width and structural requirements. The four through lanes are retained and a minimum 2.0 m raised median is continued over the grade separation. The boulevard is reduced to a 1.0 m splash pad and buffers of 0.5 m are provided to the railing/barrier on outside of the multiuse paths.

The proposed cross-section is further refined at the CP Rail crossing structure and is illustrated in **Figure 7-3**. Shoulders of 1.5 m are provided on the structure and a width of 0.75 m will provide for both a roadside traffic/pedestrian combined barrier and a 0.5 m buffer to the multiuse path. The multiuse paths on each side of the structure will therefore have 0.5 m buffers on each side (conforming to OTM Book 18 guidance), resulting in a total width of 4.0 m between the barriers for active transportation users.

This cross-section will continue over the Ellwood Drive Underpass. The underpass is required due to the proposed connection between Ellwood Drive and Grapevine Road, under Coleraine Drive. This study investigated this connection vs a cul-de-sac of

Ellwood Drive West (with a structural culvert for an active transportation connection only) and identified the connection as the preferred option. The connection is further detailed in **Section 7.1.2.2.**

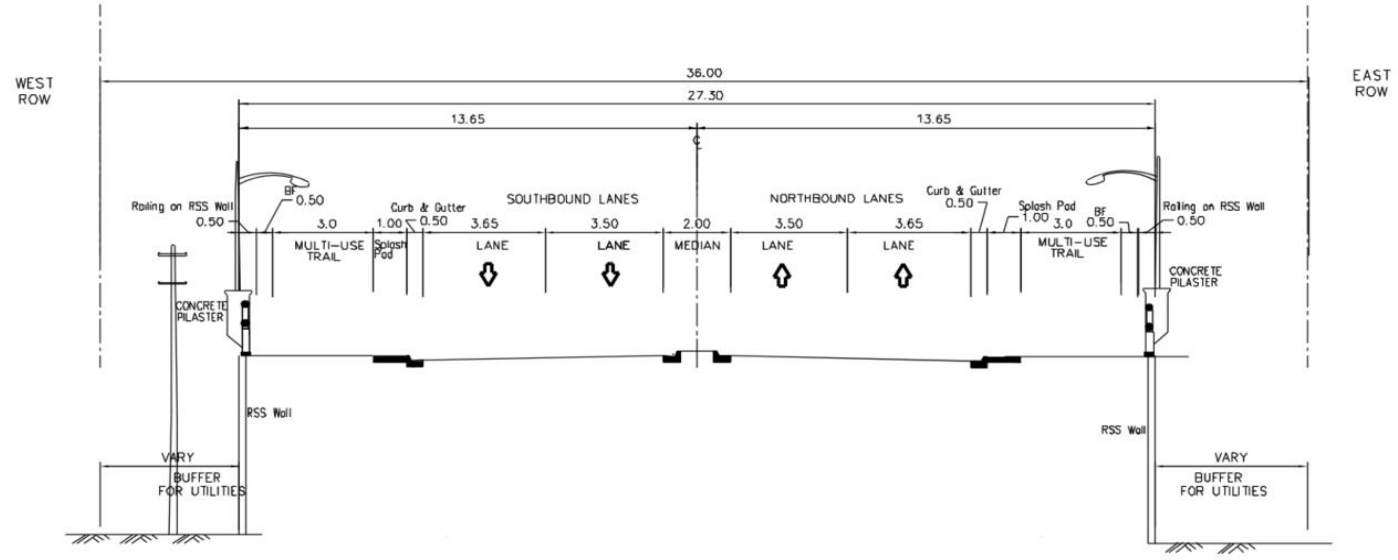

Figure 7-2 Proposed Cross-section immediately north and south of CP Rail crossing

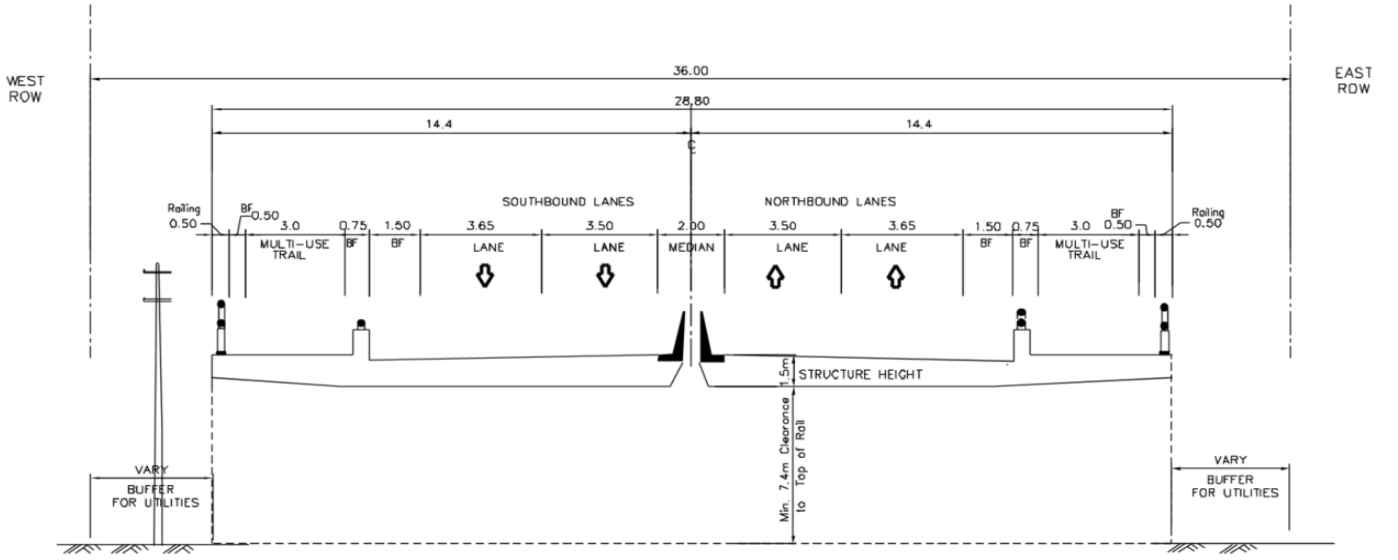

Figure 7-3 Proposed Cross-section at CP Rail Crossing

7.1.1.3 From North of Ellwood Drive West to North Study Limits

The proposed cross-section from north of Ellwood Drive West to the north study limits is consistent with the proposed improvements as detailed above. The proposed raised median is continued to the Harvest Moon Drive / King Street intersection at which it blends with the northbound splitter island of the proposed roundabout. The use of the roundabout means that turning lanes are not required, and this helps reduce the required width, providing benefits in mitigating impacts to the existing stormwater management pond to the west and the existing natural ravine to the east.

7.1.2 Adjacent Local Roads

As part of the grade separation improvements, modifications and/or improvements are required to the adjacent local municipal roads. The improvements are summarised below and detailed in the preliminary design plates included in **Appendix M**.

7.1.2.1 Old Ellwood Drive Extension to Ellwood Drive

The existing Old Ellwood Drive and Coleraine Drive intersection will require closure due to the grade separation. Old Ellwood drive is proposed to be realigned and extended to connect with Ellwood Drive, at the existing Ellwood Drive and Wakely Boulevard intersection. The proposed cross-section will match the existing roadway. The realignment and extension will not require property or new right-of-way designation (ROW) as there is existing, disused ROW dedicated for this improvement. This is because this configuration was the ultimate plan for the subdivision, which was originally designed with the consideration of a grade separation (completed as part the Bolton Arterial Roads Individual Environmental Assessment, 2000). The roadway extension will bisect the Wakely Memorial Park, however the length of Old Ellwood Drive ROW (a length of approximately 180 m from Coleraine Drive) that will now be disused would provide opportunity for a new parkland and/or community area. At PIC #2, two options were presented to the public at this location: a natural berm or park expansion. The final decision of how the disused ROW will be used in the future will be determined by the Town of Caledon at a future date and the Region will further consult with the Town in the future design and construction phases.

7.1.2.2 Ellwood Drive West at Coleraine Drive / Grapevine Road

The existing Ellwood Drive West and Coleraine Drive intersection will require closure due to the grade separation. With the Road Over Rail alternative, this study identified a road connection between Ellwood Drive and Grapevine Road underneath the grade separated Coleraine Drive as a suitable connection to provide extra accessibility for

residents in the two subdivisions; as they will lose the current accesses from Ellwood and Old Ellwood Drives to Coleraine Drive. As described in **Section 6.3**, two options were presented at PIC #2 (a connection through or a cul-de-sac of Ellwood Drive West) and the connection through to Grapevine Road has been identified as preferred.

7.1.2.3 Manchester Court

Manchester Court will require realignment over a length of approximately 170 m. The proposed cross-section will match the existing roadway and the realigned road will intersect with Coleraine Drive approximately 70 m south of the existing intersection. The realignment and shift of the intersection is required to better accommodate the raise in roadway and construction required for the grade separation. The road realignment will result in property acquisition from property west of Coleraine Drive (3 Manchester Court). Property requirements are further detailed in **Section 7.12**.

7.2 Active Transportation

As mentioned in **Section 7.1.1**, the proposed improvements will include new Multi-Use Paths (MUPs) on each side of Coleraine Drive, from Holland Drive to King Street West / Harvest Moon Drive. North of the King Street West / Harvest Moon Drive, the improvements will include a new MUP on the east side which will match the existing MUP at the northern study limits. The proposed MUPs are consistent with the proposed network improvements of the Region's Long Range Transportation Plan (2019) and the Town's Transportation Masterplan (2017) (i.e., the provision of Bike Lanes on Coleraine Drive). The improvements are also in-keeping with the Region's Sustainable Transportation Strategy (2018), which recommends multi-use trail on Coleraine Drive, from King Street West to Mayfield Road, south of the study area.

The MUPs on both sides of the road also provide the following benefits in this case:

- Better convenience and is more desirable for commuter cyclists;
- Better service to industries that are on both sides of the road; and,
- Provides greater access to all surrounding areas, without a requirement of additional crossings.

7.3 Transit

Coleraine Drive within the study area is used by the Bolton Line in both the morning and afternoon routes. For this route, there are two stops in the study area: at Old Ellwood Drive and at Holland Drive. The existing bus stops on Holland Drive will not be impacted by the improvements. The existing northbound and southbound bus stops at Old

Ellwood Drive will be removed, as the intersection itself will be removed as part of the grade separation. In replacement, new northbound and southbound bus stops are proposed at the improved Harvest Moon Drive / King Street West intersection.

7.4 Intersections

7.4.1 Existing Intersection Closures

The intersections of Coleraine Drive and Ellwood Drive West, and Coleraine Drive and Old Ellwood Drive will be closed due to the proposed improvements. Further details of the improvements at these locations are detailed in **Section 7.1.2.**

7.4.2 Coleraine Drive and Holland Drive

The study area southern limits end at this intersection and so the intersection of Coleraine Drive and Holland Drive will remain largely the same as existing, however the north leg of the intersection will be improved per the improvements described in **Section 7.1.2.**

7.4.3 Coleraine Drive and Manchester Court

The existing Coleraine Drive and Manchester Court intersection provides access to industries along Manchester Court and an access to a property east of Coleraine Drive and south of the CP Rail. With the realignment of Manchester Court Road, the existing Coleraine Drive and Manchester Court intersection is shifted approximately 70 m to the south. The shift of intersection is proposed to enable Coleraine Drive to rise in elevation to the north, for the grade separation at the CP rail. The southerly shift of the intersection was also limited to an extent, due to the desire to ensure property access is retained to the east of Coleraine Drive. The intersection configuration (number of through lanes / turning lanes) will remain the same as existing with the addition of a new southbound right-turn lane on Coleraine Drive. The east and west arms of the intersection will also be improved. It is understood that the intersection will be heavily used by trucks, given the surrounding industries and land uses, and so the Manchester Court left-turn stop bar is staggered to ensure turning movements do not conflict between entering and exiting vehicles.

7.4.4 Coleraine Drive and King Street West / Harvest Moon Drive

The existing signalised intersection of Coleraine Drive and King Street West / Harvest Moon Drive is proposed to be reconfigured into a two-lane roundabout. This study identified options of improving the signalised intersection vs the roundabout, and their

assessment and evaluation is detailed in **Section 5.2.2.** The roundabout can be constructed mostly within the existing right-of-way (ROW), with property requirement only in the northwest quadrant. The roundabout is recommended to include active transportation crossings on all arms and will provide opportunities for streetscaping, as further described in **Section 7.11.**

It is acknowledged that reconfiguring the intersection into a roundabout could present barriers to pedestrians who are visually impaired, however accessibility can be improved through tactile warning surface indicators (TWSIs) installed at crosswalks and by installing Type C or B PXOs at the crossings on each arm. The use of these measures will be confirmed in Detailed Design.

7.5 Structural Engineering

The structural component of this undertaking includes the proposed Coleraine Drive and CP Rail crossing, the potential Coleraine Drive and Ellwood Drive West/Grapevine Road crossing, and the retaining walls required to elevate Coleraine Drive within the study limits.

The proposed bridge over CP Rail has a span 30.9 m and skew of 42 degrees. The bridge's deck is a 225 mm thick slab on pre-stressed concrete girders, supporting the two lanes in each direction. The structure will be supported by semi-integral abutments. According to the information available during this study and preliminary calculations, the bridges cannot be supported by shallow foundation and driven piles through the Retained Soil System (RSS) walls are proposed. The crossing structure required at Ellwood Drive West / Grapevine Road is anticipated to follow the same design approach. Final design of the structures will be confirmed during Detailed Design.

For the approaches, RSS walls to a height of 9 m are required to retain the embankment. Due to the heights, soil improvement techniques or preloading of the fill material could be required and thus potentially lengthening construction duration, and this will be confirmed in Detailed Design.

The structural engineering memorandum completed as part of this study is included in **Appendix N**. It is noted that the memo details the provision of a sidewalk on the west side and a multi-use path (MUP) on the east side of Coleraine Drive. This configuration was updated to MUPs on both sides after the completion of that initial design, however the overall structure width is not changed.

7.6 Drainage and Stormwater Management

The Drainage and Stormwater Management Report is included in **Appendix G**, and the key findings are summarised below.

It was concluded that the proposed grade separation may proceed in general conformance with the applicable Region of Peel, Town of Caledon, MECP and TRCA requirements. The findings are as follows:

- The improvements will cause a minor increase in imperviousness of the study area due to the implementation of sidewalks, multiuse paths, and pedestrian bridges, causing a marginal increase in runoff peak flows.
- The minor and major drainage outlets to the East and West main branches of the Humber River will be returned to the original conditions before the roadway reconstruction in 2010.
- Quality, quantity, and erosion controls is proposed to be provided by the existing stormwater management pond to the southwest of the Harvest Moon Drive intersection (SWMP 9).
- The overall increases to SWMP 9 should be confirmed in Detailed Design to ensure that the pond can accommodate the additional flows.
- The increases in flow will not increase the 100-year flow at the 1350 mm diameter intercepting trunk storm sewer beyond its 100-year capacity.
- The current storm sewer system is designed for a 5-year storm event. As the road is being taken over by the Region of Peel, the storm sewers are recommended to be upgraded to the 10-year storm design standard.
- Runoff Volume Control targets (90^{th} percentile, 27-28 mm) shall be met with the implementation of low impact development (LID). It is recommended to construct LID as part of the realignment of Manchester Court and Old Ellwood Drive to achieve these targets.
- The Regon will further consult with the Town during or prior to Detail Design, regarding the detailed analysis of the pond (and confirmation of SWMP 9 pond capacity) and confirmation of SWM strategy.

Further regarding SWMP 9 and as above, the pond is intended to provide quality and quantity control for the storm flow from Coleraine Drive. To help accommodate major storm events, an additional storage facility is proposed for peak flow control until the minor storm sewers have the capacity to convey the flow north to SWMP 9. An assessment was completed to review the available capacity of SWM 9 to ensure that the pond can handle the additional flow from the roadway area. It was concluded that a

minimum additional quantity control volume of 278 m^3 must be provided in order to return to existing conditions. This additonal control is proposed to be provided by a Low Impact Development (LID) facility at the Manchester Court and Coleraine Drive intersection. It is recommended to complete the detailed sizing and outlet design of the LID facility during the Detailed Design phase to ensure that the LID has a storage capacity of equal or greater than 278 m^3 for the 100-year storm event, providing the necessary additional quantity control to allow SWMP 9 to continue to function as it does in existing conditions. Supporting background information was received through consultation with the Town of Caledon, and further consultation (including future maintenance agreements) will occur during Detailed Design.

The Toronto Region Conservation Authority (TRCA) were consulted with regarding the stormwater management strategy and agreed that the existing SWM pond (Pond 9) would be able to provide the required water quantity, quality, and erosion storage (as per the as-built drawing), should the Town permit its use. However, TRCA also agreed that a detailed update to the pond stage-storage-discharge and further hydrologic modeling to confirm potential changes in the outflows will be required at the Detailed Design stage. A lot of sediments may accumulate over time. Therefore, TRCA staff will also require confirmation that the facility still provides adequate storage by the time the proposed works are implemented. Further consultation will occur during Detailed Design.

If required, there are also alternative/further solutions including resizing the LID facility at Manchester Court Road to accommodate further additional capacity or have the LID facility drain southerly and outlet to the West Humber River. Should a change of drainage pattern and outletting to West Humber River be considered in Detail Design, the TRCA will have to be consulted with again to obtain approval.

The MECP issued Peel Regional Road Stormwater Management System CLI ECA 009-S701 on September 30, 2022. The Stormwater CLI ECA contains criteria for design of alterations to the Region’s existing stormwater system. At the time of completion of this EA study, the CLI ECA conditions and criteria were not available, therefore the EA recommendations do not guarantee compliance with the CLI ECA conditions and criteria. It is recommended that at the Detailed Design Stage, the Engineering Consultant re-assess the EA recommendations against the CLI ECA criteria and make the necessary adjustments and changes to the stormwater recommendations to be in compliance.

7.7 Geotechnical Investigation and Pavement Design

A preliminary Geotechnical Investigation and Pavement Design Report was completed and included in **Appendix O**. A field investigation was undertaken between January 26 and July 14, 2017, and included carrying out a borehole subsurface exploration, pavement visual condition inspection and Falling Weight Deflectometer (FWD) load/deflection testing. A total of 16 boreholes were advanced, presented in **Appendix O**.

It was determined that the boreholes encountered the pavement structure at ground surface, underlain by granular fill materials comprised of gravelly sand to sand and gravel to gravelly silty sand, underlain by a silty clay fill (disturbed/reworked till). The fill material is underlain by a till deposit consisting of stiff to hard silty clay in all boreholes. In Borehole BH17-08 and BH17-09 the till material is underlain by deposit of silt deposit, which in turn is underlain by a cohesive silty clay/clayey silt deposit.

Based on a visual condition inspection, the pavement was assessed to be in fair condition, with slight distresses. Based on the results of the FWD testing, the total length of Coleraine Drive, within the study area, was subdivided into two sections: Section A and Section B. The Section A northbound lanes and southbound Lane 2, excluding Section A southbound Lane 1, were either at the lower end or below the typical pavement surface modulus, indicating that the pavement has some structural deficiency. Section B for all lanes was within this typical range, indicating that the pavement is in relatively good structural condition. Furthermore, the corrected spring static deflection indicated that the pavements on the northbound lanes and the southbound Lane 2 in Section A requires some structural improvement. While the pavement in Section B does not require structural improvements. Even though the Section B pavements and southbound Lane 1 pavement in Section A do not require structural improvements, some pavement rehabilitation may be required.

Additional geotechnical investigation will be required during Detailed Design to delineate the depth to competent soil and to assess the stability and settlement performance of the new road embankment and any wing walls associated with the new overhead structure. Furthermore, it is recommended that additional boreholes be advanced within the footprints of foundation elements, along any proposed retaining walls and any cut or high fills. Construction and detailed design considerations are included in **Appendix O**.

7.8 Construction Staging

It is anticipated that the improvements will require a multi-year timeframe and so normally the Region would try to keep Coleraine Drive open to the extent possible throughout the duration of construction. However, it is noted that as long as access is maintained to businesses immediately south of the rail crossing there is the option to close the section of Coleraine Drive between the rail crossing and Harvest Moon Drive/King Street W. without affecting local access.

The final construction staging strategy and plans will be confirmed in Detailed Design, however it is anticipated that the construction will occur using one or a combination of the following two strategies. The strategies are identified with the aim of minimizing impacts to traffic and adjacent residents, to the extent possible. Identification of the preferred strategy or combination of strategies will occur in the Detailed Design phase with the confirmation of the final design.

It is noted that Strategy 1 appears to be the easier construction option (and fastest) given the closure of Coleraine Drive.

7.8.1 Strategy 1 – Closure of Coleraine Drive

Construct the realignment of Manchester Court.

Undertake any rehabilitation/improvement required along Humber Station Road in order to accommodate additional traffic due to the closure of Coleraine Drive in the next stage.

Coleraine Drive (rail line to Harvest Moon/King St) could then be closed to traffic and the grade separation constructed in its entirety in a continuous phase. Traffic will be detoured via Humber Station Road to the west or via Highway 50 to the east. Further mitigation for out-of-way travel could be provided via a new road westerly from the Coleraine Drive / Holland Drive intersection, to intersect Humber Station Road. It is the understanding of the project team that this new road was previously considered, and the new link would require a separate environmental assessment study to be completed.

While this strategy has disadvantages to wider traffic patterns, in terms of delay and out-of-way travel, it will enable the most effective construction approach of the grade separation and thus likely result in the shortest construction duration. It is noted that impacts to local traffic (i.e., closure to access into and out of the Ellwood Drive subdivision) will not be different from the long-term impacts of the project.

It is anticipated the required utility relocations will be completed first, prior to starting work on the grade separation. Utility impacts and relocations are also described in

Section 7.9 and the study proposes utilities be relocated to the gaps between the proposed retaining walls and the ROW boundary. While it is anticipated that the relocations will mostly remain within the ROW, there may need to be localised permanent utility easements in certain conditions, for example:

- A potential crossing option for the hydro infrastructure is to bury the lines which will likely require larger-than-typical vaults either side of the crossing (discussion with hydro during detail design required).
- Multiple shafts will likely be needed to be constructed on either side of the rail corridor to install liner pipes for utility crossings.
- Watermain crossings may require drain chambers near the rail crossing which can require additional space.

As this study proposes utilities be relocated to the gaps between the proposed retaining walls and the ROW boundary, the construction of the retaining walls will require careful consideration of the relocated facilities, during the Detailed Design and construction phases.

7.8.2 Strategy 2 – Construction in Halves

For this strategy, Coleraine Drive would be reduced from four to two lanes, so that half the right-of-way (ROW) will be available for construction of the raised embankments and required structures. This strategy is anticipated to comprise the following key steps.

- Relocate existing utilities to the gaps between the proposed retaining walls and the ROW boundary (note this strategy may require two-stage relocations of some utilities).
- Construct the realignment of Manchester Court.
- Reduce Coleraine Drive to two lanes (one per direction) and shift the lanes to the west side of the ROW. A temporary road widening along the west side of Coleraine Drive may also be required to accommodate the construction staging including the need to relocate the existing rail warning signal assemblies with gates and cantilevers in both the northbound and southbound directions. Construct the northbound bridges at the CP Rail crossing and at Ellwood Drive crossing, and the eastern half of the approach embankments. The embankment either side, and between the structures, is anticipated to be constructed in halves and due to the constrained ROW it is likely to require temporary retaining walls/shoring between the ultimate northbound and southbound lanes. The abutments would have to be constructed first and it is noted access to both north and south sides of the rail would be required, in conjunction to maintaining traffic.

Temporary access closures will likely be required at the property access from the Manchester Court intersection. Alternative measures potentially include a temporary easement and sharing of the access to the property to the immediate south, though agreement will be required between both property owners. Closure of Coleraine Drive and detours could also be used during this step.

- Traffic is shifted over to the eastern half of the grade separation once its embankments and northbound structures have been constructed. Temporary, short-term closures of Manchester Court at the intersection are likely required to tie the roadway into the new construction on the eastern side.
- Construct the southbound bridges at the CP Rail crossing and Ellwood Drive crossing (if a connection to Grapevine Road is confirmed) and the western half of the embankments. The same construction complexities as experienced with the northbound structures above, will apply to this stage also.
- Once all infrastructure is constructed, traffic is shifted into its ultimate configuration.

Due to the likely need of temporary retaining walls/shoring and likely longer construction duration, this strategy is likely to be the most expensive; however, it will result in less out-of-way travel.

7.9 Municipal Services and Utilities

The existing utilities within the study area are also summarised in **Section 3.10**. The proposed improvements will require the relocation of the following utilities along Coleraine Drive and within the Right-of-Way (ROW), including:

- Hydro One (Acronym) infrastructure, including fibre optic cable, currently located towards the west side of the ROW. Acronym's fiber cable is aerial along the west side of Coleraine Drive up to the northwest corner of Coleraine Drive and Harvest Moon Drive. From that intersection, Acronym's fiber cable submerges and runs through a Public Sector Network (PSN)-owned conduit heading east along King Street West. The relocation of the Hydro pole line will affect Acronym's aerial fiber optic cables. Through consultation, Acronym confirmed they do not object to the strategy of relocation to the 'buffer' outside of the walls provided accommodations are made to allow Acronym to transfer the fiber optic cable with minimal disruption to services. The duct under the railway tracks utilized by Acronym is owned by PSN who are also recommended to be further consulted with during Detailed Design.

- Municipal Services including watermain (300PV/400CPP) and sanitary sewer (525 mm) currently located under the roadway. It is noted the sanitary sewer is relatively deep (8 / 9 m at the rail crossing) and so its relocation requirement will be confirmed in Detailed Design and the final design of the crossing structures and their foundations.
- Gas (Enbridge) – a 4 inch intermediate pressure, steel coated main line that currently is located approximately towards the west side of the ROW. There are also distribution lines and headers / header connections throughout the study area. Per consultation with Enbridge:
    - the relocation of the gas main is recommended to be nearest to the property line
    - the existing header to Brand Energy & Infrastructure Services will have to be rerouted due to the close location of the header connection to the CP Rail ROW. This may require additional topographical or utility survey requirements (Level B) on Manchester Court.
    - The buffer zone for the relocated utilities should be wide enough to accommodate Service Trucks for servicing gas and attending to emergencies. The preliminary design has a identified a width of 6 – 9 m would be provided; however, this will be confirmed in Detailed Design.
    - If noise walls are deemed to be required, there should be a minimum of 0.6 m horizontal clearance from the proposed gas main relocation.
- Buried Bell and Rogers infrastructure, predominately located on towards the east side of the ROW however locations vary.

A Utility Conflict Plan has been included in **Appendix P**. Further consultation will be required with the impacted utility companies during Detailed Design and upon confirmation of the final design. During the information gathering process of this study, the proposal of relocating the utilities to the gap between the retaining wall and ROW boundary was shared with utility companies and no objection was made at this stage; however, it is noted that utility companies require a further level of design (i.e., Detailed Design) to confirm impacts, protection and relocation requirements.

7.10 Illumination

Illumination requirements will be confirmed in Detailed Design. For the purposes of preliminary design, an illumination layout typical of this facility has been assumed and includes street poles located at 45 m spacing each side of the roadway that are staggered (typical for full illumination requirements and of this facility type).

It is recommended that the illumination design follows municipal standards with 3000K color temperature lighting to adhere to International Dark Sky Association requirements, and luminaires that are pre-approved by the Region. If a streetlight pole is located in front of the sidewalk/multi-use path, a back light should be installed to ensure the sidewalk/multi-use path is properly lit.

7.11 Landscaping/Streetscaping

The proposed improvements provide several landscaping / streetscaping opportunities, the locations of which are detailed below. The landscaping / streetscaping will be confirmed in Detailed Design, however, can include plantings, trees, flowerbeds, planters, benches etc. Locations include:

- Boulevards of 3.0 m width, each side of Coleraine Drive and south of Manchester Court Road
- Buffer that varies approximately 5.0 – 9.0 m in width, between the retaining walls of the grade separation and the roadway right-of-way (ROW) – see **Section 7.11.1**.
- At the proposed Harvest Moon / King Street roundabout, on the centre island and in the northwest and northeast quadrants. The easterly realignment of Coleraine Drive north of the roundabout presents opportunities where the existing roadway is located, however it is also noted that this land could also be disposed of at the Region's discretion.

7.11.1 Adjacent the Grade Separation

The construction of the grade separation, namely the high retaining walls, will have some adverse impacts to aesthetics and the view-scape from the adjacent subdivision. There are mitigation measures that can be implemented (including trees, planting, murals) which will be further reviewed in Detailed Design.

For the purposes of this preliminary design, the option of trees adjacent the retaining walls was considered, and an example rendering is included in **Figure 7-4**. A combination of a deciduous and coniferous trees is recommended to provide screening and some interest all year around, with intermittent ornamental trees where space permits. Please see **Table 7-1** for three options of species. These planting suggestions are all very hardy, requiring minimal maintenance, and would also do well under the overhead hydro lines that are anticipated to be relocated into the same area of the right-of-way.

Figure 7-4 Landscaping Mitigation - Tree Screening

Table 7-1: Landscaping Mitigation - Tree Screening – Species Options

Option	Description	Location	Example Image
Wintergreen Cedar Thuja Occidentalis 'Wintergreen'	Grows up to a height of maximum 9m and spread 1.5m, the shape is conical and likes shaded areas	Ideal in fully shaded areas where the wall is at it highest. These can be planted in random groupings so if one thuja doesn't establish well, it will still look aesthetic vs. planting them in a row as per example photo	

Option	Description	Location	Example Image
Ironwood Ostrya Virginiana	A very slow growing small tree (approximately one foot a year) which does well in deep shade. It's native to Canada, attracts birds and can grow up to 8m in width and 10m in height with a compact shape. In the fall the leaves become deep red, orange or yellow.	Often used as an understory element in shaded areas and would be a good addition planted between the groupings of the Wintergreen Cedar.	
Dolgo Crabapple Malus 'Dolgo'	This tree has a show all season long. It is hardy, a good pollinator, white flowers with a yellow foliage and red apples in the fall/winter.	It does like full sun and can be planted towards where the road is rising until the height of the structure provides too much shade	

7.12 Property Requirements and Access Management

Property acquisition will be required from the following properties to facilitate the proposed improvements. The study has aimed to reduce the property impacts to the extent possible and while acquisition of an entire property is not required, segments of the following properties will be required:

- 3 Manchester Court
- 13377 Coleraine Drive
- 13576 Coleraine Drive
- 13584 Coleraine Drive
- 13656 Emil Kolb Parkway

Property requirements will be further refined and confirmed in the Detailed Design phase. Property requirements are detailed in the Preliminary Design plates included in **Appendix M.**

Regarding access, the full-move accesses onto Coleraine Drive will be converted to right-in / right-out for the following properties:

- 13352 Coleraine Drive
- 13371 Coleraine Drive
- 13377 Coleraine Drive
- 13393 Coleraine Drive
- 13668 Emil Kolb Parkway

The full-move accesses onto Coleraine Drive for 13576 and 13584 Coleraine Drive will be closed. It is understood that these properties are identified for redevelopment and the new development is proposed be accessed via the local road network west of Coleraine Drive (i.e., Jack Kenny Court).

There are several development proposals along the study corridor. The Coleraine Drive Grade Separation is not anticipated to prohibit or significantly impact the development properties or proposed accesses:

- 13656 Emil Kolb Parkway – property northwest of Coleraine Drive and Harvest Moon. The roundabout will require some property in this quadrant however this is from area of proposed landscaping per the site plan, and will not prohibit the development. The properties access is proposed to be on Harvest Moon Drive and will not be impacted by the Coleraine Drive Grade separation. It is understood that the site may expand to include 13668 in the future. This would include the re-zoning of the property and in this event, its access onto Coleraine Drive will be closed following Region access management policies. The property will be considered combined with 13656 and accessed from Harvest Moon Drive.
- As above, 13576 and 13584 Coleraine Drive are identified for redevelopment and the new development will be accessed via the local road network west of Coleraine Drive – Jack Kenny Court.
- 1341 Coleraine Drive is proposed for re-development. The current property is accessed directly from the Manchester Court intersection and this will continue with the relocated Manchester Court Road intersection.

- 3 Manchester Court is proposed for re-development. The property has an access onto Manchester Court and this will not be impacted by the grade separation. The current site plan also proposes a new access onto Coleraine Drive, between the realigned Manchester Court and Holland Drive intersections, and this new access will not be precluded and be right-in / right-out only.

7.13 Construction Cost Estimates

Preliminary construction cost estimates have been completed as part of this study and are included in **Appendix Q**. The construction cost of the identified preferred solution, Road Over Rail, is approximately **$34.3M**. The cost of the Road Under Rail alternative is estimated at **$55.4M**. Key reasons for the cost disparity are the required pumping station ($4M) and the rail diversion ($5M) are high individual costs, in addition to the larger construction requirements of the Road Under Rail option, due to its deep excavation. These construction cost estimates do not include property cost.

The construction costs of modifying roads under the jurisdiction of the Town, required because of this grade separation, will be carried by the Region.

8 Mitigations and Commitments to Further Work

In consultation with agencies, the recommended plan has incorporated measures to mitigate negative impacts to the environment, where possible. Where impacts cannot be entirely avoided, specific mitigation measures and commitments for further work during detailed design and construction have been developed to minimize or avoid impacts.

8.1 Socio-Economic

8.1.1 Properties and Access

Impacts to property and changes in access are detailed in Section 7.12.

Final impacts to private property will be confirmed during detailed design. The Region of Peel will continue to consult with any affected property owners on an individual basis during detailed design and any acquisitions will occur in accordance with the Region's procedures.

The Region of Peel will contact property owners well in advance of construction to seek permission to enter private lands. Permission to enter or temporary construction easements may be required at some locations, of which will be identified and finalized during detailed design.

8.1.2 Natural Berm or Park Expansion

The existing Old Ellwood Drive and Coleraine Drive intersection will require closure due to the grade separation. Old Ellwood drive is proposed to be realigned and extended to connect with Ellwood Drive, at the existing Ellwood Drive and Wakely Boulevard intersection. The roadway extension will bisect the Wakely Memorial Park, however the length of Old Ellwood Drive ROW (a length of approximately 180 m from Coleraine Drive) that will now be disused would provide opportunity for a new parkland and/or community area. At PIC #2, two options were presented to the public at this location: a natural berm or park expansion. The final decision of how the disused ROW will be used will be determined by the Town of Caledon at a future date and the Region will further consult with the Town in the future design and construction phases.

8.1.3 Noise Assessment

8.1.3.1 Noise Impact Study

A Noise Impact Study (NIS) was completed in accordance with the Ontario Ministry of Environment, Conservation and Parks (MECP) and Ministry of Transportation (MTO)

document ‘A Protocol for Dealing with Noise Concerns During the Preparation, Review, and Evaluation of Provincial Highways Environmental Assessments’ (MECP/MTO Noise Joint Protocol) and supplemented accordingly with the MTO’s Environmental Guide for Noise (MTO Noise Guide). This NIS, included in **Appendix R** (with supplemental information regarding the Peel Region Private Noise Wall Conversion Policy included as **Appendix R1** and Private Noise Wall Locations included as **Appendix R2**), provides a summary of the noise impact assessment on neighbouring sensitive receptors and noise arising from construction activities.

In assessing potential noise effects, Noise Sensitive Areas (NSAs) and respective OLAs (i.e., receiver locations) were identified in accordance with the MTO Noise Guide and/or the Region of Peel’s guidance documents. NSAs were selected that represented the acoustic environment within the area and the potential impact of the proposed Recommended Plan. For the purpose of the NIS, only existing sensitive land uses were evaluated, with the understanding that future development-specific noise studies would be prepared through the typical planning process. OLAs were identified for the dwellings within each NSA that are anticipated to be the most highly impacted due to the proposed Recommended Plan. It is also recommended that any future development-specific noise studies ensure that all NSAs and OLAs are assessed considering the traffic projections and improvements identified by this study.

Based on the results of the noise prediction modelling, it is expected that the noise levels of the grade separation will be acoustically similar to existing road traffic noise. Improvements to existing acoustic fencing is not expected to be required. Specific risks with potential “tunneling effect” of the rail traffic noise will need to be considered during the detailed design.

8.1.3.2 Construction Noise Assessment

The impacts of construction noise will be reviewed further during detailed design, when the construction methodology and schedule are fully developed. In addition to implementing a process for dealing and managing noise complaints during the construction phase, mitigations to assist in minimizing noise impacts from construction equipment and activities include:

- All construction equipment should be properly maintained according to the manufacturer’s recommendations and in accordance with MECP Model Municipal Noise Control by-law.
- Construction activities, including those involving piling, should be carried out in accordance with OPSS 120 and MECP NPC-119, NPC-115 and NPC-118.

Construction activities will also need to adhere to Town of Caledon noise by-law(s).

- Construction equipment and/or activities typically known to be of annoyance should consider some of the following:
    - Limit operating time within the daytime period when ambient noise levels are expected to be higher;
    - Maintain an acceptable setback distance from the identified nearby NSAs;
    - Carry out additional noise studies or monitoring program to verify and document noise levels;
    - Implement temporary acoustic barriers or other localized noise mitigation measures;
    - Investigate other alternative construction equipment or processes to complete the task.

8.1.4 Vibration Assessment

A vibration assessment was completed to determine the impacts of ground vibrations produced during anticipated construction operations and their potential impact on neighbouring residential structures.

Based on the Peel Policy Directive (2013) and the Toronto Vibration Control By-Law (which is typically used as the reference in the GTA area), the vibration assessment established a ZOI, which is the area inside of which construction vibrations may exceed 5.0 mm/s. Where buildings or structures are identified inside the ZOI, various consultation, inspection and communications protocols and processes are recommended, including a vibration monitoring program and pre-construction condition inspections.

The estimated vibrations at the nearest structure to the proposed Recommended Plan were marginally above the assumed vibration limit of 8 mm/s (for vibration frequencies less than 4 Hz). For dominant frequencies above 4 Hz, the estimated vibration levels were all below the assumed guideline limit. However, this would need to be confirmed during site-specific vibration monitoring. Where road construction operations occur within 70 – 160 m of residences, the induced ground vibrations are likely to be perceived and could be an annoyance.

Continuous vibration monitoring provides data, which allows for ongoing feedback regarding the vibrations and advancing complaint resolutions. Furthermore, preconstruction condition surveys should be carried out on adjacent residences within the ZOIs, and vibration monitoring should be conducted for the duration of the

construction activities to help mitigate any impacts. The complete vibration assessment is provided in **Appendix S**.

8.1.5 Shadow Impact Study

A Shadow Impact Study was completed and is included in **Appendix T**. The analysis was conducted per the requirements for Shadow Studies summarized in the Town of Caledon Town-wide Design Guidelines, to analyse the impact of the proposed Recommended Plan upon the adjacent properties, streets, and public spaces on Coleraine Drive, near Ellwood Drive in the Town of Caledon. The analysis was undertaken to identify that there are at least five consecutive hours of full sunlight, that shadows are not cast on more than 50% of outdoor residential amenities (throughout the seasons) and that shadows are not cast on the opposite sidewalk within the study area during the spring and fall seasons.

Based on the evaluation undertaken, it is concluded that:

- The level of shadow on neighbouring streets and sidewalks from the proposed road structure will be minimal and not considered an impact, per the guidelines.
- The level of shadow on neighbouring low-rise residential amenity spaces immediately east of the road structure does not meet the requirements of the Town's guidelines (i.e., some homes will not receive five hours of consecutive full sunlight at certain times of the year, and some homes will have shadow cast on more than 50% of their outdoor residential amenities (i.e., back gardens).

8.1.6 Air Quality

8.1.6.1 Air Quality Assessment

As per the general guidance provided in the Ontario Ministry of Transportation (MTO) Guidance Document "Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions for Provincial Transportation Projects, June 2012", the methodology focussed on key pollutants released from mobile sources. As the Recommended Plan does not involve new roads or widening of existing roads, it has limited opportunity to impacts air emissions. As a result, the air quality assessment followed a primarily qualitative approach, as per the general guidance provided in the Ministry of the Environment, Conservation, and Parks (MECP) Central Region Draft Document "Traffic Related Air Pollution: Mitigation Strategies and Municipal Class Environmental Assessment Air Quality Impact Assessment Protocol."

The US EPA mobile sources emission factor is one of the MECP and MTO recommended models for calculating emission factors for roads. The current Canadian version, MOBILE 6.2C, uses Canadian climate data and fuel compositions and was therefore used for the air quality assessment.

The assessment concluded that future traffic emissions in 2041 are expected to result in as much as a 93% increase in annual emissions from the Study Area. This increase in emissions is directly attributed to expected growth in the Region of Peel and resultant projected traffic volumes. However, the proposed Recommended Plan would act to reduce the frequency of congestion, the flow disruption and will act to minimize the air quality impact of increased traffic through improved traffic flows and reduced queueing times at intersections, within the local vicinity of the study area. The complete Air Quality Report is provided in **Appendix U**.

8.1.6.2 Air Quality During Construction

During construction of the grade separation, dust is the primary contaminant of concern. Other contaminants including NOx and VOCs may be emitted from equipment used during construction activities. Due to the temporary nature of construction activities, there are no air quality criteria specific to construction activities. However, the Environment Canada “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” document provides several mitigation measures for reducing emissions during construction activities.

Mitigation techniques discussed in the document include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, and limiting exposed areas, which may be a source of dust and equipment washing. It is recommended that these best practices be followed during construction of the proposed grade separation to reduce any air quality impacts that may occur. It is noted that MECP recommends non-chloride dust suppressants be applied and referring to the following publication in developing dust control measures: Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities – Report prepared for Environment Canada, March 2005.

8.1.7 Climate Change Considerations

The Ministry of the Environment and Climate Change (MOECC) guide, titled ‘Consideration of Climate Change in Environmental Assessment in Ontario’, sets out Ministry expectation and supports the province’s Climate Change Action Plan by outlining climate change considerations for EA studies. The guide notes that ‘climate consideration’ within a project refers to:

(1) Consideration has been given to methods to reduce greenhouse gas emissions; and
(2) Developing a design that is more resilient to future changes in climate and helps maintain the ecological integrity of the local environment in the face of a changing climate.

Consideration for how a project may contribute to climate change, through greenhouse gas emissions or its effects on the natural landscape, is important during the planning process to ensure climate mitigation measures are being taken into account to avoid, reduce or offset any impacts.

Climate Change Master Plan (2019)

The Region of Peel is a leader in the community to reduce greenhouse gas (GHG) emissions and to ensure its services, operations, and infrastructure are resilient to the impacts of climate change. The Region's Climate Change Master Plan (CCMP) is comprised of 20 actions and 66 activities, which set forth the direction for how the Region will lead by example through the management of Regional assets, infrastructure, and services in a changing climate over the next decade; and substantiate the influence necessary to support the community as it transforms in response to climate change. Recommended actions are based on in-depth analysis, modelled calculations, review of the available literature and extensive consultation. The CCMP outcomes include:

- **Build Capacity**: Climate change is considered in all decision-making through organization-wide climate literacy, planning, and accountability.
- **Reduce GHG emissions**: Corporate greenhouse gas emissions are reduced by 45% by 2030, relative to 2010 levels.
- **Be Prepared**: A safe, secure, and connected community is provided by ensuring Regional services and assets are more resilient to extreme weather events and future climate conditions.
- **Invest**: Innovative and sustainable approaches are used to finance action on climate change.
- **Monitor and Report**: Progress on addressing Regionally-funded climate change work is consistently reported, available, and widely understood.

As part of the CCMP, the Region will:

- Be the first municipality in Canada to apply a carbon budget to its own operations;

- Undertake a deep retrofit program for existing buildings targeting near net zero emissions in alignment with anticipated transformations in the energy sector;
- Construct new buildings to target net zero emissions in alignment with anticipated transformations in the energy sector;
- Integrate climate resilience into asset management;
- Implement a green infrastructure program on existing and new assets; and
- Help pioneer climate risk and opportunity reporting by municipalities as specified by the Task Force on Climate-Related Financial Disclosures.

Further opportunities to contribute to the Region's CCMP should be considered during detailed design.

8.1.8 Contaminated Areas

A Phase I Environmental Site Assessment (ESA) was completed as part of this study and is included in **Appendix I**, with the results and impacts summarized in **Section 3.9**. Two locations were identified as having potential environmental concern on adjacent lands west of Coleraine Drive.

It is therefore recommended that limited intrusive investigation be conducted in the vicinity of the neighbouring sites with issues of potential environmental concern, in conjunction with the geotechnical investigation. It is also recommended that the soil cores be inspected for visual and/or olfactory evidence of impacts, and that the analytical program for select soil samples include petroleum hydrocarbons, volatile organic compounds, polyaromatic hydrocarbons, and metals and inorganics.

As the quality and source of the fill material along Coleraine Drive is unknown, an assessment of the quality of the fill would be required as part of the proposed construction activities prior to the reuse of any excavated and/or excess fill material. Furthermore, there is a potential for soil and groundwater along the Coleraine Drive ROW to be impacted with sodium and chloride as a result of highway de-icing activities. Therefore, excess soil generated during construction should be assessed for salt-related impacts, before being reused off-site. Similarly, the quality of water generated during any construction dewatering activities should be assessed prior to being discharged to the environment. Any excess soils shall be managed and disposed of in accordance with Ontario Regulation 406/19: Onsite and Excess Soil Management.

8.2 Cultural Heritage

8.2.1 Built Cultural Heritage

A Cultural Heritage Assessment Report (CHAR) was completed in 2017 and identified a protected heritage property and a property of cultural heritage value or interest within the vicinity of the study area, and a property of cultural heritage value or interest adjacent to the study area. These include the Shore-Wakely Stone House at 13304 Coleraine Drive, 13303 Coleraine Drive, and 49 Wakely Boulevard. Of these properties, 49 Wakely Boulevard, presented in **Figure 8-1**, is predicted to be at a medium risk for direct impact under the proposed construction activities.

To ensure that the heritage attributes will not be adversely affected by construction operations, the following recommendations include:

- Site plan control and communication: The property boundaries and structures should be clearly marked on project mapping and communicated to all project personnel for avoidance during construction.
- Monitor for vibration impact: 49 Wakely Boulevard should be monitored during construction with digital seismographs to ensure that the built heritage resources are not being impacted by vibration from excavation, compacting, or associated heavy vehicle traffic during construction.

The final Detailed Design should avoid and establish as much distance as practicable between Project components and the property of cultural heritage value or interest at 49 Wakely Boulevard.

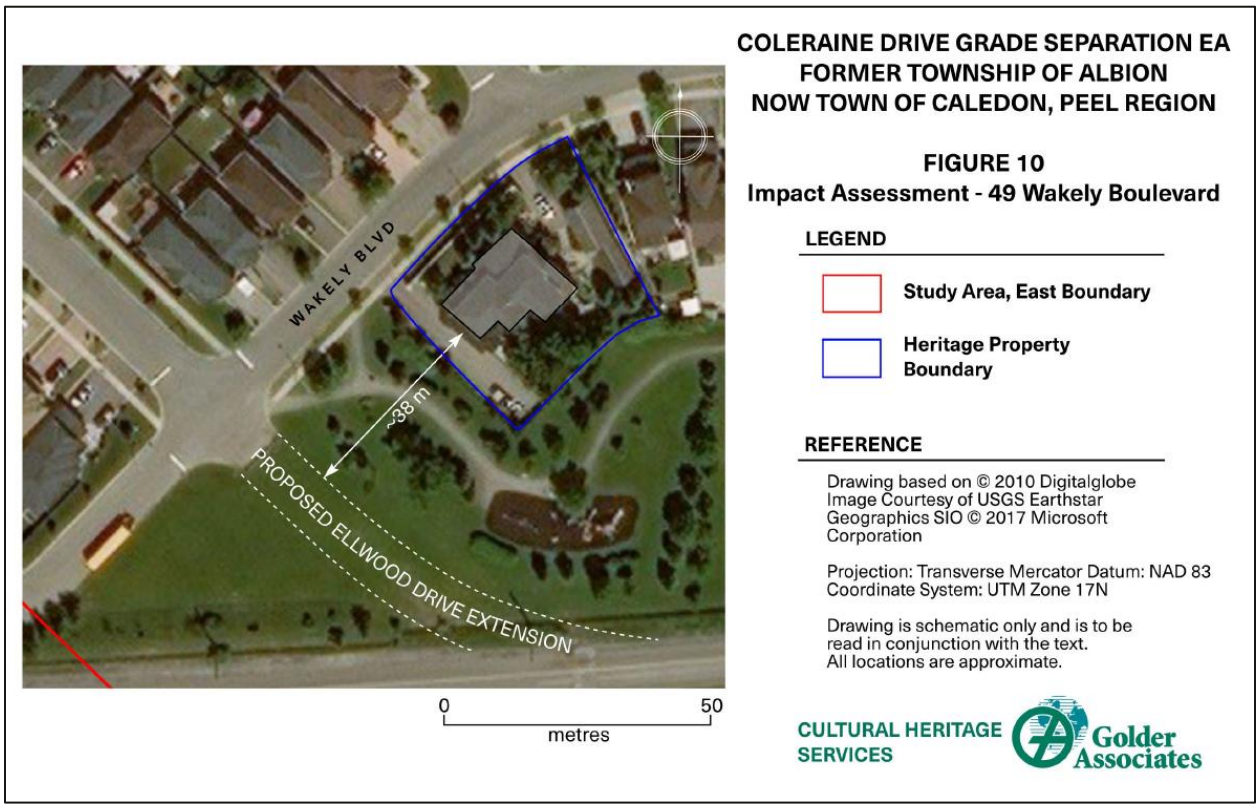

Figure 8-1: Impact Assessment - 49 Wakely Boulevard

8.2.2 Archaeology

A Stage 1 Archaeological Assessment was conducted as part of this study to evaluate the study area's archaeological potential through an examination of its geography, history, previous archaeological fieldwork and current land conditions, and to recommend appropriate strategies if a Stage 2 assessment is required. The Stage 1 AA Report is included in **Appendix D**.

The Stage 1 Assessment determined that the study area did have archaeological potential for both pre-contact Aboriginal and historical Euro-Canadian sites, but that this potential has been removed from most parts of the study area due to deep and extensive disturbances, resulting from urban and industrial development. However, several sections of manicured lawn, overgrown fields and bushlot within the study area still retain archaeological potential.

Based on the findings from the Stage 1 Archaeological Assessment, archeological potential was identified south of Holland Drive. As the construction limits of the proposed improvements end at the northern arm of the Holland Drive and Coleraine Drive intersection, no Stage 2 archeological assessment is considered required.

- The Shore-Wakely House property is designated and retains cultural heritage value or interest, as discussed in **Section 8.2.1**. It is therefore, recommended for further archaeological assessment as follows:
    - Prior to allowing construction in the area, no-go instructions must be issued by the Canadian Tire Corporation (CTC) to all personnel, so that the area of avoidance is not accidentally impacted. The area to be avoided with be shown on all contract drawings, when applicable. If accidental impacts to the archaeological site are observed at any time during construction, a licensed archaeologist will be contracted to inspect and report to the MTCS on the effectiveness of the strategy in ensuring that the areas to be avoided remain intact. If CTC determines at a later date that grading impacts will be extended into the remainder of the archaeological site, a licensed archaeologist will be contracted to carry out the Stage 4 mitigation by excavation of the remainder of the site.
    - It is recommended that when soil disturbance and grading activities are occurring within 20 metres of the area to be avoided, a licensed archaeologist must be contracted to monitor the activities and prevent impacts to the remainder of the archaeological site. Should an undisturbed part of the site be impacted, the archaeologist is empowered to stop construction in the area until further Stage 4 mitigation by excavation is concluded. The results of the construction monitoring will be reported on to the MTCS.
    - Once all subsequent development has been completed the temporary fence will be removed and replaced by permanent barrier that will permanently delineate the area of the Shore Site (AIGw-163) that will be avoided and protected. The permanent fence should be placed two metres in from the temporary fence, lands containing the protected areas remain passive and will prohibit soil disturbance with the exception of traditional farming and minor property maintenance.
- The remainder of the Study Area, outside of the identified areas has been subject to deep disturbance, and as such, no further archaeological assessment is recommended for this portion of the study are (May 7).

8.3 Natural Environment

The Natural Heritage Evaluation Report is provided in **Appendix E**. Potential impacts to natural heritage features were evaluated for the Recommended Plan and where

potential adverse impacts were identified, environmental mitigation measures are proposed. The Recommended Plan will have limited impacts to the valley and wooded area, east of Coleraine Drive at the north end of the study area, and vibration impacts to natural heritage features and local wildlife is limited. The construction footprint and grading limit would likely extend no further than an area within the EPA that appears to have already been heavily disturbed, as seen in aerial imagery from 2009. Due to the potential for SAR, additional surveys may be required during Detailed Design. Additional surveys and mitigation measures to be undertaken during Detailed Design are summarised below. As a result of access limitations during the tree survey undertaken for this study (restricted to transects along Coleraine Drive) a bat survey may be required during Detailed Design, due to the potential for suitable habitat along Jaffary Creek's woodland.

Preliminary mitigation recommendations are summarized below and will be finalized during detailed design. Mitigation of negative effects to the natural environmental features is applied throughout the Class EA process, as the design alternatives are developed and evaluated. However, some negative effects cannot be completed avoided, therefore, additional mitigation measures are identified to minimize these effects.

Measures to mitigate impacts to Terrestrial Vegetation and Wildlife

- Fencing will be installed outside of the critical root zone (CRZ) of any trees not intended for removal to prevent soil compression, root damage and to minimize damage to branches.
- Branches of trees that overhang the work area will be pruned back to prevent unintentional harm. If root damage is unavoidable, sever roots cleanly with pruning tools to limit decay and vectors for disease.
- If vegetation removal is required, all vegetation/trees should be surveyed for birds/nests/bats/roosts prior to removal by a certified biologist.
- Work areas will be clearly demarcated by fencing.
- Stockpiled materials will be surrounded by sediment control fencing to prevent turtle nesting.
- If outside material (e.g. top soil, sand) has to be used on the construction site, it will be reputably sourced.
- Existing access roads will be used as much as possible and speed limits will be clearly posted on site access and construction roads to minimize the potential for road mortality.

- Should any mammal, reptile or amphibian species be encountered during construction, the construction activities will immediately stop until the animal has safely moved out of harm's way. If a non-SAR individual needs to be moved, it can be relocated to its appropriate habitat outside of the work area.
- If SAR are encountered and it is suspected that the activity will cause harm, harass or kill the animal(s), MNRF should be contacted for advice on how to proceed.
- Prior to vegetation clearing, preconstruction sweeps of vegetated areas will be undertaken to ensure wildlife are not present. It is recommended that grading and slope be minimized to retain as many trees as possible, as well as edge plantings during the post construction phase to protect the remnant woodlands.
- The removal of native vegetation will be minimized and the areas to be cleared will be clearly delineated on the construction drawings.
- Grading should occur in phases to limit the size of the disturbed area.
- Graded areas that are to be revegetated according to an approved plan shall be revegetated with approved plant-list species appropriate to the site and in keeping with the adjacent forest edge.
- Grading should be restricted to areas contained by silt fencing.
- Restore soil surfaces immediately following final grading, with surface restoration to include features that minimize erosion (e.g. placing sod).
- Removal of woody vegetation will not occur during the breeding bird season from March 1st - August 31st inclusive, unless a qualified biologist has searched the site for nests and concluded that no nests are present, no more than 2 days prior to clearing.
- Nesting migratory birds will be protected in accordance with the *Migratory Birds Convention Act, 1994*
- Small equipment will be utilized in order to prevent harming woody vegetation not intended for removal.
- Any stockpiling of cleared vegetation or chips will be situated away from the water.
- Where possible, cleared areas will be re-vegetated with native trees and shrubs following the completion of the construction phase.
- When possible, work will be completed during daylight. If nighttime lights are used, they will be installed so as to illuminate the work area only to minimize impacts to nighttime activities of wildlife.

- Vehicles and equipment will have the appropriate mufflers installed to minimize sound disturbance to wildlife.
- Food scraps and garbage will not be left at the project site.

Measures to Protect Water Quality

- The news structure drainage design will take into consideration the existing erosion issues, identified for Jaffary Creek by the TRCA.
- An Erosion and Sediment Control Plans (ESC) should be developed and implemented to ensure erosion and sedimentation is minimized and water quality is maintained through construction.
- The contractor will be responsible for ensuring that the ESC measures chosen are appropriate for the site and are functioning as intended.
- The contractor will maintain and monitor ESC measures, provide the results of monitoring, and ensure adjustments are made on a continuous basis, as needed.
- No work will occur within 15 m of the water until the appropriate ESC measures have been properly implemented. These will be designed to prevent the movement of suspended sediments and concrete outside of the site preparation and construction work areas.
- Work will stop if sedimentation issues occur outside of work areas until the cause of sedimentation is identified and addressed.
- Should dust particles be created during work, then they will be suppressed using appropriate methods (i.e. tarps). Chemical dust suppressant will not be used.
- Any removal of vegetation will be minimized, and removal will be completed using small machinery.
- Machinery working in the temporary work area will be clean of mud and free of leaks.
- Additional materials (i.e., filter cloth and silt fencing) should be readily available in case they are needed promptly for erosion and/or sediment control.
- The sediment fencing will not be removed until the terrestrial vegetation has re-established.
- There will be no use of herbicides in clearing of vegetation.
- Refueling of equipment (e.g., pumps) and maintenance shall be conducted off slopes and away from water bodies on impermeable pads (drip tray) or buried liners to allow full containment of spills.

- A spill response plan should be developed and ensure adequate response training for personnel on-site.
- Emergency spill kits will be located on site.
- The contractor crew will be fully trained on the use of clean-up materials in order to minimize impacts of any accidental spills.
- Methods to prevent soil compaction, such as swamp mats or pads should be used.
- The area will be monitored for leaks and spills. In the unlikely event of a minor spillage, the contractor will halt the activity and corrective measures will be implemented. Any spills will be immediately reported to the MECP Spills Action Centre (1-800-268-6060) and TRCA.
- Minimization of the slope length and gradient of disturbed areas.
- Exposed soil will be graded to a stable angle and revegetated in a manner that prevents erosion.

Measures to Mitigate Impacts to Significant Wildlife Habitat and Species at Risk, Wildlife and Migratory Birds

- Vegetation removal/clearing and site preparation for construction will occur before March 1st or after October 31st to protect habitat of amphibians, reptiles, butterflies, mammals and migratory birds during critical life stages, and comply with provincial and federal legislation.
- Contractor will not destroy active nests (i.e. nests with eggs or young birds), or wound or kill birds, of species protected under the *Migratory Birds Convention Act, 1994* and/or regulations under the Act.
- If a nesting migratory bird or nest containing eggs or young of migratory birds are identified within the study area adjacent lands, all activities will stop, and the Canadian Wildlife Services of Environment and Climate Change Canada will be contacted to discuss mitigation measures.
- Any nest found will be protected with a buffer zone determined by a setback distance appropriate to the species, the intensity of the disturbance and the surrounding habitat until the young have naturally and permanently left the vicinity of the nest.
- If works are being completed during the Snapping Turtles nesting season (June to October), sediment fences along the shoreline of the creek and pond in the works area need to be installed before June 1 following the MNRF *Reptile and Amphibian Exclusion Fencing* (2013) to prevent impacts to turtles and their nests.

- Prior to vegetation clearing, preconstruction sweeps of vegetated areas will be undertaken to ensure wildlife are not present.
- Ensure that SAR are not in the area by scanning the location where your activity is to occur.
- If SAR are encountered and it is anticipated that the activity will cause harm, harass or kill the animal(s), the activity should immediately stop. A qualified biologist should then be contacted to ensure proper implementation of mitigation measures.

Measures for Addressing Invasive Species

- An Invasive Plant Species Management Plan should be designed by an environmental professional before the start of the works. This plan will include the location of all exotic invasive plant species individuals/colonies within the work area, as well as required management and disposal measures to be implemented by the contractor. These management and disposal measures will be based on the Ontario Invasive Plant Council Best Practices.
- To prevent the spread of invasive species, the Clean Equipment Protocol for Industry should be followed. Boots and equipment that are to be used in conjunction with the project works must also be clean of soils and plant parts before arriving and leaving the site.

8.4 Tree Inventory and Assessment

A tree inventory and assessment were undertaken in order to identify and record species, size, and condition of trees and groups of vegetation within the site for use in the development of a tree preservation plan. The tree inventory and assessment is provided in **Appendix F**. Several structural defects and health problems were identified. Structural defects are often insignificant when a tree is small but can pose problems when the tree grows larger, and the weight of branches put added stress on defects that can cause weakness.

To protect trees, any grade changes and construction activities that could cause soil compaction should be kept away from trees as much as possible. If roots do get damaged by excavation equipment, where applicable, it will be better to cut roots cleanly with sharp pruning tools rather than allow them to be torn by large equipment. Clean cuts will also help to minimize decay and entry points for disease. Equipment and materials should not be stored near trees, and equipment should not be left idling where exhaust could burn foliage.

8.5 Fluvial Geomorphology

In addition to the Stormwater Management assessment, a fluvial geomorphic assessment was completed, included in **Appendix H**, to assess meander potential and channel stability based on proposed modifications to Coleraine Drive as part of the improvements. The assessment determined that any proposed modifications to the existing circular concrete culvert should be designed to enhance flow and/or sediment conveyance. In addition, the incorporation of band and bed treatments (e.g. flow dissipation pool, bank revetments, bed armouring etc.,) should be considered at the outlet of the culvert to mitigate any increased opportunity for scour and erosion in the local area or further downstream.

8.6 Hydrogeology

A hydrogeological assessment was completed and is provided in **Appendix V** to determine the hydrogeological conditions along a section of Coleraine Drive under the proposed improvements. The hydrogeological investigation included a review of available information to characterize existing groundwater conditions and identify any potential issues associated with the permanent infrastructure or construction dewatering activities. A site and area reconnaissance was undertaken to identify any private wells or septic systems that may exist within the likely radius of groundwater influence for any site works.

The hydrogeological investigation was undertaken as part of the geotechnical investigation conducted for this study. A total of 15 boreholes were advanced for the hydrogeological investigation. No free groundwater was observed in the boreholes during drilling. As the groundwater table is judged to be relatively shallow in the area based on water levels observed in the monitoring wells, the absence of free groundwater during drilling is an indication of low soil permeability, rather than a low groundwater elevation.

The section of Coleraine Drive being assessed, is located within the urban area, where groundwater is not generally used as a source of potable water supply. However, precipitation infiltrating contributes to the regional groundwater system, which sustains baseflow to a number of small creeks and wetland features. The area is located outside any mapped Wellhead Protection Areas (WHPA) and no water supply wells are located within the estimated zone of influence (ZOI) for the water taking. Furthermore, no significant wetland areas or cold-water fisheries are known to occur within the estimated ZOI of the water taking. Therefore, potential to impacts drinking water supply wells or environmental / ecological features is considered low, provided that adequate measures

are taken to ensure that water discharged from construction excavations is low in suspended solids and dissolved contaminants.

8.7 Monitoring

Monitoring requirements will be fulfilled by the Region of Peel. Monitoring may encompass the following aspects:

- Monitoring of EA commitments to further work through future detailed design and construction phases to ensure these commitments are addressed;
- Monitoring associated with any conditions of approvals/permits to be obtained;
- Monitoring during construction (by the Region and/or Contractor) to ensure construction mitigation measures are implemented as planned; and
- Monitoring of site restoration aspects including landscape plantings (under warranty).

Other monitoring requirements may be identified in future project phases.

A

Appendix A: Consultation Record

B

Appendix B: Transportation Report

C

Appendix C: Cultural Heritage Assessment Report

D

Appendix D: Stage 1 Archeological Assessment Report

E

Appendix E: Natural Heritage Evaluation Report

F

Appendix F: Tree Inventory and Assessment Report

G

Appendix G: Drainage and Stormwater Management Report

H

Appendix H: Fluvial Geomorphic Assessment Technical Memorandum

Appendix I: Phase 1 Environmental Site Assessment Report

J

Appendix J1: Design Alternatives – Road Over Rail Option

J

Appendix J2: Design Alternatives – Road Under Rail Option

K

Appendix K: Ellwood Drive and Grapevine Road Technical Memorandum

L

Appendix L: Indigenous Community Engagement Record

M

Appendix M: Preliminary Preferred Design Plates

N

Appendix N: Structural Engineering Technical Memorandum

O

Appendix O: Geotechnical Investigation and Pavement Design Report

P

Appendix P: Utility Conflict Plan

Q

Appendix Q: Preliminary Cost Estimate

R

Appendix R: Noise Impact Study

R

Appendix R1: Peel Region Private Noise Wall Conservation Policy

R

Appendix R2: Private Noise Wall Locations

S

Appendix S: Vibration Assessment Study

T

Appendix T: Shadow Impact Study

U

Appendix U: Air Quality Report

V

Appendix V: Hydrogeological Report


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