Environmental Study Report

Schedule “C” Class EA for Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive

The Regional Municipality of Peel

June 10, 2021

Disclaimer

The material in this report reflects HDR's professional judgment considering the scope, schedule and other limitations stated in the document and in the contract between HDR and the client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, HDR did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that HDR shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party resulting from decisions made or actions taken based on this document.

In preparing this report, HDR relied, in whole or in part, on data and information provided by the Client and third parties that was current at the time of such usage, which information has not been independently verified by HDR and which HDR has assumed to be accurate, complete, reliable, and current. Therefore, while HDR has utilized its best efforts in preparing this report, HDR does not warrant or guarantee the conclusions set forth in this report which are dependent or based upon data, information or statements supplied by third parties or the client, or that the data and information have not changed since being provided in the report. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that HDR shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party resulting from decisions made or actions taken based on this document.

Executive Summary

Introduction

The Region of Peel completed a Municipal Class Environmental Assessment (EA) Study to determine specific improvements to Airport Road to accommodate the current and future transportation needs of pedestrian, cyclists, transit users, and motorists along Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive within the City of Brampton. The study was conducted in accordance with the planning and design process for Schedule "C" projects as outlined in the Municipal Engineers Association, Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011, and 2015).

Background and Study Purpose

Airport Road (Regional Road 7), between Braydon Boulevard/Stonecrest Drive and Countryside Drive, is currently a four-lane, north-south regional arterial with a posted speed of 70km/h and exclusive northbound/southbound left and right turn lanes at signalized intersection locations.

The Peel Region Official Plan has identified the road as a Major Road (PR-OP Schedule E) with midblock right-of-way requirements of 45 m (PR-OP Schedule F). The existing right-of-way varies between 44 m and 57m along the corridor's length.

The purpose of the Airport Road Class EA study is to determine specific improvements to accommodate the current and future transportation needs of pedestrians, cyclists, transit users and motorists along the Airport Road corridor from Braydon Boulevard/Stonecrest Drive to Countryside Drive within the City of Brampton.

Study Area

The Airport Road Class EA spans approximately 1.6 kilometres in length, and is illustrated in **Exhibit A**. The predominant land use type adjacent to Airport Road through the study limits is low-rise residential.

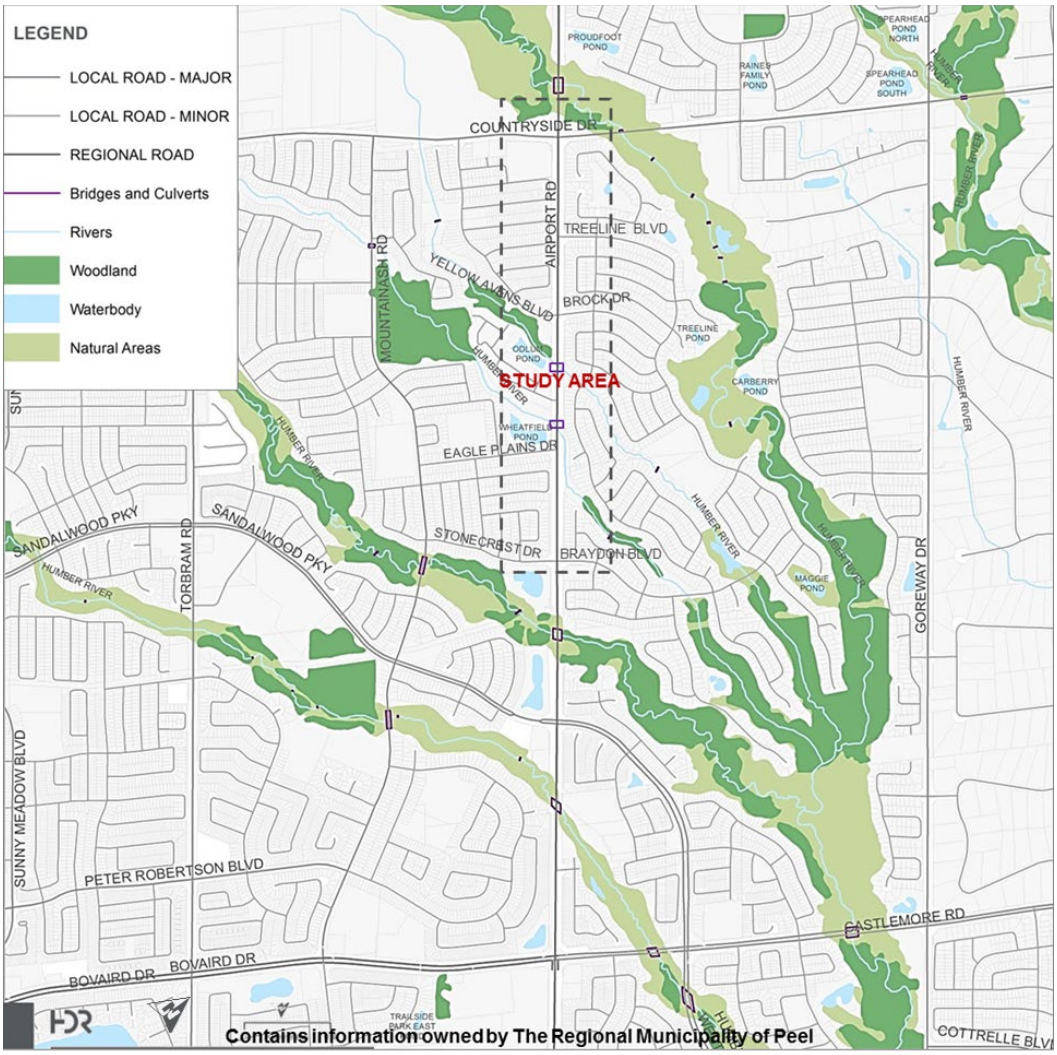


Exhibit A: Study Area Map

Needs Assessment

The Needs Assessment for the Airport Road EA study reviewed transportation conditions for all travel modes and traffic safety needs to identify areas of improvement for the corridor. The review was completed in 2017, using information and data available at the time.

A summary of the transportation needs in the Airport Road corridor is summarized as follows:

- The need to widen Airport Road from four to six lanes by 2031
- The need to improve the pedestrian and cyclist environment to reduce the automobile mode share for short trips
- The need to improve transit services and facilities
- Enhance safety through countermeasures such as improved illumination along the corridor

Problem and Opportunity Statement

The Problem and Opportunity Statement was developed with consideration of existing conditions, deficiencies, and the future needs of the study corridor. The Problem and Opportunity Statement provides the foundation for transportation improvements for Airport Road, consistent with the Region's vision for the corridor and other official documents.

Problems and opportunities along the study corridor are summarized as follows:

Problem	Opportunity
Existing road and intersections within study limits cannot accommodate projected traffic volumes.	Improve Airport Road to accommodate projected traffic demand and provide sufficient north-south transportation capacity through the northern part of Peel Region.
With regional roads at capacity, there is the potential for increased traffic on local roads.	Improve Airport Road to provide sufficient capacity to mitigate potential traffic infiltration and traffic increases on local roads.
Lack of cyclist facilities.	Provide cyclist facilities to accommodate existing users and growth as a result of future development.
Active transportation mode share is low for short and local trips.	Improve streetscape to promote active transportation modes. Enhance both safety and overall experience for cyclists, pedestrians, and transit users along the street.
Bus stop spacing on east side between Braydon Boulevard/Stonecrest Drive and Yellow Avens/Brock Drive is inadequate.	Review bus stop location in consultation with Brampton Transit.
High number of collisions at main intersections and at night-time.	Evaluate intersection-related improvements to enhance safety and accessibility. Consider countermeasures such as illumination improvements along the corridor.

Public, Agency, and Indigenous Consultation

Public input was an important part of the Airport Road Class EA and a number of public and stakeholder consultation activities were held to provide opportunities to participate in the planning process. An overview of the key consultation milestones is provided as follows:

Consultation Event	Date
Notice of Commencement and Notice of Public Information Centre (PIC) #1	November 9, 2017
Public Information Centre (PIC) #1	November 23, 2017
Notice of Public Information Centre (PIC) #2	November 14, 2019
Public Information Centre (PIC) #2	November 28, 2019
Notice of Study Completion	June 17, 2021

Public outreach was conducted in a variety of methods including advertisements in local newspapers, direct mail, email notifications, regional mobile signs, project website updates, and public open houses.

As part of the EA process, multiple technical staff from Peel Region and partner agencies as well as other stakeholders were consulted on a regular basis.

Indigenous community representatives were included in the mailing list for the project, and those on the contact list at the time of each notice were emailed study notices (including Notice of Commencement and PIC #1, Notice of PIC #2, and Notice of Completion). The contact list was updated to add additional Indigenous community representatives or updated with their latest contact information, as requested throughout the study.

No concerns were raised by Indigenous community representatives in response to the project.

Alternative Solutions

Alternative Solutions are functionally different ways of approaching and addressing a problem or opportunity. The Class Environmental Assessment process requires documentation and examination of all reasonable alternatives to address the problem, referred to as Alternative Solutions.

Based on the Needs Assessment, a variety of Alternative Solutions were developed for the study area. The following alternative solutions were considered to address the problems and opportunities identified for the Airport Road study:

Alternative #	Title	Description
1	**Do Nothing**	Maintain existing conditions, including the number of lanes.
2	**Implement Active Transportation Improvements**	Provide continuous, shared space for cyclists and pedestrians.
3	**Widen Airport Road from Four to Six Lanes**	Provide two continuous, additional lanes to increase capacity for vehicular traffic.
4	**Implement Intersection Improvements**	Provide right and/or left turn lanes where warranted, signal optimization.
5	**Limit Development**	Limit growth to relieve road traffic.
6	**Improve Other Roads**	Widen other roads to divert traffic away from Airport Road.
7	**Transportation Demand Management (TDM)**	Apply strategies and policies to reduce travel demand, or to redistribute this demand in space or in time. TDM could include telecommuting, carpooling and peak hour spreading.

The selected preferred solution consisted of a hybrid of alternatives 2 (implement active transportation improvements), 3 (widen Airport Road from four to six lanes), and 4 (implement intersection improvements). Following input from the public at PIC #1 on November 23, 2017, the preferred solution was refined and included:

- Widening Airport Road from four (4) to six (6) lanes,
- Implementing active transportation improvements in the form of a multi-use path on both sides; and,
- Implementing intersection improvements to address localized needs (for example, confirm storage length for left-turn lanes and confirm need for signalization of unsignalized intersections).

Alternative Designs

Based on the preferred solution, three alternative design concepts were developed to address the widening of Airport Road. The three options considered were:

- Option 1: Widen to the west
- Option 2: Widen about the centreline
- Option 3: Widen to the east

Preferred Design

The preferred design for Airport Road was chosen after consideration of transportation service for all road users (motorists, pedestrians, cyclists, and transit users) and impacts to the natural environment, cultural heritage, and socio-economic environment, safety, aesthetics, drainage, driveway access, property requirements, and capital construction and maintenance costs. The preferred design best reflects the goals of the EA and balances the infrastructure improvements with the anticipated impacts. The preferred design was developed and refined through extensive consultation with agencies, stakeholders, and the public.

Based on the evaluation of design alternatives, **Alternative Design 2: "Widen about the centerline"** was selected as the preferred design.

Roadway

The preferred design consists of providing a continuous urban cross-section, which will include two (2) curb lanes, four (4) through lanes (a total of three (3) lanes in each direction), a raised median, and a multi-use path on both sides of Airport Road. The proposed design aims to follow the existing horizontal and vertical alignment.

Cycling and Pedestrian Facilities

The preferred design incorporates two, off-road multi-use paths (MUP), one on the east and one on the west side of Airport Road between Braydon Boulevard / Stonecrest Drive and Countryside Drive.

Transit

The Airport Road recommendations accommodate all existing bus stop locations. Some of the bus stop locations have been moved slightly in order to conform with the latest Brampton Transit and Peel Region guidelines for bus stop placement. No additional bus stop locations are proposed as part of the Airport Road EA recommendations; however, the proposed roadway improvements do not preclude additional stops from being added in the future.

Intersection and Access Modifications

Intersections will be designed in accordance with AODA standards and to facilitate the movement of all road users, including pedestrians and cyclists. Between Braydon Boulevard/Stonecrest Drive and Countryside Drive, the preferred road design will match into the existing intersections. No new signalized intersections are proposed along the study corridor based on signal warrant analysis. Operations at the existing unsignalized intersections (such as Eagle Plains Drive, Camrose Street, and Treeline Boulevard) should be monitored in the future, and signalization should be reassessed at a later time as warranted as they are not precluded by the proposed design. Access to the plaza at the southwest quadrant of Airport Road and Countryside Drive is to be maintained per existing conditions, providing right-in, right-out, left-in movements. Existing dedicated right-turn lanes will be converted to through-right movements at all intersections, with the exception of Airport Road and Braydon Boulevard/Stonecrest Drive

where the dedicated northbound right-turn lane will remain to accommodate the higher volumes of right-turning traffic.

Traffic Signals, Illumination, and Signage

No additional traffic signals are recommended along the Airport Road EA study area. Illumination levels and signage are also proposed to be maintained to meet current design standards, with details regarding type, location and spacing to be confirmed during detailed design.

Streetscaping and Landscaping

The preferred design considered maximizing the available boulevard space for tree plantings and other landscaping within the corridor. Landscaping opportunities exist within the boulevards on both the east and west side of Airport Road. Details regarding the type of species as well as their planting spacing is to be confirmed during detailed design.

Property Requirements

The proposed improvements to Airport Road attempt to minimize property requirements, as such, there are no property takings anticipated as per the preferred design. At some locations, retaining walls are proposed to avoid the need for property requirements.

Drainage and Stormwater Management Plan

The existing drainage patterns and discharge locations are not proposed to be altered as per the proposed roadway improvements.

Stormwater best management practices, including infiltration trenches, are proposed for storm water quality treatment of the runoff from the roadway right-of-way and to meet water balance and erosion control requirements. As per the TRCA Stormwater Management Criteria (August 2012), this area of the West Humber River watershed does not require specific quantity flood control measures. The storm sewer system draining the pavement for the ultimate roadway configuration should have the capacity to convey the peak flow from the 10-year storm event based on Peel Region Stormwater Management Guidelines.

As part of the SWM strategy, a total of 4.83 ha of pavement area will receive quality treatment through the proposed infiltration trenches, which exceeds the MECP requirement of providing treatment to the increased pavement area.

The proposed infiltration trenches in combination with the existing OGS units will meet the minimum SWM criteria. However, opportunities to implement supplemental stormwater best management practice measures to provide additional treatment can be considered in the detailed design stage.

No impact to the watercourse crossing is anticipated as a result of the proposed improvements, as the road widening does not require a culvert extension or replacement at these two crossings.

Utilities

Hydro poles are located on the west side of Airport Road within the study corridor while light standards line the east side. Based on the preferred design, it is anticipated that both hydro and streelighting infrastructure would require relocation. The location and alignment of existing municipal services including storm sewers, sanitary sewers, and watermain, as well as any private telecommunication infrastructure, is to be confirmed during detailed design, which may result in changes to the identified utility impacts. All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary.

Preliminary Cost Estimate

Based on the preliminary cost estimates, the cost of the recommended improvements is estimated at $23.5 million. The preliminary cost estimate includes cost for roadwork, active transportation, illumination, utilities, landscaping, noise wall, traffic signals and engineering for both the design phase and construction duration. These preliminary cost estimates are to be reviewed and confirmed during detailed design.

Environmental Effects and Mitigation

Anticipated impacts to the natural, socio-economic, and cultural environments together with proposed mitigation measures were identified to address the implementation of the preliminary preferred design. Socio-economic analysis considered property impacts, noise, and air quality. Natural environment impacts considered aquatic habitat and fisheries, vegetation and vegetation communities, wildlife and wildlife habitat, and contamination. Cultural impacts considered built heritage and cultural heritage landscape features, and archaeology.

In general, impacts associated with the proposed Airport Road widening are minor in nature and can be mitigated. Further information on environmental effects and mitigation can be found in **Section 10** of the ESR.

Timing of Implementation and Future Commitments

Timing of improvements is to be confirmed during detailed design. Based on Peel Region's 2020 capital budget, construction of the Airport Road improvements is currently scheduled to begin in 2027; however, this timing is subject to change.

The ESR identifies specific items to be reviewed and confirmed during detailed design. Some of these commitments will address specific concerns raised by property owners and review agencies during the EA process and are provided in **Section 11.2** of the ESR.

Table of Contents

Executive Summary ii
1 Introduction 1
1.1 Purpose of the Project 1
1.2 Study Area 2
1.3 Study Process 2
1.3.1 The Municipal Class Environmental Process 2
1.3.2 Part II Orders 5
1.3.3 Canadian Environmental Assessment Act (CEAA) 5
2 Planning Context 7
2.1 Provincial Planning Context 7
2.2 Regional Planning Context 9
2.2.1 Peel Region Long Range Transportation Plan (2019) 11
2.3 Municipal Planning Context 14
3 Existing Conditions 16
3.1 Transportation Network 16
3.1.1 Existing Facilities 16
3.1.2 Existing Access Locations 17
3.1.3 Existing Truck Restrictions 18
3.1.4 Future Road Improvements 18
3.1.5 Transit Network 18
3.1.6 Active Transportation Network 21
3.2 Socio-Economic Environment 24
3.2.1 Existing Land Use 24
3.2.2 Archaeology 27
3.2.3 Built Heritage Resources and Cultural Heritage Landscapes 28
3.2.4 Streetscape Environment 28
3.2.5 Noise Barriers 29
3.3 Contamination 30
3.4 Natural Environment 31
3.4.1 Soils and Terrain 32
3.4.2 Watercourses and Woodland 33

3.4.3 Vegetation 33
3.4.4 Vascular Flora 34
3.4.5 Tree Inventory 34
3.4.6 Wildlife 34
3.5 Source Water Protection 36
3.6 Pavement/Geotechnical and Environmental Investigation 36
3.6.1 Pavement Performance (Existing Condition) 36
3.6.2 Pavement Structure 36
3.6.3 Excess Soil Characterization 37
3.7 Existing Drainage 38
3.7.1 Existing Storm Sewer System 39
3.7.2 Culvert Assessment Criterion 39
3.7.3 Hydraulic Assessment 40
3.8 Hydrogeology 41
3.9 Existing Structures 41
3.9.1 Tributary B Crossings 42
3.9.2 Tributary C Crossings 42
3.9.3 Structural Assessment 43
3.10 Existing Utilities and Other Services 43
3.10.1 Illumination 43
4 Needs Assessment 44
4.1 Transportation Conditions 44
4.1.1 Automobile Traffic 44
4.1.2 Mode Share 44
4.1.3 Active Transportation Activity 47
4.2 Collision Analysis 50
4.2.1 Collision by Type 50
4.2.2 Collision Rate 51
4.2.3 Collisions by Year 52
4.2.4 Collisions by Severity 53
4.2.5 Collisions by Initial Impact type 56
4.2.6 Collisions by Environmental Conditions 56
4.2.7 Collisions by Light Conditions 57

4.2.8 Potential for Safety Improvement 57
4.2.9 Summary of Collision Analysis 58
5 Problem and Opportunity Statement 60
6 Alternative Solutions 61
6.1 Generation of Alternative Solutions 61
6.2 Evaluation of Alternative Solutions 61
6.2.1 Screening 62
6.2.2 Evaluation Criteria 63
6.2.3 Detailed Evaluation of Alternative Solutions Carried Forward 64
6.3 Preferred Solution 71
7 Alternative Designs 72
7.1 Evaluation Criteria 72
7.2 Evaluation of Alternative Designs 73
7.3 Preferred Design 78
7.4 Confirmation of Preferred Design 78
8 Intersection Operational Improvements 79
8.1 Auxiliary Turn Lane Requirements 79
8.2 Traffic Signal Warrants 79
9 Project Description 81
9.1 Design Criteria 81
9.2 Road Geometry 83
9.2.1 Horizontal Alignment 83
9.2.2 Vertical Alignment 83
9.3 Structural Design 83
9.4 Typical Cross-Sections 84
9.5 Cycling and Pedestrian Facilities 84
9.6 Transit Stops 85
9.7 Intersections and Access Modifications 85
9.8 Traffic Signals, Illumination and Signage 86
9.9 Streetscaping and Landscaping 86
9.10 Property Requirements 86
9.11 Drainage / SWM Plan 86
9.11.1 Roadway Drainage 86

9.11.2 Stormwater Management Strategy 88
9.12 Geomorphology 89
9.13 Pavement/Geotechnical Recommendations 89
9.13.1 Rehabilitation of Existing Lanes 89
9.13.2 Pavement Widening Recommendations 89
9.13.3 Soil Disposal Recommendations 90
9.14 Utilities 91
9.15 Preliminary Cost Estimate 92
9.16 Constructability, Staging and Detour Considerations 92
9.17 Construction Monitoring and Maintenance Considerations 92
10 Potential Environmental Effects and Mitigation 94
10.1 Socio-Economic Environment 94
10.1.1 Property Impacts and Access 94
10.1.2 Air Quality Assessment 94
10.1.3 Noise Impact Assessment 95
10.1.4 Archaeological Resources 96
10.1.5 Built Heritage Resources and Cultural Heritage Landscapes 96
10.2 Natural Environment 97
10.2.1 Vegetation and Vegetation Communities 97
10.2.2 Tree Removal 98
10.2.3 Terrestrial Wildlife and Habitat 99
10.2.4 Fish and Aquatic Habitat 100
10.3 Structures 100
10.4 Contamination 101
10.5 Hydrogeology 101
10.6 Utilities and Other Services 101
10.7 Climate Change 102
10.7.1 Approach to Climate Change Consideration 102
10.7.2 Potential Climate Change Effects 102
10.7.3 Climate Change Mitigation 103
10.8 Source Water Protection 104
10.8.1 Stormwater Runoff 104
10.8.2 The Application of Road Salt 104

10.8.3 The Storage of Snow Related to Roadway Clearing Operations 104
11 Timing of Implementation and Future Commitments 106
11.1 Project Schedule 106
11.1.1 Lapse of Time 106
11.2 Commitments for Future Work 106
Property Requirements 106
Archaeology 107
Built Heritage Resources and Cultural Heritage Landscapes 107
Noise 107
Natural Environment 108
Roadway Design 108
Active Transportation Facilities 109
Transit Provisions 109
Traffic Signals and Illumination 109
Streetscaping and Landscaping 109
Geotechnical and Pavement Design 110
Drainage and Stormwater Management 110
Utilities 110
Constructability, Staging and Detours 110
Additional Consultation and Coordination 111
Summary of Anticipated Permits and Approvals 111
Timing of Improvements 111
12 Public and Stakeholder Consultation 112
12.1 Consultation Approach 112
12.2 Key Consultation Milestones 113
12.3 Public Information Centre #1 113
12.4 Refinement and Confirmation of Preferred Alternative Solution 114
12.5 Public Information Centre #2 115
12.6 Notice of Completion 116
12.7 Agency and Stakeholder Consultation 116
12.8 Indigenous Group Consultation 117

List of Appendices

Appendix A – Preliminary Design Plates

Appendix B – Socio-Economic Environment
- B.1 Stage 1 Archaeology Assessment Report
- B.2 Cultural Heritage Resource Assessment Report

Appendix C – Contamination Overview Study

Appendix D – Natural Environment
- D.1 Natural Heritage Impact Assessment Report
- D.2 Tree Evaluation Report

Appendix E – Pavement/Geotechnical and Environmental Investigation and Preliminary Design Report

Appendix F – Drainage and Stormwater Management Report

Appendix G – Hydrogeology Report

Appendix H – Transportation Systems
- H.1 Long Range Transportation Plan Validation Memorandum
- H.2 Auxiliary Turn Lane Memorandum
- H.3 Traffic Signal Warrant Memorandum

Appendix I – Fluvial Geomorphic Assessment

Appendix J – Preliminary Cost Estimate

Appendix K – Air Quality Assessment Report

Appendix L – Noise Impact Study
- L.1 Noise Assessment Report
- L.2 Peel Region Private Noise Wall Conversion Policy
- L.3 Location of Private Noise Attenuation Walls along the Study Corridor

Appendix M – Structural Assessment Report

Appendix N – Public Consultation
- N.1 Notices
- N.2 Public Information Centre #1 Summary Report
- N.3 Public Information Centre #2 Summary Report
- N.4 Public Comments and Responses

Appendix O – Agency Consultation
Appendix P – Indigenous Group Consultation

List of Exhibits

Exhibit 1-1: Study Area Map 2
Exhibit 1-2: Components of the Municipal Class EA Process 4
Exhibit 1-3: Traditional vs. Airport Road Municipal Class EA Process 4
Exhibit 2-1: Planned Road Improvements in Brampton (Source: 2012 Peel LRTP) 13
Exhibit 3-1: Airport Road looking north of Braydon Boulevard/Stonecrest Drive (Google Streetview, October 2018) 16
Exhibit 3-2: Location of signalized and unsignalized intersections along the study area 17
Exhibit 3-3: Brampton Transit bus route serving the study area (Brampton Transit) 19
Exhibit 3-4: Brampton Transit Bus Stop Locations 20
Exhibit 3-5: Recommended 2031 Transit Network (source: Brampton Transit) 21
Exhibit 3-6: Existing Sidewalks (Google Streetview, October 2018) 21
Exhibit 3-7: Existing Pedestrian Network (STS 2018) 22
Exhibit 3-8: Future Active Transportation Network (STS 2018) 23
Exhibit 3-9: Cyclists riding on the sidewalk in the absence of cycling facilities (Google Streetview, August 2017) 24
Exhibit 3-10: General Land Use Designation along the study area (Source: City of Brampton Official Plan) 25
Exhibit 3-11: The Vale of Castlemore Secondary Plan (Source: City of Brampton) 26
Exhibit 3-12: Sandringham-Wellington Secondary Plan (Source: City of Brampton) 27
Exhibit 3-13: Typical cross-section of Airport Road within the study limits (Peel Region Road Characterization Study, 2013) 28
Exhibit 3-14: Notable streetscape elements along study area 29
Exhibit 3-15: Existing noise barriers within the Airport Road study area 30
Exhibit 3-16: Natural Heritage Resources along the Airport Road study area 32
Exhibit 3-17: Study Area and Water Crossing Locations 38
Exhibit 4-1: Mode share of residents within the study limits (Source: TTS 2011) 45
Exhibit 4-2: Mode share of commuters destined to the study area (Source: TTS 2011) 45
Exhibit 4-3: Mode share of commuters residing along Airport Road for trips 1 km and shorter (Source: TTS 2011) 46
Exhibit 4-4: Mode share of commuters destined to Airport Road for trips 1 km and shorter (Source: TTS 2011) 46
Exhibit 4-5: Mode share of commuters residing along Airport Road for trips 5 km and shorter (Source: TTS 2011) 47
Exhibit 4-6: Mode share of commuters destined to Airport Road for trips 5 km and shorter (Source: TTS 2011) 47
Exhibit 4-7: Points of interest and destinations along Airport Road 48
Exhibit 4-8: Existing pedestrian volumes at intersections along the study area 49
Exhibit 4-9: Existing cyclist volumes at intersections along the study area 50
Exhibit 4-10: Collisions by year and severity 53
Exhibit 4-11: Collisions by Severity and Location within the Study Area (January 2012 to December 2016) 55
Exhibit 4-12: Collisions by Environmental Conditions (January 2012 to December 2016) 57
Exhibit 4-13: Collisions by Light Conditions (January 2012 to December 2016) 57

Exhibit 6-1: Preferred Solution Cross-section 71
Exhibit 7-1: Preferred Design 78
Exhibit 9-1: Typical Cross-Section 84

List of Tables

Table 2-1: Provincial Planning Context 7
Table 2-2: Regional Planning Context 9
Table 2-3: Municipal Planning Context 14
Table 3-1: Intersections and Driveways on Airport Road 18
Table 3-2: Summary of Existing Pavement Structure on Airport Road 37
Table 3-3: Existing Storm Sewer System 39
Table 3-4 Hydraulic Analysis Results for the Transverse Culverts (Existing Condition) 40
Table 3-5: Streetlight Spacing along Airport Road within study limits 43
Table 4-1: Collisions based on Location and Types 51
Table 4-2: Segment Collision Analysis 51
Table 4-3: Intersection Collision Analysis 52
Table 4-4: Collisions by year and severity between January 2012 and December 2016 53
Table 4-5: Collisions by Severity and Location within the Study Area (January 2012 to December 2016) 54
Table 4-6: Collisions by Initial Impact Type and Location (January 2012 to December 2016) 56
Table 4-7: PSI and PSI Ranking for Segments 58
Table 4-8: PSI and PSI Rankings for Intersections 58
Table 5-1: Summary of Problems and Opportunities for Airport Road 60
Table 6-1: Long-list of Potential Alternative Solutions 61
Table 6-2: Screening of the Long-list of Potential Solutions Considered for Airport Road 62
Table 6-3: Alternative Solution Evaluation Criteria 63
Table 6-4: Evaluation of Alternative Solutions 65
Table 7-1: Criteria Used to Evaluate Alternative Designs 72
Table 7-2: Evaluation of Alternative Designs 74
Table 9-1: Roadway Design Criteria 81
Table 9-2: Drainage Area Summary 87
Table 9-3: Summary of Stormwater Management Plan 88
Table 12-1: Key Consultation Milestones 113

1 Introduction

The Regional Municipality of Peel (Peel Region) is responsible for monitoring its transportation network and implementing required improvements in a timely manner. As such, Peel Region's transportation and roadway management strategies under the 2017 Long Range Transportation Plan (PR-LRTP) have identified future road network needs for Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive within the City of Brampton. Implementation of works on Airport Road is scheduled by 2031 as per the 2017 PR-LRTP.

To further assess the transportation needs, Peel Region retained HDR to conduct the Airport Road Municipal Class Environmental Assessment (EA) study. The study is being conducted in accordance with the planning and design process for Schedule "C" projects as outlined in the Municipal Engineers Association, Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011, and 2015).

1.1 Purpose of the Project

The purpose of the Airport Road Class EA study is to determine specific improvements to accommodate the current and future transportation needs of pedestrians, cyclists, transit users and motorists along the Airport Road corridor from Braydon Boulevard/Stonecrest Drive to Countryside Drive within the City of Brampton.

In particular, the EA study has:

- Reviewed existing conditions and future transportation needs along this section of Airport Road;
- Identified opportunities for improvement and offered possible solutions to existing issues;
- Investigated and recommended alternative designs for the preferred solution; and,
- Collected, documented and assessed input and feedback from residents and affected groups within the study area.

While the need and justification for capacity improvements at Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive have been identified in previous studies such as the Peel Region Long Range Transportation Plan (2012, 2017), this Class EA study aims to update and confirm prior recommendations while also investigating potential active transportation improvements, to align with Peel Region's vision for a sustainable and healthy future.

At the onset of the study, the traffic horizon forecast for improvements was the year 2031. This has been revised subsequently through discussions with Peel Region to confirm that the recommendations and proposed improvements from this study address the growth through year 2041.

1.2 Study Area

Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive is a four-lane, north-south regional arterial located in the City of Brampton. The Airport Road Class EA spans approximately 1.6 kilometres in length and is illustrated in **Exhibit 1-1**.

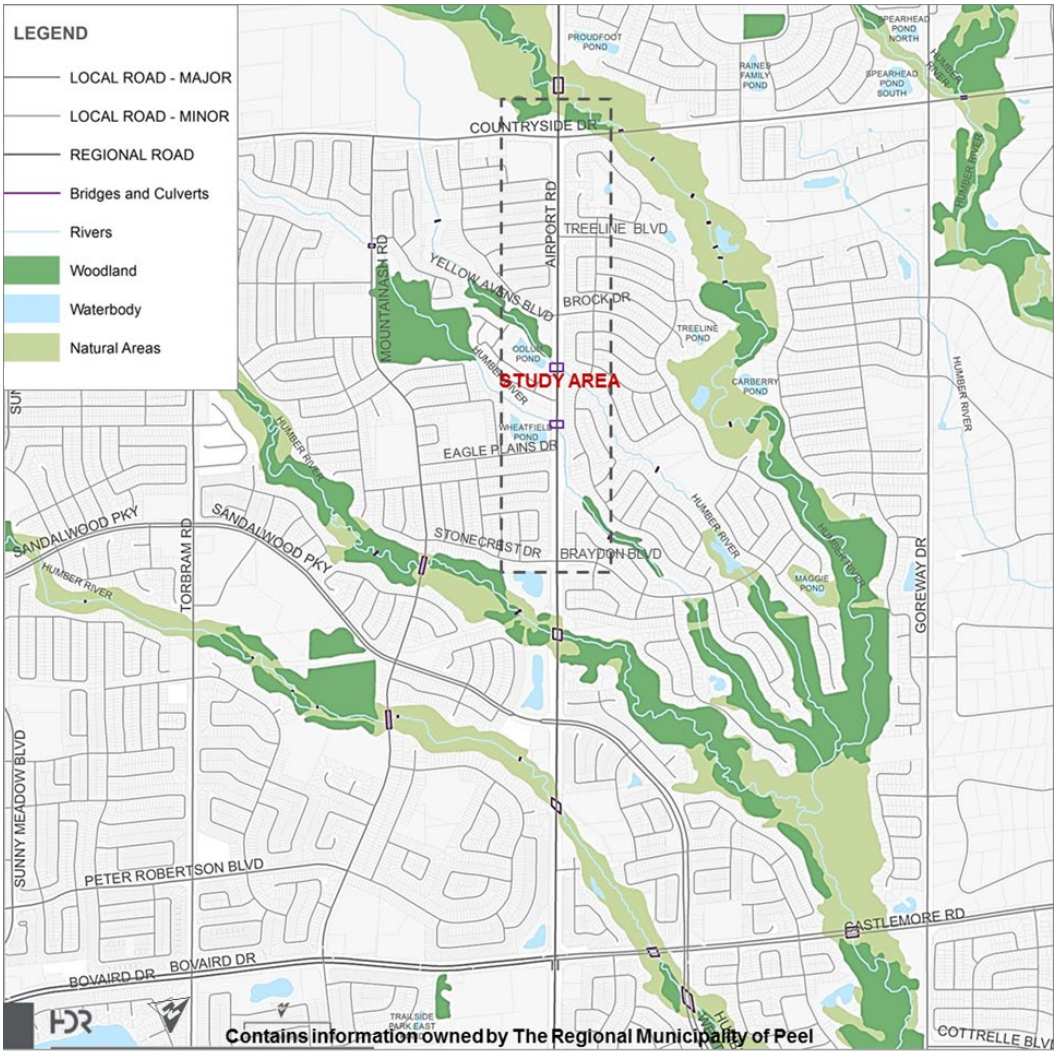


Exhibit 1-1: Study Area Map

1.3 Study Process

1.3.1 The Municipal Class Environmental Process

The Municipal Class EA is an approved Class EA process, in accordance with the Environmental Assessment Act of Ontario (EAA) that applies to municipal infrastructure projects including roads, water, and wastewater. This process provides a comprehensive planning approach to consider alternative solutions and evaluate their impact on a set of criteria (e.g. technical, environmental, social, cost) and determine any mitigating measures to arrive at a preferred alternative for addressing the problem (or opportunity).

The process involves consulting agencies (technical and regulatory), Indigenous groups, and public at the various project stages.

This Class EA was undertaken and prepared in accordance with the guidelines of the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). Due to the type of project, anticipated potential impacts, and estimated construction cost, the EA was conducted in compliance with a Schedule "C" project. A Schedule "C" project involves either the construction of new facilities or major expansions of existing facilities. For the existing facilities, this could include road widening, adjustments, and operational improvements. This study has completed the first four phases of the five-phase Class EA Process.

Exhibit 1-3 illustrates the sequence of activities within the approved Class EA process leading to project implementation. The phases for this study are described below:

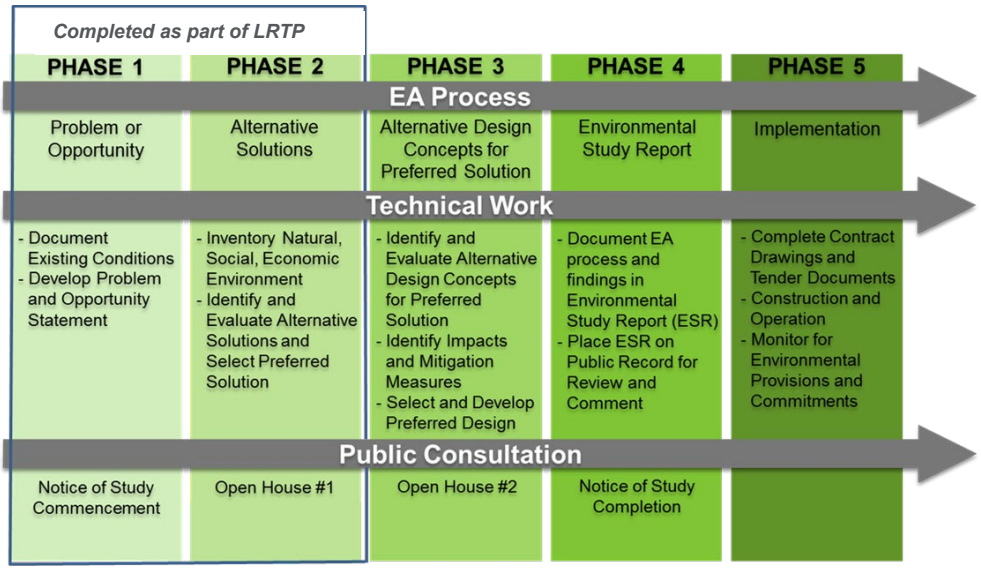
Phase 1 (Problem or Opportunity) – Identify the problem (deficiency) or opportunity.

Phase 2 (Alternative Solutions) – Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution by taking into account public and review agency input.

Phase 3 (Alternative Design Concepts for Preferred Solution) – Examine alternative methods of implementing the preferred solution, based on the existing environment, public and review agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects.

Phase 4 (Environmental Study Report) – Document in an Environmental Study Report a summary of the rationale, the planning, design, and consultation process of the project. Place the ESR on public record for a minimum 30 calendar days for review and notify completion of the ESR and provision for Part II Order requests.

Phase 5 (Implementation), which involves detailed design, preparation of contract drawings and tender documents, construction, operation, and monitoring, is not part of this study. The ESR provides information on the study background, problem statement, alternative solutions, alternative designs, and the public consultation process.



The needs assessment and alternative evaluation supporting Phase 1 and Phase 2 of the Class EA for Airport Road has been completed as part of Peel Region's 2012 LRTP

Exhibit 1-2: Components of the Municipal Class EA Process

A Transportation Master Plan (TMP) is typically conducted to examine the overall transportation system in order to outline a framework for planning for subsequent projects. Peel Region has conducted a Regional Transportation Master Plan, the PR-LRTP, which has addressed Phases 1 and 2 of the Municipal Class EA process. Traditionally, specific projects within a TMP would fulfill all appropriate Class EA requirements by addressing Phases 1 through 4; however, the Airport Road EA study has built upon the recommendations from Phases 1 and 2 of the PR-LRTP to form the basis of Phases 1 and 2 of the Class EA. The traditional process compared to the process being implemented for this Class EA is illustrated in **Exhibit 1-3**.

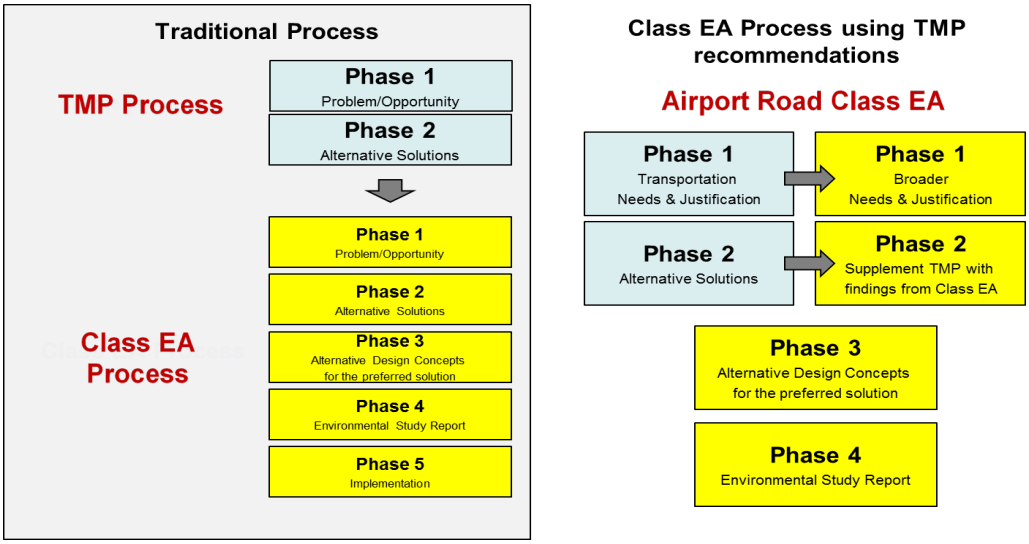


Exhibit 1-3: Traditional vs. Airport Road Municipal Class EA Process

This study builds on the findings from the PR-LRTP and reconfirms the needs and justification more closely at the corridor-level in terms of corridor-specific constraints and issues.

After the ESR is finalized, it is filed and placed on public record for a minimum of 30 calendar days for review by the public and review agencies. At the time the report is filed, a Notice of Completion of the Environmental Study Report will be advertised, advising the public and other stakeholders where the Environmental Study Report may be seen and reviewed, and how to submit comments. The Notice will also advise the public and other stakeholders of their right to request a Part II Order, and how and when such a request must be submitted.

1.3.2 Part II Orders

Under the Environmental Assessment Act, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment, Conservation and Parks (MECP) to require the proponent (Peel Region) to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order) before proceeding with the proposed undertaking. Part II of the Act addresses Individual Environmental Assessments. The Environmental Assessment Act was recently amended through Bill 197, Covid-19 Economic Recovery Act, 2020.

Any outstanding concerns are to be directed to the proponent (Peel Region) for a response, and in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests on those matters may be addressed in writing to the Minister of the Environment, Conservation and Parks and the Director of the Environmental Assessment Branch.

The Region cannot proceed with the Airport Road project until at least 30 days after the end of the comment period provided in the Notice of Completion. Further, the project may not proceed after this time if:

- a Part II Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed Order regarding the project.

1.3.3 Canadian Environmental Assessment Act (CEAA)

Under the *Canadian Environmental Assessment Act, 2012 (CEAA 2012)*, a federal environmental assessment study may be required to the physical activities that constitute a "designated project", under the project list identified in the *Regulations Amending the Regulations Designating Physical Activities, 2013*. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts to matters of federal jurisdiction. The Airport Road EA study does not constitute a "designated project" and therefore does not require a federal environmental assessment under the CEAA, 2012.

However, the Minister of the Environment may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

2 Planning Context

Summaries of the Provincial, Regional, and Municipal planning and policy contexts are provided in this section as they relate to the Airport Road Schedule "C" Class EA.

2.1 Provincial Planning Context

Provincial planning policies were reviewed to identify their relevance to the Airport Road Class EA. Regional plans are outlined and summarized in **Table 2-1**.

Table 2-1: Provincial Planning Context

Provincial Planning Document	Description/Relevance
Provincial Policy Statement (2020)	The PPS provides direction related to the creation of efficient land use and development patterns which "support sustainability by promoting strong, liveable, healthy and resilient communities, protecting the environment and public health and safety, and facilitating economic growth". Key directions in the PPS which are relevant to transportation planning for the Airport Road EA study include: • recognizing the importance of striking a balance between growth and infrastructure provision • offering a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation • supporting public streets, spaces and facilities that are safe, meet the needs of all users, foster social interaction and facilitate active transportation, community connectivity and improved public health • protecting natural heritage systems and conserving built heritage resources and cultural heritage landscapes, as well as archaeological resources.
Oak Ridges Moraine Conservation Plan (2017)	Originally published in 2002, the ORMCP provides direction on how to protect the Moraine's ecological and hydrogeological features. No section of the Study Corridor falls within the boundary of the Oak Ridges Moraine.

Provincial Planning Document	Description/Relevance
Greenbelt Plan (2017)	Updated in 2017 as a result of the Co-ordinated Land Use Planning Review, the Greenbelt Plan identifies environmentally and agriculturally protected lands within the Greater Golden Horseshoe, where urbanization should not occur, in order to protect ecological features. The Airport Road study corridor between Braydon Boulevard/Stonecrest Drive and Countryside Drive does not fall within the boundaries of the Greenbelt Plan.
Places to Grow Act / Growth Plan for the Greater Golden Horseshoe (2006, 2017)	Originally adopted in 2006, the 2017 update sets forth a framework for implementing the Government of Ontario's 2041 vision for building stronger, prosperous communities by better managing growth in the region. Within Peel Region, two Regional Centres (Downtown Mississauga and Downtown Brampton) are designated as Urban Growth Centres. The land around the Airport Road corridor is classified as a 'built-up' area in the plan (Schedule 4).
The Big Move (2008, Approved Changes 2013)	The Big Move identifies a 25-year plan for the Regional Rapid Transit and Highway Network and sets forth a vision for Regional Express Rail (RER). The plan does not identify any transportation improvements within the study area.
Provincial Co-ordinated Plan Review (2017)	The Province completed a simultaneous review of the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Greater Golden Horseshoe Growth Plan. This Coordinated Review of the four plans recognizes their common geography and the interconnected nature of their policies and provides an opportunity to assess progress to date, address challenges and make improvements to strengthen the plans and ensure a vibrant, healthy region for current and future generations. The Plan Review's role is to develop consensus-based recommendations to the Ministers of Municipal Affairs and Housing, and Natural Resources and Forestry on ways to amend and improve the plans. The review recommends increased efforts to curb sprawl, build complete communities, grow the Greenbelt, support agriculture and address traffic congestion. The proposed revisions were released in May 2017 and do not affect the study corridor.
#CycleON: Ontario's Cycling Strategy (2013)	The document provides a route map to support and encourage growth in cycling to 2033 and beyond. The Airport Road EA study will explore options that are cyclist-friendly in accordance with the recommendations of Ontario's Cycling Strategy.

2.2 Regional Planning Context

Regional planning policies were reviewed to identify their relevance to the Airport Road Class EA. Regional plans are outlined and summarized in **Table 2-2**.

Table 2-2: Regional Planning Context

Regional Planning Document	Description/Relevance
Peel Region Official Plan Update (PR-OP) (2018)	The Official Plan provides direction to guide economic, environmental, and community-building decisions to manage growth. The Region of Peel completed the Peel Regional Official Plan Review (February 2013 Draft) to bring its Official Plan policies into conformity with provincial requirements. The main objectives of the PR-OP is to recognize the urban and rural natures of Peel Region, protect the natural and cultural environment, manage resources, direct sustainable growth and set the basis for providing Regional services in an efficient and effective manner. The Official Plan establishes a framework for future planning activities and for public and private initiatives aimed at improving the existing physical environment. The PR-OP identifies the study area as a Major Road (PR-OP Schedule E) with midblock right-of-way requirements of 45 metres (PR-OP Schedule F).
Peel Region Long Range Transportation Plan (PR-LRTP) (2019)	The Peel Long Range Transportation Plan (LRTP), last updated in 2019, identifies major transportation challenges that the Region of Peel expects to face over the next several decades, as well as appropriate policies, strategies and planned road improvements to address these challenges. Further information pertaining to transportation infrastructure improvements as documented in the Region's LRTP is described within **Section 2.2.1** of this report.
Region of Peel Road Characterization Study (RCS) (2013)	Completed in 2013, the Road Characterization Study provides guidelines for future Regional roadways that respect multiple transportation modes and ensures that the Regional arterial transportation network considers all road users, transportation options, health impacts, and local context. Assigning a Road Character to a road allows for the road to be designed in a way that is more context sensitive and balances the need for mobility with that of land access. The RCS characterizes Airport Road within the study area as a Suburban Connector.

Regional Planning Document	Description/Relevance
Region of Peel Active Transportation Study (2012)	In 2012, Peel Regional Council approved Peel Region's first Active Transportation Plan. The Plan provides a framework for how the Region will increase the share of walking and cycling trips, improved links with transit, and create a pedestrian and cycling friendly environment. It also sets out policies, recommends active transportation improvements and outlines strategies and programs to shift travel behaviour. The Region of Peel Active Transportation Study identifies the Airport Road study area as being part of a Provincial-designated Growth Area within residential and mixed-use areas.
Region of Peel Sustainable Transportation Strategy (STS) (2018)	The STS was approved by Peel Regional Council in February 2018 and sets a goal of a 50% sustainable mode share by 2041. The STS builds on the framework established by the 2012 Active Transportation Plan, focusing on active transportation and transportation demand management to ensure sustainable long-term growth and for healthy and livable communities. The STS lays out the short-term priorities such as the locations of new and upgraded walking and cycling infrastructure, and measures to encourage cycling and walking to and from schools, transit hubs, and other community destinations. Airport Road within the study limits is planned to have a Multi-use trail per the STS Proposed Long Term Cycling Network (Appendix C-2).
Region of Peel Strategic Goods Movement Network Study (SGMNS) (2013)	The SGMNS identified potential truck priority routes for goods movement to develop a hierarchical truck route network throughout Peel Region. The goal of the SGMNS is to improve, prioritize and preserve goods movement corridors through the Region. Airport Road within the study area is identified in the SGMNS as Primary Truck Route. The existing road geometry and the subbase material make the road suitable for truck traffic in its current state.

Regional Planning Document	Description/Relevance
Peel Region Vision Zero Road Safety Strategic Plan (RSSP) (2018-2022)	The Road Safety Strategic Plan (RSSP) sets out the vision, goals, and an action plan to create safer roads by reducing, and ultimately eliminating motor vehicle collisions causing injury and death. The RSSP promotes healthy and age-friendly built environments and building a community that promotes safe mobility, walkability, healthy living, and various modes of transportation. Moreover, the RSSP is one of the three component studies of the Region's Long-Range Transportation Plan and serves as the implementation plan for achieving the Region's safe mobility objective. The Airport Road EA study is aligned with the RSSP priorities, including improving the experience of road users most vulnerable to fatal collisions. The RRSP's proposed action plan was consulted for measures to improve the pedestrian and cyclist experience.
Region of Peel's Healthy Development Assessment User Guide (HDAUG) (2016)	The Healthy Development Assessment User Guide (HDAUG) aims to assist planning and development stakeholders in creating healthy, supportive environments. The HDAUG is a collection of local, context specific tools that assess the health-promoting potential of communities and assess the density, service proximity, land use mix, street connectivity, streetscape characteristic and parking. The Airport Road EA study has reviewed and incorporated where feasible the recommendations of the HDAUG, particularly with respect to streetscape characteristics including but not limited to active transportation facility widths, street tree planting, intersection treatments, traffic calming measures, pedestrian prioritization, public amenities and lighting.

2.2.1 Peel Region Long Range Transportation Plan (2019)

The purpose of the 2019 Peel Region Long Range Transportation Plan Update (PR-LRTP) was to identify the transportation challenges anticipated by the Region over the next 20 years, as well as appropriate policies, strategies and a road improvement plan.

The LRTP Update:

- Ensured that transportation planning decisions are made within the context of changes in provincial legislation and general transportation and land use trends;
- Served as input to other studies, including Environmental Assessments; and
- Supported transportation policies in the Regional Official Plan (ROP).
- Sought to address challenges pertaining to population growth, congestion, economic competitiveness and sustainability

These four objectives re streamlined into several main policy areas that will affect the development of preliminary design alternatives for the Airport Road corridor. These policy areas include:

- Transportation Vision, Goals, Objectives and Policies, which provide a framework for developing and coordinating future actions and programs to improve transportation in Peel Region
- Regional road improvements required by 2031
- Regional strategies, studies and action plans in goods movement, transportation demand management, and other sustainability initiatives
- Implementation and Performance Measurement Plan

The scope of Master Plans such as the LRTP is broad and includes analysis of the system in order to outline a framework for future works and developments. They do not typically address site-specific issues. However, they do satisfy the requirements of Phases 1 and 2 of the Municipal Class EA process including problem identification and alternative planning solutions.

For the Airport Road EA study, the work completed in preparing the LRTP has satisfied the first two phases of the Municipal Class EA process, identifying the need for Airport Road widening.

The widening of Airport Road from four to six lanes was identified in the LRTP for the year 2027 as shown in **Exhibit 2-1.** The widening is needed to address projected capacity deficiencies in northeast Brampton/southeast Caledon resulting from planned growth. The improvements will also benefit goods movement and provide opportunities to enhance the active transportation network.

Additionally, the LRTP reviewed Brampton Transit Züm Phases 1 and 2. No transit improvements are specified for Airport Road within the study limits through 2031.

Over the course of this Airport Road EA study, updates to the LRTP have been completed in 2017 and 2019, retaining the recommendation for the widening of Airport Road within the study limits to six lanes by 2031. The most recent update, approved in June 2019, specified that improvements to Airport Road are included as part of the 2019 approved budget.

Exhibit 2-1: Planned Road Improvements in Brampton (Source: 2012 Peel LRTP)

2.3 Municipal Planning Context

Municipal planning policies were reviewed to identify their relevance to the Airport Road Class EA. Regional plans are outlined and summarized in **Table 2-3**.

Table 2-3: Municipal Planning Context

Municipal Planning Document	Description/Relevance
City of Brampton Official Plan Update (2015 Consolidation)	Provides guidance on responsible future development in the City of Brampton through several guiding principles, including, growth management, environmental stewardship, economic prosperity, and transportation/transit development. It provides a framework for decision-making regarding land-use planning, and the requirement of municipal services to support growth. Schedule A (Land Use Plan) designates the majority of the study area as Residential. Natural areas surrounding the 2 creeks that cross Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive are designated as Open Area. Schedule B (Road Hierarchy) identifies Airport Road within the study limits as a Regional Major Arterial. Schedule C (Transit Network) designates the study area as a Primary Transit Corridor.
City of Brampton Transportation Master Plan Update (2015)	The City of Brampton TMP addresses existing challenges and makes recommendations to provide sustainable transportation solutions to manage the transportation impacts and address travel demand associated with future growth. The Master Plan establishes a transportation system to better serve residents, employers, employees and visitors while accommodating all modes of transportation (e.g., public transit, commuter travel, commercial vehicles and active transportation). The TMP's 2041 Road Network Map shows Airport Road as a Regional Road Expanded to Six Lanes within the study area limits. The Transit Network Needs to 2041 designate the study area as a Support Corridor. Additionally, Boulevard Paths are proposed along Airport Road to serve cycling needs according to the Active Transportation Plan.

Municipal Planning Document	Description/Relevance
City of Brampton Secondary Plans (2015)	Secondary plans guide how Official Plan policies are implemented and represent detailed plans for specific areas of the City – new communities, employment areas, older neighbourhoods and downtown. These plans provide more details on elements such as land use, community design, natural heritage, roads and parks. Two Secondary Plan Areas surround Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive. The Vales of Castlemore Secondary Plan applies to the land east of the study area and is mostly zoned for low density residential. The Sandringham-Wellington Secondary Plan applies to the lands west of Airport Road. It is zoned for low-density residential for the most part, with several locations designated for highway, convenience and neighbourhood commercial uses.

3 Existing Conditions

The following sections document information related to existing conditions including the built, socio-economic, cultural heritage and natural environments, and existing infrastructure along the study corridor.

3.1 Transportation Network

3.1.1 **Existing Facilities**

Within the study limits, Airport Road (Regional Road 7) is currently a four-lane, north-south regional arterial with a posted speed of 70km/h and exclusive northbound/southbound left and right-turn lanes at signalized intersection locations.

The Peel Region Official Plan has identified the road as a Major Road (PR-OP Schedule E) with midblock right-of-way requirements of 45 m (PR-OP Schedule F). The existing right-of-way varies between 44m and 57m along the corridor's length.

Exhibit 3-1 depicts a typical cross-section of Airport Road, looking north of Braydon Boulevard/Stonecrest Drive.

Exhibit 3-1: Airport Road looking north of Braydon Boulevard/Stonecrest Drive (Google Streetview, October 2018)

The intersections of Airport Road at Braydon Boulevard/Stonecrest Drive, Yellow Avens Boulevard/Brock Drive and Countryside Drive are signalized with raised medians, while the intersections at Eagles Plain Drive, Camrose Street and Treeline Boulevard are unsignalized. The locations of signalized and non-signalized intersections are depicted in **Exhibit 3-2**.

Airport Road is a key north-south road that provides direct connections to major east-west arterials including Mayfield Road and Bovaird Drive/Castlemore Road. In addition, should the GTA West Transportation Corridor be implemented by MTO, Airport Road is anticipated to serve a greater regional role.

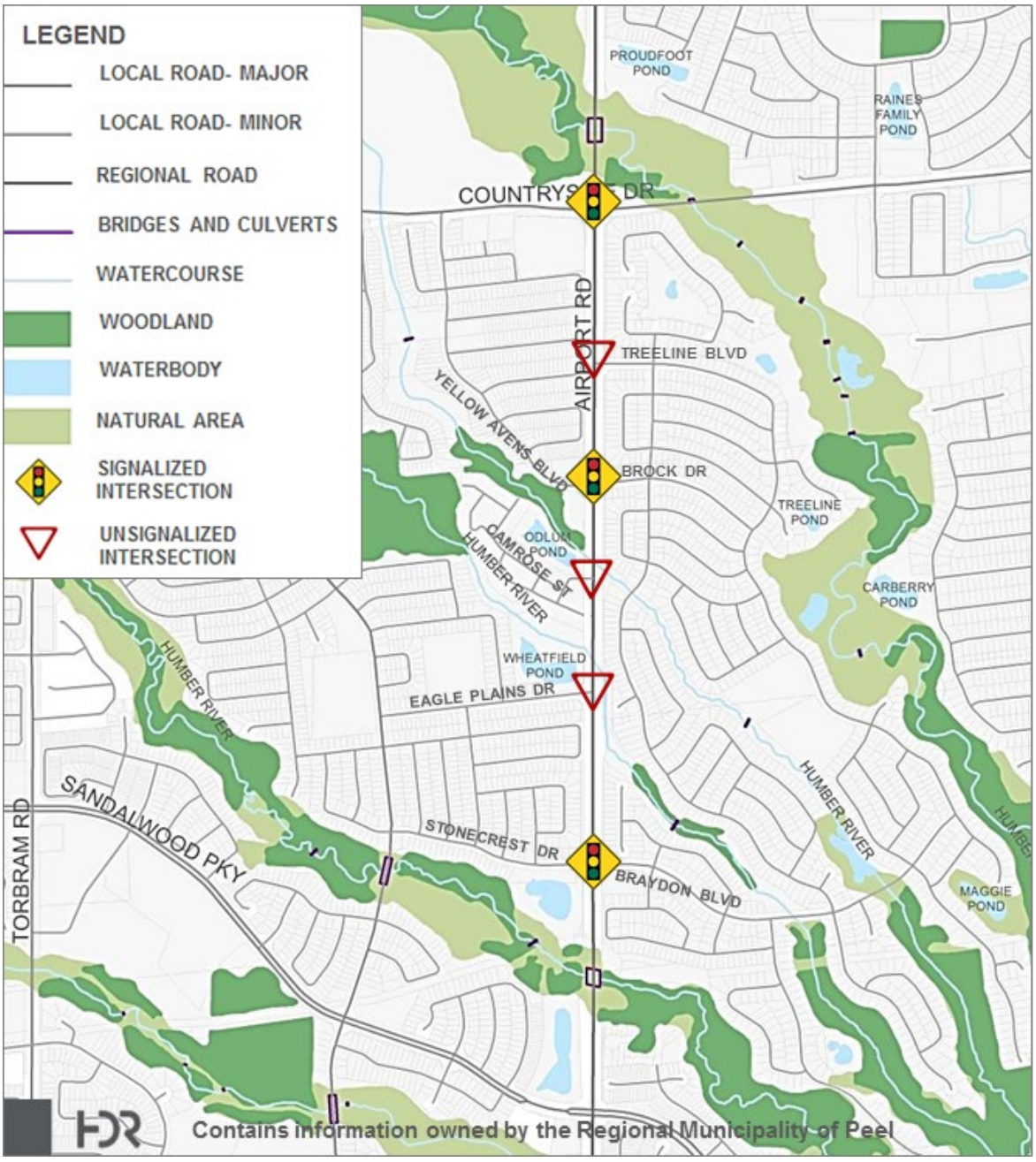


Exhibit 3-2: Location of signalized and unsignalized intersections along the study area

3.1.2 Existing Access Locations

Regional access management guidelines limit the number of access points along regional roads to optimize transportation operations, based on the road classification. The number of access points along Airport Road between Braydon Boulevard/ Stonecrest Drive and Countryside Drive is minimal. Only two access points that are not main or local roads exist and allow ingress/egress to retail plazas. The shopping plazas and their parking lots are located on the southwest quadrants of the intersections with Countryside Drive and Yellow Avens Boulevard.

The access points for each section of the corridor separated by major intersection are summarized in **Table 3-1**.

Table 3-1: Intersections and Driveways on Airport Road

Road Link	Intersecting Roads (excluding road link extremities)	Commercial Parking Lots/ Driveways	Residential Driveways	Total
Braydon Boulevard / Stonecrest Drive to Yellow Avens Boulevard/ Brock Drive	2	1	0	3
Yellow Avens Boulevard/ Brock Drive to Countryside Drive	1	1	0	2

Within the study limits, there are 6 streets that intersect Airport Road. Some of these roads are arterial while others are collector and local roads.

3.1.3 Existing Truck Restrictions

Airport Road within the study area is identified as a Primary Truck Route in the Strategic Goods Movement Network Study. There are currently no restrictions on trucks on Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive.

3.1.4 Future Road Improvements

The widening of Airport Road from four to six lanes is identified in the Peel Region LRTP (2012 and 2017) by 2031 and is described in more detail in **Section 2.2.1.**

3.1.5 Transit Network

3.1.5.1 EXISTING TRANSIT NETWORK

The 30 Airport Road is currently the only Brampton Transit (BT) bus route serving the study area. The bus runs between the Westwood Mall Terminal and the intersection of Airport Road and Mayfield Road. There are six instances throughout a typical weekday that the bus route originates and terminates at the AMB Distribution Centre instead, which is located just north of the Airport Road and Mayfield Road stop. The route showing major stops is illustrated in **Exhibit 3-3.**

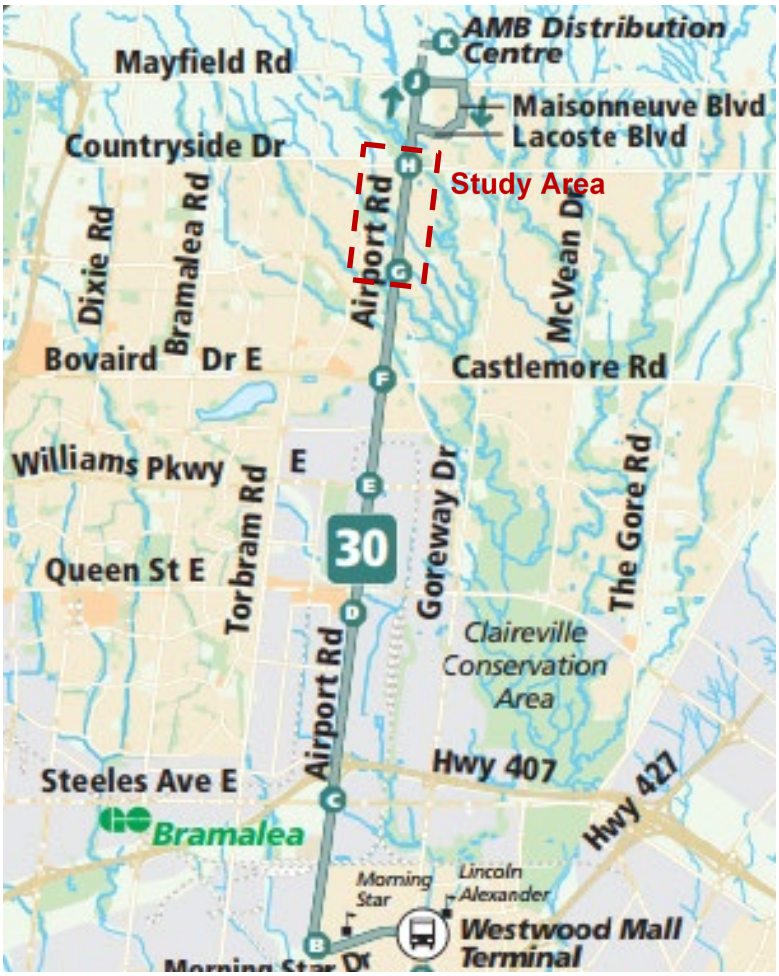


Exhibit 3-3: Brampton Transit bus route serving the study area (Brampton Transit)

On weekdays, the bus frequency varies between every 8 minutes during the peak periods and 30 minutes during the off-peak. Service is less frequent on weekends, when buses run every 30 minutes between 6AM and midnight.

The bus stops locations within the study area are depicted in **Exhibit 3-4**. Northbound bus stops are located 520m apart on average, while southbound stops are more frequent and have separation distances averaging 300m.

The largest separation distance between bus stops is approximately 920m and extends from Braydon Boulevard/Stonecrest Drive and Yellow Avens Boulevard / Brock Drive. A petition for a new bus stop across Eagle Plains Drive was filed by residents in 2012. The petition, signed by 65 community members, also asked for a push button sign that can facilitate safe crossing of Airport Road. According to the letter to councilors, the large separation between bus stops impacted Eagle Plains School staff and students and posed concerns to the safety of women at night hours.

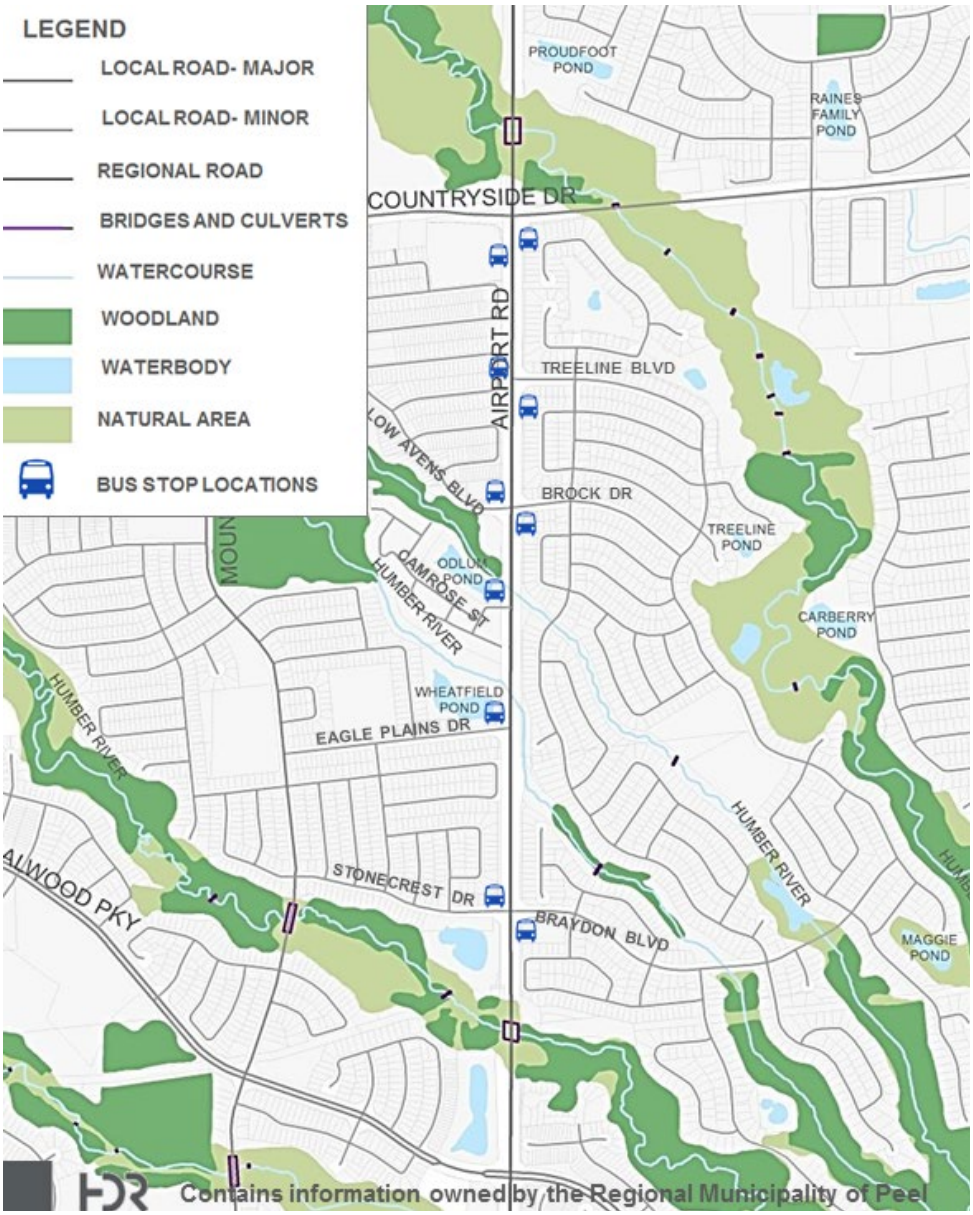


Exhibit 3-4: Brampton Transit Bus Stop Locations

3.1.5.2 2031 TRANSIT NETWORK

The City of Brampton has set a transit mode share goal of 16% by 2031 in its 2015 TMP Update. To achieve its objective, the TMP recommends that higher-order transit facilities be implemented in strategic locations connected to Support Corridors. Airport Road within the study limits is designated as a Support Corridor in 2031. **Exhibit 3-5** presents the recommended transit network in 2031.

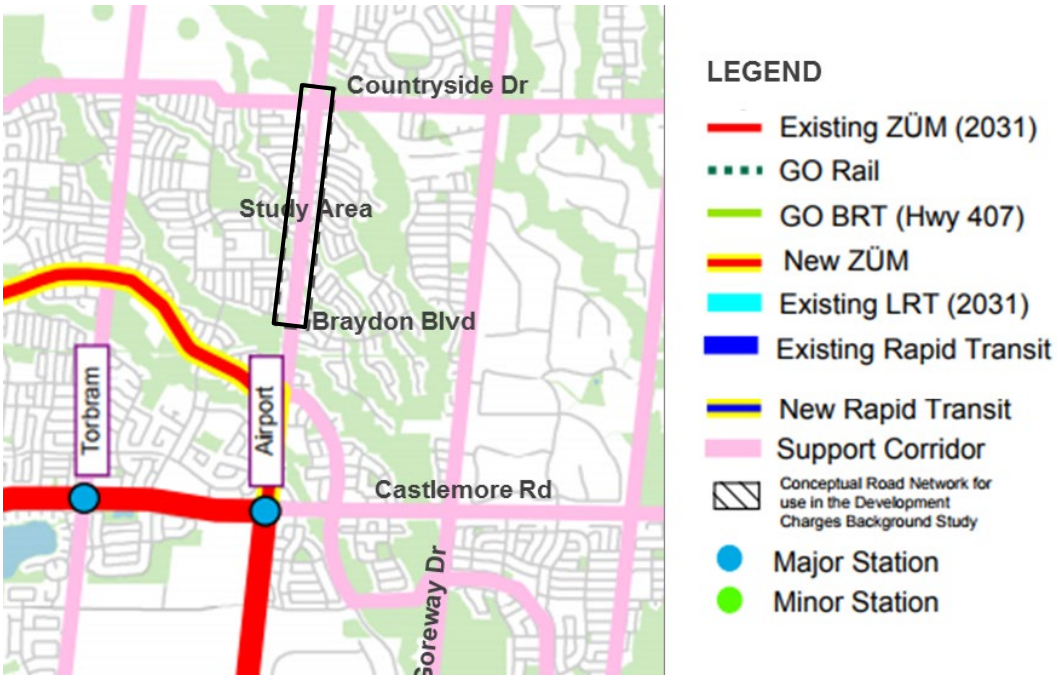


Exhibit 3-5: Recommended 2031 Transit Network (source: Brampton Transit)

3.1.6 Active Transportation Network

3.1.6.1 EXISTING AND FUTURE PEDESTRIAN FACILITIES

There are continuous sidewalks along both the east and west sides of Airport Road within the study limits. The sidewalks' minimum widths of 1.5m comply with the Accessibility for Ontarians with Disabilities Act (AODA). The sidewalks are also separated from the road by grass boulevards that vary between 2m and 7m in width and asphalt splash pads throughout the corridor, as seen in **Exhibit 3-6.**

Exhibit 3-6: Existing Sidewalks (Google Streetview, October 2018)

No sidewalk gaps are identified within the study limits per the 2018 Peel Region Sustainable Transportation Strategy, as seen in **Exhibit 3-7.**

Exhibit 3-7: Existing Pedestrian Network (STS 2018)

The proposed long-term pedestrian network includes a multi-use trail on Airport Road within the study limit, per **Exhibit 3-8**.

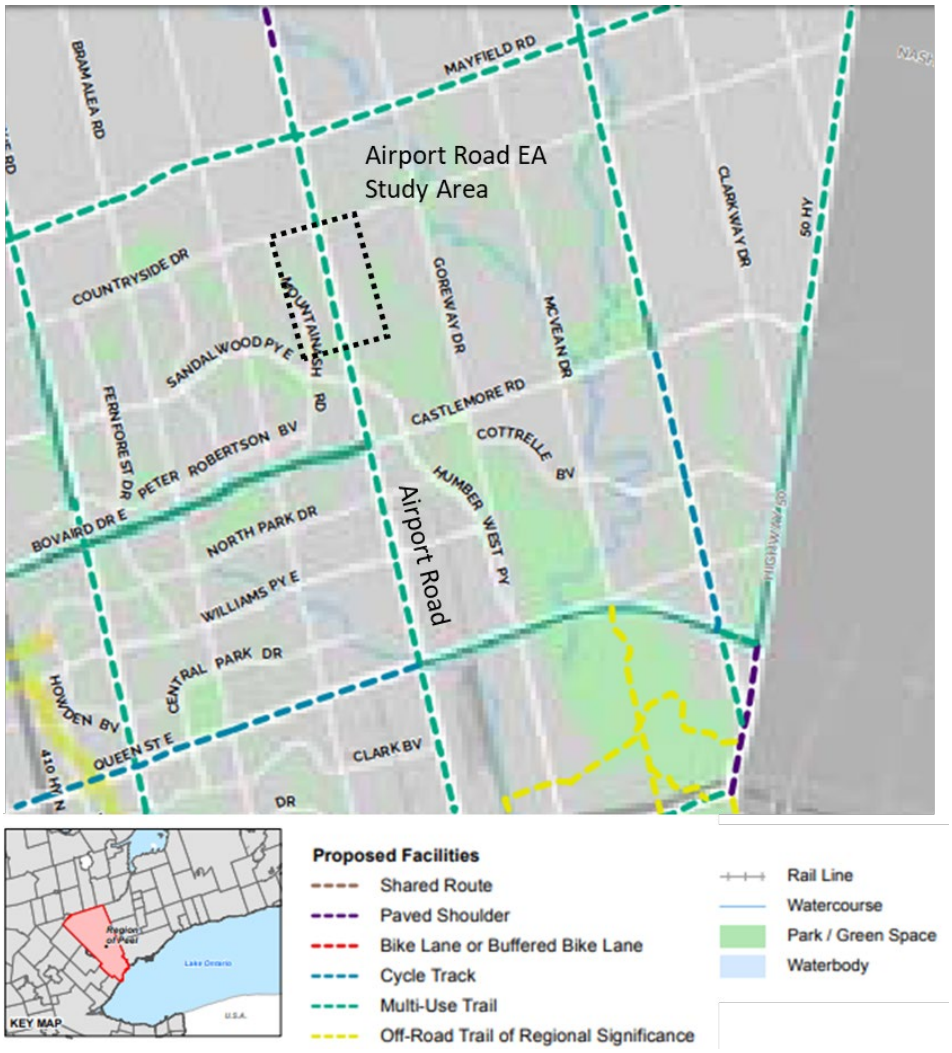


Exhibit 3-8: Future Active Transportation Network (STS 2018)

3.1.6.2 EXISTING AND FUTURE CYCLING FACILITIES

Currently, there are no cycling facilities on Airport Road within the study limits. Cyclists must share travel lanes with vehicular traffic, or ride on the sidewalk as was observed in a site visit in August 2017 (**Exhibit 3-9**).

Exhibit 3-9: Cyclists riding on the sidewalk in the absence of cycling facilities (Google Streetview, August 2017)

The 2018 Peel Region Sustainable Transportation Strategy recommends the implementation of a multi-use trail on Airport Road within the study limits by 2031, as illustrated in **Exhibit 3-8.** The Plan notes that "Along Regional roads, the general policy for pedestrian facilities is that they should be provided on both sides of the road within urban and rural settlement areas, and may consist of sidewalks and/or multi-use trails".

3.2 Socio-Economic Environment

3.2.1 **Existing Land Use**

The predominant land use type adjacent to Airport Road through the study limits is low-rise residential, as seen in **Exhibit 3-10**.

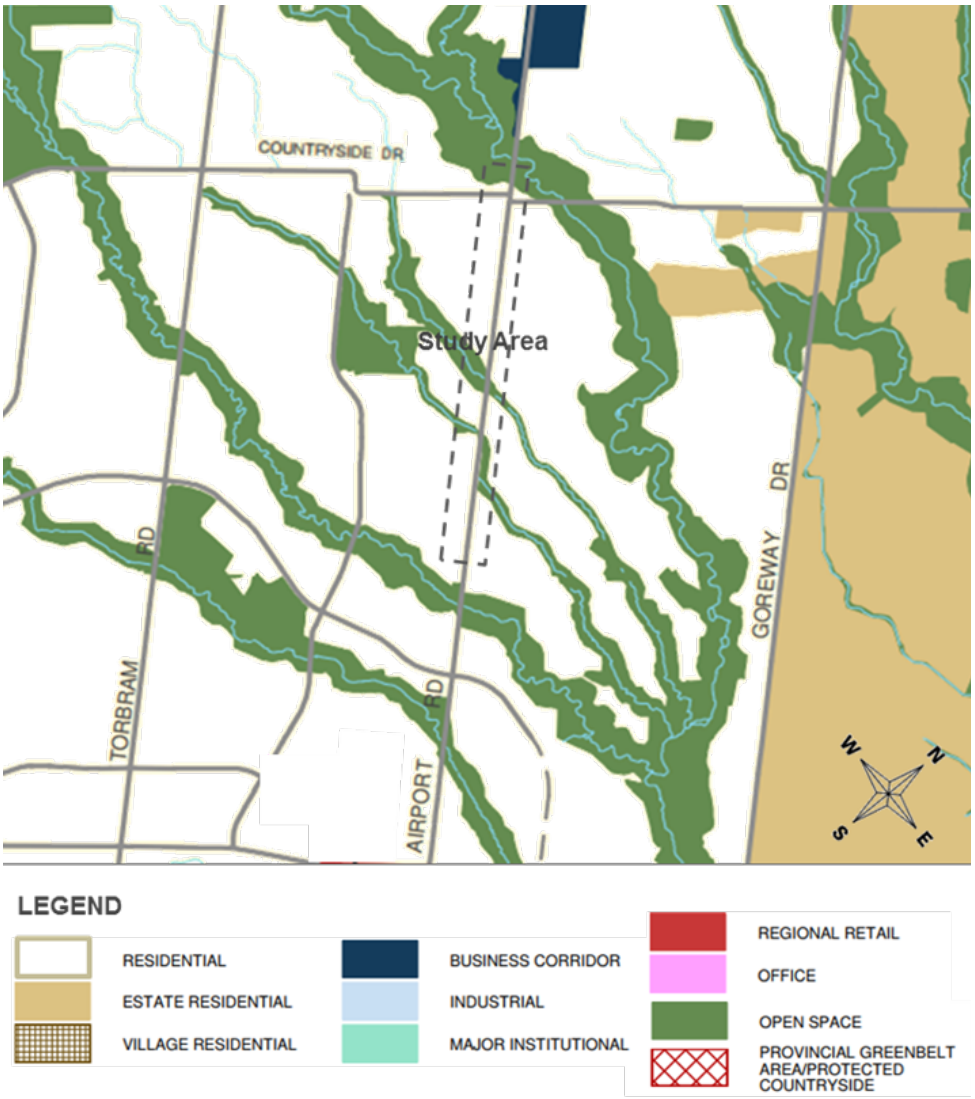


Exhibit 3-10: General Land Use Designation along the study area (Source: City of Brampton Official Plan)

Two Secondary Plans provide additional information on the land use surrounding Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive. The Vales of Castlemore Secondary Plan applies to the area east of Airport Road and is mostly zoned for low density residential, as illustrated in **Exhibit 3-11**.

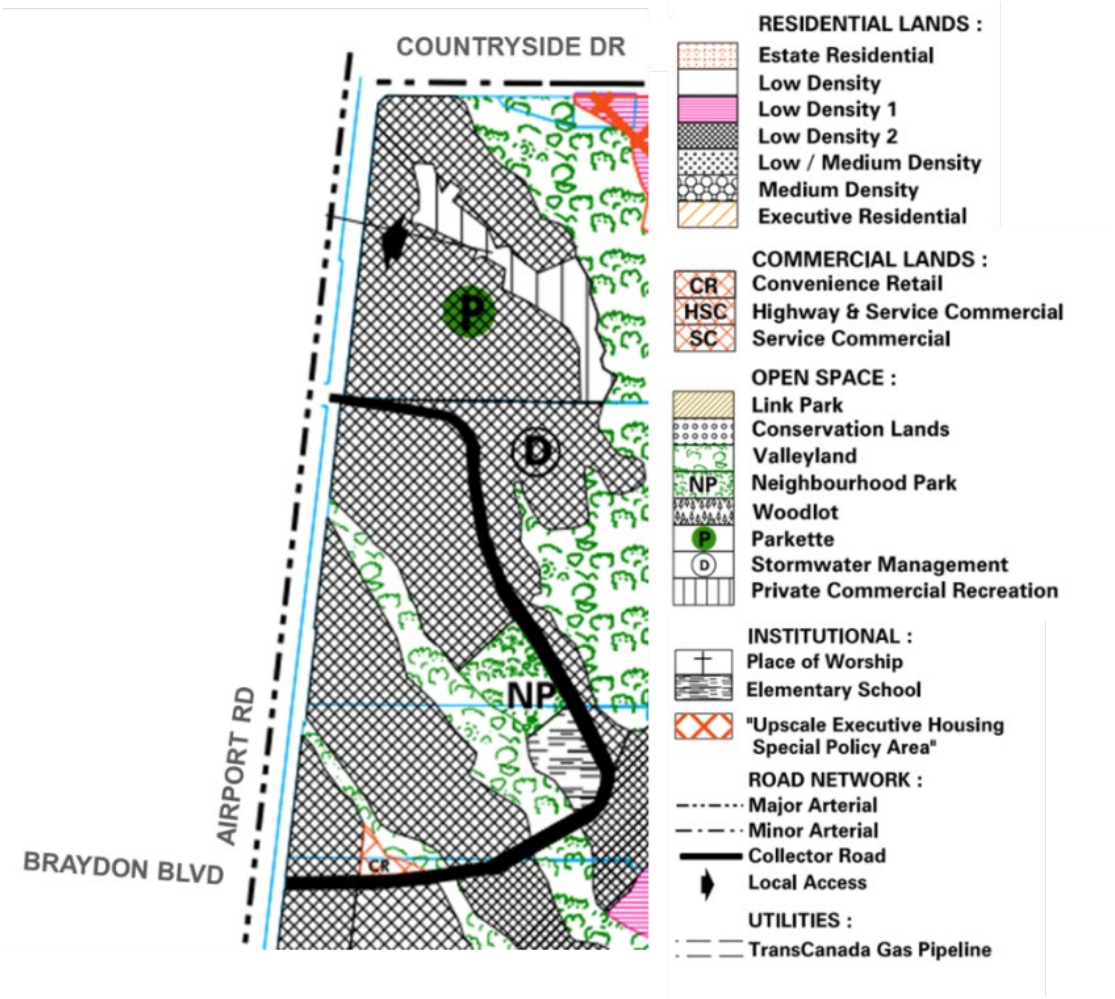


Exhibit 3-11: The Vale of Castlemore Secondary Plan (Source: City of Brampton)

The Sandringham-Wellington Secondary Plan applies to the lands west of Airport Road. That area is designated mostly for low-density residential, with several locations zoned for highway, convenience and neighbourhood commercial uses, as depicted in **Exhibit 3-12**.

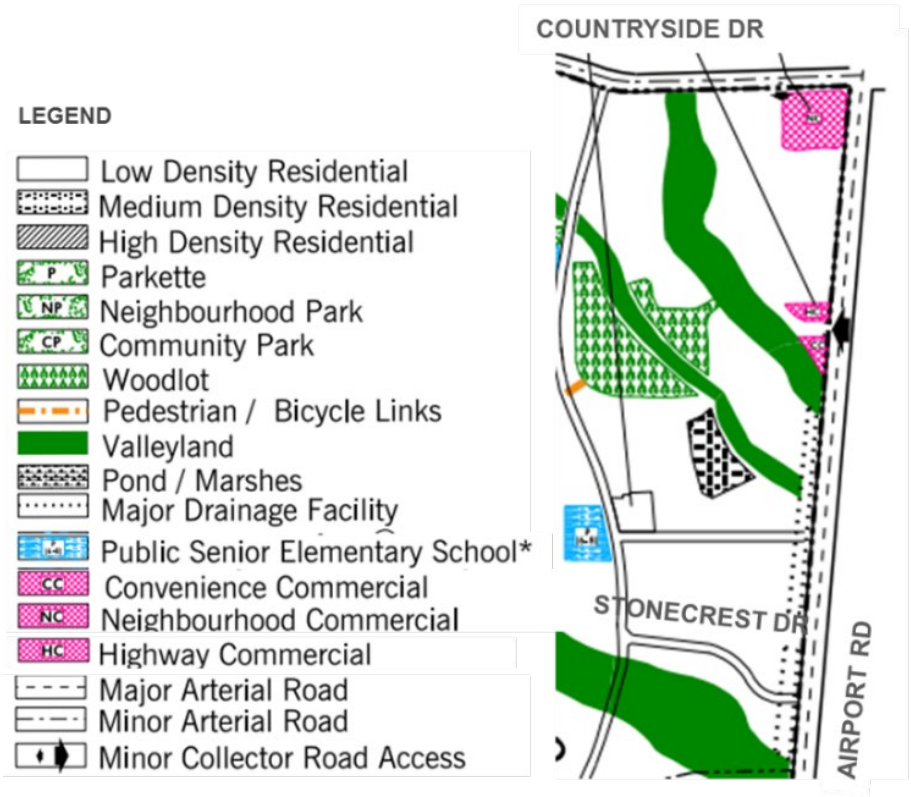


Exhibit 3-12: Sandringham-Wellington Secondary Plan (Source: City of Brampton)

3.2.2 Archaeology

A Stage 1 Archaeological Assessment was completed as part of the Airport Road EA study. The background research and property inspection was performed in accordance with the Ontario Heritage Act (1990, as amended in 2009) and the standards administered by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI). The assessment can be found in **Appendix B**.

The report determined that 23 previously registered archaeological sites are located within one kilometre of the study area. The property inspection determined that parts of the study area exhibit archaeological potential and will require Stage 2 assessment.

In light of these results, the report recommended the following:

1. Parts of the study area adjacent to Salt Creek tributaries and the north side of Countryside Drive adjacent to the right-of-way exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed impacts to the property;
2. The remainder of the study area does not retain archaeological potential on account of deep and extensive land disturbance. These lands do not require further archaeological assessment; and,

3. Should the proposed work extend beyond the current study area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

3.2.3 Built Heritage Resources and Cultural Heritage Landscapes

A Cultural Heritage Resource Assessment was conducted as part of the Airport Road EA study. The report, found in **Appendix B**, presents an inventory of cultural heritage resources, outlines existing conditions of the Airport Road study area, identifies impacts to cultural heritage resources, and proposes appropriate mitigation measures.

The assessment revealed that Airport Road within the study limits has a rural land use history dating back to the early nineteenth century. A field review was conducted for the entire study area to confirm the location of previously identified cultural heritage resources and document newly discovered ones.

The report determined that one cultural heritage resource is located within or adjacent to the Airport Road EA study area. The identified cultural heritage resource (identified as CHL 1) includes two tributaries of the Humber River, a Canadian Heritage River.

3.2.4 Streetscape Environment

Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive is characterized as a suburban connector, according to the Peel Region Road Characterization Study (2013). A suburban connector is composed of a vehicle zone (travel lanes), a median zone, separate pedestrian/cycling zones (in the form of a multi-use path), curb and gutter, splash strip and green zones. **Exhibit 3-13** shows a typical cross-section for a suburban connector.

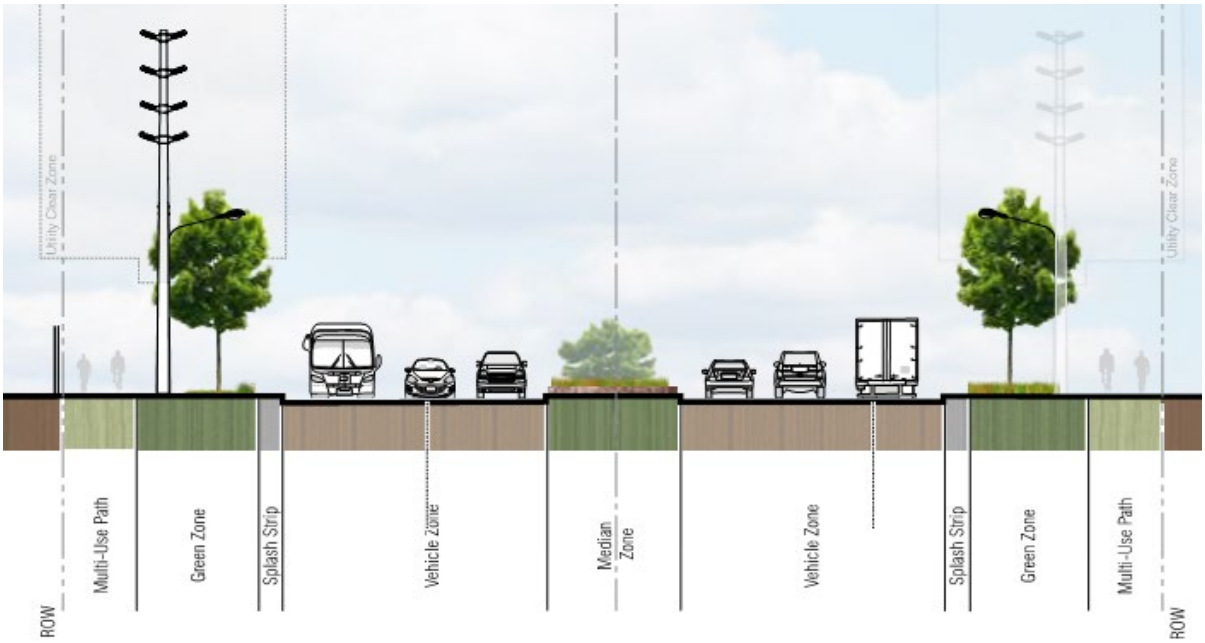


Exhibit 3-13: Typical cross-section of Airport Road within the study limits (Peel Region Road Characterization Study, 2013)

As mentioned in **Section 3.1.1**, Airport Road has a right-of way of 45m. Bi-directional traffic is separated by a concrete median that varies in width between 2m and 6m. Asphalt splash pads and grassy boulevards act as buffers between the sidewalks and the roadway. Utility poles line the west side of the corridor. Noise walls and berms protect adjacent subdivisions from noise while limiting direct access onto Airport Road.

Airport Road currently has an auto-oriented streetscape environment. Street fronting retail malls located behind surface parking areas are common. Reverse frontage residential development allows for free-flowing traffic by limiting access between major intersections. Pedestrian traffic is generally moderate with isolated examples of high pedestrian activity at main intersections, while bicycle traffic is currently low.

The study area is notable for streetscape and landscape features that mark gateways and entrances. **Exhibit 3-14** depicts the location and type of these streetscape elements.

Exhibit 3-14: Notable streetscape elements along study area

3.2.5 **Noise Barriers**

Existing acoustic barriers are located along the Airport Road right-of-way within the study area. The locations of existing acoustic barriers are shown in **Exhibit 3-15**.

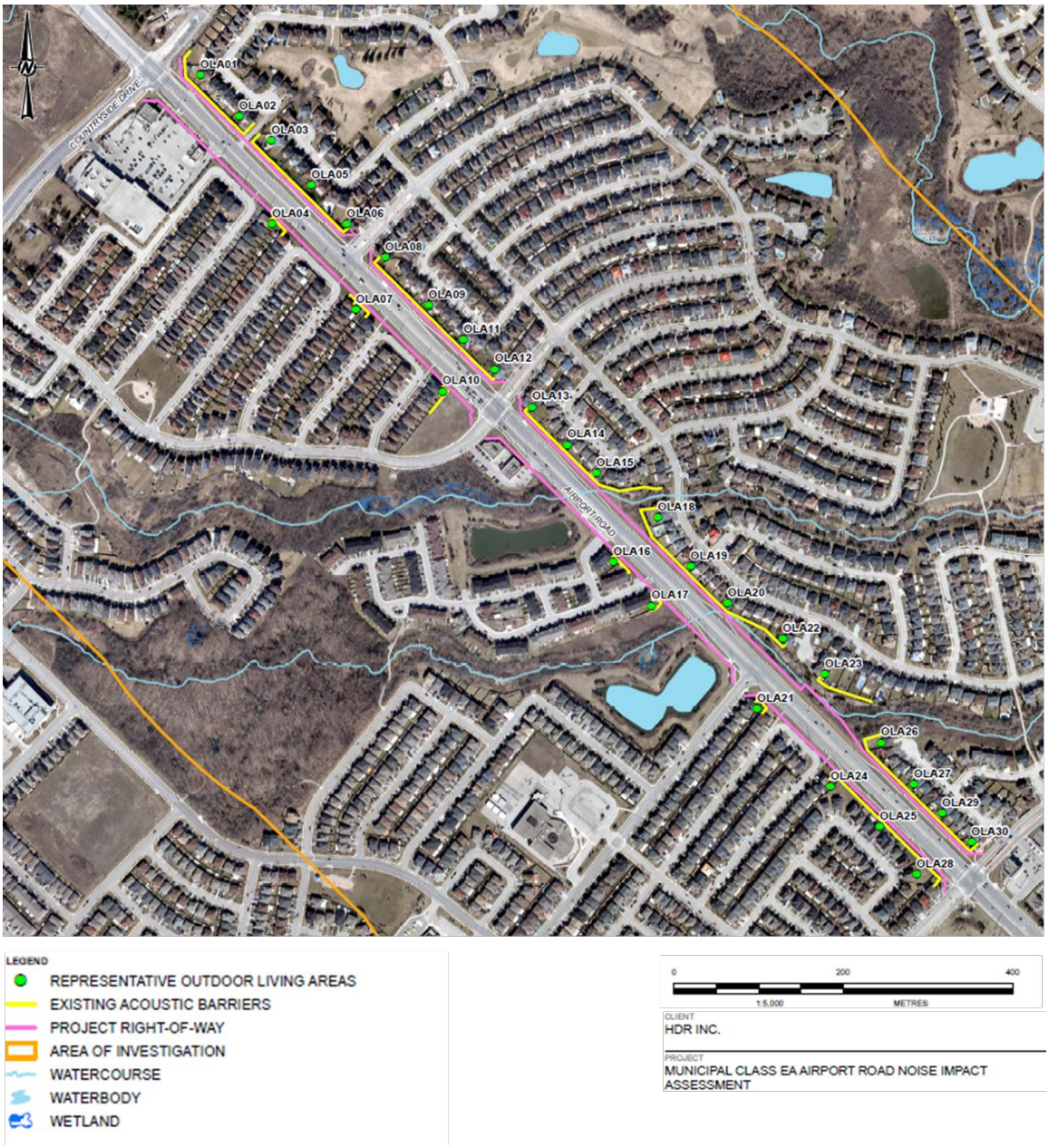


Exhibit 3-15: Existing noise barriers within the Airport Road study area

3.3 Contamination

A contamination overview study (COS), found in **Appendix C**, was completed to identify former or current practices within the Airport Road study area that may represent issues of actual or potential environmental concern. The COS consisted of a broad assessment of actual and potential sources of contamination within based on a review of readily available information regarding current and former land uses and a drive-by visual reconnaissance of the site.

Issues of potential environmental concern were identified, and recommendations provided with regards to the need for further investigation. An issue of potential

environmental concern consists of an area with actual or potential for subsurface contamination based on current and historical land usage. Contamination is defined as subsurface soil, groundwater and/or sediment with the potential to exceed established Ontario Ministry of the Environment and Climate Change ("MOECC") generic site condition standards, as set out in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (dated April 2011).

Based on the findings of the COS, no high-risk issues of potential environmental concern with the potential for subsurface impacts on the site were identified. The following low risk was identified:

- A low risk was identified from an accidental spill of 400 L of diesel from a tanker truck due to operator error to a ditch in the vicinity of the intersection of Airport Road and Countryside Drive in 2004.

As part of the geotechnical investigation (refer to **Appendix E**), limited subsurface sampling was completed along the study corridor in 2019, which included the submission of eight soil samples for the analysis of metals, inorganics, volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), petroleum hydrocarbons ("PHCs") and polychlorinated biphenyls ("PCBs"). The results indicated that the levels of electrical conductivity ("EC") and sodium adsorption ration ("SAR") exceeded the MECP "Table 1 Standards" at eight locations, and the MECP "Table 3 Standards" at seven locations; these impacts were inferred to likely be associated with the application of de-icing salts which are commonly used on roadways. In addition, concentrations of PHCs (F3 and F4) exceeded Table 1 and/or Table 3 Standards at three locations. It is noted that none of the exceedances were present in the vicinity of the Airport Road and Countryside Drive intersection (where a diesel spill was reported), but there were no samples analyzed from within the intersection. The closest sample with a PHC exceedance was noted approximately 200m south of the intersection.

3.4 Natural Environment

A review of natural environment features was completed for the Airport Road EA study. The assessment summarized background information on natural heritage features within the study area as well as the results of field surveys completed, to accurately characterize the existing natural environment conditions. The natural environment review includes the description of watercourses, woodland, wildlife and vegetation along the study corridor, as illustrated in **Exhibit 3-16**.

Exhibit 3-16: Natural Heritage Resources along the Airport Road study area

3.4.1 Soils and Terrain

The study area is located within the South Slope physiographic region, which slopes gradually toward Lake Ontario. The South Slope is underlain by glacial till and is dominated by clay, clay loam, and loam soils. The combination of topography and soils within this physiographic region results in relatively high runoff and low infiltration capacity. The tributaries originate to the northwest of the study area within the Peel Plain physiographic region. The Peel Plain is made up of deep deposits of limestone and shale till, often covered by a layer of clay sediment. According to the Surficial Geology of

Southern Ontario Mapping (2010), the dominant soil within the subject property is clay to silt-textured till.

3.4.2 **Watercourses and Woodland**

The study area includes two watercourse crossings by Airport Road, located between the intersections with Eagle Plains Drive and Yellow Avens Boulevard/Brock Drive. These watercourses are tributaries to the West Humber River, and each has an associated narrow wooded riparian corridor in a surrounding landscape dominated by residential development.

Two additional watercourses traverse the far northern and southern extents of the study area (north of Countryside Drive and south of Braydon Boulevard/Stonecrest Drive, respectively). The Region has stated that these watercourse crossings are outside the scope of this EA. However, the wooded riparian features associated with these watercourses will still be considered in the natural environment assessment, to better understand adjacent natural features.

The City of Brampton Official Plan (Schedule D) delineates the presence of "valleyland/watercourse corridor" associated with each of the watercourses and delineates "woodland" corresponding to the wooded riparian features located along these watercourses on the west side of Airport Road. These features also fall within the regulation limits of the Toronto and Region Conservation Authority (TRCA) and are subject to Ontario Regulation 166/06. These City-designated and TRCA-regulated Natural Heritage System features represent the focus of the natural environment assessment study for the purposes of this EA.

The Peel Region Official Plan Schedule A identifies the riparian wooded feature surrounding the watercourse immediately north of Countryside Drive as Core Greenland, while Map 2 of the Regional Official Plan identifies this feature as "River Valley Connection (Outside Greenbelt)". This watercourse (and its wooded valley lands) is considered important as it serves as a major tributary to the Humber River and facilitates the continuous linkage between the Regional Greenlands system. Although the road crossing associated with this watercourse was not specifically studied in this EA, this adjacent feature was considered in the selection of a preferred road design alternative that avoids, minimizes or mitigates potential impact to this feature.

3.4.3 **Vegetation**

The majority of the surrounding land uses comprised urban residential properties with some limited agricultural areas consisting of corn and winter wheat annual row crops. Vegetation communities around the Humber River tributaries were classified as Fresh-Moist Lowland Deciduous Forest, characterized by the presence of trees such as Manitoba Maple, Crack Willow, Green Ash and White Elm. Understorey vegetation was generally composed of Common Buckthorn, Red-osier Dogwood and Nannyberry. The groundcover layer was covered mainly by Woodland Chervil, Reed Canary Grass, Spotted Touch-me-not, White Avens, Calico Aster and Lance-leaved Aster.

Roadside areas were dominated by hardy and opportunistic graminoids such as Smooth Brome, Witch Grass and Kentucky Bluegrass. Few trees were found to be present within the Airport Road right-of-way, and included White Ash, Freeman's Maple, Norway Spruce, and Norway Maple.

3.4.4 Vascular Flora

A total of 150 species of vascular flora were inventoried within the study area. A complete list of inventoried species is provided in **Appendix D**. Of the species observed, 42% were non-native species. The majority of inventoried species are urban-tolerant and reflective of disturbed conditions.

3.4.5 Tree Inventory

In total, 368 trees were inventoried, comprising 27 species. Of the trees inventoried and assessed, 95 (25.8%) are native species and 273 (74.2%) are non-native species. See **Appendix D** for a complete list and mapping of trees inventoried within the study area.

3.4.6 Wildlife

BIRDS

In total, 106 bird species have been recorded in the vicinity of the study area (BSC et al. 2008).Thirty-three (33) of these species were documented within the study area during field surveys. Of these, 30 species displayed evidence of possible, probable or confirmed breeding within the study area based on OBBA breeding evidence codes (BSC 2001). Refer to **Appendix D** for a complete list of all bird species known and observed in the study area and vicinity.

Multiple foraging Barn Swallow individuals were observed over portions of the study area near the two watercourse crossings during field investigations. Most observed individuals were recorded flying over stormwater management (SWM) ponds that exist immediately upstream of the Airport Road watercourse crossing locations. No Barn Swallow nests were observed within or immediately adjacent to the study area, including within the culvert/bridge structures conveying the tributaries under Airport Road. However, a possible Barn Swallow nest was observed on the exterior of a house on Bay Breeze Drive, within approximately 150m of the Tributary C Airport Road crossing and SWM pond, and within approximately 300m of the Tributary B Airport Road crossing and SWM pond.

Of the observed bird species, only one species is considered significant in the TRCA watersheds (rank of L3 or less): Great Blue Heron (ranked L3; TRCA 2008). One individual Great Blue Heron was observed site investigations as a fly-over and was not utilizing study area habitats. All other observed species are considered to have secure or generally secure populations in the TRCA watersheds.

REPTILES AND AMPHIBIANS

In total, 14 reptile and amphibian species have been recorded from the vicinity of the study area (Ontario Nature 2015). No herpetofauna species were observed during field investigations in the study area, including during the spring reptile survey completed within the ideal basking period. A complete list of all herpetofauna species known from the study area is provided in **Appendix D.**

MAMMALS

In total, 18 mammal species have been documented within the vicinity of the study area (Dobbyn 1994). Four mammal species were observed incidentally during field investigations in the study area: Eastern Cottontail (*Sylvilagus floridanus*), Beaver (*Castor canadensis*) (indirect evidence based on tree cuttings), Muskrat (*Ondatra zibethicus*) and Eastern Gray Squirrel (*Sciurus carolinensis*). A complete list of all mammal species known from the study area is provided in **Appendix D**.

INSECTS

One odonate species, Ebony Jewelwing (*Calopteryx maculata*), and one butterfly species, Cabbage White (*Pieris brassicae*) were observed during field investigations. Two odonate species identified through background review, Amber-winged Spreadwing and Lilypad Clubtail, were not recorded within the study area.

FISH COMMUNITY

A total of 3 fish species were captured within the study area watercourse crossings, including the Creek Chub (*Semotilus atromaculatus*), Fathead Minnow (*Pimephales promelas*), and Goldfish (*Carassius auratus*).

Creek Chub are a tolerant, coolwater species found throughout Ontario. Fathead Minnow and Goldfish are both a highly tolerant, warmwater species found throughout southwestern Ontario.

These species are common, with Goldfish being an invasive species. All of these species are quite often found within SWM ponds and the watercourses to which they outlet.

The fish species known from the West Branch of the Humber River was provided by the TRCA. Their records show that typical species found are cool- and warmwater fish made up of a combination of highly tolerant and intermediate tolerant species. None of the fish species known from within the project area are Species-at-risk (SAR). The background review did not confirm the presence of any SAR fish or mussel species within the study area (DFO 2017). The MNRF background information confirmed that study area tributaries contribute flow to downstream Redside Dace occupied habitat (MNRF 2017c). Redside Dace prefer cool, slow-moving areas of small streams and headwaters with a gravel bottom, where there is overhanging grasses and shrubs (MNRF 2016). No occupied habitat for Redside Dace exists within the study area reach of these tributaries.

3.5 Source Water Protection

According to correspondence exchanged with the TRCA, found in **Appendix O**, the Airport Road study area falls within the Toronto and Region Source Protection Area, but no policies in the Credit Valley – Toronto and Region – Central Lake Ontario Source Protection Plan (CTC SPP) apply.

The portion of Airport Road between Countryside Road and Braydon Boulevard / Stonecrest Drive does not transect any of the vulnerable areas identified in the *Clean Water Act, 2006* and the Toronto and Region Assessment Report. Therefore, no policies in the CTC SPP are applicable.

3.6 Pavement/Geotechnical and Environmental Investigation

3.6.1 **Pavement Performance (Existing Condition)**

The pavement on Airport Road was observed to be generally in fair condition with localized areas in poor condition. Some of the transverse and longitudinal cracks have been sealed with rubberized asphalt, and the sealant is generally performing well. The majority of this section of Airport Road has an urban cross-section (curb and gutter system), with catch basins for drainage. The following types, severities and densities of surface distresses were observed:

- Extensive, moderate to severe transverse cracking;
- Frequent slight to moderate longitudinal wheel path cracking;
- Intermittent, slight alligator cracking;
- Extensive slight to severe opening of longitudinal construction joints;
- Intermittent slight to moderate map cracking;
- Frequent slight to moderate pavement edge cracking;
- Intermittent, very slight rutting; and,
- Few severe potholes.

The Pavement Condition Rating (PCR) assigned to this section of Airport Road is 62.

3.6.2 **Pavement Structure**

19 boreholes were drilled through the Airport Road lanes. A layer of granular base is present immediately under the HMA for all 19 boreholes, but the granular base layer was underlain by a granular subbase layer in only 10 of the 19 boreholes. The remainder of the boreholes had granular base only. The existing pavement structures encountered in the boreholes drilled along Airport Road are summarized in **Table 3-2**.

Table 3-2: Summary of Existing Pavement Structure on Airport Road

Section	Pavement Component	Pavement Thickness on Main Lanes	
		Range (mm)	60th Percentile Value (mm)
Airport Road	HMA	150 – 290	200
	Granular Base	130 – 1340	650 (Combined)
	Granular Subbase	0 – 880	
	[1]Total Pavement Thickness	690 - 1520	850

[1]The average total pavement thickness is 1100 mm.

Gradation testing was carried out on 5 of the granular base samples. The results indicated that one (1) of the samples tested satisfied the current OPSS.PROV 1010 gradation requirements for Granular A. In most cases, the samples were too fine or too coarse on some or most of the sieve sizes. The water content of the granular base samples ranged from 2 to 9 percent.

Granular subbase was encountered in about 50 percent of the boreholes. Gradation testing was carried out on three (3) granular subbase samples. None of the subbase samples satisfied the current OPSS.PROV 1010 gradation requirements for Granular B, Type I, generally due to excessive material passing the 75 µm sieve. The water content of the granular subbase samples tested ranged from 4 to 10 percent.

3.6.3 Excess Soil Characterization

A limited soil characterization was completed to provide a preliminary indication of potential reuse and/or disposal options for excess fill and native material that would be generated during the proposed rehabilitation and widening of Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive. 44 boreholes were advanced to a maximum depth of 6.6m below ground surface ("bgs"). Eight soil samples were selected based on presence of staining, odour and/or debris (if any) and in the absence of obvious impact, to provide general coverage across the project area. At the selected locations, samples were placed in pre-cleaned laboratory-supplied sample containers for potential chemical analysis. Samples for analysis of metals, inorganics, volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), petroleum hydrocarbons ("PHCs") and polychlorinated biphenyls ("PCBs") were taken from soil fill materials near the surface, up to a maximum depth of 1.5m bgs.

The reported concentrations of Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR) in all eight samples submitted for analysis were above their respective Standards. Reported concentrations of SAR in four samples and EC in seven samples (of the eight analyzed) also exceeded their respective Standards. In Golder's opinion, these exceedances are most likely associated with the application of de-icing salts which are commonly used in roadways.

The reported concentrations of PHC F3 in two samples and PHC F4 in three samples exceeded their respective Standards. Two samples also exceeded the Table 3 Standard for PHC F3. More details are included in **Appendix E**.

3.7 Existing Drainage

Within the project limits, Airport Road traverses the West Humber River watershed. At the point where these watercourses cross Airport Road, the general drainage direction is from west to east. All creeks and watercourses that cross the Airport Road right-of-way are tributary to the Humber River Watershed. The project limits and water crossing locations are shown in **Exhibit 3-17.**

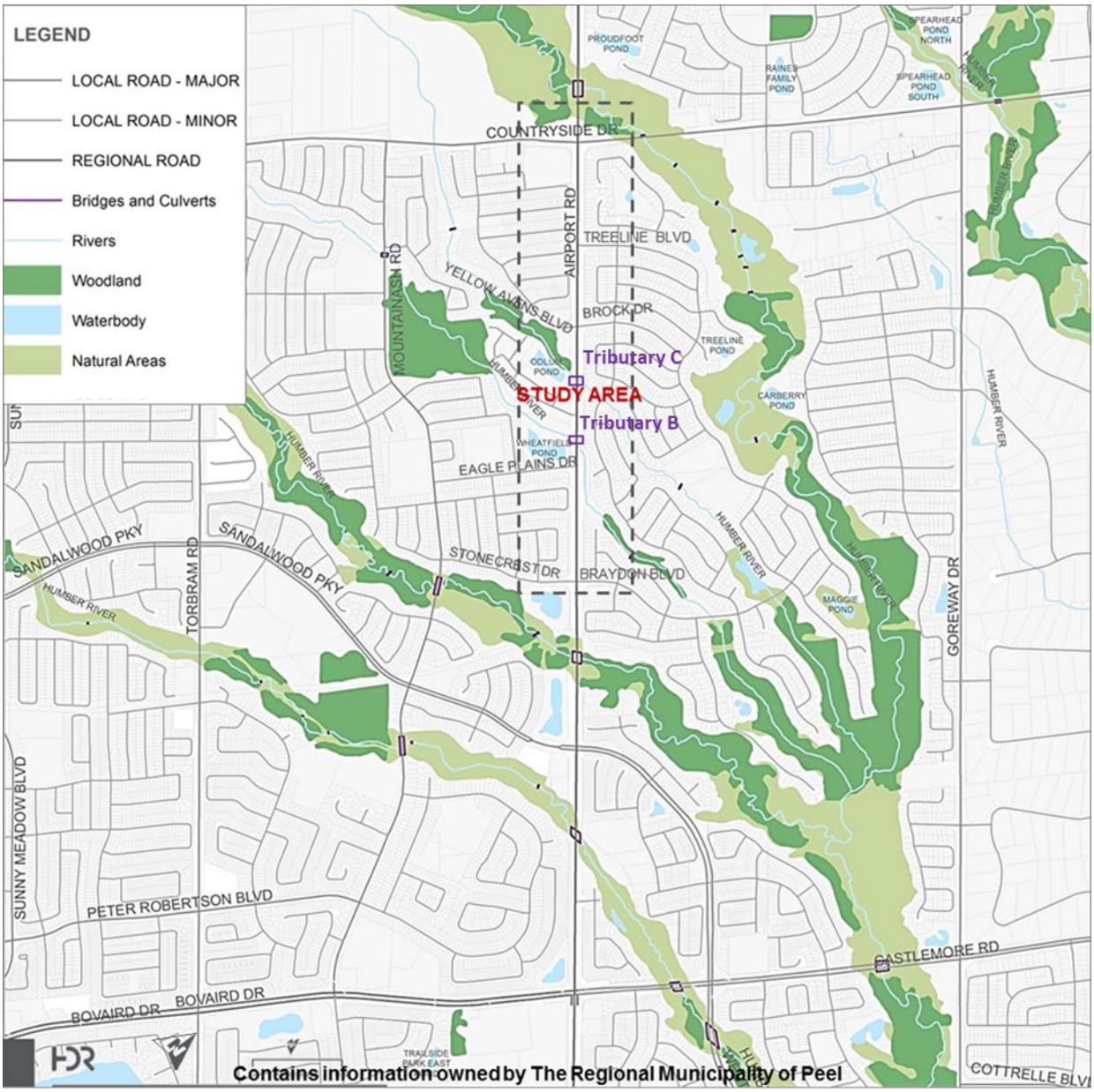


Exhibit 3-17: Study Area and Water Crossing Locations

3.7.1 Existing Storm Sewer System

Under the existing condition, runoff from Airport Road is collected by catchbasins and conveyed primarily by storm sewer systems which discharge to 4 (four) separate outlets which discharge directly or indirectly to the west branch of West Humber River.

At one location, the sewer systems are directed to the storm sewer system along Braydon Boulevard with eventual discharge to West Humber River. The size of existing storm sewer system ranges from 375 mm to 600 mm. The current sewer system details are provided in **Table 3-3**. The existing storm water management system does not provide for any water quality treatment before discharging into the above noted creeks or external storm sewer systems.

Table 3-3: Existing Storm Sewer System

Outlet No.	Sewer Reach	Length (m)	Flow Direction	Size Range (mm)	Receiving System
1	From Braydon Boulevard to 200m north of Braydon Boulevard	200	S	450-600	Storm Sewer Trunk at Braydon Boulevard
2	From 200m north of Braydon Boulevard to H4 Crossing	280	N	375-525	H4 -West Humber River Tributary
3	From H4 Crossing to Camrose Street	220	S	375-450	H4- West Humber River Tributary
4	From H5 Crossing to 100m south of Countryside Drive	720	S	375-525	H5- West Humber River Tributary

3.7.2 Culvert Assessment Criterion

In view of the proposed improvements, hydraulic assessments of the existing culverts across Airport Road between Braydon Boulevard and Countryside Road were undertaken. The following criterions were applied to evaluate hydraulic performance of existing culverts.

DESIGN FLOWS

According to the MTO Drainage Standard WC-1, the design return period for structures with spans less than 6.0m is the 50-year event (Freeway & Urban Arterial roadways).

A structure with a span of over 6m on an Urban Arterial road should be designed to convey the 100-year design storm at the required freeboard.

FREEBOARD

The minimum required freeboard has been specified as 1.0m as per MTO Drainage Standard WC-7: Culvert Crossings on a Watercourse.

CHANGES IN UPSTREAM WATER LEVELS

In accordance with good design practice, any increase in the upstream flood elevation resulting from the construction of a new structure should be kept to a minimum. Where the increase exceeds 1.0m, the potential impacts should be investigated further.

MINIMUM CULVERT SIZES

The minimum culvert size for roadway crossing is 600mm diameter as per Region of Peel Linear Infrastructure Storm Sewer Design Criteria.

3.7.3 Hydraulic Assessment

A hydraulic analysis was conducted for all crossings to assess their hydraulic capacity under the existing conditions. The HEC-RAS hydraulic model was obtained from TRCA for all crossings and updated using the culvert design drawings.

The HEC-RAS models and corresponding design flows obtained from TRCA were reviewed and used to conduct the hydraulic assessment for the two crossings. It is recommended that during detailed design, the assessment results be reviewed and verified to confirm the existing conditions based on a topographic survey.

As per the MTO Highway Drainage Design Standards, culvert capacities were assessed based on the 50-year storm event peak flow for structure with spans less than 6.0m to determine the available freeboard and clearance.

Table 3-4 summarizes the hydraulic analysis results for the transverse crossings along the study corridor. All hydraulic assessment output files are provided in the Drainage and Stormwater Management Report (**Appendix F**).

Table 3-4 Hydraulic Analysis Results for the Transverse Culverts (Existing Condition)

Crossing ID	Type	U/S Invert* (m)	D/S Invert* (m)	Length (m)	Road Elev. (m)	Water Surface Elevation (m)			Free-board (m)	Remarks
						50-yr	100-yr	Reg.		
Trib-B	Culvert	210.75	210.26	98.0	212.14	212.93	213.01	213.27	-0.79	Does not meet MTO criteria, Regional flood overtops road by 1.13m
Trib-C	Culvert	213.15 212.29	212.58 212.00	90.7 99.25	215.22	213.85	213.88	214.98	1.37	Meets MTO criteria

*River bed elevation

Based on the hydraulic analysis results, Trib-C Crossing is in compliance with the Ontario Ministry of Transportation Highway Drainage Design Standards (January 2008), as the freeboard provided is more than 1.0m from the design high water level (50-yr storm event). However, Trib-B Crossing does not meet the vertical freeboard criteria of minimum 1.0m from the design high water level (50-yr storm event). Under the Regional storm condition, no overtopping of Airport Road will occur at Trib-C Crossing, but Airport Road is overtopped at the lowest point of the driving surface at Trib-B Crossing by 1.13m. It is

recommended to review the hydraulic conditions of the Trib-B culvert crossing during detailed design, and in particular the existing 3.0m x 1.5m parallel culvert that discharges from the adjacent SWM pond, to ascertain whether Trib-B flows are conveyed by this culvert. This will need to be confirmed with TRCA.

3.8 Hydrogeology

A standpipe piezometer was installed at one of the boreholes drilled as part of the geotechnical investigation, in close proximity to Tributary C, to evaluate the groundwater level in the vicinity. The groundwater level at the piezometer was measured to be 3.2m below the existing ground surface on January 7th, 2020, about 6 weeks after completion of drilling. These observations reflect the groundwater conditions encountered in the monitoring well during the time of the field investigation (January 2020). It is expected the shallow groundwater surface (i.e. the water table) in the area of the Site reflects the surface topography, with groundwater flow from north to south. Shallow groundwater likely reports, at least locally, to the various surface water features.

The water well database indicated there are a total of 42 water well records within a 500 m radius of the Site. Of the listed records:

- 13 were indicated as being for domestic water supply use;
- 2 were indicated as being for either stock or commercial water supply;
- 15 were indicated as either abandoned or not use;
- 6 were observation wells or test holes; and,
- 1 municipal supply well.

Five of the records had no listed use and no detailed information. The depth of the various wells ranges from approximately 10m to 30m. Nearly all the wells listed for private water supply were drilled between the 1950s and 1970s. Based on the extent of development in the area, and the presence of infrastructure along the roadways (e.g. sewers, fire hydrants), it is assumed that all private property in the vicinity of the Site is connected to the municipal water supply system, and that the private supply wells listed in the database are no longer in use.

Based on a review of the MECP Source Protection Information Atlas (MECP, 2020), the municipal well (drilled in 1949) is no longer active, and the MECP Permit to Take Water Mapping Database indicates no active water taking permits within approximately 5 km of the Site.

Additional information is included in **Appendix G**.

3.9 Existing Structures

There are two watercourse crossings and two storm pond outlet crossings along the study corridor, as summarized below.

3.9.1 Tributary B Crossings

TRIBUTARY B WATERCOURSE CROSSING

Asset ID: RR007-1430 (former ID 071560)

Owned and maintained by: Peel Region

The existing cast-in-place crossroad culvert that serviced the 2-lane rural cross-section of Airport Rd was removed and replaced with a pre-cast concrete culvert through project #01-4035, circa 2005-2006, which consisted of the widening of Airport Road from two to four lanes including full urbanization of the roadway. The replaced pre-cast culvert was increased in length on the west side. An extension was installed on the east side of the existing culvert with the development of subdivision file # 21T-98003B, circa 2001-2002, ahead of the construction for project # 01-4035.

STORM POND (WHEATLAND) CROSSING

Asset ID (Region): STNDRR007-0876-STNDRR007-0877

Owned and maintained by: City of Brampton

The twin 1.8m x 0.9m precast concrete box culvert was installed for discharge of the Wheatland storm pond north of Eagle Plains Dr., ahead of construction for project # 01-4035, circa 2005-2006, as described above. The storm pond was constructed to service subdivision 21T-2006B.

3.9.2 Tributary C Crossings

TRIBUTARY C WATERCOURSE CROSSING

Asset ID: RR007-1455

Owned and maintained by: Peel Region

The existing cast-in-place crossroad culvert that serviced the 2-lane rural cross-section of Airport Road was removed and replaced with a pre-cast concrete culvert through project #01-4035, circa 2005-2006, as described above. The replaced pre-cast culvert was increased in length on the west side. An extension was installed on the east side of the existing culvert with the development of subdivision file # 21T-98003B, circa 2001-2002, ahead of the construction for project # 01-4035.

STORM POND (ODLUM) CROSSING

Asset ID (Region): STNDRR007-0878-STNDRR007-0879

Owned and maintained by: City of Brampton

The single 2.4m x 1.2m box non-structural culvert was installed for discharge of the Odlum storm pond north of Camrose Street, ahead of construction for project # 01-4035, circa 2005-2006, as described above.

3.9.3 **Structural Assessment**

A structural assessment was completed for the two watercourse crossings within the Airport Road study corridor. The structural assessment was based on the review of the available materials, including the Region's biennial structural inspection reports (where available) and visual inspection, and documented existing conditions of structures located at tributaries B and C, shown in **Exhibit 3-17**.

Structural inspections indicate that both culverts are generally in good condition and do not require major repair or upgrade. Minor rehabilitation is recommended at Tributary C to address minor spalling observed at the inlet. At the time of detailed design, additional observations should be undertaken at both culverts to assess the latest conditions and requirements for repairs or upgrades at that time. The complete Structural Assessment Report can be reviewed under **Appendix M.**

3.10 Existing Utilities and Other Services

There are existing utilities within the study corridor, including a hydro pole line on the west side of Airport Road. A 1050mm diameter Regional feedermain runs along the entire study corridor and is situated within the east boulevard at minimum depth of 2.1m. There is an existing sanitary sewer that is 975mm in diameter, flowing north to south, and is generally situated under the west boulevard of Airport Road at a depth ranging from 4.7 to 6.5m. Pavement widening, boulevard construction and/or profile correction may conflict with the existing pole lines or underground municipal services. There are also Bell and Rogers plant infrastructure at certain points along the corridor.

3.10.1 **Illumination**

Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive is illuminated with streetlights. The approximate spacing between streetlights is listed in **Table 3-5**.

Table 3-5: Streetlight Spacing along Airport Road within study limits

Location	Spacing
East	47 to 55m
West	50 to 55m

4 Needs Assessment

The Needs Assessment for the Airport Road EA study reviewed transportation conditions for all travel modes and traffic safety needs to identify areas of improvement for the corridor. The review was completed in 2017, using information and data available at the time.

4.1 Transportation Conditions

This section documents a summary of trends, conditions and demands of different mobility alternatives including vehicular traffic, transit, cycling, and pedestrian facilities.

4.1.1 **Automobile Traffic**

The Peel Region LRTP (2012) identified the need to widen Airport Road from four to six lanes by 2031 based on projected development and associated traffic growth in the Region. The findings and underlying analysis of the 2012 LRTP at the onset of the study was based on data provided by the Region. The project team confirmed that the LRTP (2012, updated in 2017 and 2019) documents the need and justification for widening Airport Road based on transportation network needs, in accordance with the requirements of Phases 1 and 2 of the Municipal Class EA Process.

HDR completed an LRTP validation assessment in August 2017 to confirm the findings from the Region's 2012 LRTP (which was the latest available at the time). HDR's analysis can be found in the Airport Road LRTP Validation Memorandum, available in **Appendix H**. It should be noted that the 2031 recommendations for the Airport Road corridor as identified in the 2012 LRTP are consistent with the 2041 recommendations identified in the 2017 and 2019 LRTP updates (i.e. widening Airport Road from four to six lanes). As such, the Airport Road EA assessment is still valid.

4.1.2 **Mode Share**

To better identify the opportunities for modal shift, mode share data from the 2011 Transportation Tomorrow Survey (TTS) was extracted for trips made by residents in the traffic zones adjacent to Airport Road and for commuting trips destined to the study area. 2011 TTS data was the latest available during Phase 1 of the Airport Road EA study, when this assessment was completed.

In order to create an accurate representation of the mode share for intra-regional trips along the corridor (i.e. local trips by residents along Airport Road), versus inter-regional trips (i.e. commuting trips outside the region), all trips on Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive were considered in this analysis.

OVERALL MODE SHARE

During a typical day, approximately 31,200 trips were completed by people residing along Airport Road within the study limits. Of the total trips, 85% were made by car

(driver or passenger), 10% by transit, and 5% by active modes such as walking, as illustrated in **Exhibit 4-1**.

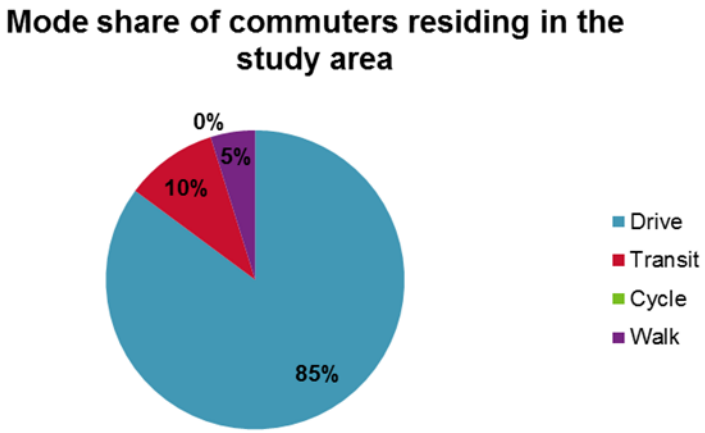


Exhibit 4-1: Mode share of residents within the study limits (Source: TTS 2011)

Almost 20,000 trips are destined to zones adjacent to Airport Road during a typical day. Car trips accounted for a majority share, with 85% of all trips being comprised of drivers. Only 8% of total trips to the study area were made by transit whereas walking reached 7% mode share. The results are summarized in **Exhibit 4-2**.

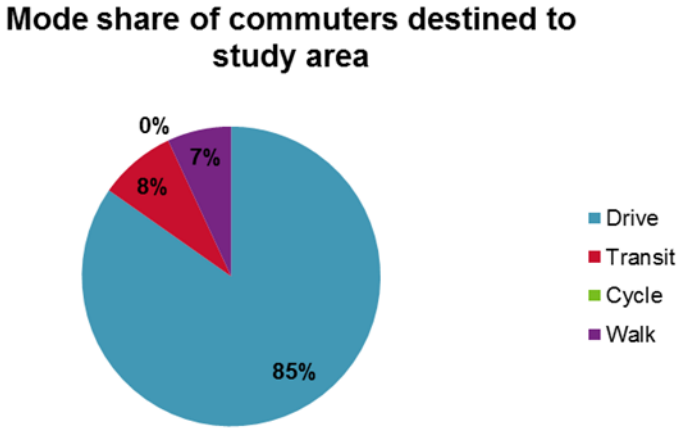


Exhibit 4-2: Mode share of commuters destined to the study area (Source: TTS 2011)

Exhibit 4-1 and **Exhibit 4-2** show that there is a high propensity to travel by car for both residents and travelers, which is typical of a primarily auto-oriented, low-density area. The limited transit options and the availability of free surface parking at commercial and retail locations within the study area also likely encourages single occupant driving. Additionally, the exhibits indicate that residents of the study corridor are more likely to choose active modes of transportation for their trips while commuters may opt for transit instead.

MODE SHARE FOR TRIPS 1 KM AND SHORTER

There are approximately 6,500 daily trips of one kilometre and shorter in length that are made each day by residents along Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive. Of these trips, 75% were completed by car, 2% by transit and 23% by foot, as illustrated in **Exhibit 4-3**. There were no trips recorded by bicycle.

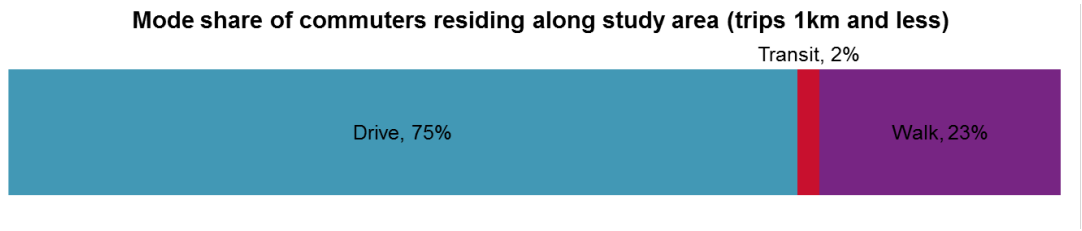


Exhibit 4-3: Mode share of commuters residing along Airport Road for trips 1 km and shorter (Source: TTS 2011)

The high proportion made by those driving indicates that walking and cycling are not attractive alternative modes to driving for short trips (i.e. ≤ 1 km).

On a typical day, almost 5,900 commuter trips destined to the study area were one kilometre or shorter in length. Of these trips, 76% were made by car, almost 2% by transit and 23% by foot, as per **Exhibit 4-4**. Expectedly, mode share of commuters to Airport Road is similar to that of study area residents. The high instance of car use indicates that walking and cycling are not attractive modes compared to driving for these short trips.

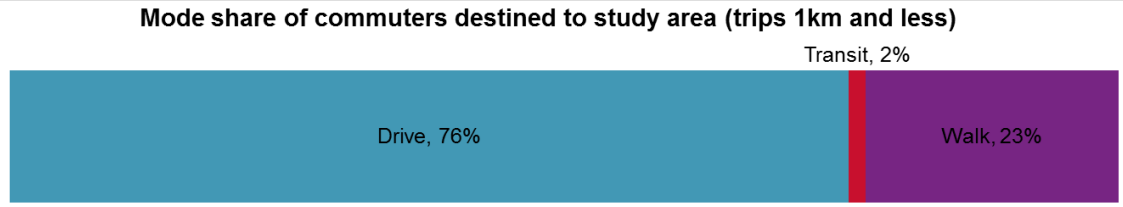


Exhibit 4-4: Mode share of commuters destined to Airport Road for trips 1 km and shorter (Source: TTS 2011)

In both cases, the high driving rates for short trips can be attributed to factors including land use, pedestrian environment, cycling environment, shorter travel times compared to other modes, availability of free parking, and existing transit service quality and cost. The fact that cycling is so uncommon along the corridor for these short trips may be a reflection of the current inhospitable environment due to the absence of cycling infrastructure. The current mode split presents an opportunity to improve the pedestrian and cyclist environment to reduce the automobile mode share for short trips.

MODE SHARE FOR TRIPS 5 KM AND SHORTER

There are approximately 13,000 daily trips less than and equal to five kilometres in length that are made each day by residents of the study area. Of these trips, 83% were completed by car, 5% by transit, and 14% by foot, as illustrated in **Exhibit 4-5**. There were no trips recorded by bicycle.

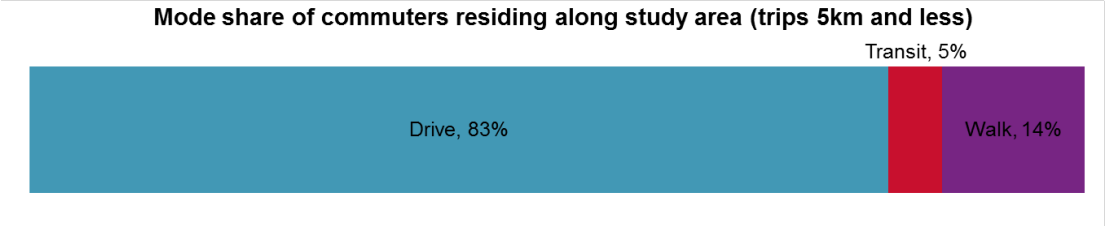


Exhibit 4-5: Mode share of commuters residing along Airport Road for trips 5 km and shorter (Source: TTS 2011)

In addition, on a typical day, 9,900 commuter trips destined to the study area were five kilometres or shorter in length. Of these trips, 82% were made by car, 4% by transit, and 14% by walking, as per **Exhibit 4-6**.

The mode share distribution shows that walking and cycling are not attractive alternatives to driving for neither commuters nor residents of the study area.

Expectedly, longer trips have higher driving and transit mode shares. However, transit use is still much lower than the transit mode target at 4%. Furthermore, the absence of cycling representation for trips provides an opportunity to improve the cycling conditions.

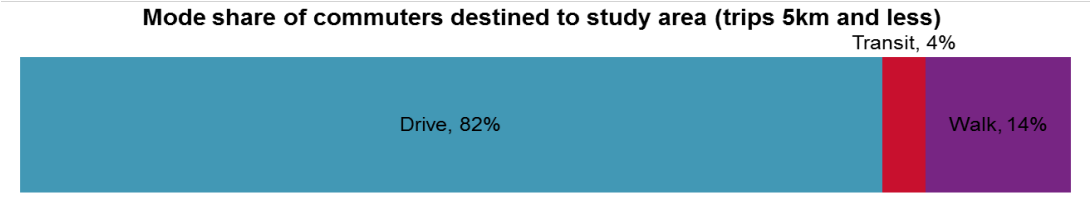


Exhibit 4-6: Mode share of commuters destined to Airport Road for trips 5 km and shorter (Source: TTS 2011)

4.1.3 Active Transportation Activity

To better understand pedestrian and cyclist activity in the study area, locations of interest within 1km of Airport Road were mapped. These destinations, displayed in **Exhibit 4-7**, include schools, parks and retail services that draw residents and commuters.

Exhibit 4-7: Points of interest and destinations along Airport Road

Four schools and five parks are located within 1 km from Airport Road. Retail services front the study corridor and occupy main intersections such as Braydon Boulevard/Stonecrest Drive, Yellow Avens Boulevard/Brock Drive and Countryside Drive. Commercial uses are composed of banks, health centres/pharmacies, restaurants and grocery stores. As the study area is largely residential, the destinations located within likely serve local demand.

EXISTING PEDESTRIAN DEMAND

Pedestrian volumes were estimated from 2016 intersection turning movement counts provided by Peel Region. **Exhibit 4-8** illustrates the combined AM and PM peak pedestrian volumes at all intersections along the corridor. Pedestrian activity with combined peak hour volumes greater than 100 persons was noted at Braydon Boulevard/Stonecrest Drive. The peak level of pedestrian activity at Braydon Boulevard/Stonecrest Drive is likely due to the intersection's proximity to Eagle Plains Jr. Public School, Sandalwood Heights Secondary School and Treeline Public School.

Exhibit 4-8: Existing pedestrian volumes at intersections along the study area

The amount of pedestrian activity generally decreases from the south end of the study area to the north end of the corridor, which generally correlates to the change in land use and urban density along Airport Road. Towards the south of the corridor, the area is composed of completely developed neighbourhoods, including various residential, commercial, and institutional uses, which facilitate higher pedestrian volumes. Conversely, Countryside Drive at the north limit of the study area is adjacent to a greenfield lot.

EXISTING CYCLIST DEMAND

Cycling demand along the corridor was estimated by examining turning moving counts, similarly to pedestrian demand. While it is important to acknowledge the limitations of the data—primarily that data showing low cyclist use can be attributed to the absence of cycling infrastructure— the TMCs can still provide valuable insight into usage patterns in the area.

Exhibit 4-9 represents the number of combined AM and PM peak hour cycling movements at study intersections. Cycling demand is modest and generally constant along the study corridor given that cyclists must travel in mixed traffic. Higher cycling

volumes are observed at the southern limit of the study area, possibly due to the nearby cycling facilities on Sandalwood Parkway, west of Airport Road.

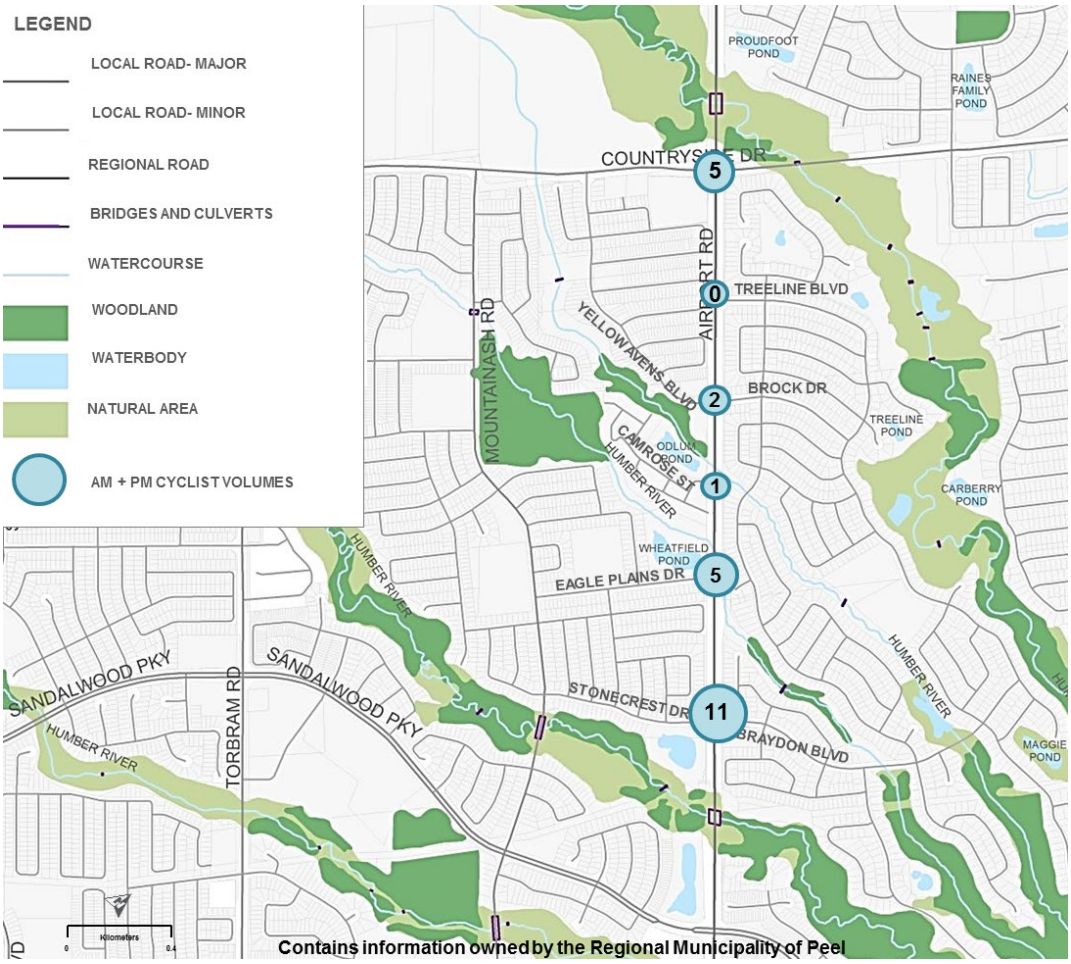


Exhibit 4-9: Existing cyclist volumes at intersections along the study area

4.2 Collision Analysis

A collision analysis was undertaken in 2017 to investigate the need for safety improvements on Airport Road. Peel Region provided both segment and intersection-related collision records for the time period between January 1, 2012 and December 31, 2016 along the study corridor.

4.2.1 **Collision by Type**

A total of 98 collisions occurred in the study area during the most recent five-year review period. Of these 98 collisions, 90 were intersection-related while 8 occurred along segments, as summarized in **Table 4-1**. Property Damage (PD) Only was the most prevalent collision type, constituting approximately 79% of collisions whereas Non-Fatal Injury collisions made up 21% of the total.

Table 4-1: Collisions based on Location and Types

	2012-2016 period			
Location Type	**PD Only**	**Non-Fatal Injury**	**Fatal**	**Total**
Intersection	69	21	0	90
Segment	8	0	0	8
Total	77	21	0	98
Percentage	79%	21%	0%	100%

Collisions were analyzed by year, severity, initial impact type, environmental condition, and light condition to identify trends and patterns in the collisions.

4.2.2 Collision Rate

Collision rates per million vehicle-kilometres travelled (MVK) are calculated separately for intersections and segments using the following formulas:

$$Segment\ Collision\ Rate = \frac{Number\ of\ Collisions \times 1{,}000{,}000}{AADT \times 365 \times Length \times Years}$$

$$Intersection\ Collision\ Rate = \frac{Number\ of\ Collisions\ \times 1{,}000{,}000}{AADT\ \times 365\ \times Years}$$

Annual Average Daily Traffic (AADT) was estimated to be ten times the average of the AM and PM peak hour volumes. The segment collision rates are provided in **Table 4-2.**

Table 4-2: Segment Collision Analysis

Airport Road Segment	Number of Collisions	AADT[1]	Segment Length (km)	Segment Collision Rate (MVK)	Percentage of Collisions within the Study Area
between Stonecrest Dr and Eagle Plains Dr	2	20,000	0.41	0.13	25%
between Eagle Plains Dr and Eagle Trace Dr	1	20,000	0.19	0.14	13%
between Camrose Dr and Yellow Avens Blvd	1	20,000	0.22	0.12	13%

Airport Road Segment	Number of Collisions	AADT[1]	Segment Length (km)	Segment Collision Rate (MVK)	Percentage of Collisions within the Study Area
between Treeline Blvd and Countryside Dr	4	20,000	0.37	0.30	50%

[1]4-year, average, bi-directional AADT from Peel Region Classification Counts (2012-2015)

The segment of Airport Road with the highest collision rate (0.30) is located between Treeline Boulevard and Countryside Drive. This 370m segment had 4 recorded collisions over the 5-year period and accounted for 50% of all segment collisions. .

Intersection collision rates were also developed and are provided in **Table 4-3.**

Table 4-3: Intersection Collision Analysis

Intersection	Number of Collisions	AADT	Intersection Collision Rate (MVK)	Percentage of Collisions within the Study Area
Braydon Blvd/Stonecrest Dr	38	20,000	1.04	42%
Eagle Plains Dr	7	20,000	0.19	8%
Camrose Dr	1	20,000	0.03	1%
Yellow Avens Blvd/Brock Dr	17	20,000	0.47	19%
Treeline Blvd	0	20,000	0.00	0%
Countryside Dr	27	20,000	0.74	30%

Collisions are highly concentrated at three major intersections along the study corridor. Out of a total of 90 intersection-related collisions, 42% (38 collisions) occurred at Braydon Boulevard/Stonecrest Drive, 30% at Countryside Drive and 19% at Yellow Avens Boulevard/Brock Drive. Together, these 3 signalized intersections constitute 91% of all intersection-related collisions. Collision rates for intersections are larger for the most part than their segment counterparts.

Overall, segments and intersections within the study area experienced collision rates below the MTO average rate of 2.7 MEV for non-provincial roads/highways.

4.2.3 Collisions by Year

The number of collisions by year and severity is shown in **Table 4-4** with the distribution shown in **Exhibit 4-10**. Overall, the total number of collisions has remained consistent from year to year during the five-year period. The number of "Property Damage Only" collisions experienced a spike in 2014 before decreasing again to below 2012 levels by 2016. The number of "Non-fatal Injury" collisions exhibited a steady decrease between

2012 and 2015, only to increase again in 2016. On average, approximately 20 accidents occur on any given year.

Table 4-4: Collisions by year and severity between January 2012 and December 2016

Severity	2012	2013	2014	2015	2016	Total	Percentage
Property Damage Only	15	13	18	17	14	77	79%
Non-Fatal Injury	6	5	4	2	4	21	21%
Fatal Injury	0	0	0	0	0	0	0%
Total	21	18	22	19	18	98	100%
Percentage	**21%**	**18%**	**22%**	**19%**	**18%**	**100%**	

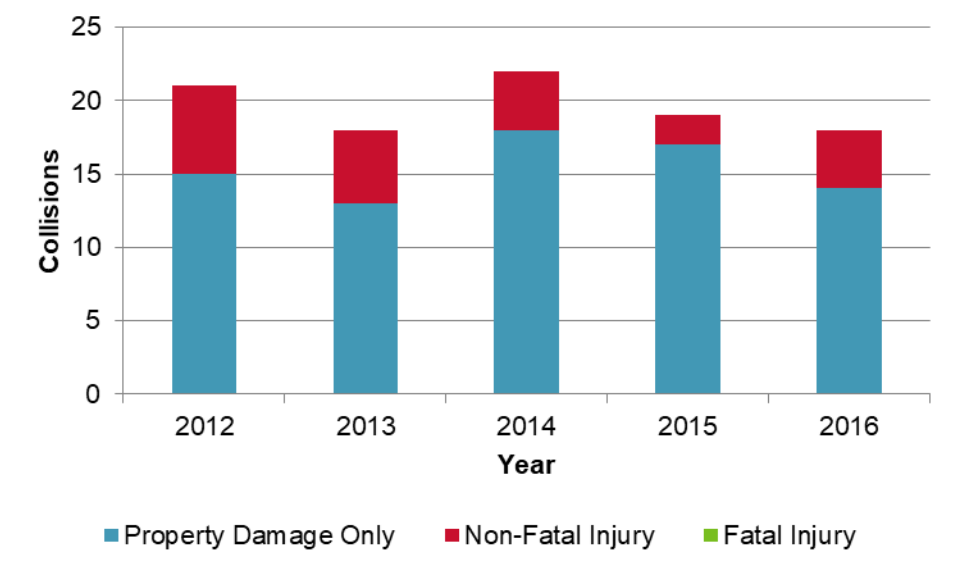


Exhibit 4-10: Collisions by year and severity

4.2.4 Collisions by Severity

The distribution of collisions by severity along the study corridor is summarized in **Table 4-5** and illustrated in **Exhibit 4-11.** Out of 98 collisions in the most recent 5-year period, the majority of collisions occurred at intersections (90, 92%), whereas only 8 (8%) of collisions occurred at midblock segments. Collisions are mostly concentrated at the major intersections, namely at Braydon Boulevard/ Stonecrest Drive (39%) and Countryside Drive (28%). Intersection-related countermeasures and treatments, particularly at busier arterial intersections, have a high potential to enhance the safety performance of the study corridor.

Table 4-5: Collisions by Severity and Location within the Study Area (January 2012 to December 2016)

Location	Property Damage Only	Non-Fatal	Fatal	Total	Percentage
Segments					
between Stonecrest Dr and Eagle Plains Dr	2	0	0	2	2%
between Eagle Plains Dr and Eagle Trace Dr	1	0	0	1	1%
between Camrose Dr and Yellow Avens Blvd	1	0	0	1	1%
between Treeline Blvd and Countryside Dr	4	0	0	4	4%
Intersections					
Braydon Blvd /Stonecrest Dr	27	11	0	38	39%
Eagle Plains Dr	4	3	0	7	7%
Camrose Dr	1	0	0	1	1%
Yellow Avens Blvd/Brock Dr	15	2	0	17	17%
Treeline Blvd	0	0	0	0	0%
Countryside Dr	22	5	0	27	28%
Total	**77**	**21**	**0**	**98**	**100%**

Exhibit 4-11: Collisions by Severity and Location within the Study Area (January 2012 to December 2016)

4.2.5 Collisions by Initial Impact type

The distribution of collisions by initial impact type and location is listed in **Table 4-6**. Rear-end collisions (33%) is the predominant impact type, followed by both angle collisions and Single Motor Vehicle or SMV (20%). The remaining 26% of collisions involved a combination of turning movement (16%) and sideswipe (10%).

Table 4-6: Collisions by Initial Impact Type and Location (January 2012 to December 2016)

Location	Angle	Rear End	Side-swipe	Turning	SMV	Total
Segments						
between Stonecrest Dr and Eagle Plains Dr	1	0	0	0	1	2
between Eagle Plains Dr and Eagle Trace Dr	0	0	0	0	1	1
between Camrose Dr and Yellow Avens Blvd	0	0	1	0	0	1
between Treeline Blvd and Countryside Dr	0	1	0	1	2	4
Intersections						
Stonecrest Dr/Braydon Blvd	6	11	4	10	7	38
Eagle Plains Dr	5	1	0	0	1	7
Camrose Dr	0	0	0	0	1	1
Yellow Avens Blvd/Brock Dr	0	11	2	3	1	17
Treeline Blvd	0	0	0	0	0	0
Countryside Dr	8	8	3	2	6	27
Total	20	32	10	16	20	98
Percentage of total	**20%**	**33%**	**10%**	**16%**	**20%**	**100%**

4.2.6 Collisions by Environmental Conditions

The distribution of collision by environmental condition and location is provided in **Exhibit 4-12**. The majority of collisions have occurred under clear conditions (84%), followed by rain (7%), and snow (6%). Very few collisions occurred in other conditions (freezing rain, drifting, fog, mist, smoke, and dust), possibly due to a rare chance of such weather conditions. No pattern can be observed related to environmental conditions.

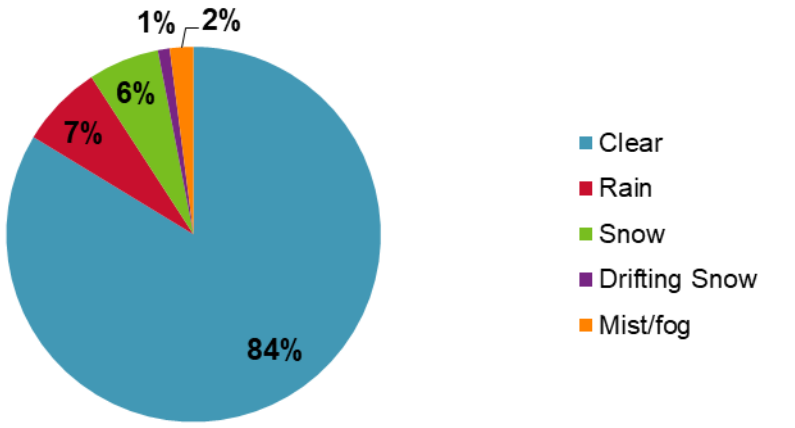


Exhibit 4-12: Collisions by Environmental Conditions (January 2012 to December 2016)

4.2.7 Collisions by Light Conditions

The distribution of collisions by light condition is provided **Exhibit 4-13**. The majority of collisions occurred in daylight conditions (64%), followed by dark (18%), dark with artificial lighting (10%), dusk (5%), and dawn (2%). The study corridor is located in an urban setting where the roads are illuminated. Based on the accident records, it appears that the share of night-time collisions is relatively high. There may be an opportunity to improve lighting along the corridor.

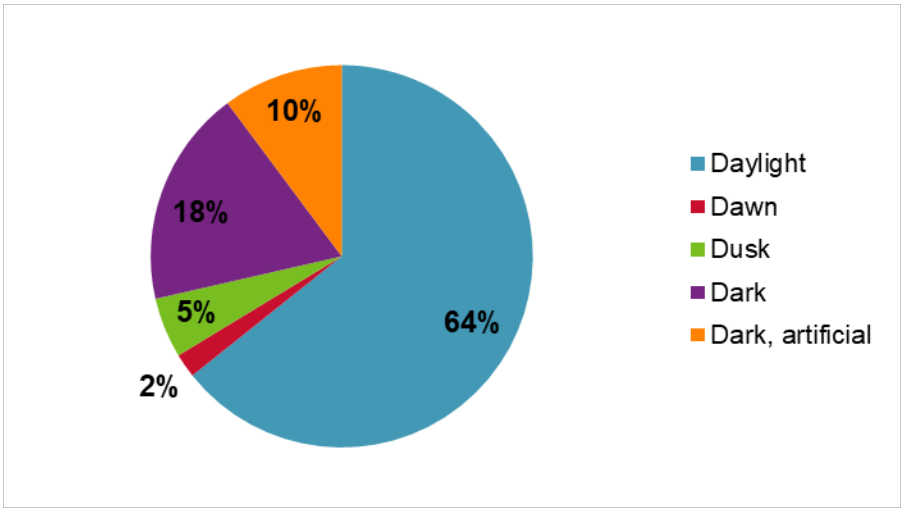


Exhibit 4-13: Collisions by Light Conditions (January 2012 to December 2016)

4.2.8 Potential for Safety Improvement

In addition to collision rates, results from the Peel Region Network Screening Report, Development of Safety Performance Functions and Network Screening Final Report (2012), were reviewed and compared against historical collision data. The Peel Region Network Screening (PRNS) report examined 587 intersections and 777 segments (non-intersection) across the region using data from 2005 to 2009 with the purpose of comparing road safety standards. Two parameters extracted from the study and used in

the collision analysis for the Airport Road study are Potential for Safety Improvement (PSI) and the PSI ranking (system-wide). Network screening analysis was used to review the roadway network with the purpose of prioritizing segments and intersections for improvement, resulting in a PSI rating and ranking.

According to the PRNS report, the segment with the highest potential for safety improvement is located between Braydon Boulevard/Stonecrest Drive and Eagle Plains Drive. The segment is ranked 301st out of the 777 segments evaluated, as displayed in **Table 4-7.**

Table 4-7: PSI and PSI Ranking for Segments

Airport Road Segment	Segment Collision Rate (MKV)	PSI	PSI Ranking
between Stonecrest Dr and Eagle Plains Dr	0.30	0.6	301
between Eagle Plains Dr and Eagle Trace Dr	0.33	0.55	306
between Camrose Dr and Yellow Avens Blvd	0.28		
between Treeline Blvd and Countryside Dr	0.67	0	627

The highest intersection PSI is observed at Braydon Boulevard/Stonecrest Drive, which also has the highest intersection collision rate. The PRNS report also validates Countryside Drive as the intersection with the second highest rate of collisions. The results are presented in **Table 4-8**.

Table 4-8: PSI and PSI Rankings for Intersections

Intersection	Intersection Collision Rate (MKV)	PSI	PSI Ranking
Braydon Blvd/Stonecrest Dr	2.37	2.76	204
Eagle Plains Dr	0.44	0	492
Camrose Dr	0.06	N/A	N/A
Yellow Avens Blvd/Brock Dr	1.06	0	486
Treeline Blvd	0.00	0.97	264
Countryside Dr	1.68	2.67	210

4.2.9 Summary of Collision Analysis

The study corridor has experienced a total of 98 recorded collisions in the five-year study period. Overall, the total number of collisions has remained consistent from year to year

during the five-year period, with approximately 20 collisions occurring annually, on average. Key collision analysis observations are summarized as follows:

- Property Damage Only accounted for the majority of collision types (79%) and no fatal accidents were recorded in the five year period.
- Intersections observe a large proportion of collisions (90) compared to segments (8).
- The intersections with the highest collisions rates are Airport Road at Stonecrest Drive/Braydon Boulevard and at Countryside Drive. Furthermore, the segment between Treeline Boulevard and Countryside Drive experiences the highest collision rate among segments.
- The most common collision impact type was rear-end collisions (33%). Angle (20%) and single motor vehicle collisions (20%) were the second most common collision type, followed by turning collisions (16%) and sideswipes (10%).
- The share of night-time collisions appears to be relatively high. There may be potential to enhance safety through countermeasures such as improved illumination along the corridor.
- The Peel Region Network Screening Report confirms the results of the collision rate analysis. The top two intersections with the highest potential for safety improvement are the Stonecrest Drive/Braydon Boulevard and Countryside Drive intersections. Despite the number of collisions within the study area, the study area segments and intersections perform at an average regional level based on the PSI rankings.

5 Problem and Opportunity Statement

There is an opportunity to improve Airport Road between Braydon Boulevard/Stonecrest Drive and Countryside Drive for all travel modes – cyclists, pedestrians, transit users, and motorists. The transportation assessment identified the need for widening from four to six lanes within the study limits, as well as the need for continuous cycling and pedestrian facilities.

Table 5-1 provides a summary of the problems and opportunities identified for the study corridor.

Table 5-1: Summary of Problems and Opportunities for Airport Road

Problem	Opportunity
Existing road and intersections within study limits cannot accommodate projected traffic volumes.	Improve Airport Road to accommodate projected traffic demand and provide sufficient north-south transportation capacity through the northern part of Peel Region.
With regional roads at capacity, there is the potential for increased traffic on local roads.	Improve Airport Road to provide sufficient capacity to mitigate potential traffic infiltration and traffic increases on local roads.
Lack of cyclist facilities.	Provide cyclist facilities to accommodate existing users and growth as a result of future development.
Active transportation mode share is low for short and local trips.	Improve streetscape to promote active transportation modes. Enhance both safety and overall experience for cyclists, pedestrians, and transit users along the street.
Bus stop spacing on east side between Braydon Boulevard/Stonecrest Drive and Yellow Avens/Brock Drive is inadequate.	Review bus stop location in consultation with Brampton Transit.
High number of collisions at main intersections and at night-time.	Evaluate intersection-related improvements to enhance safety and accessibility. Consider countermeasures such as illumination improvements along the corridor.

6 Alternative Solutions

Alternative Solutions (planning alternatives) are functionally different ways of approaching and addressing a problem or opportunity. The Class Environmental Assessment process requires documentation and examination of all reasonable alternatives to address the problem; referred to as Alternative Solutions.

6.1 Generation of Alternative Solutions

Based on the Needs Assessment, a variety of Alternative Solutions were developed for the study area. These alternatives range in complexity, cost, and their ability to address the study area issues. **Table 6-1** presents a preliminary list of alternative solutions considered to address the problems and opportunities identified for the Airport Road study.

Table 6-1: Long-list of Potential Alternative Solutions

Alternative #	Title	Description
1	**Do Nothing**	Maintain existing conditions, including the number of lanes.
2	**Implement Active Transportation Improvements**	Provide continuous, shared space for cyclists and pedestrians.
3	**Widen Airport Road from Four to Six Lanes**	Provide two continuous, additional lanes to increase capacity for vehicular traffic.
4	**Implement Intersection Improvements**	Provide right and/or left turn lanes where warranted, signal optimization.
5	**Limit Development**	Limit growth to relieve road traffic.
6	**Improve Other Roads**	Widen other roads to divert traffic away from Airport Road.
7	**Transportation Demand Management (TDM)**	Apply strategies and policies to reduce travel demand, or to redistribute this demand in space or in time. TDM could include telecommuting, carpooling and peak hour spreading.

6.2 Evaluation of Alternative Solutions

This section details the process undertaken to assess the alternative solutions including the first round of screening, the evaluation criteria used, and the results of the in-depth analysis of the options carried forward.

6.2.1 Screening

To determine the most appropriate solution for the corridor, the long list of alternative solutions identified in **Section 6.1** underwent a first round of high level screening in order to narrow down the long list of alternatives to a short list that was carried forward for more detailed evaluation. **Table 6-2** summarizes the high-level screening and identifies the recommendations to be carried forward for consideration and further analysis.

Table 6-2: Screening of the Long-list of Potential Solutions Considered for Airport Road

Alternative #	Title	Recommendation	Reasoning
1	**Do Nothing**	Carry Forward for Consideration	• The Do Nothing scenario is carried forward as it provides a baseline for comparison with other alternative solutions.
2	**Implement Active Transportation Improvements**	Carry Forward for Consideration	• Addresses concerns regarding lack of active transportation facilities in the study area. • Is consistent with Peel Region's vision to increase the mode share of sustainable transportation options.
3	**Widen Airport Road from Four to Six Lanes**	Carry Forward for Consideration	• Addresses impending roadway capacity shortfall in the study area. • Supports Peel Region's growth and economic competitiveness.
4	**Implement Intersection Improvements**	Carry Forward for Consideration	• Has the potential to improve localized traffic operations in the study area. • Supports Peel Region's growth and economic competitiveness.
5	**Limit Development**	Do Not Carry Forward	• Is not in line with provincial, regional and municipal growth policies.
6	**Improve Other Roads Only**	Do Not Carry Forward	• The 2012 Long Range Transportation Plan demonstrates that widening other roads alone will not be sufficient to address the capacity constraints on Airport Road by 2031. This is consistent with more recent LRTP updates (2017, 2019) which confirm that improvements to other roads alone will not address the capacity needs of Airport Road by 2031 or 2041.

Alternative #	Title	Recommendation	Reasoning
7	**Transportation Demand Management (TDM) Only**	Do Not Carry Forward	• TDM policies provide added benefits as supplementary /additional strategies, but not as a standalone solution. Any physical solutions carried forward as part of the Airport Road EA will not preclude the implementation of TDM initiatives.

6.2.2 Evaluation Criteria

The evaluation criteria used to compare the alternative solutions carried forward is listed in **Table 6-3**.

Table 6-3: Alternative Solution Evaluation Criteria

Category	Criteria
Transportation Service 	• Improve Public Transit Service • Reduce Traffic Congestion and Delays • Create a Pedestrian-Friendly Environment • Create a Cyclist-Friendly Environment • Facilitates Goods Movement • Improve Safety for All Travel Modes • Improve Mode Choice • Meets Region's Long-Range Transportation Plan Objectives
Natural Environment 	• Protect Designated Natural Areas • Protect Vegetation • Protect Wildlife • Protect Aquatic Habitat • Protect Surface Water and Ground Water
Public Health 	• Improve Air Quality • Support Age-Friendly Living and Accessibility • Promotes Healthy Living by Encouraging Active Transportation such as Cycling and Walking
Social Environment 	• Minimize Impacts on Existing Residential, Institutional and Recreational Dwellings / Properties • Improve Access to Residential Areas, Institutional and Recreational Facilities • Mitigate Traffic on Local Streets • Minimize Traffic Noise • Conserve Cultural Heritage Resources • Improve Visual Aesthetics • Improve Community Character

Infrastructure Design 	• Minimize Utility Relocation • Minimize Constructability Complexity • Minimize Disruption due to Construction
Economic Environment and Cost Effectiveness 	• Accommodate Planned Development and Growth • Minimize Impacts on Business Properties • Improve Access to Businesses and Key Employment Areas • Maximize Construction Value • Minimize Operating Costs • Minimize Property Requirements

6.2.3 Detailed Evaluation of Alternative Solutions Carried Forward

Based on the evaluation criteria identified in **Section 6.2.2**, an evaluation was conducted to compare the four Alternative Solutions carried forward for consideration and thereby determine the recommended alternative. The analysis is provided in Table **6-4**.

Based on the evaluation presented, Alternative 1: "Do Nothing" is least preferred. A combination of Alternatives 2, 3 and 4 is preferred to better address the needs of all travel modes while also considering Airport Road's role as a regional corridor for people and goods.

Table 6-4: Evaluation of Alternative Solutions

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Transportation Service				
Improve Public Transit Service	• Transit service on Airport Road will be significantly delayed as congestion continues to increase		• Airport Road transit service and reliability would be enhanced, and delays minimized due to a reduction in traffic congestion	• Airport Road transit service and reliability has the potential to be enhanced and delays minimized if buses can use dedicated turn lanes
Reduce Traffic Congestion and Delays	• Capacity shortfall will continue to increase with insufficient capacity to meet future demands • Significant increase in traffic congestion will cause longer delays	• Capacity shortfall will continue to increase with insufficient capacity to meet future demands • Active transportation improvements can marginally reduce dependence on automobile, but will not offset insufficient capacity • Significant increase in traffic congestion will cause longer delays	• Reduced traffic congestion by increasing future capacity to meet future demands • Provides greatest relief to traffic congestion to mitigate delays	• Has the potential to improve level of service at intersections. However, capacity shortfall along the corridor will continue to increase with insufficient capacity to meet future demands in the midblock segments.
Create a Pedestrian-Friendly Environment	• No improvement to pedestrian environment which includes narrow sidewalks	• Significant improvement to pedestrian environment through completion and potential widening of sidewalks	• Increased pavement width at intersections will result in longer pedestrian walk times	• If dedicated turning lanes are considered as part of the intersection improvements, increased pavement width at intersections will result in longer pedestrian walk times
Create a Cyclist-Friendly Environment	• Poor environment for cyclists, as they must travel in lanes shared with general traffic	• Improved environment for cyclists through the provision of continuous cycling facilities	• Increased pavement width at intersections will result in longer cycling crossing times. Poor environment for cyclists, as they must travel in lanes shared with general traffic	• If dedicated turning lanes are considered as part of the intersection improvements, increased pavement width at intersections will result in longer cycling crossing times. Poor environment for cyclists, as they must travel in lanes shared with general traffic
Facilitates Goods Movement	• Increase in traffic congestion will cause longer delays and will adversely impact the role of Airport Road as a goods movement corridor	• Increase in traffic congestion will cause longer delays and will adversely impact the role of Airport Road as a goods movement corridor	• Increase in road capacity will reduce delays and congestion and will contribute to goods movement connectivity	• Has the potential to improve level of service at intersections. However, capacity shortfall along the corridor will continue to increase with insufficient capacity to meet future demands, and increase in traffic congestion will cause longer delays in midblock segments and will adversely impact the role of Airport Road as a goods movement corridor.
Improve Safety for All Travel Modes	• Higher potential for collisions as congestion increases, due to increased potential for conflicts and increased driver frustration • No improvement to road safety at locations with high potential for improvement • No improvement to cyclist and pedestrian safety	• Higher potential for collisions as congestion increases, due to increased potential for conflicts and increased driver frustration • High potential to improve cyclist and pedestrian safety due to active transportation improvements, by providing dedicated facilities and reducing conflicts with motorists	• Reduced collision potential with a reduction in traffic congestion, management of potential conflicts, and reduced driver frustration • Moderate potential to improve road safety at locations with high potential for improvement through moderate geometry and operational modifications as part of road widening • No improvement to cyclist and pedestrian safety	• No discernible impacts or improvements to safety due to intersection improvements alone.

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Improve Mode Choice	• No change in mode choice, which remains limited	• Increased mode choice through improvements to cyclist and pedestrian experience	• No improvements to cyclist and pedestrian mode choice • May increase transit mode share through improvement to service and reliability due to a reduction in traffic congestion	• No improvements to transit, cyclist and pedestrian mode choice
Meets Region's Long Range Transportation Plan Objectives	• Does not meet LRTP objectives	• Contributes to LRTP objectives by improving cyclist and pedestrian experience	• Contributes to LRTP objectives by providing additional capacity to meet future demands	• Contributes to LRTP objectives by improving intersection operations
Summary of Transportation Service	**Not Preferred**	**Partially Preferred**	**Preferred**	**Partially Preferred**
Natural Environment				
Protect Designated Natural Areas	• There are no Areas of Natural and Scientific Interest (ANSIs), Provincially Significant Wetlands (PSWs) or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area			
Protect Vegetation	• No anticipated impact on vegetation	• Minor impact to vegetation communities due to wider roadway platform to accommodate active transportation facilities; however, impacts can be minimized or mitigated through design • The study area is dominated by vegetation that is manicured and regularly maintained, as well as vegetation communities that are culturally influenced, including plant species that are well adapted to persist in areas that are regularly disturbed	• Moderate impact to vegetation communities due to wider roadway platform to accommodate additional lanes; however, impacts can be minimized or mitigated through design • The study area is dominated by vegetation that is manicured and regularly maintained, as well as vegetation communities that are culturally influenced, including plant species that are well adapted to persist in areas that are regularly disturbed	• Minor impact to vegetation communities due to potentially wider roadway platform at intersections to accommodate potential dedicated turning lanes; however, impacts can be minimized or mitigated through design • The study area is dominated by vegetation that is manicured and regularly maintained, as well as vegetation communities that are culturally influenced, including plant species that are well adapted to persist in areas that are regularly disturbed
Protect Wildlife	• No anticipated impact on wildlife	• Minor impact on wildlife due to wider roadway platform to accommodate active transportation facilities; however, impacts can be minimized or mitigated through design • Wildlife species identified within the study area are largely tolerant of human disturbance	• Moderate impact on wildlife due to wider roadway platform to accommodate additional lanes; however, impacts can be minimized or mitigated through design • Wildlife species identified within the study area are largely tolerant of human disturbance	• Minor impact on wildlife due to potentially wider roadway platform at intersections to accommodate potential dedicated turning lanes; however, impacts can be minimized or mitigated through design • Wildlife species identified within the study area are largely tolerant of human disturbance
Protect Aquatic Habitat	• No anticipated impact on aquatic habitat with no improvement at both West Humber River Tributary crossings	• Potential for minor impact at both West Humber River Tributaries (North of Eagle Plains Drive and North of Camrose Street), can be minimized or mitigated through design • Opportunities for improvements at these crossing as part of the road improvements	• Potential for moderate impacts at both West Humber River Tributaries (North of Eagle Plains Drive and North of Camrose Street), can be minimized or mitigated through design • Opportunities for improvements at these crossings as part of the road improvements	• No anticipated impact on aquatic habitat as intersections are sufficiently set back from both West Humber River Tributary crossings

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Protect Surface Water and Ground Water	• No anticipated impact to stormwater quality or quantity. • No anticipated impact on groundwater resources	• Minor impact with marginally increased hard surface area to accommodate active transportation facilities, stormwater quantity will increase, and quality mitigation may be required; however, can be addressed through design • No anticipated impact on groundwater	• Moderate impact with increased roadway width and hard surface area to accommodate additional lanes, stormwater quantity will increase, and quality mitigation may be required; however, can be addressed through design • Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width (i.e. road salt, etc.)	• Minor impact with potential for marginally increased hard surface area to accommodate potential dedicated turning lanes, stormwater quantity will increase, and quality mitigation may be required; however, can be addressed through design • No anticipated impact on groundwater
Summary of Natural Environment	**Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Public Health				
Improve Air Quality	• High deterioration to air quality through increased vehicle emissions due to increased congestion • Potential for deterioration in air quality on adjacent streets due to traffic diversion	• High deterioration to air quality through increased vehicle emissions due to increased congestion • Active transportation improvements can marginally reduce dependence on automobile and provide minor air quality improvements • Potential for deterioration in air quality on adjacent streets due to traffic diversion	• Potential for improvement to air quality due to reduced congestion • Potential for deterioration in air quality due to accommodation of additional automobiles resulting from increased capacity • Minor improvement in air quality on adjacent streets due to reduction in traffic diversion	• Potential for improvement to air quality due to reduced congestion at intersections • Potential for minor improvement in air quality on adjacent streets due to potential reduction in traffic diversion
Support Age-Friendly Living and Accessibility	• High reliance on automobile excludes those who do not own vehicles and/or are unable to drive (such as children and the elderly) • No improvements to study corridor conditions	• Active transportation improvements provide opportunities for people of all ages and socio-economic positions to travel along the corridor	• Improvements to driving conditions may encourage driving while excluding those excludes those who do not own vehicles and/or are unable to drive (such as children and the elderly)	• Improvements to intersection operations only target driving conditions and do not address the needs of people who rely on other modes of transport
Promotes Healthy Living by Encouraging Active Transportation such as Cycling and Walking	• No incentive to promote active transportation, which remains limited to pedestrian movement only	• Provision of active transportation facilities may lead to walking and cycling mode shift and their associated health benefits	• No incentive to promote active transportation, which remains limited to pedestrian movement only	• No incentive to promote active transportation, which remains limited to pedestrian movement only
Summary of Public Health	**Not Preferred**	**Preferred**	**Partially Preferred**	**Partially Preferred**
Social Environment				

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Minimize Impacts on Existing Residential, Institutional and Recreational Dwellings / Properties	• No direct impacts to existing dwellings / properties	• No anticipated impacts to existing dwellings / properties, as active transportation improvements can generally be accommodated within the existing ROW	• Potential impact to existing dwellings / properties as a result of reduced distance between travel lanes and properties, and potential for property acquisition to accommodate widening at some locations, but additional lanes can generally be accommodated within the existing ROW • Temporary grading or drainage easements for construction may be required	• Potential impact to existing dwellings / properties adjacent to intersections as a result of reduced distance between potential dedicated turning lanes and properties, and potential for property acquisition to accommodate these potential turning lanes at some locations, but additional turning lanes can generally be accommodated within the existing ROW • Temporary grading or drainage easements for construction may be required at some intersection locations
Improve Access to Residential Areas, Institutional and Recreational Facilities	• Increased difficulty to access Airport Road from driveways and unsignalized cross-streets, due to increased congestion • No changes to existing driveways	• Increased difficulty to access Airport Road from driveways and unsignalized cross-streets, due to increased congestion • Improved pedestrian and cycling access	• Improvement to access Airport Road from driveways and unsignalized cross-streets, due to reduced traffic congestion • Potential for shorter driveways due to wider road platform	• Intersection improvements alone will not provide improvement to access Airport Road from driveways and unsignalized cross-streets
Mitigate Traffic on Local Streets	• Moderate increase in traffic diversion to neighbouring collector and local roads may result due to increased traffic congestion on Airport Road		• Moderate decrease in traffic diversion to neighbouring collector and local roads due to increased capacity to move automobiles on Airport Road	• Minor decrease in traffic diversion to neighbouring collector and local roads due to improved intersection operations along Airport Road
Minimize Traffic Noise	• Anticipated increase in noise levels with future traffic growth and increased congestion		• Anticipated increase in noise levels with future traffic growth and lanes in closer proximity to properties	• Anticipated increase in noise levels with future traffic growth and increased congestion in the midblock segments and potential for turning lanes in closer proximity to properties
Conserve Cultural Heritage Resources	• No impact on cultural heritage resources	• No anticipated impact on cultural heritage resources due to previously disturbed conditions		
Improve Visual Aesthetics	• No improvement to existing aesthetics	• Minor reduction of visual aesthetics, due to increased platform width for active transportation facilities • Moderate improvement to visual aesthetics through localized plantings or other boulevard treatments, where possible within ROW	• Moderate reduction of visual aesthetics, due to increased pavement width for additional lanes • Moderate improvement to visual aesthetics through localized plantings or other boulevard treatments, where possible within ROW	• Potential for minor reduction of visual aesthetics at intersections, due to increased platform width for potential dedicated turning lanes
Improve Community Character	• No improvement to community character • Reduction in community connectivity due to increased traffic congestion	• Moderate improvement to community character through provision of improved pedestrian / cycling opportunities • Reduction in community connectivity due to increased traffic congestion	• Deterioration to community character • Moderate improvement to community connectivity due to improved traffic flow and reduction of transit service delays	• Potential for minor deterioration to community character • Minor improvement to community connectivity due to improved traffic flow at intersections

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Summary of Social Environment	**Not Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Infrastructure Design				
Minimize Utility Relocation	• No change in road infrastructure, therefore no anticipated utility relocations required	• Potential for minor utility relocation in the vicinity of active transportation improvements	• Potential for significant utility relocation anticipated to accommodate additional lanes	• Potential for significant utility relocation anticipated to accommodate potential turning lanes
Minimize Constructability Complexity	• No change in road infrastructure, therefore no constructability issues	• Lower constructability complexity anticipated	• Higher constructability complexity anticipated, especially at constrained localized areas; however, can be addressed through design	• Moderate constructability complexity anticipated
Minimize Disruption due to Construction	• No change in road infrastructure, therefore no construction disruption	• Minor disruption to install pedestrian and cycling facilities	• Significant disruption to construct additional lanes • Potential temporary disruptions to driveways • Mitigation strategies including Smart Work Zones could be applied	• Moderate disruption to construct improvements at intersections
Summary of Infrastructure Design	**Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Economic Environment and Cost Effectiveness				
Accommodate Planned Development and Growth	• Does not support planned and committed development in the vicinity of the Study Area, as capacity cannot accommodate planned growth		• Supports planned and committed development in the Study Area by providing adequate capacity and transportation choices to accommodate planned growth • Reduction in travel times yield a region-wide economic benefit	• Does not support planned and committed development in the vicinity of the Study Area, as midblock capacity cannot accommodate planned growth and intersection improvements alone do not provide the required capacity
Minimize Impacts on Business Properties	• No direct impacts to existing business properties	• No anticipated impacts to existing business properties, as active transportation improvements can generally be accommodated within the existing ROW	• Potential impact to existing business properties as a result of reduced distance between travel lanes and properties, and potential for property acquisition to accommodate widening at some locations, but additional lanes can generally be accommodated within the existing ROW • Temporary grading or drainage easements for construction may be required	• Potential impact to existing business properties adjacent to intersections as a result of reduced distance between potential dedicated turning lanes and properties, and potential for property acquisition to accommodate these potential turning lanes at some locations, but additional turning lanes can generally be accommodated within the existing ROW • Temporary grading or drainage easements for construction may be required at some intersection locations

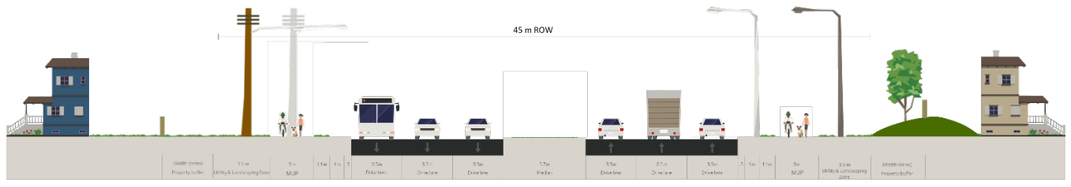
Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Improve Access to Businesses and Key Employment Areas	• Increased difficulty to access Airport Road to/from commercial driveways and cross-streets, due to increased congestion and reduced gaps in traffic • No changes to existing driveway entrances	• Increased difficulty to access Airport Road to/from commercial driveways and cross-streets, due to increased congestion and reduced gaps in traffic • Improved pedestrian and cycling access • Potential for minor changes to existing driveway entrances to accommodate cyclist and pedestrian facilities	• Improvement to access Airport Road to/from commercial driveways and cross-streets, due to reduced traffic congestion and reduced gaps in traffic • Potential for shorter driveways due to wider road platform	• No improvement to access Airport Road to/from commercial driveways and cross-streets, due to increased traffic congestion in the midblock segments and reduced gaps in traffic
Maximize Construction Value	• No capital costs • No improvements to any travel modes	• Minor capital costs for active transportation facilities • Improvements focus on cyclists and pedestrians	• Significant capital costs for improvements to Airport Road to construct additional lanes • Greatest improvement for drivers	• Moderate capital costs for improvements to Airport Road to construct potential additional turning lanes • Greatest improvement for drivers
Minimize Operating Costs	• Moderate increase in operating costs; as traffic volumes accelerate road deterioration, resulting in need to resurface road more often	• Moderate increase in operating costs; as traffic volumes accelerate road deterioration, resulting in need to resurface road more often • Minor increase in operating costs to maintain active transportation facilities	• Moderate increase in operating costs with additional roadway width (additional lanes) to maintain	• Moderate increase in operating costs for the midblock segment; as traffic volumes accelerate road deterioration, resulting in need to resurface road more often • Minor increase in operating costs at the intersections with potential additional roadway width (potential additional turning lanes) to maintain
Minimize Property Requirements	• No property acquisition required	• No property acquisition anticipated as improvements can generally be accommodated within the existing ROW	• Potential for property acquisition to accommodate widening at some locations, but additional lanes can generally be accommodated within the existing ROW	• Potential for property acquisition to accommodate potential turning lanes at some locations, but intersection improvements can generally be accommodated within the existing ROW
Summary of Economic Environment and Cost Effectiveness	**Partially Preferred**	**Partially Preferred**	**Preferred**	**Partially Preferred**
Overall Summary				

Criteria	Option 1: Do Nothing	Option 2: Implement Active Transportation Improvements	Option 3: Widen Airport Road from four to six lanes	Option 4: Intersection Improvements
Comments	• The current configuration of Airport Road between Braydon Boulevard/ Stonecrest Drive and Countryside Drive is insufficient to achieve economic, social, and transportation objectives. With future growth planned in the vicinity of the study area, corridor improvements must be made.	• Providing active transportation improvements results in some balance between transportation objectives and impacts to the natural and social environment. However, these improvements on their own are insufficient to achieve economic, social, and transportation objectives. With future growth planned in the vicinity of the study area, additional corridor improvements must be made.	• Widening to provide general purpose lanes results in moderate impacts to the natural environment, while achieving economic and transportation objectives. The additional roadway capacity only supports auto travel and does not provide benefits to alternative modes of travel.	• Providing intersection improvements results in some balance between transportation objectives and localized impacts to the natural and social environment. However, these improvements on their own are insufficient to achieve economic, social, and transportation objectives. With future growth planned in the vicinity of the study area, additional corridor improvements must be made. • Intersection analysis will determine improvements to road operations at specific locations.
	NOT PREFERRED	**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED**
OVERALL RECOMMENDATION	**PREFERRED SOLUTION: HYBRID OF OPTIONS 2 & 3 & 4**			
	IMPLEMENT ACTIVE TRANSPORTATION & INTERSECTION IMPROVEMENTS & WIDEN AIRPORT ROAD FROM FOUR TO SIX LANES			

6.3 Preferred Solution

The selected preferred solution consisted of a hybrid of alternatives 2 (implement active transportation improvements), 3 (widen Airport Road from four to six lanes), and 4 (implement intersection improvements), as documented in **Section 6.** Following input from the public at Public Information Centre #1 on November 23, 2017 (refer to **Section 12.3**), the preferred solution was refined and includes:

- Widening Airport Road from four (4) to six (6) lanes,
- Implementing active transportation improvements in the form of a multi-use path on both sides; and
- Implementing intersection improvements to address localized needs (for example, confirm storage length for left-turn lanes and confirm need for signalization of unsignalized intersections)



Reference: The above images are created using Streetmix and are subject to the Creative Commons BY-SA 3.0 license (http://creativecommons.org/licenses/by-sa/3.0/).
Exhibit 6-1: Preferred Solution Cross-section

7 Alternative Designs

Alternative designs are different concepts in which a project can be developed and executed to implement the preferred solution. This section documents the Class EA required process for the examination of all reasonable design options; referred to as Alternative Designs.

Three alternative design concepts were developed to address the widening of Airport Road. The three options considered were:

- Option 1: Widen to the west
- Option 2: Widen about the centreline
- Option 3: Widen to the east

7.1 Evaluation Criteria

The evaluation criteria used to compare the alternative solutions carried forward is listed in **Table 7-1**.

Table 7-1: Criteria Used to Evaluate Alternative Designs

Category	Criteria
Transportation Service 	• Reduce Traffic Congestion and Delays • Improve Public Transit Service • Create a Pedestrian-Friendly Environment • Create a Cyclist-Friendly Environment • Facilitates Goods Movement • Improve Safety for All Travel Modes • Improve Mode Choice • Improve Access to Residential Areas, Businesses and Institutional and Recreational Facilities • Meet Region's Long-Range Transportation Plan Objectives
Natural Environment 	• Protect Designated Natural Areas • Protect Vegetation • Protect Wildlife • Protect Aquatic Habitat • Protect Species At Risk • Protect Surface Water and Ground Water
Public Health 	• Improve Air Quality • Support Age-Friendly Living and Accessibility • Promotes Healthy Living by Encouraging Active Transportation such as Cycling and Walking

Category	Criteria
Social Environment 	• Minimize Impacts on Existing Residential, Institutional and Recreational Dwellings / Properties • Mitigate Traffic on Local Streets • Minimize Traffic Noise • Conserve Cultural Heritage Resources • Improve Visual Aesthetics • Improve Community Character
Infrastructure  **Design**	• Minimize Utility Relocation • Minimize Constructability Complexity • Minimize Disruption due to Construction
Economic Environment and Cost Effectiveness 	• Accommodate Planned Development and Growth • Minimize Impacts on Business Properties • Maximize Construction Value • Minimize Operating Costs • Minimize Property Requirements

7.2 Evaluation of Alternative Designs

Based on the evaluation criteria identified in **Section 7.1**, an evaluation was conducted to compare the three Alternative Designs and determine the recommended design. The evaluation is provided in **Table 7-2**.

Table 7-2: Evaluation of Alternative Designs

Criteria	Alternative Design 1: Widen to the west	Alternative Design 2: Widen about the centerline	Alternative Design 3: Widen to the east
Transportation Service			
Reduce Traffic Congestion and Delays	• All alternative designs increase capacity to meet future demands and have the same potential to reduce traffic congestion and delays.		
Improve Public Transit Service	• All alternative designs will improve Airport Road transit service and reliability through a reduction in traffic congestion.		
Create a Pedestrian-Friendly Environment	• Pedestrians are proposed to be accommodated on multi-use paths (MUPs) on both sides of the street.		
Create a Cyclist-Friendly Environment	• All alternative designs propose the installation of MUPs on both sides of the street, thereby improving the cycling conditions substantially.		
Facilitates Goods Movement	• Increase in road capacity will reduce delays and congestion and will improve to goods movement connectivity.		
Improve Safety for All Travel Modes	• All alternative designs provide equal road safety improvement for active transportation. The potential for cyclist – vehicle conflict is drastically reduced through the provision of MUPs on both sides of the street.		
Improve Mode Choice	• The provision of cycling facilities (such as MUPs) is known to increase the cycling mode share. • There is the potential for transit mode share increase due to improvement to service and reliability resulting from lower congestion.		
Meets Region's Long Range Transportation Plan (LRTP) Objectives	• All alternative designs contribute to LRTP objectives as they provide additional capacity to meet future demands and improve the cyclist and pedestrian experience.		
Improve Access to Residential Areas, Businesses, and Institutional / Recreational Facilities	• Reduced traffic congestion and greater gaps in traffic help improve access to/from commercial driveways and cross-streets. • Active transportation facilities (MUPs) on both sides of the street also help improve access to residences and businesses. • Potential for shorter driveways due to wider road platform.		
Summary of Transportation Service	**Preferred**	**Preferred**	**Preferred**
Natural Environment			
Protect Designated Natural Areas	• No impact to designated natural areas as no Provincially Significant Wetlands (PSWs), Environmentally Sensitive Area (ESA) or Area of Natural and Scientific Interest (Earth or Life Science) are within 120 m of the study area.		
Protect Vegetation	• Because in general, vegetation is less prevalent on the west side of the corridor, widening to the west will result in less significant impacts to vegetation communities compared to alternative design 3, but greater than compared to alternative design 2.	• Widening about the centerline minimizes impact to vegetation communities as the design footprint is balanced on already disturbed areas on both sides of Airport Road.	• Because in general, vegetation is more prevalent on the east side of the corridor, widening to the east will result in greater impacts to vegetation communities compared to alternative designs 1 and 2.
Protect Wildlife	• A similar degree of impact on wildlife is expected as a result of all alternative designs. However, wildlife species identified within the study area are largely tolerant of human disturbance. • The main impact is anticipated to pertain to temporary displacement during construction.		

Criteria	Alternative Design 1: Widen to the west	Alternative Design 2: Widen about the centerline	Alternative Design 3: Widen to the east
Protect Aquatic Habitat	• Widening to the west requires extending the culverts to accommodate the additional roadway footprint, resulting in disturbance to the aquatic habitat.	• Widening about the centreline may require extending the culverts but to a lesser extent compared to alternative design 1; however, there are opportunities to optimize this design alternative to avoid or minimize culvert extensions and their associated impacts to the aquatic habitat.	• Widening to the east is not anticipated to result in culvert extensions, thereby avoiding any disturbance to the aquatic habitat.
Species at Risk	• The two watercourse crossings in the study area are classified as contributing habitat to Redside Dace. • Culvert extension is anticipated to result in moderate impacts to Redside Dace habitat zone (watercourse) as footprint is concentrated only on one side of Airport Road.	• The two watercourse crossings in the study area are classified as contributing habitat to Redside Dace. • Low to moderate impacts to Redside Dace habitat zone (watercourse) as culvert extension may be required; however, there are opportunities to optimize this design alternative to avoid or minimize culvert extensions.	• The two watercourse crossings in the study area are classified as contributing habitat to Redside Dace. • Minimizes impacts to Redside Dace habitat zone (watercourse) as culvert extension is not anticipated.
Protect Surface Water and Ground Water	• Moderate impact with increased roadway width and hard surface area to accommodate additional lanes, stormwater quantity will increase and quality mitigation may be required; however, can be addressed through design. • Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width (i.e. road salt, etc.).		
Summary of Natural Environment	**Not Preferred**	**Preferred**	**Less Preferred**
Public Health			
Improve Air Quality	• Reduced congestion and improved transit service have the potential to reduce greenhouse gas emissions, thereby providing local air quality improvements. • There is the potential for deterioration in air quality due to the increased capacity attracting additional automobiles. • Minor improvement in air quality on adjacent streets is anticipated due to reduction in traffic diversion.		
Support Age-Friendly Living and Accessibility	• Active transportation improvements provide opportunities for people of all ages and socio-economic backgrounds to travel along the corridor. All alternative designs support social equity to the greatest extent, as they facilitate all travel modes, including active transportation on both sides of Airport Road.		
Promotes Healthy Living by Encouraging Active Transportation such as Cycling and Walking	• Providing active transportation facilities is known to encourage walking and cycling, which are associated with health benefits.		
Summary of Public Health	**Preferred**	**Preferred**	**Preferred**
Social Environment			
Minimize Impacts on Existing Residential, Institutional and Recreational Dwellings / Properties	• The proposed road works under this alternative design generally exceed the existing Right-of Way (ROW) on the west side. • Encroachment into the Region's buffer zone and potentially into private properties is anticipated for a large part of the corridor; impacts on residential properties are higher compared to alternative design 2 but lower than alternative design 3. • Temporary grading or drainage easements for construction may also be required.	• The proposed road works under this alternative design are mostly contained within the existing ROW. • However, minimal encroachment into the Region's buffer zone may be required at some locations; impacts are lowest compared to alternative designs 1 and 3. • Temporary grading or drainage easements for construction may be required at some locations.	• The proposed road works under this alternative design generally exceed the existing ROW on the east side. • Encroachment into the Region's buffer zone and into private properties is anticipated for a large part of the corridor; impacts are highest compared to alternative designs 1 and 2. • Temporary grading or drainage easements for construction may also be required.

Criteria	Alternative Design 1: Widen to the west	Alternative Design 2: Widen about the centerline	Alternative Design 3: Widen to the east
Mitigate Traffic on Local Streets	• Decrease in traffic diversion to neighbouring collector and local roads due to increased capacity and mode choices on Airport Road.		
Minimize Traffic Noise	• Alternative design 1 is anticipated to increase noise levels to the west side of the study area due to the additional lanes in closer proximity to properties and businesses.	• When widening about the centerline, the increase in noise experienced by the surrounding area is more balanced between properties on both sides of Airport Road, compared to alternative designs 1 and 3.	• Alternative design 3 is anticipated to increase noise levels to the east side of the study area due to the additional lanes in closer proximity to properties and businesses.
Conserve Cultural Heritage Resources	• The potential impacts on cultural heritage resources are concentrated around the two study area watercourses. • Potential impacts are anticipated due to the culvert extensions and work in the valley systems.	• The potential impacts on cultural heritage resources are concentrated around the two study area watercourses. • The impacts are expected to be minimized compared to alternative designs 1 and 3 as the road footprint is balanced on already disturbed areas on both sides of Airport Road.	• The potential impacts on cultural heritage resources are concentrated around the two study area watercourses. • Potential impacts are anticipated due to potential work in the valley systems.
Improve Visual Aesthetics	• Moderate reduction of visual aesthetics, due to increased pavement width for additional lanes. • Improvement to visual aesthetics on both sides of the street can be achieved through localized plantings or other boulevard treatments, where possible within median and boulevards.		
Improve Community Character	• Moderate improvement to community character through provision of improved pedestrian / cycling opportunities. • Moderate improvement to community connectivity due to improved traffic flow and reduction of transit service delays.		
Summary of Social Environment	**Less Preferred**	**Preferred**	**Not Preferred**
Infrastructure Design			
Minimize Utility Relocation	• Widening to the west requires complete relocation of utility (hydro and light) poles on the west side. • No relocation anticipated for light standards on the east side.	• Hydro poles on the west side and light poles on the east and west side are anticipated to require relocation to accommodate safety clear zone requirements.	• Widening to the east avoids relocation of hydro poles on the west side but would require relocation of light standards on the east side.
Minimize Constructability Complexity	• High constructability complexity is anticipated under this alternative design due to shift in centreline alignment and roadway crown.	• Lowest construction complexity is anticipated as the existing centreline, raised median, and roadway crown are maintained.	• High constructability complexity is anticipated under this alternative design due to shift in centreline alignment and roadway crown.
Minimize Disruption due to Construction	• Greater disruption is expected to implement this design alternative compared to alternative design 2, due to the longer construction duration and the additional traffic staging anticipated. • There is the potential for temporary disruptions to driveways. • Mitigation strategies including Smart Work Zones could be applied.	• Less disruption is expected to implement this design alternative compared to alternative designs 1 and 3, due to the shorter construction duration and less traffic staging anticipated. • There is the potential for temporary disruptions to driveways. • Mitigation strategies including Smart Work Zones could be applied.	• Greater disruption is expected to implement this design alternative compared to alternative design 2, due to the longer construction duration and the additional traffic staging anticipated. • There is the potential for temporary disruptions to driveways. • Mitigation strategies including Smart Work Zones could be applied.
Summary of Infrastructure Design	**Not Preferred**	**Preferred**	**Less Preferred**
Economic Environment and Cost Effectiveness			
Accommodate Planned Development and Growth	• Supports planned and committed development in the Study Area by providing adequate capacity and transportation choices to accommodate planned growth. • The reduction in travel times yields a region-wide economic benefit.		

Criteria	Alternative Design 1: Widen to the west	Alternative Design 2: Widen about the centerline	Alternative Design 3: Widen to the east
Minimize Impacts on Business Properties	• Potential impact to the two commercial plazas located at Yellow Avens Boulevard/Brock Drive and Countryside Drive as a result of reduced distance between travel lanes and properties. • Temporary grading or drainage easements for construction may be required.	• Potential impacts to existing business properties on both sides of Airport Road as a result of reduced distance between travel lanes and properties. Commercial plazas include those at Yellow Avens Boulevard/Brock Drive, Countryside Drive and Stonecrest Drive/Braydon Boulevard. • Temporary grading or drainage easements for construction may be required	• Potential impact to the commercial plaza located at Stonecrest Drive/Braydon Boulevard as a result of reduced distance between travel lanes and properties. • Temporary grading or drainage easements for construction may be required.
Maximize Construction Value	• All options provide improvements to all modes. • Significant capital construction costs are expected due to the combination of utility relocation, culvert extensions and shifting the road alignment to the west.	• All options provide improvements to all modes. • Moderate capital construction costs are expected because centerline widening will maintain the existing raised median and roadway crown but results in significant utility relocations.	• All options provide improvements to all modes. • Moderate capital construction costs are expected due to the combination of minor utility relocation and shifting the road alignment to the east.

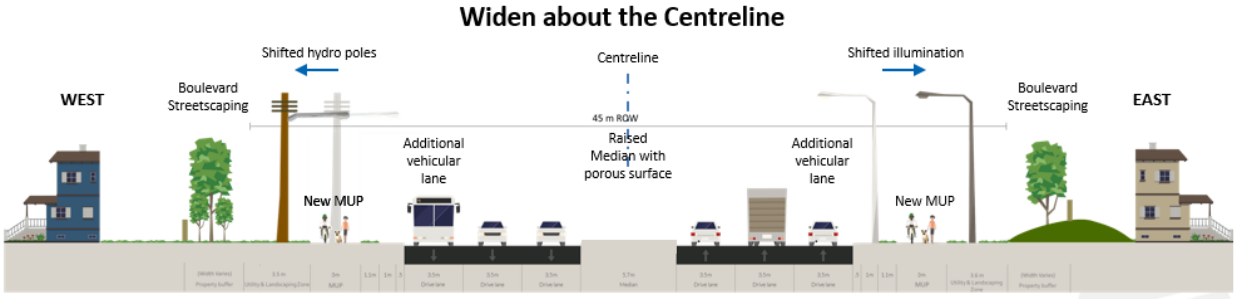
Minimize Operating Costs	• An increase in operating costs is expected for all alternative designs due to:
	  ○ The additional roadway width (additional lanes) which require maintenance and;
	  ○ The accelerated rate of road deterioration from increased traffic which results in the need to resurface Airport Road more often.
	• A portion of the increase in operating costs can be attributed to maintaining active transportation facilities.		

Minimize Property Requirements	• This alternative design results in moderate property acquisition anticipated.	• Property acquisition can be minimized or avoided as improvements can generally be accommodated within the existing ROW	• This alternative design results in moderate property acquisition anticipated.
Summary of Economic Environment and Cost Effectiveness	**Not Preferred**	**Preferred**	**Less Preferred**
Overall Summary			
Comments	• Widening Airport Road to the west results in significant impacts on adjacent properties, incurs large capital costs, and does not maximize the existing infrastructure design. Compared to the other alternatives, alternative design 1 is less able to achieve the economic, and social criteria set and is not recommended for further consideration.	• Widening Airport Road about the centerline minimizes property acquisition, and balances impacts on the already disturbed lands on both sides of the road. This alternative design generally outperforms the other alternatives considered, and there are opportunities to optimize the design to address localized concerns relating to the watercourses. As such, this alternative design is recommended for further refinement.	• Widening Airport Road to the east results in considerable impacts on adjacent properties, existing natural and cultural heritage features. Alternative design 3 is less able to satisfy the natural, economic, and social criteria set, compared to the other options, and is not recommended for further consideration.
OVERALL RECOMMENDATION	**NOT PREFERRED**	**PREFERRED** **PREFERRED DESIGN: ALTERNATIVE DESIGN 2** **Widen Airport Road from Four to Six Lanes About the Centreline And Implement Active Transportation Facilities**	**LESS PREFERRED**

7.3 Preferred Design

Based on the evaluation presented, **Alternative Design 2: "Widen about the centerline**" is the preferred design. Alternative Design 3 is less preferred while Alternative Design 1 is the least preferred option given its associated impacts on the social and natural environments, infrastructure design and project cost.

A cross-sectional view of the preferred alternative design is displayed in **Exhibit 7-1.**



Reference: The above images are created using Streetmix and are subject to the Creative Commons BY-SA 3.0 license (http://creativecommons.org/licenses/by-sa/3.0/).
Exhibit 7-1: Preferred Design

7.4 Confirmation of Preferred Design

Following Public Information Centre (PIC) #2 on November 28, 2019, the project team has confirmed the recommendation of Alternative **Design 2: Widen about the centerline** for Airport Road within the study limits.

8 Intersection Operational Improvements

8.1 Auxiliary Turn Lane Requirements

A memorandum was produced to summarize traffic analysis and findings for investigating the auxiliary turning lane requirements for Airport Road within the study limits. The memo, which can be found in **Appendix H**, answered the following two questions:

- Whether auxiliary left-turn lanes require extension, and
- Whether auxiliary right-turn lanes are required in the post-widening conditions

Based on the analysis, the following configurations are recommended for left-turn and right-turn lanes along Airport Road, as part of the six-lane widening preferred alternative:

- Left-Turn lanes – Maintain existing parallel lane lengths
- Right-Turn lanes – Convert existing auxiliary right-turn lanes to continuous shared through-right lanes, with the exception of the northbound right-turn lane at Stonecrest Drive/Braydon Boulevard, which is proposed to be maintained

For the boundary intersection at Countryside Drive (SBR), the existing auxiliary right-turn lane is recommended to be converted to allow shared through-rights.

At Stonecrest Drive/Braydon Boulevard (NBR), an auxiliary right-turn lane is recommended to be included.

8.2 Traffic Signal Warrants

A memorandum was also produced to document the traffic signal warrant analysis for unsignalized intersections along Airport Road within the study limits. The three intersections reviewed as part of this analysis are:

- Airport Road at Treeline Boulevard
- Airport Road at Camrose Street
- Airport Road at Eagle Plains Drive

To provide recommendations regarding the signal warrants, the Ontario Traffic Manual (OTM) Book 12 standards and justifications were reviewed as follows:

- Justification 1 – Minimum Vehicle Volume
- Justification 2 – Delay to Cross Traffic
- Justification 3 – Volume/Delay Combination
- Justification 5 – Collision Experience
- Justification 6 – Pedestrian Volumes and Delays
- Justification 7 – Projected Volumes

The analysis showed that none of the intersections meet or exceed the requirements for traffic signal installation. As a result, there are no new traffic signals or controlled pedestrian crossings recommended for the Airport Road at Treeline Boulevard, Airport

Road at Camrose Street, and Airport Road at Eagle Plains Drive intersections. However, it is recommended that future transit ridership and pedestrian activity at these intersections be monitored, to assess whether a new controlled east-west pedestrian crossing might be warranted at a later time. The recommended Airport Road improvements do not preclude these separate crossings from being implemented at a later date.

The full analysis can be found in **Appendix H**.

It is also understood at the time of the Airport Road EA that Peel Region is undertaking a separate assessment for potential modifications to turning movements at the Airport Road and Eagle Plains Drive intersection. Recommendations from that separate study should be reviewed during detailed design in conjunction with the overall Airport Road recommendations.

9 Project Description

9.1 Design Criteria

The criteria for roadway, active transportation and access design along Major Mackenzie Drive are summarized in **Table 9-1**.

Table 9-1: Roadway Design Criteria

ROAD DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS	PROPOSED STANDARDS	SOURCE / REFERENCE
DESIGN CLASSIFICATION	4 Lane UAD 80/90	6 Lane UAD 80	6 Lane UAD 80	Based on 70km/h posted speed, 80km/h design speed
POSTED SPEED	70 km/hr	70 km/hr	70 km/hr	
MINIMUM STOPPING SIGHT DISTANCE	160m	130m	130m	2017 TAC – Table 2.5.2; Chapter 2 page 38
EQUIVALENT MINIMUM "K" FACTOR	50 CREST 40 SAG	26 CREST 12-16 SAG	26 CREST 12-16 SAG	Crest: 2017 TAC – Chapter 3 page 59 Table 3.3.2; Sag: 2017 TAC – Chapter 3 page 63 Table 3.3.5
GRADES MINIMUM	0.5%	0.5%	0.5%	2017 TAC – Chapter 3 page 56
GRADES MAXIMUM	2.5%	3.0%	3.0%	2017 TAC – Chapter 3 page 55 Table 3.3.1
MINIMUM RADIUS	3000m	2130m	2130m	2017 TAC – Chapter 3 page 14 Table 3.2.4 (normal crown)

ROAD DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS	PROPOSED STANDARDS	SOURCE / REFERENCE
LANE WIDTH	Through lanes: 3.75m Auxiliary lanes: RT: 3.5m LT:3.5m	Through lanes: 3.4 – 3.5m (3.5 – 3.7m curb lane) Auxiliary lanes: RT: same width as through lane LT: same width as through lane	Through lanes: 3.5m Auxiliary lanes: RT: 3.5m LT: 3.5m	Through lanes: Region of Peel's Road Characterization Study, Suburban Connector with 45 m ROW Auxiliary lanes: 2017 TAC – Chapter 4 page 13 (Section 4.3.2.2 and 4.3.2.3)
SHOULDER WIDTH	N/A	N/A	N/A	
SPLASH STRIP	1.0m	1.0m	1.0m	Region of Peel's Road Characterization Study, Suburban Connector with 45 m ROW
BOULEVARD / GREEN ZONE WIDTH	Varies (3.5m to 7.5m)	4.0m	Desirable: 4.0m Typical: 3.0 m (further reduced at locations such as behind bus pads, where constrained)	Desirable: Region of Peel's Road Characterization Study, Suburban Connector with 45 m ROW Typical: available road right-of-way
MULTI-USE PATH WIDTH	N/A	Typical: 3.0m Minimum: 2.4m (a)	Typical: 3.0m Minimum: 2.4m	Typical: Region of Peel's Road Characterization Study, Suburban Connector with 45 m ROW Minimum: 2017 TAC Chapter 5 Section 5.3.1.4.

ROAD DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS	PROPOSED STANDARDS	SOURCE / REFERENCE
MEDIAN WIDTH	5.75m (raised)	5.5m	Desirable: 5.75m Minimum: 5.5m	Desirable: match existing conditions Minimum: Region of Peel's Road Characterization Study, Suburban Connector with 45 m ROW
R.O.W. WIDTH	Varies – 45m min.	Varies – 45m min.	Varies – 45m min.	
SIGNALS & ILLUMINATION	Full signals and illumination	Full signals and illumination	Full signals and illumination	

NOTES
a. Minimum dimension to be used for short, highly constrained segments only

9.2 Road Geometry

9.2.1 **Horizontal Alignment**

The horizontal alignment for the preferred design (with an 80 km/h design speed) maintains the existing centreline of Airport Road, with widening taking place on both sides of the existing centreline. The proposed horizontal alignment is illustrated on the preliminary design drawings in **Appendix A**.

9.2.2 **Vertical Alignment**

The proposed vertical alignment accommodates an 80 km/h design speed. This vertical alignment was chosen to match the existing road profile. The vertical profile also aims to minimize impacts to existing entrances and driveways, minimize impacts on watercourse crossings, and reduce grading impacts to adjacent properties and features. The proposed vertical alignment is illustrated on the preliminary design drawings in **Appendix A**.

9.3 Structural Design

The findings of the Structural Assessment conducted as part of the Airport Road EA indicated that the structures in the study area appear to be in good condition and do not require any major rehabilitation works to be undertaken at this time. Both structures can accommodate the Airport Road widening within their existing platform, and as such are not required to be extended or widened.

Peel Region will continue to conduct OSIM investigations for the culverts across the two study area tributaries. Findings from the inspections should be reviewed and considered during the detailed design of Airport Road.

9.4 Typical Cross-Sections

The typical cross-section (looking north) is illustrated in **Exhibit 9-1.**

The typical cross-section generally consists of:

- Two (2) 3.5m curb lanes (one in each direction)
- Four (4) 3.5m through lanes (two in each direction)
- A 5.75m raised median between Braydon Boulevard/Stonecrest Drive and Countryside Drive
- A 3.0 m multi-use path on the east side of Airport Road within the study limits
- A 3.0 m multi-use path on the west side of Airport Road within the study limits

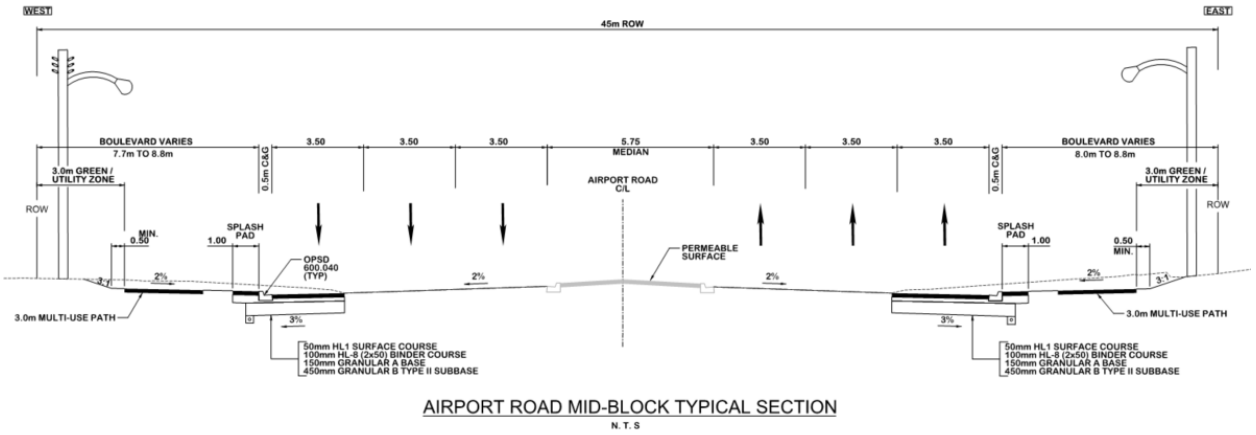


Exhibit 9-1: Typical Cross-Section

9.5 Cycling and Pedestrian Facilities

The preferred design incorporates two, off-road multi-use paths (MUP), one on the east and one on the west side of Airport Road between Braydon Boulevard / Stonecrest Drive and Countryside Drive. The design of the MUP is based on the 2017 Transportation Association Committee (Chapter 5 Section 5.3.1.4.) and on the Ontario Traffic Manual (2014) OTM Book 18 – Cycling Facilities, which provide guidelines for the design of safe active transportation facilities and intersection treatments. Cross-rides will be provided at intersections to increase visibility and facilitate safe crossing for cyclists. The multi-use paths will have a minimum 3.0 m width. The selection of material type and treatment for the multi-use path will be revisited and confirmed during detailed design.

The recommended active transportation facilities were the result of public input at PIC #1, requesting for MUPs to be considered on each side of Airport Road.

9.6 Transit Stops

The Airport Road recommendations accommodate all existing bus stop locations. Some of the bus stop locations have been moved slightly in order to conform with the latest Brampton Transit and Peel Region guidelines for bus stop placement. No additional bus stop locations are proposed as part of the Airport Road EA recommendations; however, the proposed roadway improvements do not preclude additional stops from being added in the future.

9.7 Intersections and Access Modifications

Intersections will be designed in accordance with AODA standards and to facilitate the movement of all road users, including pedestrians and cyclists. Intersection modifications for Airport Road are summarized as follows:

- Between Braydon Boulevard/Stonecrest Drive and Countryside Drive, the preferred road design will match into the existing intersections. No physical modifications are anticipated for these intersections as the road improvements will not necessitate changes to curb returns.
- As documented in **Section 8.2**, Signal warrant analysis completed as part of the study confirmed that no new signalized intersections are required along the study corridor. A sensitivity analysis was also completed to confirm whether a signal was justified at the unsignalized intersections, assuming that a bus stop would be located on the east side of Airport Road across from the Eagle Plains Drive intersection, which would result in higher pedestrian volumes and transit ridership at this location; this sensitivity analysis also confirmed that signal warrants are not justified. However, operations at the currently unsignalized intersections (such as Eagle Plains Drive, Camrose Street, and Treeline Boulevard) should be monitored in the future, and signalization should be reassessed at a later time as warranted as they are not precluded by the proposed design. It should also be noted that Peel Region is reviewing alternative modifications to the Airport Road and Eagle Plains intersection as part of a separate undertaking. The results from that assessment should be reviewed and considered during detailed design.
- Other types of pedestrian crossings (such as a pedestrian cross-over with pedestrian activated flashing lights or an intersection pedestrian signal) were considered to accommodate pedestrian crossings at unsignalized intersections in lieu of intersection signalization. However, due to the number of lanes to be crossed, the vehicular speeds along the corridor, and the high number of truck volumes along Airport Road, these pedestrian crossings were not recommended for any of the unsignalized intersections along the Airport Road corridor. Again, these intersections should be monitored in the future, and alternative pedestrian crossing options can be reassessed at a later time as warranted as they are not precluded by the proposed design.

- Access to the plaza at the southwest quadrant of Airport Road and Countryside Drive is to be maintained through right-in, right-out, left-in movements (same access as existing conditions).
- Existing dedicated right-turn lanes will be converted to through-right movements at all intersections, with the exception of Airport Road and Braydon Boulevard/Stonecrest Drive where the dedicated northbound right-turn lane will remain to accommodate the higher volumes of right-turning traffic.

9.8 Traffic Signals, Illumination and Signage

As documented in **Section 9.6**, no additional traffic signals are recommended along the Airport Road EA study area. Illumination levels and signage are also proposed to be maintained to meet current design standards, with details regarding location and spacing to be confirmed during detailed design.

9.9 Streetscaping and Landscaping

Landscaping opportunities exist within the boulevards on both the east and west side of Airport Road. Details regarding the type of species as well as their planting spacing is to be confirmed during detailed design.

The existing Airport Road median surface treatment is proposed to be converted to a permeable material to promote infiltration and reduce stormwater runoff along the study corridor (refer to **Section 9.11**). Details of the permeable treatment will be confirmed during detailed design.

Rest Areas along the corridor will be considered during the detailed design phase in accordance with the Region's Rest Area guideline.

9.10 Property Requirements

The proposed improvements to Airport Road attempt to minimize property requirements, where possible. Notwithstanding, there is one property taking anticipated as per the preferred design. The limits of the property taking are shown on Sheet 1 in Appendix A. At some locations, retaining walls are proposed to avoid the need for property requirements.

9.11 Drainage / SWM Plan

9.11.1 **Roadway Drainage**

The preferred alternative design concept for Airport Road from Braydon Boulevard/Stone Crest Drive to Countryside Drive recommends widening the road from four to six lanes, as well as the replacement of sidewalks with multi-use pathways and providing landscaped zones as feasible. The existing drainage patterns and discharge locations are not proposed to be altered as per the proposed roadway improvements.

MINOR DRANAGE SYSTEM

The storm sewer system draining the pavement for the ultimate roadway configuration should have the capacity to convey the peak flow from the 10-year storm event as per Peel Region SWM Guidelines. There is no change in the overall drainage pattern from the existing conditions to the proposed conditions. To accommodate the proposed roadway widening, catchbasin relocations are anticipated. Proposed roadway drainage will be collected by a series of catchbasins and will be conveyed by storm sewers to the existing storm outlet locations. There are a number of existing outlets for Airport Road runoff within the study corridor. For the storm sewer discharge locations, refer to the Drainage Plans in **Appendix F**. A summary table listing the right-of-way drainage area characteristic is provided in **Table 9-2**.

Table 9-2: Drainage Area Summary

Drainage Area ID	From Station	To Station	Drainage Area (ha)	Discharge Location
A-1	11+507	11+707	1.11	Municipal storm sewer along Braydon Blvd.
A-2	11+707	12+006	1.48	Tributary B
A-3	12+006	12+255	1.23	Tributary B
A-4	12+255	13+055	4.20	Tributary C

A preliminary pipe capacity assessment was completed for the last section of the storm sewer (before outfall) at each catchment area based on a 10-year design peak flow. The assessment showed that except for Catchment A-4, the storm sewers have adequate capacity to convey the 10-yr design storm under the proposed 6-lane widening condition. The details of the analysis are provided in **Appendix F**.

MAJOR DRAINAGE SYSTEM

The roadway design should ensure that the major system runoff up to the 100-year storm event can be safely conveyed to watercourse locations and should allow at least one lane in each direction to be clear of any flooding. Major system relief will occur at major watercourse crossings and intersections. At the locations, major system inlets will capture the 100-year flow and direct it to the outfall. A spread analysis should be completed at the detail design stage to ensure that the ponding at the low point maintains at a minimum one lane of traffic in each direction clear of flooding.

For major system flow route details, refer to the Drainage Plans provided in **Appendix F**.

TRANSVERSE CROSSING RECOMMENDATIONS

No impact to the watercourse crossing is anticipated as a result of the proposed improvements, as the road widening does not require a culvert extension or replacement at these two crossings.

9.11.2 Stormwater Management Strategy

The stormwater management plan for the Airport Road Class EA Study shall be developed to comply with the MOE Stormwater Management Practices Planning and Design Manual, Peel Region Guidelines for the Preparation of Stormwater Management Reports and the Toronto Region Conservation Authority Stormwater Management Guidelines. The stormwater criteria for water quality, water quantity, and water balance and erosion control that was applied for the Airport Road widening is described in **Appendix F**.

Stormwater best management practices, including infiltration trenches, are proposed for storm water quality treatment of the runoff from the roadway right-of-way and to meet water balance and erosion control requirements. As per the TRCA Stormwater Management Criteria (August 2012), this area of the West Humber River watershed does not require specific quantity flood control measures. The proposed road widening will result in an additional pavement area of 0.92 ha. As part of the SWM strategy, a total of 4.83 ha of pavement area will receive quality treatment through the proposed infiltration trenches, which exceeds the MECP requirement of providing treatment to the increased pavement area. The Region of Peel's Control Hierarchy will be met by retention of the first 15 mm of any precipitation event volume capture and release using the existing OGS units. The proposed infiltration trenches in combination with the existing OGS units will meet the minimum SWM criteria. However, through discussions with MNRF and TRCA, opportunities to implement supplemental stormwater best management practice measures to provide additional treatment can be considered in order to further enhance the quality control, peak flow reductions as well as water balance and erosion control.

Table 9-3 provides a summary of the water quality treatment strategy proposed to mitigate the increase in impervious surface within the project limits. Additional details are included in **Appendix F**.

Table 9-3: Summary of Stormwater Management Plan

Drainage Area ID	Drainage Area (ha)	Existing Pavement Area (ha)	Additional Pavement Area (ha)	% Impervious	Preliminary Quality Storage Volume Provided in Infiltration Trench (m^3)	Pavement Area Receiving Quality Treatment[1] (ha)
A-1	1.11	0.59	0.08	60.4	0	0
A-2	1.48	0.85	0.17	68.9	478	1.02
A-3	1.23	0.70	0.16	69.9	398	0.86
A-4	4.20	2.44	0.51	70.2	1280	2.95
Total	**8.02**	**4.58**	**0.92**	**68.6**	**684**	**4.83**

[1] Total pavement area is treated due to the sensitivity of the receiving watercourse.

9.12 Geomorphology

Based on the fluvial geomorphological assessment conducted for both study area tributaries, the dominant geomorphic process observed to occur upstream from the Airport Road crossing is channel widening, while aggradation was the dominant process observed downstream from the crossing. Observations of channel instability and erosion were minor and both Tributary B and Tributary C within the study area are considered to be in regime or stable. Lack of flowing water upstream from the crossings during the field assessment was indicative of an intermittent flow regime, where flow is only likely during spring freshet of following substantial rainfall events. Lack of flow decreases the risk of erosion. The above observations coupled with specific stream power results, which relate channel slope, discharge, and width to erosion potential conclude that both Tributary B and Tributary C are low risk.

Spans for the existing crossing structures are approximately equal to the channel bankfull widths. While consideration for TRCA guidelines was given, the perceived threat to public or private property is considered to be low enough from a watercourse erosion perspective that replacement of the structures is not considered necessary.

It is not anticipated that channel works will be required to accommodate the proposed road widening. However, due to aggradation conditions observed downstream, special consideration should be made regarding Erosion and Sediment Control during construction to ensure additional sediment is not entering the channel.

More details related to the fluvial geomorphology assessment are included in **Appendix I**.

9.13 Pavement/Geotechnical Recommendations

9.13.1 Rehabilitation of Existing Lanes

The recommended pavement rehabilitation strategy for Airport Road from Braydon Boulevard/Stonecrest Drive to Countryside Drive is:

Remove the existing hot mix asphalt (HMA) and granular materials to 490mm below existing grade and place the following:

- 50mm SP 12.5 FC1, Surface Course
- 70mm SP 19.0, Upper Binder Course
- 70mm SP 19.0, Lower Binder Course
- 300mm new Granular 'A' Base placed in lifts not exceeding 150mm, compacted to 100% of the material's Standard Proctor Maximum Dry Density (SPMDD).

9.13.2 Pavement Widening Recommendations

The recommended pavement design for the widening of the roadway is presented below.

Excavate the widening area beyond the existing edge of pavement to a minimum depth of 1100mm below the proposed finished pavement grade, and place the following:

- 50mm SP 12.5 FC1, Surface Course
- 70mm SP 19.0, Upper Binder Course
- 70mm SP 19.0, Lower Binder Course
- 300mm new Granular 'A' Base compacted to 100% of the material's SPMDD
- 610mm new Granular 'B' Type I Subbase in lifts not exceeding 300mm and compacted to 100% of the material's SPMDD.

9.13.3 Soil Disposal Recommendations

As mentioned in **Section 3.6.3**, eight soil samples along the corridor were analyzed and the analytical data was compared to the Ministry of Environment, Conservation and Parks ("MECP") generic site condition standards in the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011. For evaluation purposes, the results were compared to both the Table 1 site condition standards (background) for residential parkland, institutional, industrial, commercial, and community property uses ("Table 1 Standards") and the Table 3 (Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, residential uses, coarse grained soils) site condition standards ("Table 3 Standards").

The reported concentrations of Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR) in all eight samples submitted for analysis were above their respective Table 1 Standards. Reported concentrations of SAR in four samples and EC in seven samples (of the eight analyzed) also exceeded their respective Table 3 Standards. It is assumed that these exceedances are most likely associated with the application of de-icing salts which are commonly used in roadways. The reported concentrations of petroleum hydrocarbons (PHC F3 in two samples and PHC F4 in three samples) exceeded their respective Table 1 Standards. Two samples also exceeded the Table 3 Standard for PHC F3.

If excess soil is required to be removed from the project site, soils which are demonstrated to satisfy the Table 1 Standards are typically acceptable to most receiving sites for re-use as fill material, subject to the following:

- There is no evidence of potential environmental impact, including staining, discoloration or odours that are potentially associated with petroleum hydrocarbons, or other contaminants;
- The excess soil is free of wastes, including putrescible materials (e.g., organic materials, wood), coated concrete, cement fines, rebar, plastics, scrap metal, asphalt, shingles, rubbish, glass, and garbage;

- The excess fill is geotechnically suitable and approved for use as backfill material by a geotechnical engineer; and,
- The prospective receiver has reviewed the available documentation concerning excess soil quality and has provided written confirmation of acceptance.

It is noted that the majority if not all of the excess soil potentially generated from this project is likely to contain elevated levels of EC and/or SAR. Soil which meets the Table 1 Standards for all contaminants of concern except EC and SAR may be acceptable (subject to the conditions listed above) to some receiving sites, particularly other infrastructure projects or other sites where de-icing activities have and will continue to occur. It is noted that excess soil containing exceedances of the Table 1 Standards for PHCs are not likely to be accepted for re-use as fill at other receiving sites and is likely to require disposal at a licensed waste management facility as described above. At present, the source and distribution of the PHC impacts identified at borehole locations BH18-3, BH18-14, and BH18-38 is unknown; it is recommended that additional sampling and analysis be undertaken in these areas during detailed design to gain a better understanding of the nature of the impacts and the quantity of soil that may be affected.

Alternatively, excess soil may be removed from the Site to a waste disposal facility in accordance with Part V of the Environmental Protection Act. It is advisable to review a potential receiving site's acceptable protocol to determine what documentation must be submitted to facilitate the acceptance of soil. If material is to be disposed of off-Site, it is recommended to obtain and submit a sample for toxicity characteristic leachate procedure ("TCLP"), with the analytical data compared to the Leachate Quality Criteria listed in Schedule 4 of O.Reg. 347 ("Schedule 4 Criteria").

If excess soil materials generated during construction vary in composition from the samples tested during the EA, additional testing is recommended to determine their suitability for disposal/reuse.

9.14 Utilities

Coordination with the utilities stakeholders will be required during detailed design to confirm the existing utility location and alignment, which may result in design adjustments and/or changes/relocation due to the roadway improvement. Formal definition of impacts on utilities will be determined during detailed design, in consultation with individual utility companies.

Hydro poles are located on the west side of Airport Road within the study corridor while light standards line the east side. Based on the preferred design, it is anticipated that both hydro and streelighting infrastructure would require relocation.

The location and alignment of existing municipal services including storm sewers, sanitary sewers, and watermain, as well as any private telecommunication infrastructure, is to be confirmed during detailed design, which may result in changes to the identified utility impacts. All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirement as necessary. During

detailed design, meetings will be held with utility companies as required where potential impacts to existing or future services are identified.

9.15 Preliminary Cost Estimate

Based on the preliminary cost estimates, the cost of the recommended improvements is estimated at $23.5 million. The preliminary cost estimate includes cost for roadwork, active transportation, illumination, utilities, landscaping, noise wall, traffic signals and engineering for both the design phase and construction duration. More details on the preliminary cost estimate are provided in **Appendix J**. These preliminary cost estimates are to be reviewed and confirmed during detailed design.

9.16 Constructability, Staging and Detour Considerations

Airport Road is a primary north-south route through Peel Region. As such, the construction staging will focus on being able to maintain pedestrian and vehicular traffic movements equal to preconstruction levels whenever possible during construction. However, the nature of the required work is such that traffic disruption and delays cannot entirely be avoided.

Impacts will be temporary in nature and the Region will attempt to mitigate impacts as much as possible. During detailed design, a traffic management plan should be developed to determine how traffic and pedestrian access will be accommodated during construction and how access to properties and businesses adjacent to Airport Road will be maintained.

Opportunities to minimize potential impacts from the roadway improvements and other potential construction impacts will be reviewed further during detailed design in consultation with the various stakeholders.

9.17 Construction Monitoring and Maintenance Considerations

The widening of Airport Road should be staged to maintain through traffic within the study area to the extent possible, and minimize disruptions. Any necessary interruptions to traffic, including the need for lane closures, should be minimized as feasible. No full road closure is anticipated.

Commercial and residential property owners may experience temporary interruptions to their property access during construction. To reduce this impact, all property owners should be notified prior to construction and in advance of work related to their access. Detailed design plans should include details to describe how temporary accesses will be maintained, and contract specifications should specify the allowable lengths of closures and the notification requirements to property owners.

Construction of the improvements has the potential to create noise and dust for the adjacent property owners. Construction noise is temporary and will vary periodically during the construction depending on the specific activities being performed. Contract specifications should include provisions to define the allowable work hours, in accordance with local ordinances, to minimize impacts to the adjacent landowners in the evenings. However, some consideration should be given to the ability of completing the work in a lesser duration by allowing longer work hours. The impact of construction noise will vary based on the type of equipment used, number of pieces of equipment, time and duration of operation, and the proximity to noise sensitive receivers in question. Construction noise can be kept to a minimum through the use of well-maintained equipment with appropriate noise controls by the contractors.

It is recommended that during the construction period, the following be considered:

- All pertinent noise by-laws are to be adhered to;
- General noise control measures to be included in contract documents where applicable;
- Any noise complaints or concerns to be investigated to ensure compliance with the noise control measures as recommended in the contract documents. The contractor shall be warned for non-compliance and the contract shall be enforced; and,
- Additional noise control measures are to be investigated in accordance with the MECP sound level criteria for construction equipment if a persistent complaint has been made.

Removal of the existing paved surface and existing landscaping will expose native soils to wind and rain erosion, and result in a temporary increase in dust in the project area. This dust can become airborne as construction traffic runs on the exposed ground and may be noticeable by the adjacent property owners. This increase in dust levels will be temporary, and the application of best management practices, including the application of non-chloride dust suppressants, by the contractor during their normal operations can help to minimize the exposure of native soils to wind and rain erosion, and mitigate any air quality impacts caused by construction dust.

All waste generated during construction must be disposed of in accordance with ministry requirements and best management practices. Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Construction and post-construction monitoring plans should be developed during detailed design in consultation with MECP and other regulatory agencies.

10 Potential Environmental Effects and Mitigation

10.1 Socio-Economic Environment

10.1.1 Property Impacts and Access

No property requirements are associated with the proposed Airport Road project, as presented in **Section 9.10**.

Moreover, no impacts to buildings are anticipated. Some existing driveways along the study area may be impacted as part of the proposed improvements and may need to be re-graded when the ultimate design is implemented. Specific locations are identified on the preliminary design plates.

No access modifications are proposed as part of the project. Existing turning movements for each access are to be maintained at all existing driveways and access points.

10.1.2 Air Quality Assessment

A cumulative and partial air quality impact assessment was completed to assess the potential impact of widening Airport Road from four (4) to six (6) lanes between Countryside Drive and Braydon Boulevard / Stonecrest Drive.

The partial air quality assessment focused on a "hot spot" section of the 1.5 km corridor between Eagle Plains Drive and Braydon Boulevard, consistent with direction from MECP. This area was identified as a hotspot as it has the largest number of critical receptors within 300m of Airport Road and a high volume of sensitive receptors adjacent to both sides of the road. The results of this assessment indicated that the proposed project will result in increases in predicted concentrations of all indicator compounds, at receptors closest to Airport Road, relative to predicted future conditions without the project. However, when results were compared to the project criteria based on Ontario and Canadian regulatory air quality objectives, predicted concentrations of all relevant compounds were below the relevant criteria.

A cumulative assessment was also completed, using background air quality data taken from local monitoring stations. The background air quality was added to the predicted concentrations from the road and used to provide an estimate of cumulative air quality. The results of this assessment indicated that cumulative concentrations were below the relevant ambient air quality criteria for all indicator compounds with the exception of benzene on an annual averaging period. For this indicator compound, the background air quality concentration is already close to or above the relevant ambient air quality criteria and the road itself contributes less than 1% of the total concentration.

The proposed project aims to minimize the air quality impact associated with the projected increased traffic for the study through improved traffic flows within the local vicinity and reduced queuing times at other roads surrounding Airport Road. Emissions

from the proposed project do not represent a significant contribution to local air quality. As a result, the Airport Road widening is necessary to help alleviate congestion and will minimize the overall air quality impact on the surrounding environment.

Additional details regarding the Air Quality Assessment are included in **Appendix K**.

10.1.3 Noise Impact Assessment

The noise impact assessment completed as part of the Airport Road EA study detailed the proposed project's traffic noise impact on neighbouring sensitive receptors, identified the applicable municipal noise by-law, described a noise complaint process for construction activities, and outlined noise mitigation measures for construction activities.

TRAFFIC NOISE / VIBRATION

A Noise Impact Study (NIS) was completed to assess the traffic noise impacts of widening Airport Road from four (4) to six (6) lanes from Countryside Drive to Braydon Boulevard / Stonecrest Drive on the existing acoustical environment.

The NIS findings are summarized as follows:

- The Airport Road project does not result in a change in predicted noise levels exceeding the 5 dB threshold of the MECP / MTO Noise Protocol at any representative Outdoor Living Areas (OLAs). The future noise levels with the project exceed the 60 dBA threshold of the Region's Noise Policy at 16 OLAs.
- All OLAs identified within the study area with rear or side yards that abut the project ROW have existing acoustic barriers, and therefore further mitigation is not considered as part of the EA study, per the Region's Noise Policy.

It is understood that all existing acoustic barriers adjacent to the Airport Road study corridor are anticipated to be replaced as part of the Region's Private Noise Attenuation Walls Conversion Policy (W30-04). Refer to **Appendix L** for more information related to the replacement of the existing noise walls within the study corridor limits. The noise wall replacement is anticipated to be carried out as part of the Airport Road improvements design and construction program.

CONSTRUCTION EQUIPMENT AND ACTIVITIES

As construction noise could impact receptors in the vicinity of the study area, the NIS included general recommendations to assist in minimizing noise impacts due to the project's construction equipment and activities. Examples of measures include:

- All construction equipment should be properly maintained according to manufacturer's recommendations and be in accordance MECP Model Municipal Noise Control by-law (i.e., NPC-115, etc.).
- If any of the construction activities involve Piling or Blasting, they will need to be carried out in accordance with OPSS 120 and MECP NPC-119.
- Construction equipment and/or activities typically known to be of annoyance (e.g., piling) 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, if feasible
- carry out a 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

NOISE COMPLAINTS PROCESS

Noise complaints are usually received directly from the complainant or a municipal by-law officer. Note that compliance with noise guidelines or regulations does not ensure noise complaints will not occur. The following is a general recommended process dealing with noise complaints:

- Identify an individual or group on the project (i.e., Site Supervisor, Health and Safety representative, etc.) to handle the noise complaints and someone that can be easily contacted.
- Document the noise complaint. Include the date, time and the individual's contact information from whom the noise complaint was received. Specific information such as the location, duration, time and type of sound heard (i.e., steady, impulsive, etc.) should be included as it will assist in the investigation process. Be aware of any time constraints put in place by the municipality for the noise complaint to be addressed.
- Investigate the noise complaint and identify the source of the noise complaint. Document the investigation.
- If the noise complaint is justified, in that excessive noise levels were generated, minimize or eliminate the source of the noise complaint. Document the action taken.
- Follow up with the complainant and provide the results of the noise complaint investigation.

Additional details can be found in the Noise Assessment Report (**Appendix L**).

10.1.4 Archaeological Resources

A Stage 1 archaeological assessment was undertaken as part of the Airport Road EA (as described in **Section 3.2.2**), which identified that part of the study area exhibits archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed impacts to the property. The Stage 2 archaeological assessment is to be completed during detailed design.

10.1.5 Built Heritage Resources and Cultural Heritage Landscapes

A Cultural Heritage Resource Assessment was conducted as part of the Airport Road EA study. The existing conditions review determined that the features of cultural heritage value in the Airport Road study area consist of the two tributaries of the Humber River.

As the preferred design will be primarily confined to the existing Airport Road ROW, there are no significant impacts anticipated for the identified cultural heritage resources. To mitigate any potential disturbance to the aforementioned features, the following recommendations have been developed:

- Construction activities and staging should be suitably planned and undertaken to avoid impacts to the identified cultural heritage resource.
- Where feasible, the profile and cross section of the preferred alternative should be planned and executed so that any impacts to the Humber River tributaries are minimized as feasible.
- Should avoidance of tree removals and grading be determined to be infeasible, post-construction landscaping with historically-sympathetic native tree species should be employed to mitigate impacts to the heritage value of the resource. A qualified arborist or landscape architect should be consulted during the detailed design phase in this respect.

10.2 Natural Environment

The Natural Heritage Impact Assessment Report (NHIA) presents the findings and recommendations of the natural heritage investigations undertaken during the Airport Road EA, including a discussion of the potential impacts and mitigation measures associated with the preferred design. The complete NHIA report can be found under **Appendix D**.

As described in **Section 3.4**, the existing conditions along the corridor consist of a mature urbanized neighbourhood containing a combination of low-rise residential and mixed-use commercial as well as institutional buildings, with limited significant natural heritage features. Significant impacts to aquatic and terrestrial natural heritage features are not anticipated to occur as result of this project, as the footprint of the recommended design is concentrated on previously disturbed lands. Furthermore, the resilience of the identified natural features is expected to withstand any potential disturbances caused by construction and operation of the project. The proposed design aims to minimize impacts on surrounding natural features, as discussed in the following subsections.

10.2.1 Vegetation and Vegetation Communities

The majority of the roadside lands to be directly impacted by the future road widening comprise areas of mown grass that fall within the Airport Road ROW. In some areas this will require the removal of young, planted street trees within the ROW, including trees <10cm diameter-at-breast-height (DBH) that were not inventoried. Small fringing areas of Mineral Cultural Meadow (CUM1) will require removal along the ROW boundary adjacent to Yellow Avens Boulevard and immediately north of the southern watercourse (Tributary B).

The proposed grading limits are not anticipated to encroach into the landscape planting easements immediately adjacent to the Region's Airport Road ROW. However, some

trees within these landscape easements will require removal due to anticipated root zone impacts.

Based on the preliminary design, the widening of Airport Road at the crossings of the tributary watercourses will largely occur within the existing road footprint. No fill placement or other construction activities will be required within the riparian valley features. Small fringing areas of the Tributary B and C wooded corridors, along the west side of the Airport Road ROW, will require removal to accommodate the undertaking. These small edge encroachments will primarily affect early successional herbaceous growth and will only require removal of 2 trees of inventoried size (at the Tributary C crossing). These minor removals will not negatively impact the integrity of the adjacent features.

No federally, provincially or regionally significant species will require removal as a result of the planned road improvements. The regionally significant species Sandbar Willow and Rough Hedge-nettle, which were inventoried in various locations within the Tributary B and C wooded valleylands, are not located along the feature edges facing the ROW and will therefore not be impacted.

10.2.2 Tree Removal

A Tree Evaluation Report (TER) was completed as part of the Airport Road EA study. **Appendix D** includes additional details of the tree removal, protection, and mitigation requirements.

Of 368 trees that were inventoried within the study area, 42 are anticipated to be removed. Of the 42 anticipated to be removed, 5 are recommended for removal as a result of their poor condition which may pose a public hazard to adjacent structures or public use of the ROW. The remaining 37 trees require removal based on the extent of the proposed site grading within the ROW. The stems of most of these trees are not in direct conflict with the undertaking but these trees are situated along the grading limit or immediately adjacent to the existing landscape easements and may incur severe root damage as a result of grading. Most of these trees are in good to fair health with an improbable potential for structural failure, and range in size from 10.2cm diameter-at-breast-height (DBH) to 26.9cm DBH. Approximately 26% of trees to be removed are native. The remaining trees to be removed are non-native species dominated by Colorado Spruce. Multiple additional young planted street trees, which were too small to be inventoried, will also require removal.

Recommendations have been provided in the TER to protect trees to be retained through the use of tree protection fencing. Recommended measures have also been provided in the TER to mitigate construction impacts to adjacent retained trees, and to inspect tree protection fencing and respond to instances of mortality or damage to retained trees. At some locations, retaining walls are proposed to minimize encroachment into vegetation areas and to minimize tree removals.

Based on City of Brampton guidelines, a total of 39 trees of at least 70mm caliper stock are to be planted in compensation for tree removal requirements. These compensation

plantings are to be accommodated within the Airport Road ROW and/or in replacement of trees or other vegetation requiring removal within the landscape planting easements. Compensation planting details will be provided within a future Landscape Plan to be completed during the detailed design stage.

10.2.3 Terrestrial Wildlife and Habitat

BARN SWALLOW

Barn Swallow foraging habitat is present in the wooded riparian corridors and SWM ponds within the study area. Since these features will not be affected by road improvement works, no negative impact to Barn Swallow foraging habitat is anticipated to occur. It is recommended that an updated inspection for the presence of Barn Swallow nests be completed for the Tributary B and C culvert structures during the detailed design stage. If nests are observed, measures must be taken to avoid negative impacts to Barn Swallows and their nests in accordance with the *Endangered Species Act* (ESA) and in consultation with the MECP. Habitat removal may be authorized in accordance with Ontario Regulation 242/08 Section 23.5, provided measures are taken to mitigate impact to the species and habitat compensation is implemented as required under the Regulation.

OTHER WILDLIFE SPECIES

Other wildlife species documented within the study area are common and ubiquitous on the landscape and have been habituated to human-altered or urban environments. The ROW roadside lands to be directly impacted are predominantly manicured and do not provide important habitat functions. The planned undertaking is not anticipated to negatively impact local wildlife species or populations.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs and young, or avoidance of the area by breeding adults. Vegetation clearing should therefore occur outside the bird nesting season of April 1-August 31 so as to limit disturbances to nesting activities of birds and to avoid destruction of active nests. Culvert structures should be inspected prior to any construction work to document any birds and their nests that may be present and to provide mitigation and protection measures. The destruction of migratory birds and their nests is prohibited under the federal *Migratory Birds Convention Act*.

WILDLIFE MOVEMENT CORRIDORS

The existing Tributary B and C culverts are not expected to require extension to accommodate the planned road improvement works and will not be significantly modified as a result of the undertaking. The connectivity for small- to medium-sized wildlife movements that these culverts currently provide will therefore not change. No negative impacts to wildlife movement or ecological connectivity will occur as a result of the undertaking provided construction-related disturbances are appropriately mitigated.

10.2.4 Fish and Aquatic Habitat

Regulated habitat for Redside Dace is restricted to the Tributary B and C watercourses themselves within the study area, which represent contributing habitat for the species. The planned undertaking will not require any in-water works, nor is it anticipated that any work on the culverts or lands within the wooded riparian valley features is required. Therefore, no direct impacts to Redside Dace regulated habitat will occur. It is anticipated that the planned undertaking should be able to proceed without the need for a permit under Section 17(2)(c) of the ESA or for authorization under O. Reg. 242/08 Section 23.1. Consultation with the MECP should be undertaken during the detailed design stage to confirm these expectations.

The planned undertaking will require construction activities that could indirectly impact Redside Dace habitat if not appropriately mitigated. These include minor localized woody vegetation removal requirements along the ROW boundaries, erosion and sedimentation, and off-site movement of deleterious substances (e.g., oils). MNRF staff have previously identified the need to improve existing water quality mitigation measures within the Airport Road ROW as a component of the road design. These measures reflect the sensitivity of Redside Dace to impaired water quality conditions. It is anticipated that these requirements will be confirmed through a Letter of Advice. It is anticipated that the Letter of Advice will be issued by the MECP, which has assumed responsibility for administering requirements under the ESA as of April 1, 2019.

OTHER FISH SPECIES AND AQUATIC HABITAT

No in-water works or modifications to the existing culverts are anticipated to occur during completion of the road improvement works. Further, no vegetation removal or other construction work within the wooded riparian valleylands that could alter the existing aquatic habitat regime (e.g., through riparian vegetation shading, woody debris inputs) are expected. Aquatic habitat connectivity will be maintained via the existing culverts through the undertaking. Therefore, no direct impacts to other fish species or their aquatic habitats will occur. Review by the federal Department of Fisheries and Oceans will not be required for this assignment.

10.3 Structures

No modifications are proposed to the Airport Road culvert structures crossing Tributary B and Tributary C as part of the Airport Road improvements from Braydon Boulevard/Stonecrest Drive to Countryside Drive. Structural inspections indicated that both culverts are generally in good condition and do not require major repair or upgrade.

Minor rehabilitation is recommended at Tributary C to address minor spalling observed at the inlet. At the time of detailed design, additional observations should be undertaken at both culverts to assess the latest conditions and requirements for repairs or upgrades at that time.

The Structural Assessment Report can be found in **Appendix M**.

10.4 Contamination

Based on the findings of the Contamination Overview Study (as discussed in **Section 3.3**), no high-risk issues of potential environmental concern with the potential for subsurface impacts were identified. The following preliminary recommendation is provided:

- The source and distribution of the PHC impacts identified at the three locations where MECP Table 1 and/or Table 3 standards are exceeded are unknown, and it is noted that additional sampling and analysis in these areas may be undertaken to gain a better understanding of the nature of the impacts and the quantity of soil that may be affected.

Additional details related to the Contamination Overview Study can be found in **Appendix C**.

10.5 Hydrogeology

Since the improvements to Airport Road are not anticipated to require extensions or replacement of the existing concrete box culverts at the two tributary locations, nor is it anticipated that new drainage infrastructure (new storm sewer systems) will be required, dewatering impacts are not anticipated. Furthermore, the expected hydraulic conductivity for the silty clay and silty clay till materials ranges from 1×10^{-8} to 1×10^{-10} m/s. Any shallow excavations into such material, assuming the excavations are below the water table, would be expected to have limited groundwater influx, and could typically be managed using in-pit controls (i.e. pumps and sumps) rather than an active dewatering system.

10.6 Utilities and Other Services

Existing utilities along the corridor based on available information are described in **Section 3.10**. The proposed improvements aim to minimize impacts to utilities where possible; however, relocation will be required along the corridor due to several existing conflicts including the hydro poles on the west side of Airport Road and the illumination poles on the east side of Airport Road, which will be affected by the proposed road widening and MUPs.

Where utilities are located within the proposed landscaping zones, suitable placement and plant sizing can be confirmed during detailed design to avoid conflict with overhead utilities. For instance, where utility lines do not provide adequate vertical clearance, hydro form tree species may be planted to avoid conflicts.

The location and alignment of existing municipal services is to be confirmed during detailed design, which may result in changes to the identified utility impacts. Formal definition of impacts on utilities will be determined during detailed design, in consultation with individual utility companies. All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements

as necessary. During detailed design, meetings will be held with utility companies as required where potential impacts to existing or future services are identified.

10.7 Climate Change

10.7.1 Approach to Climate Change Consideration

The Ministry of the Environment, Conservation and Parks (MECP) guide *Consideration of Climate Change in Environmental Assessment in Ontario* sets out ministry expectations and supports the province's *Climate Change Action Plan* by outlining climate change considerations for Environmental Assessment studies.

The guide notes 'climate consideration' within a project means that consideration has been given to methods to reduce greenhouse gas emissions and 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. Specifically, consideration should be given to mitigation (how the project might mitigate climate change such as reducing greenhouse gas emissions and/or improving carbon storage of the landscape or removal of carbon dioxide from the atmosphere) and adaptation (measures to adapt to climate change or make the project more resilient to the effects of climate change). Considering how a project may contribute to climate change, through its greenhouse gas emissions or its effects on the natural landscape, is important to the planning process as it allows proponents to consider climate mitigation measures to avoid, minimize, or offset such effects.

Planning and design of road infrastructure should take into consideration key factors and climate change trends, such as building to withstand extreme precipitation and extreme heat. These climate events will impact the physical infrastructures as well as those using the widened Airport Road corridor in the future. It is understood that that impacts of climate change on transportation systems are already visible and include:

- More travel disruptions due to flooding, winter storms, and road washouts
- Increased pavement damage from higher temperatures and freeze-thaw cycles
- Increased maintenance requirements for roads, medians and boulevards including hardscape and vegetative materials.

10.7.2 Potential Climate Change Effects

During construction, road infrastructure being built should be as climate ready as possible. Potential effects to consider include the greenhouse gas (GHG) emissions associated with the construction period including the physical machinery and equipment, travel distance and time for construction workers to get to and from the site, and the sourcing of building materials.

Climate change impacts related to this study are also related to operations and maintenance as the transportation sector is one of the biggest contributors to CO2, a key greenhouse gas. Based on the findings of the Air Quality assessment (**Section 10.1.2** and **Appendix K**), the Project is expected to result in a slight increase in GHG

emissions, although emissions from the project are insignificant compared to Ontario total transportation sector emissions, contributing less than 0.1%.

Once Airport Road has been improved, there is the potential for stormwater capacity and drainage system issues as the amount of impervious surface areas will increase. However, increase in pavement effects have been considered as part of the stormwater management strategy, as described in **Section 9.11.2**.

Climate change will impact the study area in the future as extreme weather conditions will affect the conditions of the roadways and will require more frequent repairs and updates as time passes.

10.7.3 Climate Change Mitigation

Consistent with Peel Region's sustainability policies and practices, the project-specific recommendations outlined in **Section 9** directly support many of the climate change policies. For example:

- Multi-use paths are recommended on both sides of Airport Road and will accommodate cyclists and pedestrians, therefore encouraging active transportation and discouraging single occupancy automobile use.
- Tree plantings are proposed to be accommodated in the boulevards, as space permits.
- Low impact development strategies are proposed to be explored as feasible.
- The proposed design makes use of an existing transportation route and proposes to accommodate all road users in such a way that minimizes impacts to surrounding areas including residences, business and valleylands.

To mitigate potential effects during the construction phase of the project, the following best practices are recommended:

- Development and implementation of detailed erosion and sediment control measures to be carried out during all construction phases in order to limit the amount of sediment/laden material entering receiving drainage systems.
- Dust suppression techniques to be employed for the duration of construction activities.
- A traffic staging plan to be developed during detailed design to accommodate local access and through traffic during construction to minimize excessive detouring and congestion in alternate routes. Further opportunities to reduce idling to be considered during detailed design.
- Movement and access to the site for construction vehicles is to be described in the contract documents to be prepared at the time of detailed design.

To mitigate potential effects during the operational phase of the project, aligning with best practices for infrastructure design, practices such as the improvement of hydrological data collection, use of models and monitoring localized effects, more frequent monitoring and maintenance and improvement of road design to be more climate change resistant are recommended.

In addition, measures to adapt to climate change impacts and minimize impacts to individuals using Airport Road in the future may include (but are not limited to):

- Erosion protection techniques will be developed during detailed design to limit the extent of channel and bank erosion in the vicinity of the Humber River tributary crossings.
- Updating plans for weather emergencies, lane closures and rerouting during severe weather conditions/events, and traveler information systems to include future climate change projections.
- As the amount of impervious surface areas will increase, appropriate stormwater capacity should be considered to mitigate additional runoff, climate change and the likelihood of extreme precipitation, as described in **Section 9.11**.

10.8 Source Water Protection

As noted in **Section 3.5**, no policies in the CTC SPP are applicable. However, consistent with industry best practices, the following is being considered.

10.8.1 Stormwater Runoff

The additional impervious surface associated with the roadway widening would reduce the amount of groundwater infiltration from the surface. To offset these impacts and balance water quantity, the stormwater management strategy described in **Section 9.11** recommends the runoff be conveyed to LID features, e.g. infiltration galleries, prior to discharging to the proposed roadway storm sewer systems. In addition, permeable pavers will replace the existing asphalt surface in the raised centre median, allowing infiltration of stormwater and reducing the overall amount of impervious surface along the corridor.

10.8.2 The Application of Road Salt

Additional road salt associated with winter maintenance will be required for the proposed roadway improvements (such as the additional traffic lanes). Consistent with best management practices, Peel Region has developed a Salt Management Plan that ensures effective winter maintenance for the safety of all roadway users while striving to minimize the amount of salt entering the environment and at the same time meeting Provincial legislation related to road maintenance standards for winter services.

10.8.3 The Storage of Snow Related to Roadway Clearing Operations

Although the proposed roadway improvements will result in additional areas to be maintained in the winter (such as the additional traffic lanes and the implementation of multi-use paths), snow storage in the boulevards is not anticipated to result in significant impacts. In addition, Peel Region developed a Salt Management Plan that reduces the amount of salt that is applied during winter maintenance activities, and therefore reduces the amount of salt present in roadside snowbanks. The stormwater management

strategy (described in **Section 9.11.2**) addresses other contaminants that may be present in roadside snow banks.

11 Timing of Implementation and Future Commitments

11.1 Project Schedule

As part of the Environmental Assessment process, this Environmental Study Report is to be filed and placed on the public record for at least 30 calendar days for review by the public and review agencies.

After the review period, provided that no Part II Orders are received, the Region may proceed to Phase 5 of the Class EA process – design and construction. Property acquisition and utility relocation will then be scheduled, followed by construction.

11.1.1 Lapse of Time

According to the Municipal Class EA, "If the period of time from the filing of the Notice of Completion of ESR in the public record or the MECP's denial of a Part II Order request(s), to the proposed commencement of construction for the project exceeds ten (10) years, the proponent shall review the planning and design process and the current environmental setting to ensure that the project and the mitigation measures are still valid given the current planning period. The review shall be recorded in an addendum to the ESR which shall be placed on the public record."

Notice of Filing of Addendum shall be placed on the public record with the ESR and shall be given to the public and review agencies, for a minimum 30-day public review period. The notice shall include the public's right to request a Part II Order during the 30-day review period, but only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. If no Part II Order request is received the proponent is free to proceed with implementation and construction.

11.2 Commitments for Future Work

The ESR identifies specific items to be reviewed and confirmed during detailed design. Some of these commitments will address specific concerns raised by property owners and review agencies during the EA process. Items of particular interest to be addressed include:

Property Requirements

- Review design opportunities to confirm no property acquisition and minimize property impacts during detailed design
- Obtain Permission to Enter Agreements from landowners where access to their property is required.

- Obtain construction easements as required.
- All property owners should be notified prior to construction and in advance of work related to their access.
- Consult with property owners during the development of construction staging plans to maintain access to properties and minimize impacts as feasible.

Archaeology

- Conduct a Stage 2 Archaeological Assessment (AA) at locations possessing archaeological potential as identified by the Stage 1 AA.
- If recommended by the Stage 2 AA, complete any subsequent archaeological investigation including Stage 3 and Stage 4 AA.
- Archaeological assessment reports will be submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) for review. Ground-disturbing activities will not proceed until all required archaeological assessment reports have been reviewed and entered into the Ontario Public Register of Archaeological Reports.
- Should any archaeological material be unexpectedly encountered during construction, MHSTCI will be notified, all activities impacting archaeological resources will cease immediately, and a licensed archaeologist will carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists. If human remains are encountered, all activities will cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services will be contacted.

Built Heritage Resources and Cultural Heritage Landscapes

- Ensure minimal disturbance to the identified cultural heritage landscape: the two tributaries of the Humber River, per the recommendations in **Section 10.1.5.**

Noise

- No need for noise mitigation measures was identified through the Noise Impact Assessment found in **Appendix L**. However, it is understood that all existing acoustic barriers adjacent to the Airport Road study corridor are anticipated to be replaced as part of the Region's Private Noise Attenuation Walls Conversion Policy (W30-04), and will be included as part of the Airport Road improvements design and construction program.
- all existing acoustic barriers that are to be replaced as part of the Region's Private Noise attenuation Walls Conversion Policy shall utilize the results of the Airport Road noise assessment to identify acoustic barriers that require upgrades to meet the target level of 60 dBA.

- Construction noise control measures are to be included in contract documents where applicable. Contract specifications should include provisions to define the allowable work hours, in accordance with local ordinances and municipal noise by-laws, to minimize impacts to the adjacent landowners in the evenings.

Natural Environment

- Additional field investigations should be undertaken during the appropriate seasons using MECP protocols for Barn Swallow to confirm their presence in the study area during detailed design.
- To comply with the requirements of the Migratory Birds Convention Act (MBCA), it is recommended that disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the act. In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey will be conducted by a qualified avian biologist. If an active nest is located, a mitigation plan will be developed and provided to Environment Canada – Ontario Region for review prior to implementation. Specific timing windows are to be confirmed during detailed design.
- Erosion and Sediment Control Plan and Environmental Inspection and Monitoring Plan are to be developed during detailed design.
- The Tree Preservation and Restoration Plan is to be confirmed during detailed design, to protect existing trees and compensate for any required tree removals.
- Tree protection zones need to be installed prior to any construction which includes tree removal and utility work, and remain in good repair for the duration of the project.
- Environmental Management Plans per TRCA's draft guidelines, or their equivalent if submitted within other technical reports, are to be provided for any active groundwater controls/dewatering required for construction, as both taking and disposal of groundwater may have negative impacts on natural features.
- Construction and post-construction monitoring plans are to be developed in consultation with MECP.
- A Letter of Advice under the Endangered Species Act should be obtained from MECP during detailed design as it relates to work in the proximity of the two watercourses and any Redside Dace habitat.

Roadway Design

- Peel Region will address design requirements through the preparation of contract drawings and specifications.
- Details including length and height of proposed retaining walls (to minimize grading impacts and avoid property acquisition requirements) to be determined during detailed design.

- Signage and pavement markings to be confirmed during detailed design.
- Curb radii at all side street locations to be reviewed and confirmed during detailed design.
- At the time of detailed design, any changes to design standards and/or industry best practices compared to those available at the time of the EA are to be considered.
- Further detailed condition assessments are to be completed for the two watercourse crossing structures during detailed design.

Active Transportation Facilities

- Material type and treatment for the multi-use paths to be confirmed.
- Review the Region's current Active Transportation and Rest Area guidelines during detailed design to ensure the proposed design conforms to the most recent guidelines. This includes consideration of the applicable standards for pedestrian and cyclist treatment across entrances and intersections.
- At the time of detailed design, any changes to design standards and/or industry best practices related to the accommodation of active transportation users, compared to those available at the time of the EA, are to be considered.

Transit Provisions

- Consultation with Brampton Transit (BT) at detailed design to review and confirm potential bus stop locations and amenities, as required. If bus stops (old or new) are identified in the corridor, the need for delineation through the bus stop area by signage, tactile warning or change in elevation will be confirmed during detailed design.

Traffic Signals and Illumination

- This study recommends to maintain Eagle Plains Drive, Camrose Street, and Treeline Boulevard as unsignalized intersections, and to monitor them in the future – if traffic volumes, pedestrian volumes, or collision history change at these locations after the completion of the EA, they can be revisited at a future date for potential signalization.
- Illumination along the study corridor will consider the roadway profile, the urban cross-section, and active transportation requirements. Details will be based on Peel Region's illumination standards and will be confirmed during detailed design, at which time the type and location of poles and luminaires will be confirmed.

Streetscaping and Landscaping

- Streetscaping opportunities as identified in the preliminary design are to be confirmed. A streetscaping plan, including tree species selection and planting locations, is to be developed during detailed design.

Geotechnical and Pavement Design

- Existing pavement condition and proposed pavement structure to be confirmed during detailed design.
- Geotechnical considerations for any proposed retaining walls to be confirmed during detailed design.
- Additional soil and groundwater sampling and chemical analysis should be undertaken during detailed design to gain a better understanding of soil disposal and groundwater dewatering requirements.

Drainage and Stormwater Management

- It is recommended to review the hydraulic conditions of the Trib-B culvert crossing during detailed design, and in particular the existing 3.0m x 1.5m parallel culvert that discharges from the adjacent SWM pond, to ascertain whether Trib-B flows are conveyed by this culvert. This will need to be confirmed with TRCA.
- Opportunities to implement supplemental stormwater best management practice measures to provide additional treatment, beyond the proposed stormwater management measures, can be considered in the detailed design stage.

Utilities

- Location of existing utilities and resulting impacts and required relocations are to be confirmed during detailed design.
- Coordination of utilities, including hydro pole relocation and overhead wiring, is to be reviewed during detailed design.
- All utility information will be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary.
- During detailed design, meetings will be held with utility companies as required where potential impacts to existing or future services are identified.

Constructability, Staging and Detours

- During detailed design, a traffic management plan should be developed to determine how traffic and pedestrian access will be accommodated during construction and how access to properties and businesses adjacent to Airport Road will be maintained.
- Opportunities to minimize potential impacts from the roadway improvements and other potential construction impacts will be reviewed further during detailed design in consultation with the various stakeholders.

Additional Consultation and Coordination

- Consult with affected property owners including those where access to their property will be impacted.
- Consult with regulatory agencies, individual municipalities and affected stakeholders (City of Brampton, Brampton Transit, TRCA, MECP, etc.) as required.
- Coordinate with Indigenous groups as required, to address any comments or concerns beyond those noted during the EA study.

Summary of Anticipated Permits and Approvals

- Permission to Enter Agreements
- TRCA permit under *Ontario Regulation 166/06 - Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*
- Environmental Compliance Approval (ECA) will be required from MECP for stormwater management facilities and storm sewers.
- Obtain clearance for archaeology from MHSTCI based on findings from subsequent archaeological assessments
- Letter of Advice from MECP as it relates to the *Endangered Species Act* (for Redside Dace habitat)

Timing of Improvements

Timing of improvements is to be confirmed during detailed design. Based on Peel Region's 2020 capital budget, construction of the Airport Road improvements is currently scheduled to begin in 2027; however, this timing is subject to change.

12 Public and Stakeholder Consultation

In accordance with the Municipal Class EA Schedule "C" process, three mandatory points of contact with the public and review agencies are required for the EA study to:

- Review the project and selection of the preferred solution towards the end of Phase 2 and obtain comment and input;
- Review alternatives in Phase 3 to assist in the selection of the preferred design for the chosen solution and obtain comment and input; and
- Announce the completion of the Environmental Study Report and placement of the ESR on public record for a minimum 30-day review period.

The study has met the minimum mandatory points of contact as described in the following sections.

12.1 Consultation Approach

Public, stakeholder, and agency consultation was critical to confirm that concerns from current and future residents and affected groups within the study area were identified, documented, and assessed. A variety of stakeholder groups were identified, including individual agencies and utilities, Indigenous groups, specific interest groups, and the general public. All of these stakeholders were contacted throughout the study and encouraged to provide input and become involved in the development of the solutions and designs to address the problems and opportunities identified for the study area.

Communication with stakeholder groups and the public took place through:

- Letters
- Emails
- Notices
- Newspaper advertisements in the Brampton Guardian
- A project website (https://www.Airport Road Environmental Assessment - Region of Peel (peelregion.ca).htm)
- Regional mobile signs
- Social media posts (Facebook and Twitter)
- Meetings
- Two rounds of Public Information Centres

Peel Region was the central link for all communications. Communication and consultation was conducted in compliance with the Accessibility for Ontarians with Disabilities Act (AODA).

A mailing list of all residents adjacent to the study area was provided by Peel Region and was kept up-to-date throughout the study. Both resident mailing and email lists were revised to include a current record of mailing addresses and emails, including attendees and all those who submitted comments or expressed an interest in the current study.

Moreover, a stakeholder contact list was developed and updated regularly based on responses, meeting attendance, and comments submitted. New additions to the contact list were subsequently sent project updates and notices.

All individuals and agencies on the contact lists were contacted at the appropriate stages to inform of project updates, upcoming meetings and events.

12.2 Key Consultation Milestones

Public input was an important part of the Airport Road EA study. The project team engaged the general public online, through mail and email notifications, in print, and through Public Information Centres (PICs) to provide ample opportunity for participation in the planning process.

An overview of the key consultation milestones is provided in **Table 12-1**.

Table 12-1: Key Consultation Milestones

Engagement Strategy	Date
Notice of Commencement and PIC #1	November 9, 2017 – Notice Issued (sent to property owners and stakeholders) November 9, 2017 and November 16, 2017 – Published in the Brampton Guardian, newspaper with local circulation
PIC #1	November 23, 2017 from 6:30 P.M. to 8:30 P.M.
Notice of PIC #2	November 14, 2019 – Notice Issued (sent to property owners and stakeholders) November 14, 2019 and November 21, 2019 – Published in the Brampton Guardian, newspaper with local circulation
PIC #2	November 28, 2019 from 6:00 P.M. to 8:30 P.M.
Notice of Study Completion	June 17, 2021

Information on each of the key consultation events is provided in the following sections. Consultation event summaries for the aforementioned events can be found in **Appendix N**.

12.3 Public Information Centre #1

The first Public Information Centre (PIC) was held on November 23, 2017 at the Fairlawn Public School library, in the City of Brampton. Notice for the PIC consisted of mailing of notices to residents and property owners adjacent to the study area and all others on the project contact list (including agency and Indigenous group representatives and other stakeholders), local newspaper advertisements, social media posts, and emailed announcements to the City of Brampton Mayor and Regional Councillors.

The meeting was organized as a drop-in PIC from 6:30 pm to 8:30 pm. During this time, community residents and stakeholders had an opportunity to view project background displays and discuss their opinions and concerns with the project team, which included representatives from Peel Region and HDR. Attendees were also provided with a Comment Form for them to fill out and return to the project team by December 8, 2017. A total of ten (10) people signed in at the November 23, 2017 PIC. No Regional Councillors attended the event and no media representation was in attendance.

The residents and stakeholders who attended the PIC had several comments about the study scope and process, transportation assessment findings, and types of transportation-related solutions that were being considered as part of this study. The following is a synthesis of comments and key messages heard:

- Attendees shared their support for the improvement and implementation of active transportation facilities along the study corridor. Prioritization of pedestrian and cycling infrastructure and the provision of multi-use paths (MUPs) and sidewalks to expand and improve the active transportation network connectivity were common themes noted during the event.
- Attendees generally supported widening to six lanes.
- Some residents expressed an interest in the prioritization of transit through transit-only lanes and high-occupancy vehicle (HOV) lanes as part of the proposed widening.
- Attendees preferred MUPs to be located on both sides of the street instead of on only one, if feasible.

A total of six (6) comment forms were submitted at the PIC. No additional comments or emails were received by the Project Team in the weeks that followed the PIC.

Please refer to the PIC#1 Summary Report (dated January 12, 2018), found in **Appendix N**, for additional information including the comments received, engagement strategies, and the project team responses to questions raised.

12.4 Refinement and Confirmation of Preferred Alternative Solution

Following PIC #1 on November 23, 2017, the Evaluation of Alternative Solutions was revisited to integrate public and stakeholder comments and confirm the Phase 2 recommendations for a preferred alternative solution.

Community consultation emphasized the public's support for widening Airport Road and incorporating active transportation improvements in the study area. The incorporation of MUPs into the final design was generally seen by PIC attendees as a requirement to address not only residents' and commuters' needs but also recreational cyclists as well.

The feedback received during the PIC supported the project team's recommendation of a multi-modal solution that incorporates active transportation, road widening, and intersection improvements (where warranted) to improve traffic operations and benefit all travel modes. This confirmed the recommendation of a hybrid solution (combination of

Alternatives 2, 3 and 4), and as such this planning solution was carried forward to the next phase of the EA.

12.5 Public Information Centre #2

The second Public Information Centre (PIC #2) was held on November 28, 2019 at the Mayfield Recreation Complex (12087 Bramalea Road). PIC #2 was organized as an informal drop-in meeting from 6:00 pm to 8:30 pm. During this time, community residents and stakeholders had the opportunity to view project displays and discuss their opinions and concerns with the project team, which included representatives from Peel Region and HDR.

A total of 6 people signed in. Attendees were provided with a comment form for them to fill out and return to the project team by December 13, 2019. No regional councillors attended the event. No media representation was in attendance.

The objective of PIC #2 was to share the alternative design concepts, evaluation, and preliminary preferred design for Airport Road with the public and interested stakeholders and obtain feedback on this material. The meeting also provided the opportunity for the project team to present potential mitigation measures to alleviate impacts resulting from the proposed widening.

There were 26 display boards, which included the following:

- Objectives of the Study and PIC #2
- Overview of the Environmental Assessment process being followed for this study
- Summary of the Preferred Solution and Public Feedback
- Needs, Opportunities and Outcomes
- Project Benefits
- 3 Alternative Designs Concepts
- Evaluation Criteria and the Evaluation of Alternative Design Concepts
- Preliminary Preferred Design
- Technical Studies and their findings
- Impacts and Mitigation
- Next steps

A roll-out of the preliminary preferred design was used to facilitate dialogue with attendees and provided a plan view of the recommendation for Airport Road within the study limits.

Residents and stakeholders present were supportive of the proposed improvements to Airport Road. The majority of the comments from this event originated from City and Region representatives and focused on refinements to the preliminary design. One attendee who lives adjacent to the study corridor specifically asked about the construction timing for the proposed improvements.

No comment forms were submitted at PIC #2 on November 28, 2019. No additional comments or emails were received by the Project Team in the weeks that followed the event.

Based on the input received during the PIC, the project team confirmed the study findings and further refined the preliminary preferred design.

Please refer to the PIC #2 Summary Report found in **Appendix N**, for additional information including the comments received, engagement strategies, and the project team responses to questions raised.

12.6 Notice of Completion

The notice of study completion was published in the Brampton Guardian on June 17, 2021 and June 24, 2021. Social media posts advertising the notice of completion were shared on the Region's Facebook and Twitter accounts. The notice was directly mailed to those on the mailing list including properties adjacent to the study corridor, stakeholders and agencies, and placed on the study website.

12.7 Agency and Stakeholder Consultation

As part of the EA process, multiple technical staff from Peel Region and partner agencies as well as other stakeholders were consulted on a regular basis.

The following is a summary of the agencies and stakeholders contacted:

- Peel Region Internal Departments
- City of Brampton
- Brampton Transit
- Toronto and Region Conservation Authority (TRCA)
- Ministry of the Environment, Conservation and Parks (MECP)
- Ministry of Natural Resources and Forestry (MNRF)
- Alectra Utilities

These agencies, stakeholders and staff members were invited to review and provide input on all aspects of the study process, including: the problem and opportunity statement, evaluation criteria, development and evaluation of alternatives, and the preferred alternatives. Comments and concerns were incorporated or acknowledged throughout the study.

Agency consultation consisted of letters, notices, emails, phone calls, exchanges of information, and meetings. Individual meetings/conference calls were held with agency representatives and other stakeholders as follows:

- MNRF meeting on March 13, 2018
- Alectra Call on May 17, 2018
- TAC meetings on May 30, 2017, October 19, 2017 and on October 23, 2019
- 1 meeting with Brampton Transit on May 2, 2018
- Various meetings with Peel Region Internal Departments

Agency-specific correspondence, including minutes from key meetings, is included in **Appendix O**.

12.8 Indigenous Group Consultation

The Indigenous consultation program for the EA study involved representatives from the following groups:

- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council
- Mississaugas of the New Credit First Nation
- The Metis Nation of Ontario
- Credit River Metis Council
- Curve Lake First Nation
- Mississaugas of Scugog Island First Nation
- Alderville First Nation
- William Treaties First Nation

Indigenous community representatives were included in the mailing list for the project, and those on the contact list at the time of each notice were emailed study notices (including Notice of Commencement and PIC #1, Notice of PIC #2 and Notice of Completion). The contact list was updated to add additional Indigenous community representatives or updated with their latest contact information, as requested throughout the study.

No concerns were raised by Indigenous community representatives in response to the project.

Correspondence logging communication with Indigenous community representatives is included in **Appendix P**.