

**Municipal Class Environmental Assessment for  
Huntington Road from Langstaff Road to  
McGillivray Road (Part A) and Major Mackenzie  
Drive to Nashville Road (Part B)**

Environmental Study Report

prepared for:  
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# Table of Contents

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EXECUTIVE SUMMARY.....	V
1. INTRODUCTION .....	1
1.1 BACKGROUND .....	1
1.2 THE MUNICIPAL CLASS EA PROCESS.....	3
1.2.1 Municipal Class EA Schedules.....	3
1.2.2 Schedule C – Five Phase Planning Process.....	3
1.2.3 Consultation Responsibilities .....	5
1.3 PROJECT TEAM .....	5
2. EXISTING CONDITIONS .....	5
2.1 CONTEXT AND KEY LANDMARKS .....	5
2.2 TRANSPORTATION FEATURES .....	8
2.2.1 Roads .....	8
2.2.2 Traffic .....	12
2.2.3 Transit Service & Routes.....	23
2.2.4 Active Transportation .....	23
2.3 SOCIAL ENVIRONMENT .....	24
2.3.1 Cultural and Built Heritage.....	24
2.3.2 Archaeological.....	34
2.3.3 Relevant Provincial and Regional Policies .....	37
2.3.4 Land Use .....	38
2.4 NATURAL ENVIRONMENT.....	41
2.4.1 Natural Heritage .....	41
2.4.2 Watershed Context .....	41
2.4.3 Aquatic Environment .....	41
2.4.4 Terrestrial Environment.....	46
2.4.5 Phase I ESA & Geotechnical .....	49
2.5 STORMWATER, DRAINAGE AND HYDROLOGY .....	54
2.5.1 Hydrology Investigations .....	54
2.5.2 Hydraulic Analysis.....	54
2.5.3 Existing Drainage And StormWater MAnagement .....	55
2.6 FLUVIAL GEOMORPHOLOGY .....	55
2.7 SOURCE WATER.....	56
2.8 UTILITIES.....	57
3. DESCRIPTION OF THE PROBLEM .....	57
4. ALTERNATIVE SOLUTIONS .....	58
4.1 IDENTIFICATION AND DESCRIPTION OF THE ALTERNATIVE SOLUTIONS .....	58
4.1.1 Alternative 1: Do Nothing.....	58
4.1.2 Alternative 2: Travel Demand Management (TDM) Initiatives .....	58

4.1.3 Alternative 3: Improve Other Parallel Roadways .....	58
4.1.4 Alternative 4: Roadway Capacity and Operational Improvements .....	58
4.1.5 Alternative 5: Urbanize Cross-section.....	58
4.2 CRITERIA AND EVALUATION OF ALTERNATIVE SOLUTIONS .....	59
4.3 IDENTIFICATION OF THE RECOMMENDED ALTERNATIVE SOLUTION .....	69
<b>5. ALTERNATIVE DESIGN CONCEPTS .....</b>	<b>70</b>
5.1 IDENTIFICATION AND DESCRIPTION OF THE ALTERNATIVE DESIGNS .....	70
5.1.1 Alternative Designs for Part A .....	70
5.1.2 Alternative Designs for Part B.....	72
5.2 CRITERIA AND EVALUATION OF ALTERNATIVE DESIGNS .....	74
5.3 IDENTIFICATION OF THE RECOMMENDED ALTERNATIVE DESIGN .....	81
<b>6. THE RECOMMENDED ALTERNATIVES (PART A AND B) .....</b>	<b>81</b>
6.1 THE RECOMMENDED ALTERNATIVE DESIGN CONCEPT .....	81
6.1.1 Geometrics.....	82
6.1.2 Pavement.....	84
6.1.3 Stormwater Management and Drainage.....	85
6.1.4 Fluvial Geomorphology.....	86
6.1.5 Hydrogeology .....	86
6.1.6 Utilities .....	87
6.1.7 Electrical/Illumination .....	87
6.1.8 Property Requirements .....	88
6.1.9 Estimated Project Costs .....	88
6.2 SUMMARY OF ENVIRONMENTAL IMPACTS.....	89
6.2.1 Natural Environment .....	89
6.2.2 Socio-Economic Environment .....	96
<b>7. THE CONSULTATION PROCESS .....</b>	<b>99</b>
7.1 INTERESTED AGENCIES AND STAKEHOLDERS .....	99
7.2 PUBLIC INFORMATION CENTRE (PIC) NO. 1 .....	100
7.3 PUBLIC INFORMATION CENTRE (PIC) NO. 2 .....	101
7.4 CONSULTATION WITH INDIGENOUS COMMUNITIES .....	101
7.5 SUMMARY OF COMMENTS RECEIVED & RESPONSES.....	102
<b>8. PROPOSED MITIGATION AND MONITORING .....</b>	<b>105</b>
<b>9. ADDITIONAL WORK, APPROVALS AND FOLLOW UP COMMITMENTS.....</b>	<b>108</b>
9.1 PERMITS .....	110
9.2 ANTICIPATED PROJECT TIMELINE.....	110

**List of Figures**

Figure 1: Huntington Road Study Area.....	2
Figure 2: Phases of the Municipal Class EA Process .....	4
Figure 3: Map of the Huntington Road and Surrounding Study Area.....	7
Figure 4: Intersections within the Study Area.....	11
Figure 5: Proposed Future Road Network around Huntington Road .....	12

Figure 6: Road Network Improvement Recommendations Summary from the Traffic Operations Analysis .....22

Figure 7: Existing and Proposed Transit Networks in the Study Area .....23

Figure 8: Anticipated Improvements to Pathways and Lanes for Pedestrians and Cyclists .....24

Figure 9: Archaeological Status of Huntington Road, south section Part A.....36

Figure 10: Archaeological Status of Huntington Road, north section Part A.....37

Figure 11: Archaeological Status of Huntington Road, Part B.....37

Figure 12: Land Use around Huntington Road.....38

Figure 13: Land Use Map for the West Vaughan Employment Area (WVEA) .....39

Figure 14: Block 61 West Phasing Plan.....40

Figure 15: Aquatic Field Survey.....46

Figure 16: Illustrated Design Alternatives for Part A.....71

Figure 17: Illustrated Design Alternatives for Part B.....73

Figure 18: Preliminary Recommended Alternative Design Concepts .....84

Figure 19: Conceptual plan for Creek Realignment.....86

**List of Tables**

Table 1: Cross-Section Review Summary ..... 8

Table 2: Huntington Road Intersections ..... 9

Table 3: Existing 2015 Weekday AM Peak Hour Traffic Operational Performance .....14

Table 4: Existing 2015 Weekday PM Peak Hour Traffic Operational Performance .....15

Table 5: Future 2021 Weekday AM Peak Hour Traffic Operational Performance .....16

Table 6: Future 2021 Weekday PM Peak Hour Traffic Operational Performance .....17

Table 7: Future 2034 Weekday AM Peak Hour Traffic Operational Performance .....18

Table 8: Future 2034 Weekday PM Peak Hour Traffic Operational Performance .....19

Table 9: Summary of Traffic Analysis Findings .....20

Table 10: Summary of Recommended Improvements .....21

Table 11: Identified Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL) within and adjacent to the Huntington Road study area.....26

Table 12: Summary of Registered Archaeological Sites within 1 km of the Study Area.....34

Table 13: Fish Species Noted in Rainbow Creek and Robinson Creek.....42

Table 14: Existing Fish Habitat Conditions Summary .....42

Table 15: Vegetation Polygons .....46

Table 16: Summary of Existing Pavement Structure along Huntington Road .....50

Table 17: Design Values Representing the Existing Pavement Structure .....50

Table 18: Identified PCAs and APECs in Part A .....53

Table 19: Identified PCAs and APECs for Part B.....54

Table 20: Existing Watercourse Crossings Culverts.....54

Table 21: Existing Local Drainage Culverts .....54

Table 22: Recommended Culvert Sizes for each Crossing.....55

Table 23: Summary of Survey, Each Crossings' Geomorphic Parameters .....56

Table 24: RGA and RSAT Scores and Interpretation .....56

Table 25: Evaluation of Alternative Solutions, Part A (Langstaff Road to McGillivray Road).....60

Table 26: Evaluation of Alternative Solutions, Part B (Major Mackenzie to Nashville Road) .....64

Table 27: Evaluation of Alternative Design Concepts, Part A (Langstaff Road to McGillivray Road) .....75

Table 28: Evaluation of Alternative Design Concepts, Part B (Major Mackenzie Drive to Nashville Road) .....78

Table 29: Design Criteria, Part A (Langstaff Road to McGillivray Road) .....82

Table 30: Design Criteria, Part B (Major Mackenzie to Nashville Road).....82

Table 31: Pavement Thickness Design.....85

Table 32: Estimated Project Costs for Part A .....88

Table 33: Estimated Project Costs for Part B .....89  
 Table 34: Summary of Anticipated Impacts to the Aquatic Environment .....94  
 Table 35: Summary of Terrestrial Ecosystem Impacts and Mitigation .....94  
 Table 36: Ranking of Change in Sound Levels.....96  
 Table 37: Potential Cultural Heritage Impacts and Mitigation Required .....97  
 Table 38: Summary of Comments Received and Responses ..... 102

**List of Appendices**

Appendix A Traffic Operations Analysis Report  
 Appendix B Cultural Heritage Assessment Report  
 Appendix C Stage 1 Archaeological Assessment  
 Appendix D Natural Heritage Report  
 Appendix E Phase One ESA  
 Appendix F Drainage & Hydrology Report  
 Appendix G Fluvial Geomorphological Assessment & Meander Beltwidth Assessment  
 Appendix H Utility Composite Plan  
 Appendix I Design Plan and Profile  
 Appendix J Noise Assessment Report  
 Appendix K Record of Consultation  
 Appendix L Preliminary Geotechnical and Pavement Investigation  
 Appendix M Hydrogeological Assessment

## EXECUTIVE SUMMARY

### Study Background

The City of Vaughan retained Parsons (formerly Delcan) to conduct a Schedule C Municipal Class Environmental Assessment (Class EA) for Huntington Road, from Langstaff Road to McGillivray Road (Part A) and Major Mackenzie Drive to Nashville Road (Part B). Due to growth in nearby employment lands and residential areas, the existing rural two-lane configuration of Huntington Road will not be able to adequately accommodate future traffic demand/volumes. Through this Class EA study, the City and its consultant can plan, and assess the future needs along Huntington Road and develop an appropriate design to address the issues.

The study area includes Huntington Road from Langstaff Road to McGillivray Road (Part A) and Major Mackenzie Drive to Nashville Road (Part B). The study area is divided into two sections due to the Highway 427 extension, which includes an interchange at Major Mackenzie Drive, resulting in the termination of Huntington Road on both sides of the highway. Other key landmarks in Part A include the CP Rail facility to the west of Huntington Road and the employment lands on the east. In Part A, a new residential subdivision and the Nashville Cemetery are located on the east side of Huntington Road. Generally, existing land use in the area is a mix of rural and industrial in Part A and rural and residential in Part B.

Through the gathering of information of the existing conditions of the study area, a problem and opportunity statement was developed for this undertaking:

- Ongoing and planned development in the vicinity of the study area requires the need to provide additional capacity along Huntington Road in order to alleviate future congestion.
- In addressing the planned population and employment growth and shift to a more urban landscape, changes to the road and corresponding infrastructure is needed to provide access to adjacent development lands while supporting a variety of transportation function and uses, including transit and active transportation (cyclists and pedestrians).

### Alternative Solutions

Five alternative solutions were developed and considered to address the problem and opportunity statement:

- Alternative 1: Do Nothing
- Alternative 2: Travel Demand Management (TDM) Initiatives
- Alternative 3: Improve Other Parallel Roadways
- Alternative 4: Roadway Capacity and Operational Improvements
- Alternative 5: Urbanize Cross-section

Through the evaluation of these alternatives against a set of criteria that broadly represents the environment (technical, transportation, natural environment, socio-economic environment, costs, etc), Alternative Solutions 2, 4, and 5 were selected as the recommended solution for Parts A and B of the study area.

### Alternative Design Concepts

Subsequently, alternative design concepts were developed based on the alternative solutions. Due to different nature of the two sections of the study area, separate sets of design concepts were deemed necessary. Huntington Road, Part A will mainly service employment lands; the adjacent lands currently support rural or industrial uses but with future growth, industrial uses, such as warehouses, will dominate the landscape. The following design concepts were proposed:

- Alternative 1: Do Nothing Assumes that no improvements would be made to this section of Huntington Road, other than regular maintenance operations.
- Alternative 2: Two-Lane Urban Roadway with Multi-Use Trail and Sidewalk No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included

adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City’s standards.

- **Alternative 3: Four-Lane Urban Roadway with Multi-Use Trail and Sidewalk** Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. A 26 metre right-of-way will be incorporated into the design per the City’s standards.
- **Alternative 4: Four-Lane Urban Roadway with Multi-Use Trail** Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and a multi-use trail included only on the east side of the street. A vegetated boulevard will be included adjacent to the roadway, particularly on the east side to act as a buffer to the multi-use trail. A 26 metre right-of-way will be incorporated into the design per the City’s standards.

These alternative designs were evaluated against similar criteria as those that were used for the alternative solutions. More specific criteria were also added to allow for a more detailed evaluation of the designs (e.g. freight traffic volumes). Based on the evaluation, two alternative design concepts were recommended for two sections in Part A. From Langstaff Road to Rutherford Road, the recommended alternative design is **Alternative 3: Four-lane Urban Roadway with Multi-Use Trail and Sidewalk**. This alternative is able to meet the growing traffic demand and development along Huntington Road, including providing operational and safety improvements for an increase in freight traffic. Having pedestrian/cycling facilities to the west and the east will support development on both sides of the roadway. From Rutherford Road to McGillivray Road, the recommended alternative design is **Alternative 4: Four-lane Urban Roadway with Multi-Use Trail**. This alternative is able to meet the growing traffic demand along the corridor and also provides adequate facilities for other road users, such as pedestrians and cyclists to the east, where development is planned. A sidewalk was deemed unnecessary along this portion of Part A as there would be no development to the west due to the existing CP lands.

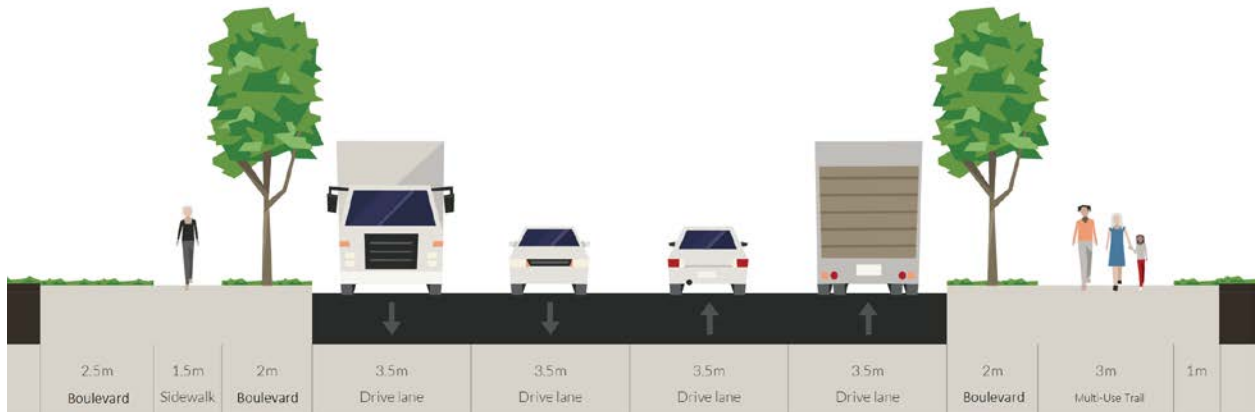
A separate set of alternative design concepts were developed for Part B. The following design concepts were proposed and evaluated:

- **Alternative 1: Do Nothing** Assumes that no improvements would be made to this section of Huntington Road, other than regular maintenance operations.
- **Alternative 2: Four-Lane Urban Roadway with Multi-Use Trail and Sidewalk** Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. A 26 metre right-of-way will be incorporated into the design per the City’s standards.
- **Alternative 3: Two-Lane Urban Roadway with Multi-Use Trail and Sidewalk** No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City’s standards.
- **Alternative 4: Two-Lane Urban Roadway with Multi-Use Trail** No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, and a multi-use trail included only on the east side of the street. A vegetated boulevard will be included adjacent to the roadway, particularly to act as a buffer to the multi-use trail. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City’s standards.

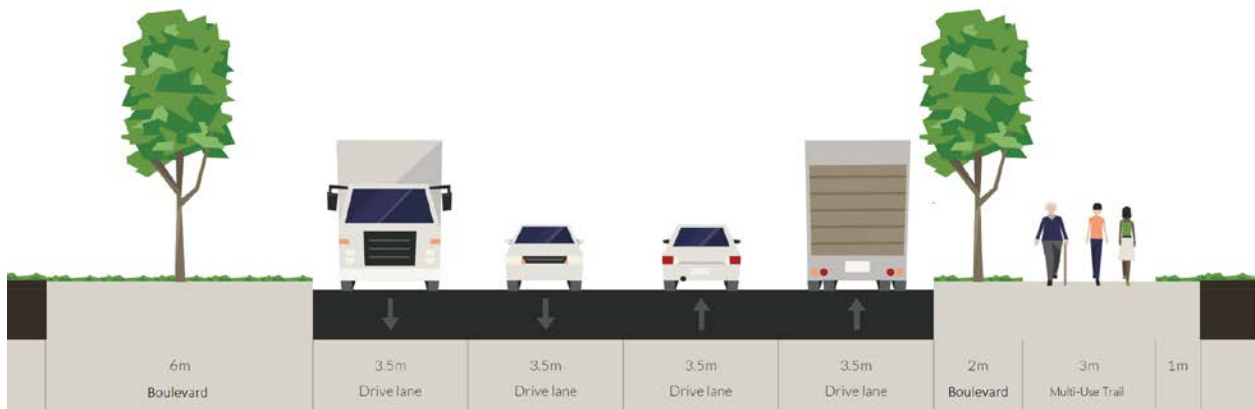
A similar evaluation was conducted for these design concepts and it was determined that, for Part B, the recommended alternative design concept is **Alternative 4: Two-Lane Urban Roadway with Multi-Use Trail**. Part B will see lower traffic demand than Part A, thus a widening to four lanes was not warranted. Similarly, a multi-use trail was sufficient to meet pedestrian and cycling needs for the corridor, thereby reducing capital and maintenance costs of an additional sidewalk.

Any pedestrian/cycling facilities on the west side of Huntington Road will be revisited further in detailed design, pending future development to the west.

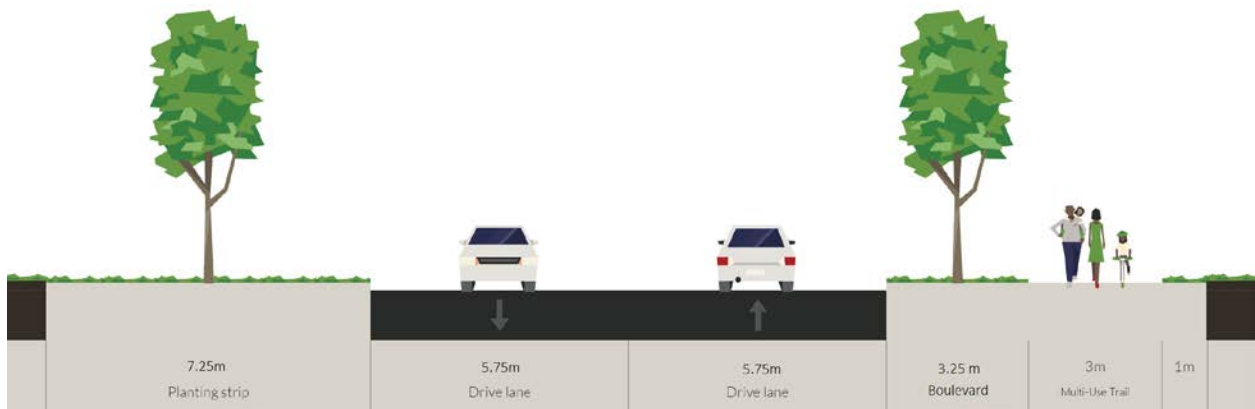
The cross-sections for the recommended design concepts are shown below:



Part A: Langstaff Road to Rutherford Road



Part A: Rutherford Road to McGillivray Road



Part B: Major Mackenzie Drive to Nashville Road

These recommended design concepts will also include improvements to the existing drainage and stormwater system. This will involve the replacement of culverts to accommodate new flows and a widened road right-of-way. In addition, a creek



realignment is required at the northeast corner of Huntington Road and Rutherford Road. Road illumination will follow City standards and utilities are to be located as required, though these specifics will be further determined in detailed design.

**Consultation**

As public input is a vital part of the Class EA process, the study included a number of contact points with public, Indigenous Communities and relevant technical agencies/stakeholders. The key consultation milestones are provided below:

Consultation Event	Date
Notice of Commencement	November 13 and 20, 2014
Public Information Centre No. 1	November 25, 2014
Public Information Centre No. 2	June 29, 2016
Notice of Completion	

Public outreach and advertisements of these milestone events included local newspaper ads, direct mailings, and email. Individual meetings with key technical agencies and stakeholders (i.e. property owners, developers) were held throughout the study. Indigenous Communities were also contacted at key milestones.

**Environmental Impacts and Mitigation**

Impacts to the natural, socio-economic and cultural environments were considered through the evaluation process and mitigation measures were developed to address potential impacts.

A natural environmental impact assessment was conducted to determine the impacts of the proposed work. This included consideration of impacts to aquatic and terrestrial ecosystems. The need to replace watercourse crossing culverts results in the direct impact to fish and fish habitat. While some of the crossings were screened out through DFO’s Self-Assessment process, it was determined that six major crossings would require DFO review. At these six crossings, approximately 147 m<sup>2</sup> of fish habitat would be directly impacted. However, it is anticipated that the aquatic ecosystem can be sufficiently protected through the proper design and implementation of standard mitigation strategies. Likewise, due to widening and culvert replacement, approximately 3.64 hectares of vegetation would be disturbed and/or removed as a result of the proposed works. However, it was determined that due to the nature of the undertaking and the existing conditions, significant impacts to terrestrial features are not anticipated. Generally, impacts can be minimized or mitigated through reducing the grading requirement, replanting and restoration work, and standard construction protective measures.

A noise impact assessment was completed for this study. The findings indicate that noise-related impacts are not significant and they will mostly be encountered during construction, therefore temporary in nature. Mitigation measures during construction will considerably offset noise impacts.

There are expected to be indirect cultural heritage impacts to 13 sites and potential for impact on one site as a result of road improvements and urbanization. Generally, these impacts will be to accesses and driveways of adjacent properties and could be minimized by reducing grading needs at the impacted locations.

Impacts to the archaeology resources will be further refined and determined with a Stage 2 Archaeological Assessment (AA) in the locations determined by the Stage 1 AA. Significant impacts at the Nashville Cemetery have been minimized by aligning the roadway away from the cemetery, though there is still potential for some impacts depending on the final design.

**Future Commitments**

This Class EA study identified some additional work that will need to be carried out during detailed design when the exact impacts to property and other environmental features are identified. These works are documented below.

Additional Work	Description
Detailed Design	Additional work is required through detailed design to confirm various technical components of the design including the roadway geometry and profile, illumination, culvert crossings, wildlife crossings, utilities, construction staging, and property requirements.
Additional Archaeological Assessments (AAs)	The Stage 1 AA identified that adjacent lands have archaeological potential. Where widening of Huntington Road will encroach on these lands having archaeological potential, a Stage 2 AA is required. Additionally, any proposed impacts to the grassy strip between

	the Nashville Cemetery fence and the road should be preceded by a Stage 3 AA investigation. Pending the results of these AAs, additional investigations may be required.
Cultural Heritage Resource Impact Assessments (CHRAs)	The implementation of the preferred alternative design will result in indirect impacts affecting the entrance driveways of several identified cultural heritage sites. When the exact impacts are known through detailed design, the Cultural Heritage Assessment Report (CHAR) recommends that the Project Team meet with the City of Vaughan to determine the need for a Cultural Heritage Resource Impact Assessment (CHRIA) for each impacted site and also regarding road improvements near the Kleinburg-Nashville Heritage Conservation District (HCD) and ensure that streetscape conforms to the HCD Plan and design guidelines.
Wildlife Surveys	Fish, amphibian, bird and bat surveys are required during detailed design to confirm the presence or absence of such wildlife in the study area. The results will impact the design of various infrastructure such as culverts and wildlife crossings. Additional permitting may be required if Species at Risk (SAR) are determined to exist in the study area.
Vegetation Survey	A vegetation survey was required by the Toronto and Region Conservation Authority (TRCA) to determine what existing vegetation, adjacent to the proposed creek realignment, needs to be retained, removed or compensated for. The vegetation survey will be conducted in detailed design and a replanting plan will be put together in later stages based on the findings of the survey.
Wildlife Crossings	Wildlife passages will be further assessed in detailed design pending the findings of the field surveys. In particular, crossings #4 and #9 will be assessed for to allow for wildlife passage.
Compensation for Impacts to Natural Environment	Compensation for natural areas, particularly wetlands, that are impacted by the preferred alternative design will be determined during detailed design. This includes quantifying the amount of natural areas removed and identifying areas to be improved and the appropriate amount of compensation required (replanting, rehabilitation, etc.).
Soil Management	A limited soil investigation is recommended to evaluate the soil conditions, prior to excavation activities, within the Area of Potential Environmental Concern (APECs). Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken in detailed design.
Consultation	Consultation with key technical agencies, Indigenous Communities and stakeholders should be carried out through detailed design, particularly MNRF and DFO pertaining to watercourse crossings and fish habitat.
Permit-to-take-water (PTTW)	A PTTW may be required as some of the roadwork may intersect some shallow and coarse-grained fill soils that might require dewatering, though it is unlikely the volumes of groundwater would warrant a PTTW. Construction dewatering is more likely to be required where deep excavations occur that intersect the shallow water table.
Request for Project Review Form (DFO)	A Request for Project Review Form is to be submitted so that Fisheries and Oceans Canada (DFO) can review the impacts to fish and fish habitat at six major watercourse crossings where culvert replacement is needed.
Environmental Compliance Approval (MOECC)	An Environmental Compliance Approval (ECA) will be required from the Ministry of Environment and Climate Change (MOECC) for storm water management (SWM) controls for municipal roads.
Species at Risk (SAR) Permits	Pending the findings of the field surveys for the presence of SAR, a permit may be required from the Ministry of Natural Resources and Forestry (MNRF) under the <i>Endangered Species Act</i> (ESA) and/or Environment and Climate Change Canada (ECCC) or DFO under the <i>Species at Risk Act</i> (SARA) depending on the listed species.

## 1. INTRODUCTION

### 1.1 BACKGROUND

The City of Vaughan (Vaughan) has identified Huntington Road as an important arterial requiring improvements to adequately support the residential and employment growth planned for West Vaughan and directly adjacent areas. The study area for Huntington Road is divided into two parts due to the extension of Highway 427, which includes Huntington Road from Langstaff Road to McGillivray Road (Part A) and Major Mackenzie Drive to Nashville Road (Part B) (**Figure 1**).

The current road alignments will not be able to accommodate the traffic increase associated with local growth and requires an assessment of how the road can be improved to support higher traffic volumes and the changing surrounding land uses appropriately. This study will be a great opportunity for the City of Vaughan to plan, provide and assess the future needs along Huntington Road.

Consequently, the City of Vaughan initiated an Environmental Assessment (EA) study for Huntington Road through the Municipal Class Environmental Assessment process as laid out in the Environmental Assessment Act (EAA). This Environmental Study Report (ESR) has been prepared as part of the Class EA to document the planning, design, and decision-making processes followed for the study on Huntington Road improvements.

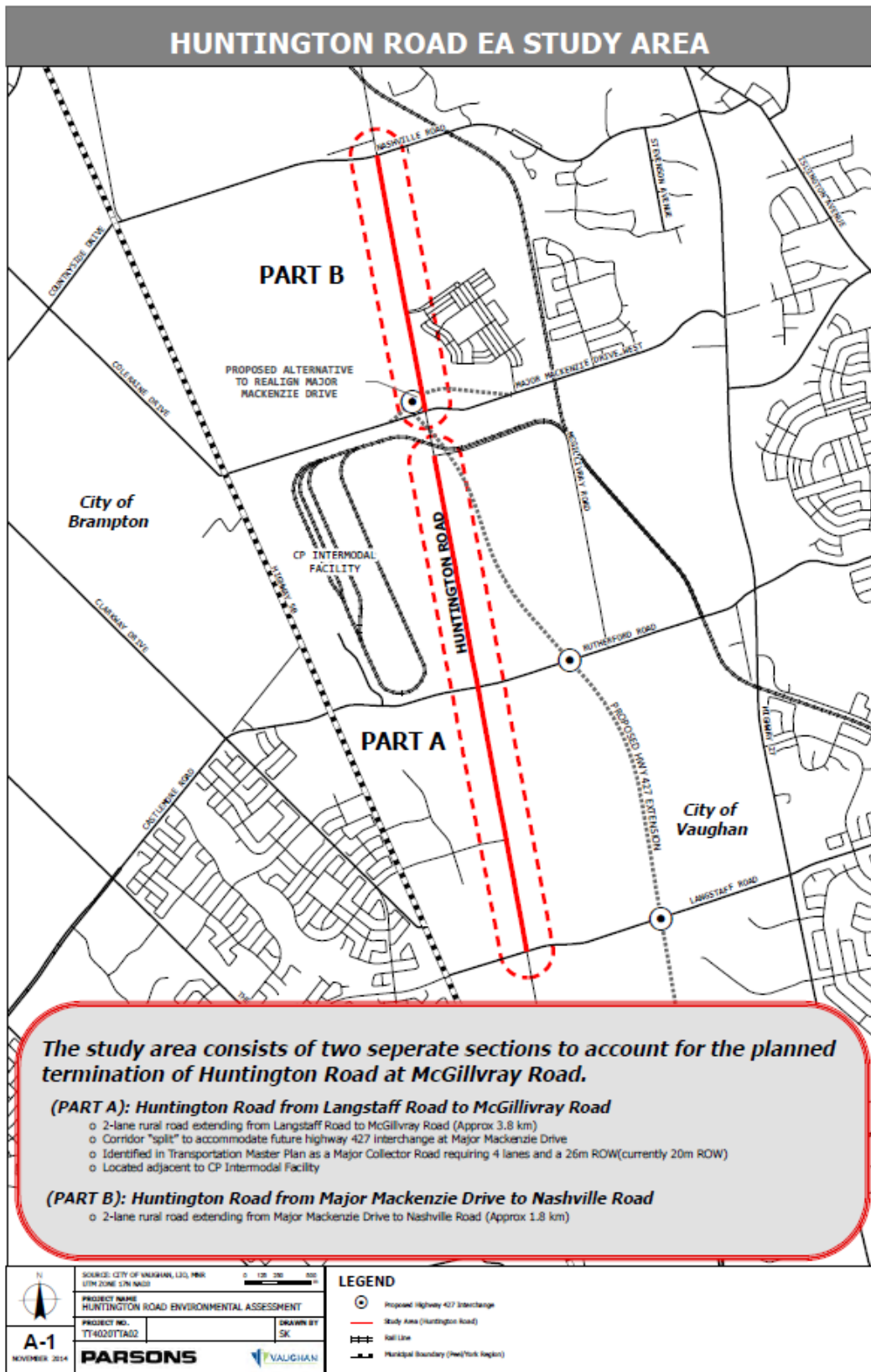


Figure 1: Huntington Road Study Area

## 1.2 THE MUNICIPAL CLASS EA PROCESS

The province of Ontario has implemented an Environmental Assessment (EA) process, as laid out in the EA Act, to ensure that the environmental impacts of projects are considered. The EA Act also sets out a Class EA process, which provides specific planning and decision-making processes for a class or group of undertakings. Projects included within the scope of a Class EA can be implemented with no further approval under the EA Act, given that the specific Class EA process was followed.

The Municipal Class EA is specific to municipal infrastructure projects, and allows municipalities a more streamlined and efficient process to carry out the many public works projects required to meet the provision of municipal services. Class EAs also provide more flexibility in the planning process, depending on the scope and context of a project, than the individual EA process.

Thus, the City of Vaughan has undertaken the Municipal Class EA planning and decision-making process to fulfill the requirements of approval under the EA Act for the Huntington Road improvement project.

### 1.2.1 MUNICIPAL CLASS EA SCHEDULES

Municipal undertakings can vary greatly in their environmental impact. Therefore, the Municipal Class EA categorizes projects into different Schedules, which correspond to the potential extent of their environmental impact.

**SCHEDULE A:** applies to projects that are limited in scale and have minimal adverse environmental impacts. These projects tend to be maintenance, operational, or emergency activities. These projects are pre-approved and are not required to follow the full Municipal Class EA planning process.

**SCHEDULE A+:** similar to Schedule 'A' with an additional requirement to provide public notification for certain pre-approved projects. The public may comment but does not have the opportunity to request a Part II Order.

**SCHEDULE B:** applies to projects with some adverse environmental effects, in which the proponent must undertake a screening process and have mandatory points of contact with the public and review agencies. These projects generally include improvements and minor expansions to facilities.

**SCHEDULE C:** applies to projects with the potential for significant environmental effects. The project must undergo the full planning and documentation process as set out by the Municipal Class EA, which includes the preparation of an ESR. These projects commonly include the construction of new facilities and major expansions to existing facilities.

An initial review of the scope and potential environmental impacts of the Huntington Road improvements suggests that Schedule C be followed.

### 1.2.2 SCHEDULE C – FIVE PHASE PLANNING PROCESS

The Municipal Class EA sets out a five phase planning and design process (**Figure 2**), which has been approved under the EA Act. This process integrates environmental assessment planning, environmental protection, effective consultation, and traceable decision-making. Schedule 'C' undertakings, and consequently this project, must follow all five of the phases listed below:

#### Phase 1: Problem or Opportunity

Projects generally arise as a response to either a deficiency (problem) or an opportunity. A clear statement that outlines the scope of the problem or opportunity being addressed should be prepared. It is not enough to simply provide a statement, but additional studies and supporting evidence must be provided to show how the proponent reached the conclusion that an improvement or change is needed.

## Phase 2: Alternative Solutions

Once a clear problem/opportunity statement is formulated, the proponent can identify and evaluate alternative solutions. Schedule 'C' projects follow six steps in Phase 2:

1. Identification of all reasonable and feasible solutions to the problem;
2. Preparation of a general inventory of the natural, social and economic environments of the project area that will be considered when reviewing potential effects;
3. Identification of the magnitude of net positive and negative effects of the alternative solutions to the environment defined in Step 2, including mitigation measures;
4. Evaluation of the alternative solutions, taking into consideration factors from Steps 2 and 3;
5. Consultation with review agencies and the public to solicit input;
6. Selection of a preferred solution.

## Phase 3: Alternative Design Concepts for Preferred Solution

This phase follows a similar process to Phase 2. Instead of alternative solutions to address the problem/opportunity, alternative designs to achieve the preferred solution are identified and assessed following these seven steps:

1. Identification of alternative design concepts for the preferred solution;
2. Preparation of a detailed inventory for the components of the environment which must be considered and evaluated;
3. Identification of the potential impacts of each alternative design, including mitigation measures;
4. Evaluation of the alternative designs, taking into consideration factors from Steps 2 and 3;
5. Consultation with review agencies and the public to solicit input;
6. Selection of a preferred design;
7. Preliminary finalization of a preferred design.

## Phase 4: Environmental Study Report

Phases 1 to 3 represent the planning and design portion of the Municipal Class EA. As the problem or opportunity now has an appropriate solution, an Environmental Study Report (ESR) can be put together to document the activities undertaken since the project commenced. This documentation provides a traceable and logical decision-making process on how the proponent reached its final conclusion on solution and design.

The ESR will then be placed on public record for at least 30 days, during which the public and review agencies can review the document. Those concerned are able to request a Part II Order under the EA Act. A Part II Order requires that the project proceed under the full Individual Environmental Assessment process. The Minister of the Environment makes the final decision on accepting or rejecting the Part II Order request; the Minister may also deny the request but subject the undertaking to condition(s) before implementation in Phase 5.

Following the public review period, given that there are no outstanding Part II Order requests, the proponent may move onto Phase 5.

## Phase 5: Implementation

The proponent can now complete contract drawings and tender documents, adhering to the selected solution, designs and mitigation measures defined previously. Once contracts are awarded, construction and operation of the project can begin. At the same time, the mitigation and monitoring programs outlined in the ESR must also be implemented.

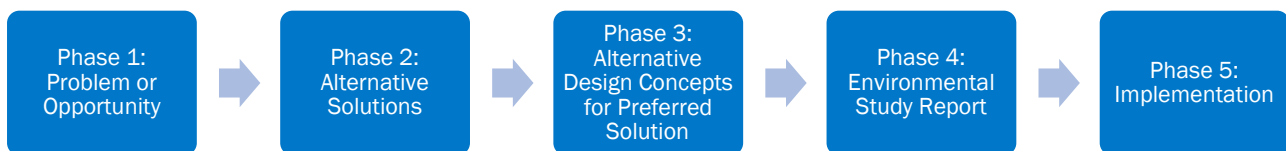


Figure 2: Phases of the Municipal Class EA Process



## 1.2.3 CONSULTATION RESPONSIBILITIES

An important component of the EA Act is consultation and communication with the public and stakeholders. The Municipal Class EA lays out mandatory requirements relating to such consultation and communication. Municipal council, the public, review agencies, municipalities, and Indigenous Communities are among those most commonly involved.

Schedule 'C' projects have three mandatory points of contact, which roughly follow this timeline:

1. End of Phase 2, inviting public comment and input on the problem/opportunity and alternative solutions formulated to date;
2. End of Phase 3, to review the alternative designs; and,
3. End of Phase 4, a notice to advise the public/review agencies that the ESR is available on the public record and their rights to requesting an order.

These are considered the minimum requirements for consultation and there may be appropriate opportunities for additional points of contact. The proponent is also required to develop a consultation plan at the outset of the study, which outlines the proposed approach to address how consultation will be carried out.

## 1.3 PROJECT TEAM

The Project Team for the Huntington Road EA consists of:

**City of Vaughan**, Project Proponent

**Parsons Inc.**, Lead Consultant

Sub-Consultants:

**A. M. Archaeological Associates**, Archaeology

**Novus Environmental Inc.**, Noise

**Sanchez Engineering Inc.**, Drainage & Hydrology

**SLR Consulting (Canada) Ltd.**, Natural Environment

**SPL Consultants Limited**, Geotechnical & Phase I ESA

**Unterman McPhail Associates**, Built & Cultural Heritage

**Water's Edge**, Geomorphology

## 2. EXISTING CONDITIONS

In order to evaluate a deficiency or opportunity associated with Huntington Road, the existing conditions must be established. The following sections discuss the current context, transportation features, and the social and natural environments of the study area.

### 2.1 CONTEXT AND KEY LANDMARKS

Understanding the surrounding context of Huntington Road is necessary in determining the current and anticipated uses of the road. This section provides a general inventory of major projects and key landmarks in the context of Huntington Road, from Langstaff Road north to Nashville Road (**Figure 3**).

#### Canadian Pacific Railway (CPR) and CPR Vaughan Intermodal Facility

CPR has a large presence on the communities surrounding Huntington Road. A large CPR intermodal rail-truck facility is located to the west of Huntington Road extending north from Rutherford Road to Major Mackenzie Drive. This facility processes large amounts of cargo traffic daily, facilitating freight transportation in the Greater Toronto Area.

Freight trains enter and exit through a track that passes Huntington Road just south of Major Mackenzie Drive. However, due to the expansion of Highway 427 that resulted in the termination of Huntington Road just south of Major Mackenzie, this rail track crossing will not have much impact on traffic flows. Trucks enter the facility only from Highway 50.

# PARSONS

## Highway 427 Extension

To address existing and short-term transportation problems in the area, the Ministry of Transportation (MTO) will extend Highway 427 north from Highway 7 to Major Mackenzie Drive. New interchanges are planned at Langstaff Road, Rutherford Road, and Major Mackenzie Drive. This extension will also help improve truck traffic accessibility to and from the Vaughan Intermodal Facility and inter-regional traffic in the Peel-York boundary area.

The extension is located to the east of Huntington Road, with the section north of Rutherford Road veering west. The new Highway 427 interchange at Major Mackenzie will be just west of the Huntington Road and Major Mackenzie intersection. A portion of the highway will cross Huntington Road south of Major Mackenzie, resulting in the termination of Huntington Road on both sides of the highway. This splits the study area into Part A, Huntington Road from Langstaff Road to McGillivray, and Part B, Huntington Road from Major Mackenzie Drive to Nashville Road.

## Nashville Cemetery

Nashville Cemetery was formerly known as Zoar Primitive Methodist Church Cemetery, as it belonged to the church of the same name. In 1884, the church disbanded and the cemetery remained, and is currently being maintained by the City of Vaughan.

Located east of Huntington Road and approximately midway between Nashville Road and Major Mackenzie Drive, this location will warrant consideration of built and cultural heritage, as well as archaeological resources.

## Hydro Corridor

A 500 kV hydro corridor owned by Hydro One transverses the study area, crossing Huntington Road approximately midway between Major Mackenzie Drive and Rutherford Road.

## Surrounding Land Uses

Several employment areas can be found within the study area including the West Vaughan Employment Area and the Vaughan Enterprise Zone in Blocks 59, 60, 64, and 66. These areas are shown and labeled in **Figure 3** as highlighted in green and light blue hatching.

A major residential subdivision, Nashville Heights, is situated to the north of the study area in Block 61. This area is depicted in **Figure 3** with dark blue hatching. Just to the north of the Nashville Heights Community is the Kleinburg-Nashville District, a heritage conservation district just north of Nashville Road. Section 2.3.3 discusses the surrounding land uses in greater detail.



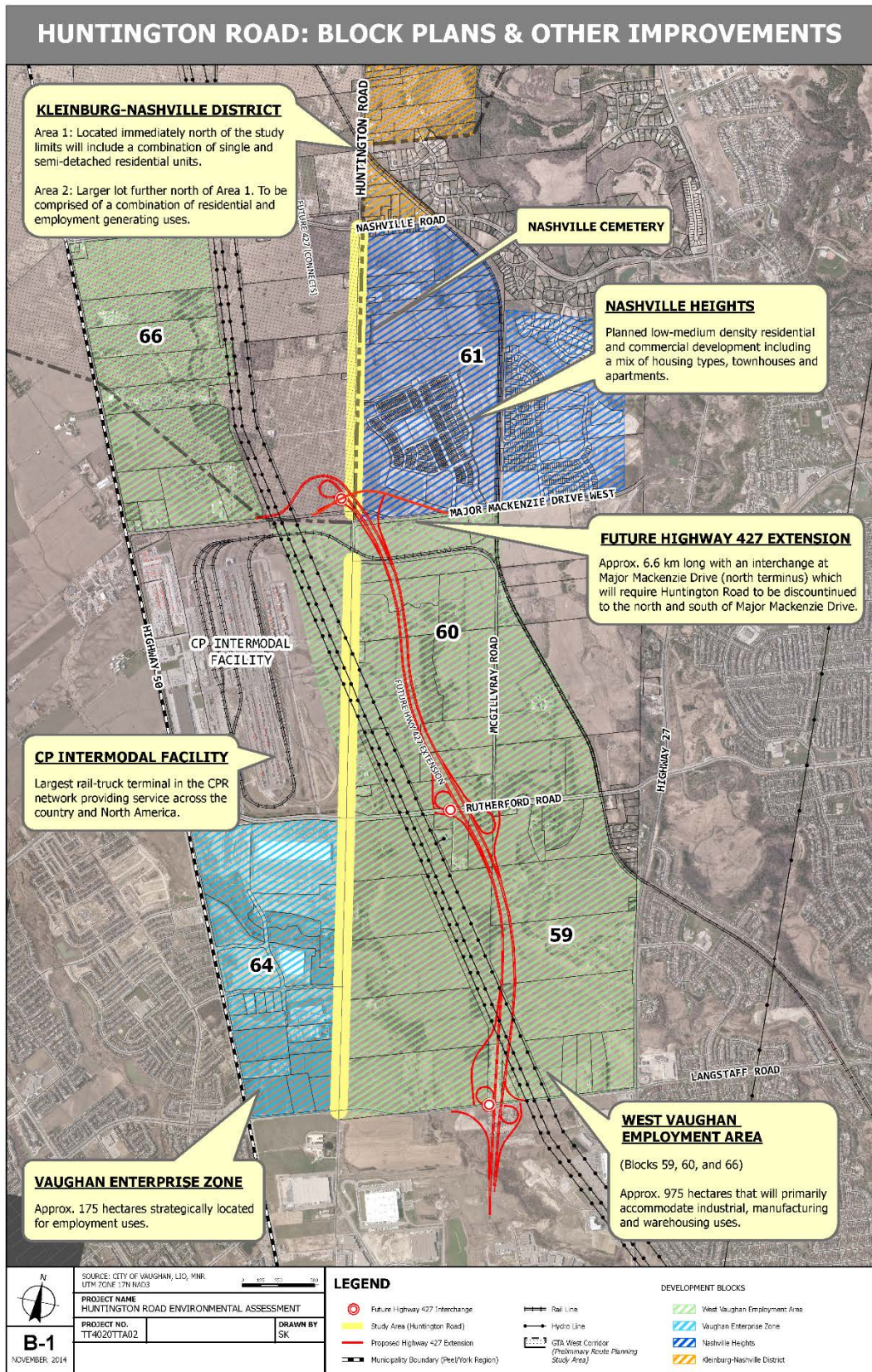


Figure 3: Map of the Huntington Road and Surrounding Study Area

## 2.2 TRANSPORTATION FEATURES

### 2.2.1 ROADS

Within the study area, Huntington Road is a two-lane rural collector road with a posted speed of 80 km/h. The right-of-way (R.O.W.) within the corridor is generally around 20 m. The total length of the road within the study area is 6.5 km, however, Part A runs 3.75 km between Langstaff Road and McGillivray Road, and Part B runs 2.03 km from Major Mackenzie Drive to Nashville Road. The 720 metre length discrepancy is due to the section of Huntington Road that was omitted from the study as a result of the Highway 427 extension.

A geometric review of the existing Huntington Road was undertaken based on a 100 km/h design speed, which is the posted speed plus 20 km/h. It includes a horizontal and vertical alignment review, a cross-section review, a guiderail length review and an intersection review. The assessment was undertaken with reference to the following documents:

1. City of Vaughan Design Criteria
2. City of Vaughan's Transportation Master Plan
3. City of Vaughan Design Standard Drawings
4. Transportation Association of Canada (TAC): Geometric Design Guide for Canadian Roads
5. Ministry of Transportation Ontario (MTO): Geometric Design Manual
6. MTO: Roadside Safety Manual

#### 2.2.1.1 Horizontal and Vertical Alignment

The existing horizontal alignment is generally straight with multiple deflections (slight change of direction) along Huntington Road. The deflection angles are less than 0° 30', thus horizontal curves are not necessary.

In Part A, the profile grade is between 0% to a maximum of 5.9% and in Part B, the profile grade is from 0% to a maximum of 3.5%. This meets the minimum and maximum allowable profile grade for a 100 km/h design speed. Although 0% grade is acceptable for an uncurbed roadway, 0.5% minimum grade is preferred for better surface drainage.

Vertical curve K-value and curve length were also reviewed. There are 20 vertical curves on Huntington Road from Langstaff Road to Major Mackenzie Drive, out of which 6 vertical curves K-value are below design requirements for a speed of 100 km/h. They are located in the vicinity of the Rainbow Creek crossing culverts. There are 10 vertical curves on Huntington Road from Major Mackenzie Drive to Nashville Road, of which 6 vertical curves K-value are below design requirements for 100 km/h. K-values below design requirements not only affect a driver's comfort, but the available stopping sight distance is below the desirable requirement of 160 m.

#### 2.2.1.2 Cross-Section

Currently, Huntington Road is a rural two-lane roadway. Existing cross-sections were reviewed based on roadway width, shoulder width and roadway crossfall. For a design speed of 100 km/h and daily hour volume (DHV) below 450, a minimum of 3.5m lane and 2.5m shoulder is required (TAC's Table 2.2.2.1 & Table 2.2.4.1). Also, it is recommended that a minimum 6:1 foreslope and 3:1 backslope be included. The cross-section review for each segment is summarized in Table 1.

Table 1: Cross-Section Review Summary

Segment	Min. Lane Width (m)	Min. Shoulder Width (m)	Max Foreslope <sup>1</sup>	Max Backslope
Langstaff Rd. to Rutherford Rd.	Paved 3.50	Gravel 1.0	2:1	2:1
Rutherford Rd. to McGillivray Rd.	Gravel 3.25	Gravel 0.5	2:1	2:1
Major Mackenzie Dr. to Nashville Rd.	Paved 3.25	Gravel 0.5	2:1	3:1

\* Greyed value indicates values below design requirement for 100 km/h design speed

<sup>1</sup> Maximum foreslope without guiderail protection

The existing crossfall at various locations along Huntington Road is as steep as 10%, which is greater than the desirable 2% crossfall. With the steep crossfall, steering may be affected and increase skidding chance when vehicles brake on icy or wet pavement.



## 2.2.1.3 Guiderail

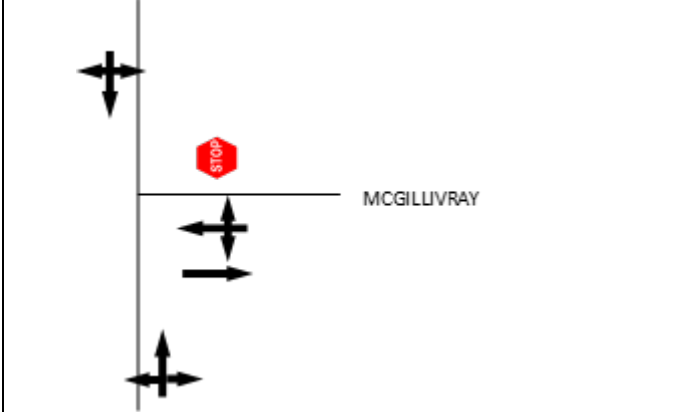
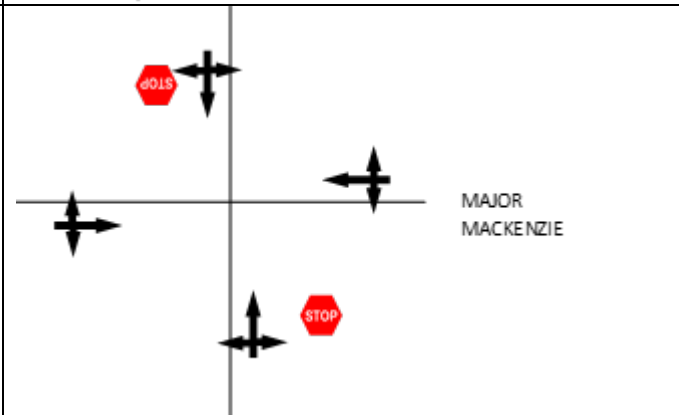
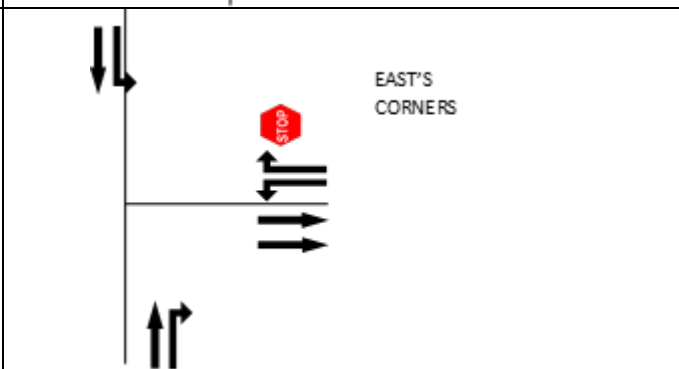

There are four guiderail systems along Huntington Road. They are all located in Part A, between Trade Valley Road and McGillivray Road at the West and East Rainbow Creek Crossings. The guiderail system is approximately 45 metre and 50 metre, respectively. It is shorter than the required guiderail length of 184 metre at the culvert crossing north of Trade Valley Road and 196 metre at the culvert crossing south of McGillivray Road.

## 2.2.1.4 Intersections

This section of Huntington Road currently includes seven intersections with other local/regional roads; the configuration summary is shown in **Table 2** and **Figure 4**.

Table 2: Huntington Road Intersections

Cross Road Intersection	Posted Speed	Intersection Layout
Langstaff Rd	80 km/h	
Trade Valley Dr	60 km/h <sup>(1)</sup>	
Rutherford Rd	70 km/h	

<p>McGillivray Rd</p> <p>60 km/h<sup>(1)</sup></p>		 <p>The diagram shows a vertical road with two-way traffic. A horizontal road, labeled 'MCGILLIVRAY', crosses it from the right. A red octagonal stop sign is located on the horizontal road just before the intersection. Arrows indicate traffic flow: two-way on the vertical road and one-way (left to right) on the horizontal road.</p>
<p>Major Mackenzie Dr</p> <p>70 km/h</p>		 <p>The diagram shows a vertical road with two-way traffic. A horizontal road, labeled 'MAJOR MACKENZIE', crosses it from the left. Red octagonal stop signs are located on the horizontal road for both directions of travel. Arrows indicate traffic flow: two-way on the vertical road and one-way (left to right) on the horizontal road.</p>
<p>East's Corners Blvd</p> <p>60 km/h<sup>(1)</sup></p>		 <p>The diagram shows a vertical road with two-way traffic. A horizontal road, labeled 'EAST'S CORNERS', crosses it from the right. A red octagonal stop sign is located on the horizontal road just before the intersection. Arrows indicate traffic flow: two-way on the vertical road and one-way (left to right) on the horizontal road.</p>
<p>Nashville Rd</p> <p>50 km/h</p>		 <p>The diagram shows a vertical road with two-way traffic. A horizontal road, labeled 'NASHVILLE', crosses it from the left. Red octagonal stop signs are located on the horizontal road for both directions of travel. Arrows indicate traffic flow: two-way on the vertical road and one-way (left to right) on the horizontal road.</p>

(1) New road, posted speed was not available during site visit, 60 km/h is assumed

Several roads are proposed within or adjacent to the study area. These future road network improvements include:

- Highway 427 extension to Major Mackenzie Drive in Phase 1 and to the north of Kirby Road in Phase 2;
- Major Mackenzie Drive realignment and widening from two to six lanes, including one High Occupancy Vehicle (HOV) lane in each direction;
- Rutherford Road widening from four to six lanes, including one HOV lane in each direction;

# PARSONS

- Huntington Road discontinuity from McGillivray Road to Major Mackenzie Drive; and,
- Construction of new roads includes “Street A”, “Street B”, MacTier Drive, Algoma drive, East Corner’s Boulevard and the intersections of the new roads with Huntington Road. “Future Road”, the connection from Huntington Road to Major Mackenzie Drive and opposite the Highway 427 NB off ramp, is subject to future approval.

The proposed future road network is shown in **Figure 5**.

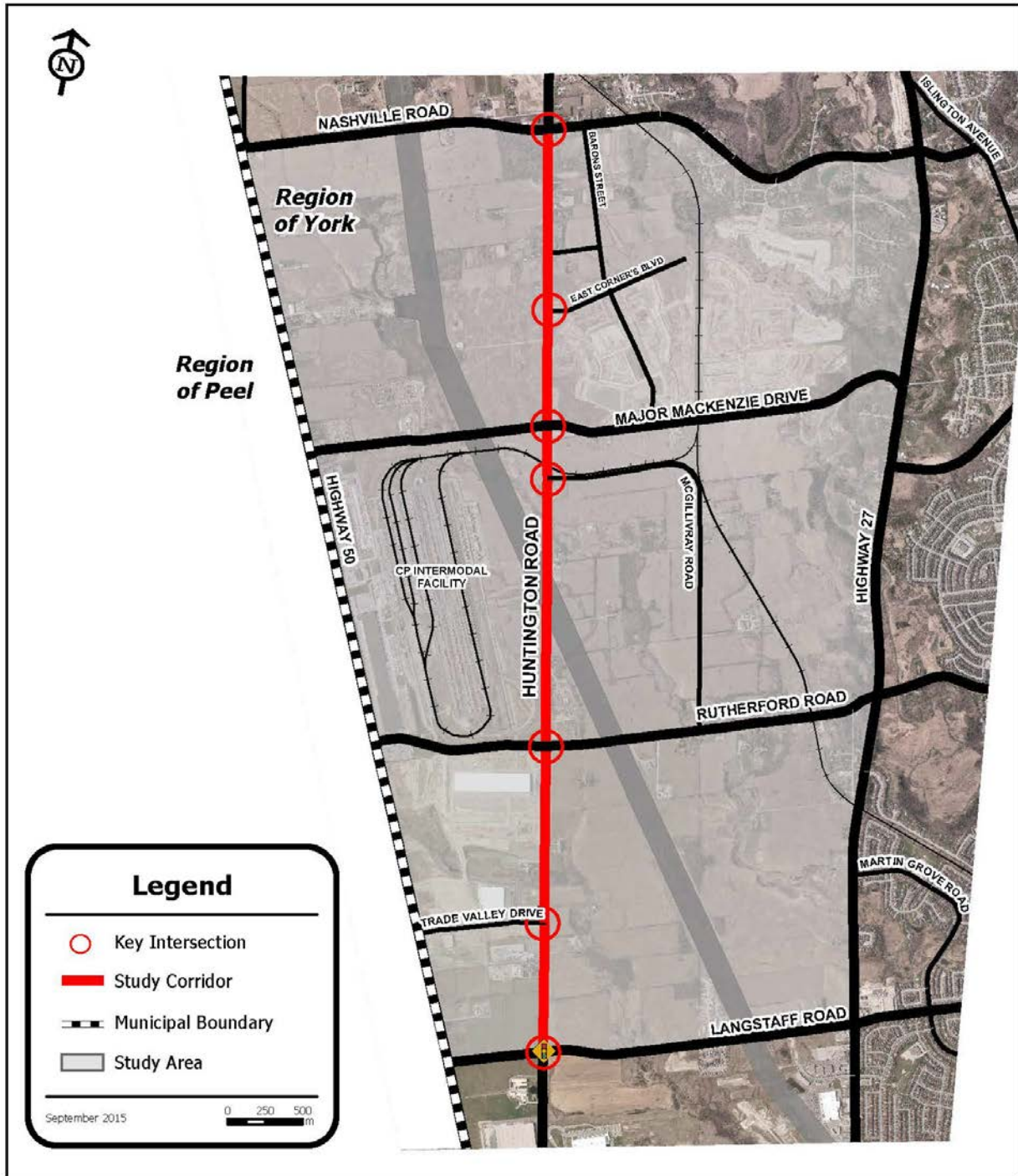


Figure 4: Intersections within the Study Area

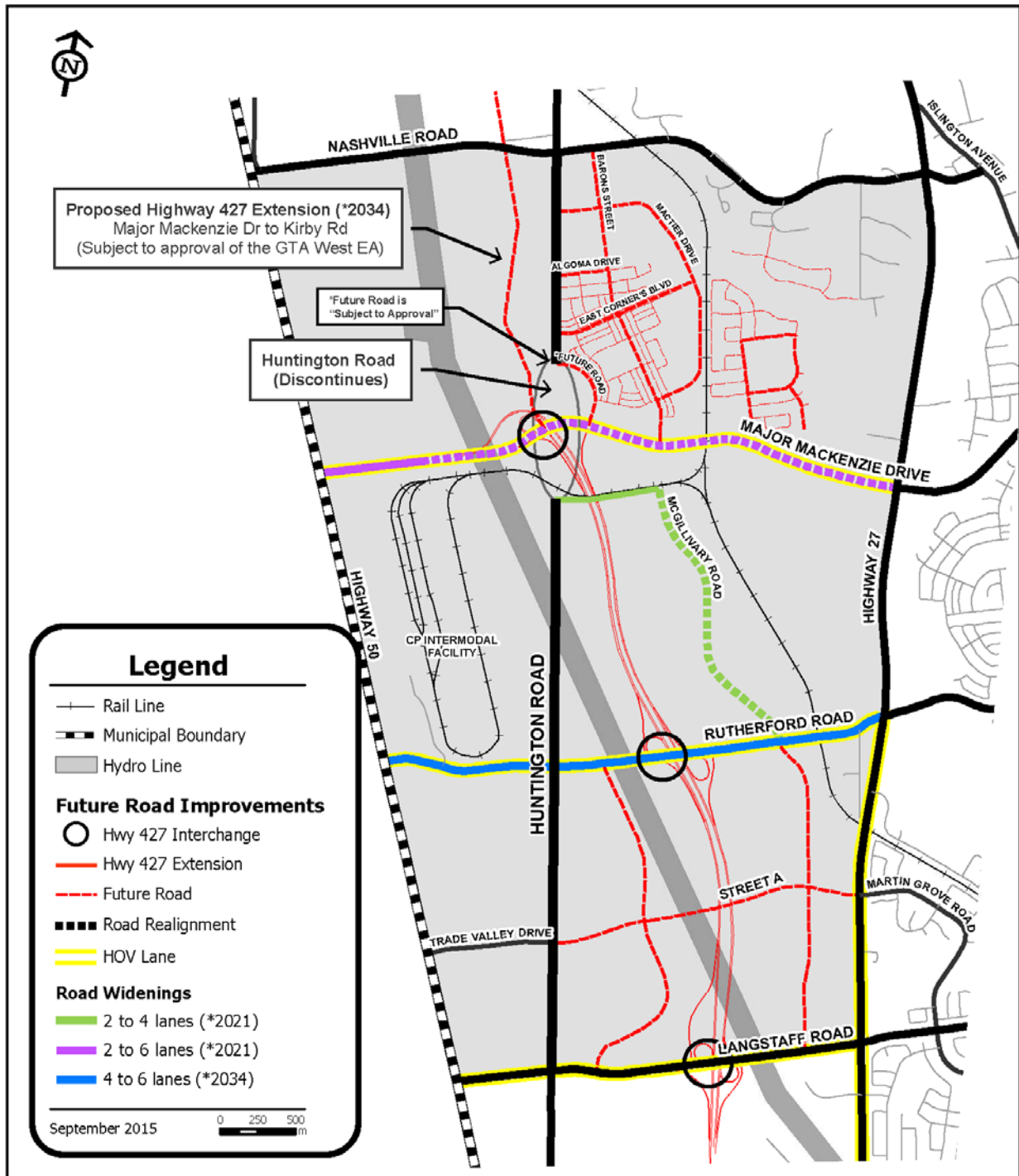


Figure 5: Proposed Future Road Network around Huntington Road

## 2.2.2 TRAFFIC

### 2.2.2.1 Traffic Volumes

A traffic analysis on existing and projected traffic volumes along Huntington Road was conducted by Parsons to determine traffic handling capability of the roadway over the short and long term. This involved review and compilation of various data sources, including previous traffic reports, development studies, future plans, traffic and collision data, site visits, and intersection operation analyses. Synchro and SimTraffic were used to run the models for the traffic capacity analysis.

The year 2015 was used as the existing traffic conditions base year and 2021 and 2034 were selected as the horizon years. For the full numbers and details, refer to Appendix A for the full Traffic Operations Analysis Report.

### **2.2.2.2 Existing 2015 Traffic Capacity Analysis**

The existing 2015 traffic volumes for both the AM and PM peak were determined based on turning movement counts (TMCs) data provided by the City of Vaughan, Poulos and Chung Limited, and Cole Engineering. This data was only available at the intersection of the following major roads with Huntington Road: Nashville Road, Major Mackenzie Drive, Rutherford Road, Langstaff Road, and Trade Valley Drive. Traffic counts were collected at these intersections in 2015, with the exception of the intersection of Huntington Road and Nashville Road, which was collected in 2013. A growth rate was applied to these counts to grow them to the 2015 base year. While TMCs were not available for the smaller intersections at McGillivray Road and East Corner's Boulevard, volumes were balanced with adjacent intersections.

Given the industrial uses in the area, consideration of traffic composition and the number of heavy vehicles on the roadway is relevant. A heavy vehicle percentage factor was applied to the Synchro models to reflect the actual road capacity. This was extracted from the TMCs and the same percentage was used in the models for the horizon years. Signal timing plans (STPs) for the traffic signalized intersection (Huntington Road and Langstaff Road) and collision data were also incorporated into the model.

Once the base conditions were set in the model, a traffic capacity analysis was performed on the study area intersections. The analysis focused on performance measures including Level of Service (LOS), volume to capacity ratio (v/c), delay time and queue length. LOS, expressed as a letter between 'A' (a good rating) and 'F' (a poor rating), provides insight into how well an intersection operates based on delay. The volume to capacity ratio indicates the level of physical capacity utilized on a roadway. The results of the traffic capacity analysis completed for the existing 2015 weekday AM and PM peak hours are presented in **Table 3** and **Table 4**.

Intersections with a LOS of 'E' or 'F' and/or a v/c ratio of 0.85 or greater are considered to be in critical or poor condition. The analysis finds that the intersections at Nashville Road and Rutherford Road operate at poor LOS under existing 2015 conditions as a result of significant delays due to the stop control when entering both those roads, which operate at free flow traffic. The other intersections operate at good traffic conditions.

In addition, a traffic signal warrant analysis was conducted for the two intersections operating at poor LOS to determine if a traffic signal was required. The results indicate that under existing conditions, both signals are warranted.

Table 3: Existing 2015 Weekday AM Peak Hour Traffic Operational Performance

Intersection	MOE	Overall	Movement											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Nashville Rd. & Huntington Rd.	Volume		6	452	15	9	449	55	6	14	9	75	26	9
	LOS	A		A			A			C			E	
	v/c	-		0.01			0.01			0.14			0.62	
	Delay (s)	6		0.2			0.3			23.5			49.6	
	Queue 95th			0			0			4			27	
East Corner's Blvd. & Huntington Rd.	Volume					0		0		25	0	0	50	
	LOS	A								A			A	
	v/c	-								0.02			0.03	
	Delay (s)	0								0			0	
	Queue 95th									0			0	
Major Mackenzie Dr. & Huntington Rd.	Volume		6	194	3	27	126	14	1	5	1	38	24	10
	LOS	A		A			A			B			B	
	v/c	-		0			0.02			0.01			0.14	
	Delay (s)	3		0			1			12			13	
	Queue 95th			0			1			12			4	
McGillvary Rd. & Huntington Rd.	Volume					5		1		9	7	4	50	
	LOS	A				A				A			A	
	v/c	-				0.01				0.01			0	
	Delay (s)	1				9				0			1	
	Queue 95th					0				0			0	
Rutherford Rd. & Huntington Rd.	Volume		4	1062	188	130	825	5	27	7	20	4	40	10
	LOS	B		B			C	-		F			F	
	v/c	-	0.1	0.45	0.35	0.28	0.35	0.18		NA			NA	
	Delay (s)	NA	11	0	0	15	0	0		NA			NA	
	Queue 95th		0	0	0	9	0	0		NA			NA	
Trade Valley/Street A & Huntington Rd.	Volume		8		207				30	83			291	5
	LOS	A	B		B				A	A			A	
	v/c	-	0.02		0.16				0.06	0.05			0.19	
	Delay (s)	4	12		11				8	0			0	
	Queue 95th		0		4				1	0			0	
Langstaff Rd. & Huntington Rd.	Volume		38	564	259	57	242	33	57	130	16	93	385	35
	LOS	B	A	A	A	A	A	A	C	C		C	C	
	v/c	0.37	0.06	0.27	0.18	0.15	0.12	0.02	0.43	0.23		0.4	0.65	
	Delay (s)	15	6	7	7	7	6	6	29	26		28	30	
	Queue 95th		7	33	10	10	14	4	19	17		26	46	



Table 4: Existing 2015 Weekday PM Peak Hour Traffic Operational Performance

Intersection	MOE	Overall	Movement											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Nashville Rd. & Huntington Rd.	Volume		13	492	7	6	559	56	37	47	24	42	13	9
	LOS	A		A			A			F			F	
	v/c	-		0.02			0.01			0.64			0.56	
	Delay (s)	8		0.5			0.2			54.6			66.5	
	Queue 95th			0			0			28			21	
East Corner's Blvd. & Huntington Rd.	Volume					0		0		114	0	0	26	
	LOS	A								A			A	
	v/c	-								0.07			0.02	
	Delay (s)	0								0			0	
	Queue 95th									0			0	
Major Mackenzie Dr. & Huntington Rd.	Volume		10	142	1	4	231	45	5	59	12	20	4	3
	LOS	A		A			A			B			B	
	v/c	-		0.01			0			0.16			0.06	
	Delay (s)	3		1			0			13			14	
	Queue 95th			0			0			4			2	
McGillvary Rd. & Huntington Rd.	Volume					12		8		68	5	0	9	
	LOS	A				A		A		A			A	
	v/c	-				0.02		0.02		0.05			0	
	Delay (s)	2				9		9		0			0	
	Queue 95th					0.5		0.5		0			0	
Rutherford Rd. & Huntington Rd.	Volume		9	788	44	20	1078	2	132	62	110	4	11	6
	LOS	B		B			B	-		F			F	
	v/c	-	0.02	0.34	0.2	0.03	0.46	0.23		4.74			NA	
	Delay (s)	NA	13	0	0	11	0	0		NA			NA	
	Queue 95th		0.5	0	0	0.8	0	0		NA			NA	
Trade Valley/Street A & Huntington Rd.	Volume		14		62				287	290			18	5
	LOS	A	D		A				A	A			A	
	v/c	-	0.08		0.04				0.21	0.19			0.07	
	Delay (s)	4	27		9				8	0			0	
	Queue 95th		2.1		0.9				6.1	0			0	
Langstaff Rd. & Huntington Rd.	Volume		18	412	64	21	642	81	267	512	94	31	145	17
	LOS	B	A	B	A	A	B	A	D	C		C	C	
	v/c	0.51	0.05	0.23	0.04	0.06	0.36	0.06	0.78	0.61		0.22	0.17	
	Delay (s)	20	10	11	10	10	12	10	38	27		24	22	
	Queue 95th		6	36	7	7	58	8	73	64		12	17	

**2.2.2.3 Future 2021 Traffic Capacity Analysis**

The study area’s future traffic volumes are comprised of two sources: background traffic volumes and traffic generated from future developments. Background traffic volumes refer to the existing 2015 volumes grown by a proper growth rate for the horizon years 2021 and 2034. These were calculated using York Region’s EMME model outputs using the screen line method. To calculate the expected traffic from future developments, trips generated were extracted from their respective studies. The calculation methods and background studies are described in full detail in the Traffic Operations Analysis Report in Appendix A.

All the future developments are assumed to be completed by the year 2021. It was also assumed that the intersections at Nashville Road and at Rutherford Road will be signalized by 2021 based on the recommendations from the 2015 existing traffic capacity analysis. Several other road improvements are expected by 2021:

- Highway 427 extended to Major Mackenzie Drive resulting in the discontinuation of Huntington Road;
- Widening of Major Mackenzie Drive to six lanes, with one HOV per direction;
- Street A as the fourth leg of the Huntington Road and Trade Valley drive intersection will be an east-west collector road extending from Huntington Road to Highway 27;
- Future Road will be constructed, subject to future approval, as a connection between Huntington Road and Highway 427 northbound off-ramp, with one lane per direction;
- Barons Street will be a four-lane north-south local road in the Nashville Heights development;
- East Corner’s Boulevard will be a two-lane east-west local road in the Nashville Heights development;
- MacTier Drive will be a two-lane east-west local road in the Nashville Heights development;

- Algoma Drive will be a two-lane east-west local road in the Nashville Heights development;
- Huntington Road will be widened from two to four lanes from Rutherford Road to Langstaff Road.

Once a model was developed, an analysis was conducted to determine if there are any problematic intersections or movements that would arise due to traffic volume growth. According to the results, several improvements need to be implemented, including road widening, installing traffic signals, and add left/right turn storage lanes.

The results of the traffic capacity analysis completed for the 2021 weekday AM and PM peak hours are presented in **Table 5** and **Table 6**. As shown in the results, the unsignalized intersections of Huntington Road with Trade Valley Drive/Street A and the Future Road with Major Mackenzie Drive/Highway 427 northbound off-ramp comprise movements with poor levels of service. This is caused by delay of stop control on side streets imposing significant delay to turning vehicles onto the main street. A traffic signal warrant analysis was completed for these two intersections, with the results indicating that both signals are warranted.

Another problematic movement is the northbound left turn movement at Langstaff Road and Huntington Road during the PM Peak hour due to high volumes.

Table 5: Future 2021 Weekday AM Peak Hour Traffic Operational Performance

Intersection	MOE	Overall	Movement											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Nashville Rd. & Huntington Rd.	Volume	-	7	544	37	17	885	97	60	18	11	87	30	11
	LOS	B		A			B			C			C	
	v/c	0.81		0.52			0.89			0.36			0.52	
	Delay (s)	15		6			18			25			27	
	Queue 95th	-		72			229			24			33	
MacTier Dr. & Huntington Rd.	Volume	-				22		24		61	83	6	99	
	LOS	A				A		A		A	A	A	A	
	v/c	-				0.06		0.06		0.04	0.05	0	0.06	
	Delay (s)	2				9		9		0	0	8	0	
	Queue 95th	-				1.4		1.4		0	0	0.1	0	
Algoma Dr. & Huntington Rd.	Volume	-				76		29		114	26	11	110	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.15		0.15		0.07	0.02	0.01	0.07	
	Delay (s)	3				11		11		0	0	8	0	
	Queue 95th	-				4		4		0	0	0.2	0	
East Corner's Blvd. & Huntington Rd.	Volume	-				201		83		57	57	28	159	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.41		0.41		0.04	0.04	0.02	0.1	
	Delay (s)	-				13		13		0	0	8	0	
	Queue 95th	-				15		15		0	0	1	0	
Future Rd/Hwy 427 Off Ramp & Major Mackenzie Dr	Volume	-	0	73	0	0	816	27	0	98	204	103		256
	LOS	C		A			A	A		C	C	F		F
	v/c	-		0.02			0.17	0.02		0.44	0.44	1.04		1.04
	Delay (s)	17		0			0	0		16	16	59		59
	Queue 95th	-		0			0	0		17	17	99		99
Rutherford Rd. & Huntington Rd.	Volume	-	4	1127	213	287	1350	9	38	9	31	5	10	10
	LOS	B	B	B	B	C	A			C	C		C	
	v/c	0.7	0.03	0.76	0.15	0.75	0.59			0.26	0.02		0.07	
	Delay (s)	14	11	19	12	24	6			28	27		27	
	Queue 95th	-	2	98	10	62	56			10	-		33	
Trade Valley/Street A & Huntington Rd.	Volume	-	17	87	207	33	15	10	37	158	103	13	302	6
	LOS	A	B	C		D	B		A	A		A	A	
	v/c	-	0.05	0.36		0.22	0.06		0.03	0.1		0.01	0.13	
	Delay (s)	6	15	16		34	13		8	0		8	0	
	Queue 95th	-	1	12		6	1		0	0		0	0	
Langstaff Rd. & Huntington Rd.	Volume	-	50	641	280	66	264	54	72	294	49	109	463	50
	LOS	B	A	A	A	A	A	A	C	C		C	C	
	v/c	0.42	0.08	0.32	0.23	0.17	0.13	0.04	0.6	0.44		0.56	0.67	
	Delay (s)	17	7	8	8	8	7	6	35	27		30	30	
	Queue 95th	-	9	41	19	12	17	5	25	36		32	55	

Table 6: Future 2021 Weekday PM Peak Hour Traffic Operational Performance

Intersection	MOE	Overall	Movement												
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Nashville Rd. & Huntington Rd.	Volume	-	24	1037	67	7	744	62	78	55	28	53	16	11	
	LOS	A		D			A			C			C		
	v/c	0.91		0.99			0.71			28.2			26.8		
	Delay (s)	25		35			9			32			28		
	Queue 95th	-		284			133			39			22		
MacTier Dr. & Huntington Rd.	Volume	-				115		26		141	115	31	58		
	LOS	A				B		B		A	A	A	A		
	v/c					0.21		0.21		0.09	0.07	0.03	0.04		
	Delay (s)					11		11		0	0	8	0		
	Queue 95th	-				6		6		0	0	1	0		
Algoma Dr. & Huntington Rd.	Volume	-				55		81		175	74	38	135		
	LOS	A				B		B		A	A	A	A		
	v/c	-				0.21		0.21		0.11	0.05	0.03	0.09		
	Delay (s)	3				11		11		0	0	8	0		
	Queue 95th	-				6		6		0	0	1	0		
East Corner's Blvd. & Huntington Rd.	Volume	-				139		57		191	161	103	87		
	LOS	A				C		C		A	A	A	A		
	v/c	-				0.4		0.4		0.12	0.1	0.1	0.06		
	Delay (s)	6				16		16		0	0	8	0		
	Queue 95th	-				15		15		0	0	2	0		
Future Rd/Hwy 427 Off Ramp & Major Mackenzie Dr	Volume	-		1088			494	144		209	603	37		190	
	LOS	F		A			A	A		F	F	F		F	
	v/c	-		0.23			0.11	0.09		4.06	4.06	NA		NA	
	Delay (s)	NA		0			0	0		NA	NA	NA		NA	
	Queue 95th	-		0			0	0		NA	NA	NA		NA	
Rutherford Rd. & Huntington Rd.	Volume	-	14	1303	76	58	1139	3	156	14	148	6	3	7	
	LOS	B	B	B	A	A	A			C	C		C		
	v/c	0.77	0.07	0.81	0.05	0.28	0.55			0.62	0.1		0.03		
	Delay (s)	15	13	18	9	10	6			28	24		23		
	Queue 95th	-	5	125	5	7	59			26	14		7		
Trade Valley/Street A & Huntington Rd.	Volume	-	22	20	93	110	85	14	318	239	71	3	175	30	
	LOS	E	F	D		F	F		A	A		A	A		
	v/c	-	0.4	0.17		1.37	0.71		0.26	0.1		0	0.07		
	Delay (s)	41	101	28		309	73		9	0		0	0		
	Queue 95th	-	11	5		69	32		8	0		0	0		
Langstaff Rd. & Huntington Rd.	Volume	-	27	433	66	59	698	93	301	618	113	63	294	55	
	LOS	C	B	B	B	B	B	B	E	C		C	C		
	v/c	0.64	0.1	0.27	0.05	0.15	0.43	0.06	0.93	0.6		0.42	0.28		
	Delay (s)	24	14	15	13	14	17	13	59	25		25	22		
	Queue 95th	-	8	38	7	15	64	8	110	79		23	35		

**2.2.2.4 Future 2034 Traffic Capacity Analysis**

Traffic volumes for 2034 were established using the same methodology as the traffic volumes for 2021 in Section 2.2.2.3. The purpose of the 2034 traffic capacity analysis is to determine if there will be problematic intersections or movements in the future.

It was assumed that the intersections at Huntington Road with Trade Valley Drive/Street A and the Future Road with Major Mackenzie Drive/Highway 427 northbound off-ramp will be signalized by 2034 based on the recommendations from the 2021 future traffic capacity analysis. Several other road improvements are expected by 2034:

- Highway 427 will be extended to Kirby Road;
- Rutherford Road will be widened to 3 lanes per direction, with one HOV lane per direction.

Similar to the 2021 traffic capacity analysis, a Synchro model was developed for the year 2034. Again, the model’s results indicated several roadway improvements to be implemented, including road widening, installing traffic signals, and adding left/right turn storage lanes.

The results of the traffic capacity analysis for the 2034 weekday AM and PM peak hours are presented in **Table 7** and **Table 8**. As presented in these two tables, the intersection of Huntington Road and Rutherford Road operates at poor traffic conditions with an LOS ‘E’ during the AM peak and LOS ‘F’ during the PM peak. Huntington Road’s movements experience significant delay due to long cycle times which is necessitated by the high traffic volumes on Rutherford Road. To provide enough capacity, westbound left turn movement at Rutherford Road requires double left turn lanes with a protect signal phase. In the PM peak period, Major Mackenzie Drive with Future Road/Highway 427 northbound off-ramp operates at

LOS 'E' and comprises two critical movements. Double right turn lanes are recommended for the northbound right turn movement on Highway 427 northbound off-ramp due to high traffic volumes.

Table 7: Future 2034 Weekday AM Peak Hour Traffic Operational Performance

Intersection	MOE	Overall	Movement											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Nashville Rd. & Huntington Rd.	Volume	-	9	687	42	40	2026	236	58	14	9	126	44	16
	LOS	C	A	A			C	A		C		C	C	
	v/c	0.91	0.1	0.33			0.99	0.16		0.35		0.57	0.19	
	Delay (s)	22	4	5			28	4		28		31	27	
	Queue 95th	-	3	36			243	7		22		33	16	
MacTier Dr. & Huntington Rd.	Volume	-				22		24		58	83	6	136	
	LOS	A				A		A		A	A	A	A	
	v/c	-				0.06		0.06		0.04	0.05	0	0.09	
	Delay (s)	2				9		9		0	0	8	0	
	Queue 95th	-				1.4		1.4		0	0	0.1	0	
Algoma Dr. & Huntington Rd.	Volume	-				76		29		111	26	11	147	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.16		0.16		0.07	0.02	0.01	0.09	
	Delay (s)	3				11		11		0	0	8	0	
	Queue 95th	-				4		4		0	0	0	0	
East Corner's Blvd. & Huntington Rd.	Volume	-				201		83		54	67	28	196	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.43		0.43		0.03	0.04	0.02	0.13	
	Delay (s)	7				14		14		0	0	8	0	
	Queue 95th	-				16		16		0	0	1	0	
Future Rd/Hwy 427 Off Ramp & Major Mackenzie Dr	Volume	-		73				1478	25	95	204	130		266
	LOS	D		B				D	B	C	C	C		C
	v/c	0.55		0.05				1.01	0.02	0.22	0.08	0.32		0.16
	Delay (s)	43		19				52	19	25	23	27		25
	Queue 95th	-		7				123	0	25	9	33		17
Rutherford Rd. & Huntington Rd.	Volume	-	5	1307	302	749	3933	25	54	12	50	8	16	16
	LOS	C	B	C	B	E	C		E	E	E		E	
	v/c	1.00	0.09	0.53	0.2	0.87	1		0.45	0.08	0.03		0.3	
	Delay (s)	30	18	22	18	57	27		63	59	59		61	
	Queue 95th	-	4	126	17	128	490		30	10	11		24	
Trade Valley/Street A & Huntington Rd.	Volume	-	17	138	229	115	24	16	66	219	35	48	512	9
	LOS	B	B	B		C	V		A	A		A	A	
	v/c	0.37	0.06	0.31		0.56	0.07		0.16	0.13		0.09	0.28	
	Delay (s)	11	16	17		21	16		6	6		6	6	
	Queue 95th	-	5	16		24	8		10	12		8	27	
Langstaff Rd. & Huntington Rd.	Volume	-	51	727	259	78	357	64	120	301	51	159	640	69
	LOS	C	B	C	B	C	B	B	C	B		C	D	
	v/c	0.59	0.13	0.5	0.18	0.37	0.24	0.04	0.53	0.25		0.61	0.76	
	Delay (s)	24	17	21	17	23	18	16	23	19		35	36	
	Queue 95th	-	16	82	16	27	38	6	23	29		47	83	

**Table 8: Future 2034 Weekday PM Peak Hour Traffic Operational Performance**

Intersection	MOE	Overall	Movement											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Nashville Rd. & Huntington Rd.	Volume	-	57	2289	84	9	921	80	97	80	41	42	12	9
	LOS	D	A	E		A	A			D		C	C	
	v/c	1.02	0.2	1.11		0.56	0.05			0.73		0.22	0.24	
	Delay (s)	49	6	70		8	5			39		26	26	
	Queue 95th	-	10	293		60	5			54		14	7	
MacTier Dr. & Huntington Rd.	Volume	-				115		26		199	115	31	54	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.23		0.23		0.13	0.07	0.03	0.03	
	Delay (s)	4				12		12		0	0	8	0	
	Queue 95th	-				6.8		6.8		0	0	0.6	0	
Algoma Dr. & Huntington Rd.	Volume	-				55		81		233	74	38	131	
	LOS	A				B		B		A	A	A	A	
	v/c	-				0.23		0.23		0.15	0.05	0.03	0.08	
	Delay (s)	3				12		12		0	0	8	0	
	Queue 95th	-				6.5		6.5		0	0	0.8	0	
East Corner's Blvd. & Huntington Rd.	Volume	-				139		57		249	161	103	83	
	LOS	A				C		C		A	A	A	A	
	v/c	-				0.44		0.44		0.16	0.1	0.1	0.05	
	Delay (s)	5				18		18		0	0	9	0	
	Queue 95th	-				16.5		16.5		0	0	2.5	0	
Future Rd/Hwy 427 Off Ramp & Major Mackenzie Dr	Volume	-		2292				564	198	213	988	37		187
	LOS	E		F				C	C	C	E	D		D
	v/c	0.91		1.13				0.28	0.13	0.39	0.94	0.16		0.11
	Delay (s)	78		107				26	25	39	65	54		54
	Queue 95th	-		319				49	15	74	174	21		21
Rutherford Rd. & Huntington Rd.	Volume	-	42	3775	229	53	1317	4	290	101	247	7	4	8
	LOS	F	B	F	A	E	A		F	D	D		E	
	v/c	1.23	0.22	1.25	0.19	0.36	0.38		1.12	0.31	0.63		0.1	
	Delay (s)	321	11	490	10	64	9		146	47	55		55	
	Queue 95th	-	14	554	21	15	63		143	43	74		11	
Trade Valley/Street A & Huntington Rd.	Volume	-	44	32	192	67	128	45	487	518	106	12	182	34
	LOS	B	C	C		C	C		B	A		A	A	
	v/c	0.67	0.25	0.13		0.38	0.55		0.7	0.29		0.03	0.1	
	Delay (s)	13	25	24		26	28		13	5		4	4	
	Queue 95th	-	13	10		19	36		96	27		3	9	
Langstaff Rd. & Huntington Rd.	Volume	-	33	586	85	37	767	89	435	852	158	89	331	74
	LOS	C	D	C	C	C	D	C	D	B		B	B	
	v/c	0.85	0.33	0.55	0.06	0.22	0.71	0.06	0.93	0.56		0.49	0.22	
	Delay (s)	27	36	33	26	30	37	26	46	16		17	13	
	Queue 95th	-	18	86	12	17	118	12	162	91		29	31	

**2.2.2.5 Conclusions and Recommendations**

The future traffic conditions and growth is a result of broad future residential/commercial developments, road network improvements and population and employment growth in and around the study area. Two major developments on Block 61 and Block 59 will be fully built by 2021, and by 2034, Highway 427 will be extended north to Kirby Road and major arterial roads will be widened to six lanes. The discontinuity on Huntington Road from McGillivray Road to Major Mackenzie, which is planned to be replaced by a substitute link, will also change the north-south distribution on Huntington Road.

Based on the traffic studies on Huntington Road for base year 2015 and horizons 2021 and 2034, **Table 9** provides a summary of this study from a capacity and traffic performance point of view.

**Table 10** and **Figure 6** shows a summary of the recommended capacity and safety improvement measures.

Table 9: Summary of Traffic Analysis Findings

Intersection	Existing 2015 Conditions	Future 2021 Traffic Conditions	Future 2034 Traffic Conditions
Huntington Rd. & Nashville Rd.	Side street movements (NBT and SBT) experience significant delay. Warranted for signalization.	Operates well under signal control.	Operates well except for EBT movement operates at LOS 'E'.
Huntington Rd. & MacTier Dr.	Not constructed.	Operates well under stop sign control.	Operates well under stop sign control.
Huntington Rd. & Algoma Dr.	Not constructed.	Operates well under stop sign control.	Operates well under stop sign control.
Huntington Rd. & East Corner's Dr.	Not in operation.	Operates well under stop sign control.	Operates well under stop sign control.
Major Mackenzie Dr. & Huntington Rd. (Future Rd./Hwy 427 NB Off-ramp)* <i>*Subject to future approval</i>	Intersection operates well under stop sign control with no issues.	Proposed new intersection with Future Rd. and Hwy 427 NB Off-Ramp operates at LOS 'F' during PM peak hour. Warranted for signalization.	Intersection operates at LOS 'E' due to at/over capacity movements of EBT and NBR, Consideration should be given for capacity improvements on Hwy 427 NB off-ramp and Major Mackenzie Dr. eastbound movement.
Huntington Rd. & Rutherford Rd.	Side street movements (NBT and SBT) experience significant delay. Warranted for signalization.	Operates well under signal control.	Intersection operates at LOS 'F' during the PM peak hour due to over capacity movements of EBT and NBL. Consideration should be given for capacity improvements on Rutherford Rd. EBT movement and Huntington Rd. NBL.
Huntington Rd. & Trade Valley Dr./Street A	A three-leg intersection operates well under stop sign control with no issues.	A four-leg intersection with poor traffic operations on side street movements (WBT, WBL, EBL) and experience significant delay. Warranted for signalization.	Operates well under signal control.
Huntington Rd. & Langstaff Rd.	Intersection operates well with no significant issues.	Intersection operates well with no significant issues.	Intersection operates well with no significant issues.

Table 10: Summary of Recommended Improvements

Category	Improvement Type	Location	Year
Urbanization	Exclusive Right Turn Lanes	Future Rd* @ Major Mackenzie Drive - SB	2021
		Major Mackenzie Dr @ Future Rd*/Hwy 427 NB Off Ramp - WB	
		Rutherford Rd @ Huntington Rd - EB	
		Huntington Rd @ Nashville Rd - SB	2034
		Nashville Rd @ Huntington Rd - WB	
		Double right lanes on Major Mackenzie Dr @ Future Rd/Hwy 427 NB Off Ramp - WB	
	Exclusive Left Turn Lanes	Rutherford Rd @ Huntington Rd - WB	2021
		Huntington Rd @ Street A - NB	
		Huntington Rd @ Street A - SB	
		Street A @ Huntington Rd - WB	
		Nashville Rd @ Huntington Rd - EB	2034
		Double left lanes on Rutherford Rd @ Huntington Rd - WB	
		Huntington Rd @ Rutherford Rd - NB	
	Traffic Signal	Huntington Rd & Nashville Rd	2021
Huntington Rd & Rutherford Rd			
Huntington Rd & Major Mackenzie Dr			
Huntington Rd & Trade Valley/Street A			
Widening	Two-lane to Four-lane	Huntington Rd (Rutherford Rd to Langstaff Rd)	2021

\*Subject to future approval

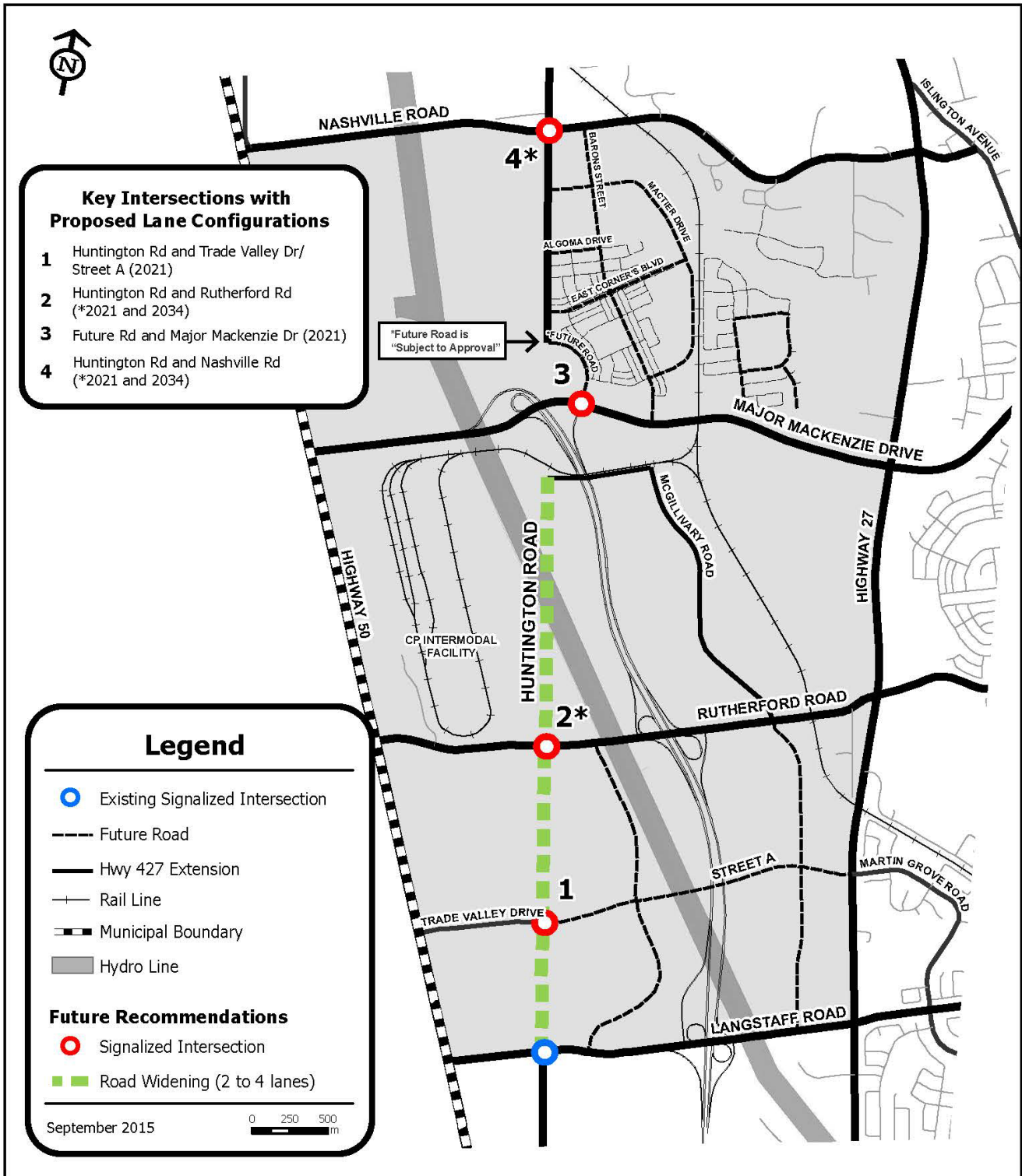


Figure 6: Road Network Improvement Recommendations Summary from the Traffic Operations Analysis



## 2.2.3 TRANSIT SERVICE & ROUTES

Currently, York Region Transit (YRT) operates one bus route, Route 28, within the study area. This route runs partially along Huntington Road, providing hourly weekday service from the Martin Grove Road/Steeles Loop to Rutherford Road/Huntington Road. Another route, Route 7, runs up Martin Grove Road and parts of Highway 27 and Rutherford Road to the east.

Future transit initiatives are also planned for this area. Under the York Region Official Plan (OP), Major Mackenzie Drive and Rutherford Road are listed as part of the Regional Transit Priority Network. Transit routes are suggested along the major arterials in the West Vaughan Employment Area to support the employment land use in the area. Highway bus service is proposed on the Highway 427 extension in the Vaughan OP, and GO Transit also has proposed stations and rail service in the area. **Figure 7** depicts these existing and proposed transit networks.

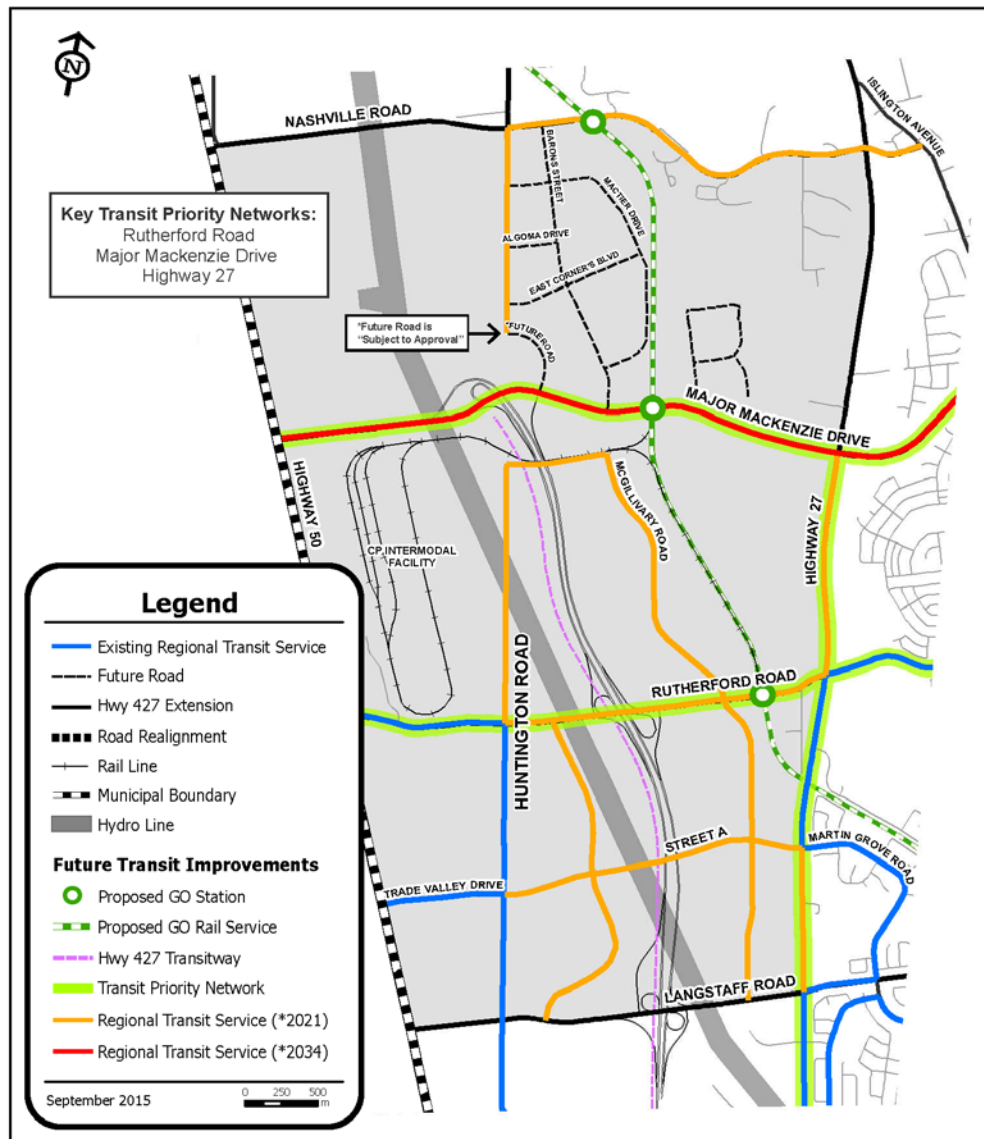


Figure 7: Existing and Proposed Transit Networks in the Study Area

## 2.2.4 ACTIVE TRANSPORTATION

The City of Vaughan adopted the Pedestrian and Bicycle Master Plan in 2007 to set out improvements to the existing and proposed pedestrian and cycling network. The City is trying to promote increased active transportation modes by providing friendlier environments and better facilities for residents to walk or cycle.

The Pedestrian and Bicycle Master Plan laid out the anticipated improvements for active transportation facilities within the Huntington Road study area (Figure 8). Huntington Road and the perpendicular roads shown below are listed as having short term implementation priorities, except Nashville Road, which has long term implementation priorities.

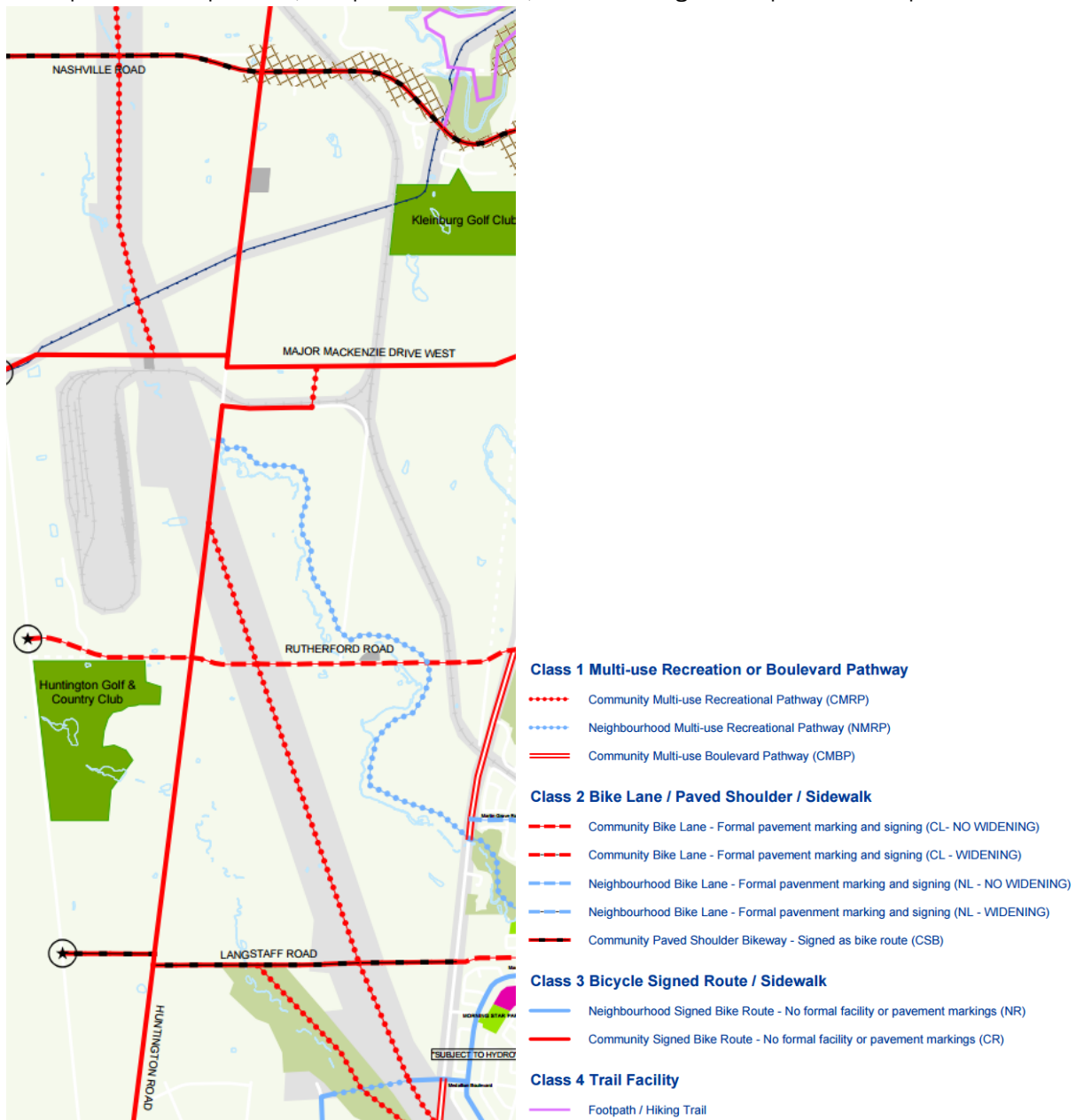


Figure 8: Anticipated Improvements to Pathways and Lanes for Pedestrians and Cyclists

## 2.3 SOCIAL ENVIRONMENT

### 2.3.1 CULTURAL AND BUILT HERITAGE

A cultural heritage resource assessment for cultural heritage landscape and built heritage resources was undertaken by Unterman McPhail Associates to provide preliminary information concerning cultural heritage resources located adjacent to Huntington Road. Primarily, the Vaughan Heritage Inventory, an inventory of identified places of cultural heritage, was a major resource for identifying relevant sites. A windshield survey was completed in May 2014 to identify cultural heritage landscapes and principal, above ground, built heritage features of 40 years of age and older in the study corridor. Given

the nature of the project, the emphasis of the site review was placed on the identification of cultural heritage resources located within and adjacent to the existing Huntington Road right-of-way. The key findings are presented below and the full document can be found in Appendix B.

### **2.3.1.1 Historical Context**

In 1787, the Vaughan Township was purchased by the British government from the Mississauga Nation. By 1840, Vaughan Township included a population of 3,921 people, 38,214 acres of cultivated land, 257 taxable dwellings, 18 sawmills, and 6 grist mills. In 1842, the population reached 4,187 people, with over one quarter from an English, Irish and Scottish background and 1,500 native British Canadians.

Over the next thirty years, the township prospered as a farming area, with nearby Toronto as a major market. Wheat-growing was the first principal crop grown, followed by mixed crop and livestock practices. Historical settlements also established around mills, and expanded to provide services for the surrounding agricultural community. Population levels remained relatively steady until the mid-1930s. Following World War II, the Vaughan Township received a steady influx of immigration and by the 1960s, the population stood at 15,957 people. In 1971, the Vaughan Township merged with the Village of Woodbridge to form the Town of Vaughan, and in 1991, officially changed its legal status to the City of Vaughan.

#### **Kleinburg**

The community of Kleinburg developed around a mill site established by John N. Kline in the late 1840s. The mills served the local agricultural community and served as the stimulus for the establishment of a commercial centre. As the area grew, other businesses followed, serving the needs of the mills and the local and area population. Kleinburg continued as a local and area service centre into the 20th century, and in the 1960s, became known as the site of the McMichael Canadian Art Collection.

#### **Elder's Mills**

Elder's Mills developed as a farming community along Rutherford Road and Highway 27. In 1850, James Gibb Thomson erected a sawmill, a grist mill and a carding mill on the main branch of the Humber River. In 1869, David Elder, from whom the community is named, took over operation of the mills. Early settlement included the mills, a schoolhouse, a Presbyterian church, a post office established in 1874, and a blacksmith shop. In 1870, the Toronto Grey and Bruce Railway opened its line through the community.

#### **Nashville**

East's Corners, later renamed Nashville, was established at the Toronto, Grey and Bruce Railway station in the latter part of the 19th century. A number of residences were built along Nashville Road to the east of the present Huntington Road. In 1855, John Bird built a small frame chapel for the Nashville Zoar Primitive Methodist Church. Thirty years later, the congregation disbanded and the church building was sold. However, the adjoining cemetery, now Nashville Cemetery, still remains on Huntington Road.

### **2.3.1.2 Existing Context**

The present and former agricultural fields, fencerows, tree lines and several farm complexes continue to characterize the study area, particularly on the west side of Huntington Road, north of Major Mackenzie Drive. However, several former farm complexes located in the area have been abandoned or have lost their associated agricultural buildings. Presently, a handful of rural residential buildings from the latter half of the 20th century are scattered along the local roads and the grid pattern of the original township is still distinct.

Land use in the area is in transition and former lands used for agricultural purposes are being converted to industrial and residential uses. The lands east of Highway 50 to Highway 27 and south of Major Mackenzie Drive are designated for industrial use. The east side of Huntington Road north of Major Mackenzie Drive is currently undergoing residential subdivision development. The Nashville Cemetery is located immediately north of this residential development. The west

side of Huntington Road north of Major Mackenzie Drive includes some former farm complexes with associated buildings and agricultural field patterns.



Nashville is located at the intersection of Huntington Road and Nashville Road, and is part of the Kleinburg-Nashville Heritage Conservation District.



### 2.3.1.3 Identified Cultural Heritage Resources

**Table 11** below includes a description of the identified cultural heritage resources, including cultural heritage landscapes (CHL) and built heritage resources (BHR). The Vaughan Heritage Inventory (VHI) was consulted for the properties and heritage resources in **Table 11**. Sites 17 and 18 refer to geographical areas located throughout the study corridor.





The properties/landscapes included in the Kleinburg-Nashville Heritage Conservation District (HCD) and the City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study (CHLI) are also included. All development within the Kleinburg-Nashville HCD must be in keeping with the historical streetscape and must conform to the Heritage Conservation District Plan and design guidelines. For development proposed on or adjacent to a cultural heritage landscape included on the Vaughan Heritage Inventory and/or recognized as an Area of Cultural Heritage Character in the City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study, compliance procedures are outlined in the City of Vaughan Cultural Heritage Landscape Inventory and Policy Study (March 2010).




Table 11: Identified Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL) within and adjacent to the Huntington Road study area




Site #	Resource Category	Resource Type & Address/ Study Area Location	Heritage Recognition	Digital Image/Aerial Photo & Description
1	BHR	Residential: Former Farmhouse  8700 Huntington Road, west side (Lot 12E, Concessions 10, geographical Township of Vaughan), City of Vaughan	Municipally designated under the OHA, By-Law 46-82, and included on the <i>VHI</i>	 <p>View southwest to the front (east) and north elevations of the former residence.</p> <p>Liuna Local 183 Training Centre, formerly the Robert Agar House: Built c1855, this vernacular 1 ½ storey dichromatic brick building has a centre gable roof with return eave detail, end chimneys and a full width front verandah with trellis detailing. The property is associated with the community of Elder’s Mills.</p>
2	BHR	Residential: Former Farmhouse  8741 Huntington Road, east side (Lot 12W, Concession 9, geographical Township of Vaughan), City of Vaughan	Included on <i>VHI</i>	 <p>View of front (west) elevation of the residence.</p>

				<p>Residence:</p> <p>This vernacular 19<sup>th</sup> century, 1 ½ storey wood frame house has a three bay front with a centre door and flanking window openings and a side gable roof clad in metal roofing material with two end chimneys. It is currently vacant and in a derelict condition. Former barn and agricultural outbuildings have been demolished. The property is associated with the community of Elder’s Mills.</p>
3	CHL	<p>Agricultural: Former Farm Complex</p> <p>8811 Huntington Road, east side (Lot 13W, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	Included on <i>VHI</i>	<p>No photograph available, too far back from public roadway.</p> <p>Henry Burton House:</p> <p>The residence is set a distance back from the road. The long drive crosses Rainbow Creek. No access provided on-site for the survey and residence not visible from public roadway. On-site there is a mid-19<sup>th</sup> century wood frame farmhouse, a foundation of an older barn, barns, and outbuildings. The property is associated with the community of Elder’s Mills.</p>
4	BHR	<p>Residential</p> <p>8934 Huntington Road, west side (Lot 14E, Concession 10, geographical Township of Vaughan), City of Vaughan</p>	Included on <i>VHI</i> (Registered LSHS) and in the <i>City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study</i> (AGR 9)	 <p>View to front (east) elevation of the residence.</p> <p>James Somerville House:</p> <p>This 1 ½ storey stone house was built c1856. It has a five bay front elevation with a centre door and two window openings on each side, a side gable roof with return eave detail and stone quoins. It has undergone some change to the exterior. The property is associated with the community of Elder’s Mills.</p>
5	BHR	<p>Residential</p> <p>No municipal number Rutherford Road (Lot 15W, Concession 9, geographical Township of Vaughan) City of Vaughan.</p> <p><i>Identified as 9151 Rutherford Road by City of Vaughan</i></p>	Not included on the <i>Vaughan Heritage Inventory</i>	 <p>View east from Huntington Road to the residence.</p> <p>Residence:</p> <p>This site is accessed by a long drive. It includes an early 20<sup>th</sup> century, 2 storey brick house with a truncated hip roof and additions. A barn foundation is located to the east of the entrance drive. The property is associated with the community of Elder’s Mills.</p>









6	BHR	<p>Residential</p> <p>6666 Rutherford Road, north side (Lot 16W, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	<p>Included on <i>VHI</i> and in the <i>City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study (AGR 15)</i></p>	 <p>View of front (south) elevation of the residence.</p> <p>John Fleming Residence: This c1900, 2 storey brick residence displays elements of the Queen Anne style. It has a truncated hip roof with projecting gables on front and west. A verandah is tucked into the front ell. There may be a barn foundation north of the house. The property is associated with the community of Elder's Mills.</p>
7	CHL	<p>Agricultural: Farm Complex</p> <p>9571 Huntington Road, east side (Lot 16E, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	<p>Included on <i>VHI</i></p>	 <p>Google 2011. No photograph available.</p> <p>The buildings associated with this property are located at the end of a long driveway and not visible from the public roadway. An aerial view indicates a house and barn on-site. The property is associated with the community of Elder's Mills.</p>
8	CHL	<p>Agricultural: Farm Complex</p> <p>10220 Huntington Road, west side (Lot 22E, concession 10, geographical Township of Vaughan), City of Vaughan</p>	<p>Included on <i>VHI</i> (Registered LSHS) and in the <i>City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study (AGR 8)</i></p>	 <p>View west along long entrance drive to the farm complex.</p>  <p>View north to farmhouse.</p>



				<p>Richard Agar Farm: The c1875 side gable brick house is set back a distance from Huntington Road and faces onto Major Mackenzie Drive. The property also has a large barn complex north of the house. The property is associated with the community of Nashville.</p>
9	CHL	<p>Agricultural: Farm Complex</p> <p>10436 Huntington Road, west side (Lot 23E, Concession 10, geographical Township of Vaughan), City of Vaughan</p>	<p>Included on <i>VHI</i> (Registered LSHS) and in the <i>City of Vaughan official Plan Cultural Heritage Landscape Inventory and Policy Study</i> (AGR 6)</p>	 <p>View of front (east) elevation of the farmhouse.</p> <p>This 1 ½ storey red brick house has a dichromatic detailing consisting of decorative bands, quoins and voussoirs of buff coloured brick. It has a centre gable roof with decorative vergeboard and the front elevation has three bays, with a centre door and flanking window openings. The front entry has a small porch with decorative woodwork. As well, a small gable barn, an older concrete silo missing its roof and other buildings are located on-site. The property is associated with the community of Nashville.</p>
10	CHL	<p>Funerary: Cemetery</p> <p>Huntington Road, east side (Lot 24W, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	<p>Included on <i>VHI</i> and in the <i>City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study</i> (CEM 3)</p>	 <p>Entrance to Nashville Cemetery.</p>  <p>View north along front of Nashville Cemetery showing the fencing and wide grass boulevard.</p> <p>Nashville Cemetery: John Bird built a small frame chapel in 1855, for the Nashville Zoar Primitive Methodist Church on this site. The congregation was disbanded in 1884 and the church building was sold in 1909</p>

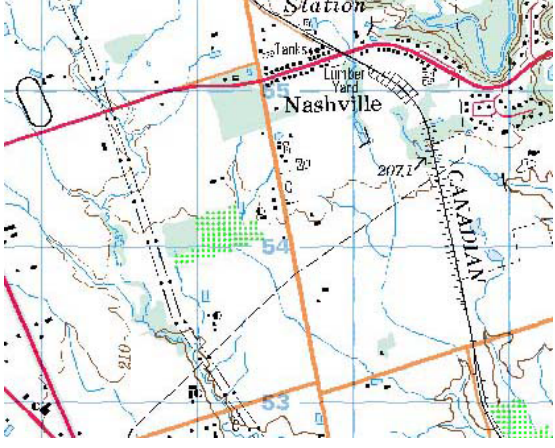
				with the proceeds being used to improve the adjoining cemetery. The cemetery contains a 1 storey concrete block building at the entrance, is enclosed with a decorative metal fence and contains a World War I memorial. It is maintained by the City of Vaughan. The property is associate with the community of Nashville.
11	CHL	Agricultural: Farm Complex  10533 Huntington Road, east side (Lot 24W, Concession 9, geographical Township of Vaughan), City of Vaughan	Included on <i>VHI</i>	 <p>View to front (west) elevation of the residence.</p> <p>This residence, which appears to be late 19<sup>th</sup> century, is 1 ½ storeys with stucco on the exterior walls, a side gable roof, a three bay front eelvation with a centre door and flanking window openings and 6/6 lights window sash. There are farm outbuildings on-site behind the house and associated agricultural fields. The property is associated with the community of Nashville.</p>
12	CHL	Agricultural: Farm Complex  10540 Huntington Road, west side (Lot 24E, Concession 10, geographical Township of Vaughan), City of Vaughan	Not included in <i>VHI</i>	 <p>View west along long driveway to the residence on the property.</p> <p>This residence is set a distance back from the public road and is not clearly visible from the road. It appears to be an early 20<sup>th</sup> century house inspired by the “Four Square” architectural style of the early 20<sup>th</sup> century. There are associated agricultural fields. The property is associated with the community of Nashville.</p>
13	BHR	Agricultural  10579 Huntington Road, east side (Lot 24W, Concession 9, geographical Township of Vaughan), City of Vaughan	Address included on <i>VHI</i>	 <p>View east to the greenhouse, not the former driveway marking location of former house to the right.</p> <p>A former residence has been demolished. The <i>Vaughan</i></p>



				<p><i>Heritage Inventory</i> indicates a Georgian style house on the property; Google Maps (2011) indicates a mid 1970s house on site that has since been demolished. There are associated cultivated fields behind the greenhouse. The property is associated with the community of Nashville.</p>
14	BHR	<p>Residential</p> <p>10671 Huntington Road, east side (Lot 25W, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	<p>Not included on <i>VHI</i></p>	 <p>View through treelot to front (west) elevation of the residence.</p> <p>The residence is hidden from view by trees and vegetation. It appears to be a 19<sup>th</sup> century, 1 ½ storey frame house with a centre gable and a front entrance with a transom and sidelights. There is an older brick and frame outbuilding on-site. The property is associated with the community of Nashville.</p>
15	CHL	<p>Transportation: Roadscape</p> <p>Huntington Road north of Major Mackenzie Drive to Nashville Road (Lots 21 to 25, Concessions 9 &amp; 10)</p>	<p>Not included on Vaughan Heritage Register</p>	 <p>View north on Huntington Road from Rutherford Road.</p>  <p>View south on Huntington Road from McGillivray Road.</p>

				 <p>View south on Huntington Road south of Nashville Road.</p> <p>Huntington Road: Opened in the 19<sup>th</sup> century as a north-south road between Concession 9 and 10, this local road has a gravel surface between Rutherford Road and Major Mackenzie Drive and paved surface from north of Major Mackenzie to Nashville Road. It is posted at 60 km/h, and limited to 5 tonnes. From Langstaff Road to Rutherford Road, Huntington Road has been improved and urbanized.</p>
16	CHL	<p>Historical Settlement</p> <p>Nashville (Lots 25&amp;26, Concession 9, geographical Township of Vaughan), City of Vaughan</p>	<p>Kleinburg-Nashville HCD under Part V of the OHA.</p> <p>The buildings at 970 and 965 Nashville Road are included on the <i>VHI</i> (Registered LSHS) and are located within the HCD. The HCD is included in the <i>City of Vaughan Official Plan Cultural Heritage Landscape Inventory and Policy Study</i> as a cultural landscape</p>	 <p>View west on Nashville Road to Huntington Road showing 970 Nashville Road on the right.</p>  <p>View to northeast of the building located at 970 Nashville Road.</p>

				 <p>View to the front (north) elevation of the residence at 975 Nashville Road.</p> <p>Nashville: Originally known as East’s Corners, this hamlet became known as Nashville after Jonathan Scott who hailed from Nashville, Tennessee. The hamlet appears to have grown up around a railway stop. A station was built in 1870 named Kleinberg. A post office opened in 1881 and was located at 970 Nashville Road. The HCD extends along Nashville Road to Huntington Road and includes Nashville Road and the buildings at 970 (built c1870) and 975 Nashville Road (built c1920) at the intersection with Huntington Road.</p>
17	CHL	Township Survey  Geographic Township of Vaughan, City of Vaughan	Not included on the Vaughan Heritage Register.	 <p>A portion of the Vaughan Township map (1877) depicts the concession, lot and road layout along Huntington Road.</p> <p>The 19th Century survey of Vaughan Township organized the land into a grid pattern of 11 concessions numbered east to west. Concessions 1-9 comprised 35 lots that were organized south to north. Concessions 10 and 11 were gores. Road allowances were provided between concessions and every fifth lot. The lot layout as identified by fence lines, tree lines, field patterns and the historic road network remains visible in the landscape.</p>

18	CHL	<p>Agricultural Landscape</p> <p>Lots 26-34, geography Township of Vaughan, City of Vaughan</p>	<p>Not included on the Vaughan Heritage Register</p>	 <p>A topographic map (2001) shows the agricultural landscape that still remains north of Major Mackenzie Drive.</p> <p>The area was first settled in the early 19th century and was well developed as rural agricultural land by mid century. North of Major Mackenzie Drive, the area along Huntington Road has retained its agricultural character into the present with the historical landscape delineated by former and existing agricultural fields, tree lines, fence lines and hedgerows. The east to west survey pattern of the original lots is still visible in the landscape. The remaining farm complexes and former farms house continue to define the historical agricultural character of the area.</p>
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**2.3.2 ARCHAEOLOGICAL**

A Stage 1 Archaeological Assessment for the Huntington Road EA study was conducted to identify the potential for the discovery of any Aboriginal and Euro-Canadian archaeological sites that may be impacted by future design requirements prior to potential construction impacts. This study, conducted by A. M. Archaeological Associates, includes a buffer zone of 100 metres on the east and west sides of Huntington Road and a look at the historic and environmental context of the study area. The historic context of the study area is described in Section 2.3.1 and the environmental setting can be found in the full Stage 1 archaeological assessment report in Appendix C.

Multiple sources of information were used for the archaeological assessments including field visits, the archaeological sites database at the Ministry of Tourism, Culture and Sport (MTCS), and property inspection.

**2.3.2.1 Registered Archaeological Sites**

The Ministry of Tourism, Culture and Sport maintains an archaeological sites database. A search of the database reveals 14 registered archaeological sites (Table 12) within one kilometre of the study area.

Table 12: Summary of Registered Archaeological Sites within 1 km of the Study Area

Name	Borden	Type	Culture	Reference
Ebenezer Road	AkGv-073	Homestead	19th C. Euro-Canadian	MTO 1988
Fletcher	AkGv-074	Farrier shop	19th C. Euro-Canadian	MTO 1988, Murray 1992
–	AkGv-175	Findspot	Pre-contact First Nation	ASI 2000
Huntingdon 1	AkGv-202	Unknown	19th C. Euro-Canadian	AMICK 2005
Huntingdon 2	AkGv-203	Unknown	19th C. Euro-Canadian	AMICK 2005
Samuel Arnold	AkGv-265	Homestead	Late 19th C. Euro-Canadian	AMICK 2005
Burton*	AkGv-276	Homestead	19th C. Euro-Canadian	ASI 2007

Hunter*	AkGv-277	Findspot	Woodland, Late	ASI 2007
--*	AkGv-278	Findspot	Pre-contact First Nation	ASI 2007
James Moody	AkGv-294	Homestead	19th C. Euro-Canadian	AMICK 2009
--	AkGv-297	Findspot	Archaic, Early	NDA 2009
--	AkGv-299	Findspot	Woodland, Early-Meadowood	NDA 2011
--	AkGv-300	Findspot	Archaic, Middle-Brewerton	NDA 2009
Richard Ager*	AlGv-301	Homestead	Late 19th C. Euro-Canadian	AMICK 2009

\* Site within 300 metres of the current right-of-way

Four of the sites are found within 300 metres of the current right-of-way. The two sites AkGv-277 and AkGv-278 are isolated finds requiring no further work. The Richard Ager site, AlGv-301, had no further work recommended due to its late nineteenth century date. The Burton site, AkGv-276, was recommended for Stage 3 test excavation, prior to future impacts. This site is approximately 70m west of the Huntington right-of-way.

### 2.3.2.2 Past Archaeological Assessments

While the lands adjacent to Huntington Road have predominantly been for agricultural use over the past 150 years, the area is seeing a rapid growth in residential, commercial, and industrial developments and highway expansion over the last 20 years. These developments have led to the completion of many archaeological assessments of adjacent lands, which intersect the study area.

Further studies into past undertakings show that a large portion of the land to the east and west (2825 metres and 1170 metres, respectively) has already been subject to Stage 2 assessment by various archaeological consultants.

### 2.3.2.3 Property and Field Inspection

On May 5, 2013, a property and field inspection was conducted that involved a visual inspection of terrain and sites with archaeological potential. The study identified Nashville Cemetery and 3 residential properties (10555, 10579, 10600 Huntington Road) as sections within the road right-of-way with archaeological potential. Should there be any proposed impacts to the strip between the cemetery fence and the road, an investigation for any burials extending beyond the cemetery boundary into the right-of-way should be conducted. Similar investigation has already taken place along the north, east and south sides of the cemetery without finding any undocumented burials.

The right-of-way widens slightly in front of the three properties listed above. There is a narrow strip of land with archaeological potential between the disturbed ditch of Huntington Road and the fully assessed area along the frontage of 10555 and 10579 Huntington Road. The right-of-way also widens in front of 10666 Huntington Road and the archaeological potential extends to the entirety of Lot 24, Concession 10. Other observations and findings are detailed in the full report.

### 2.3.2.4 Conclusions and Recommendations

The area surrounding Huntington Road has been found to have archaeological potential due to its proximity to tributary creeks and streams and also its historic importance as a settlement road. The assessment determined that a total of 2,360 metres (41%) of adjacent lands to the east and 2,780 metres (48%) to the west of Huntington Road require Stage 2 Archaeological Assessment. As these lands are a mix of agricultural fields, forest and residential properties, Stage 2 assessment methodologies should follow *Section 2.1.1 Pedestrian Survey* and *Section 2.1.2 Test Pit Survey* in the *Standards and Guidelines for Consultant Archaeologists, 2011*.

Approximately 2,825 metres (49%) of land to the east side and 1,170 metres (20%) to the west side of Huntington Road has already been subject to a Stage 2 assessment. The remaining lands adjacent to Huntington Road were determined to be disturbed or permanently low and wet (i.e. not needing Stage 2 assessment).

Consequently, the study focused on locating previous assessments, extensive and intensive disturbances and permanent low and wet conditions. These scenarios would indicate where archaeological assessment is not required.



Based on the Archaeological Assessment of adjacent lands, the following recommendations can be made concerning archaeological potential:

1. Any impacts to lands determined to have archaeological potential should be preceded by Stage 2 archaeological assessment using the appropriate methodology.
2. Any proposed impacts to the grassy strip between Nashville Cemetery fence and the road should be preceded by a Stage 3 investigation for any burials that may extend beyond the cemetery boundary into the right-of-way. This involves the mechanical stripping of topsoil so that the subsoil surface can be inspected for possible grave shafts.
3. Lands that have previously been subject to Stage 2 assessment or are extensively and intensively disturbed or are permanently low and wet no longer have potential for significant archaeological remains and no further archaeological assessment is required.

Figure 9, Figure 10, and Figure 11 depict the archaeological status of the areas surrounding Huntington Road. This includes the location of areas with archaeological potential, disturbances, previous assessments, wet areas, historic structures, one-metre contours and photo views. The full Stage 1 Archaeological Assessment report for the Huntington Road EA Study can be found in Appendix C.

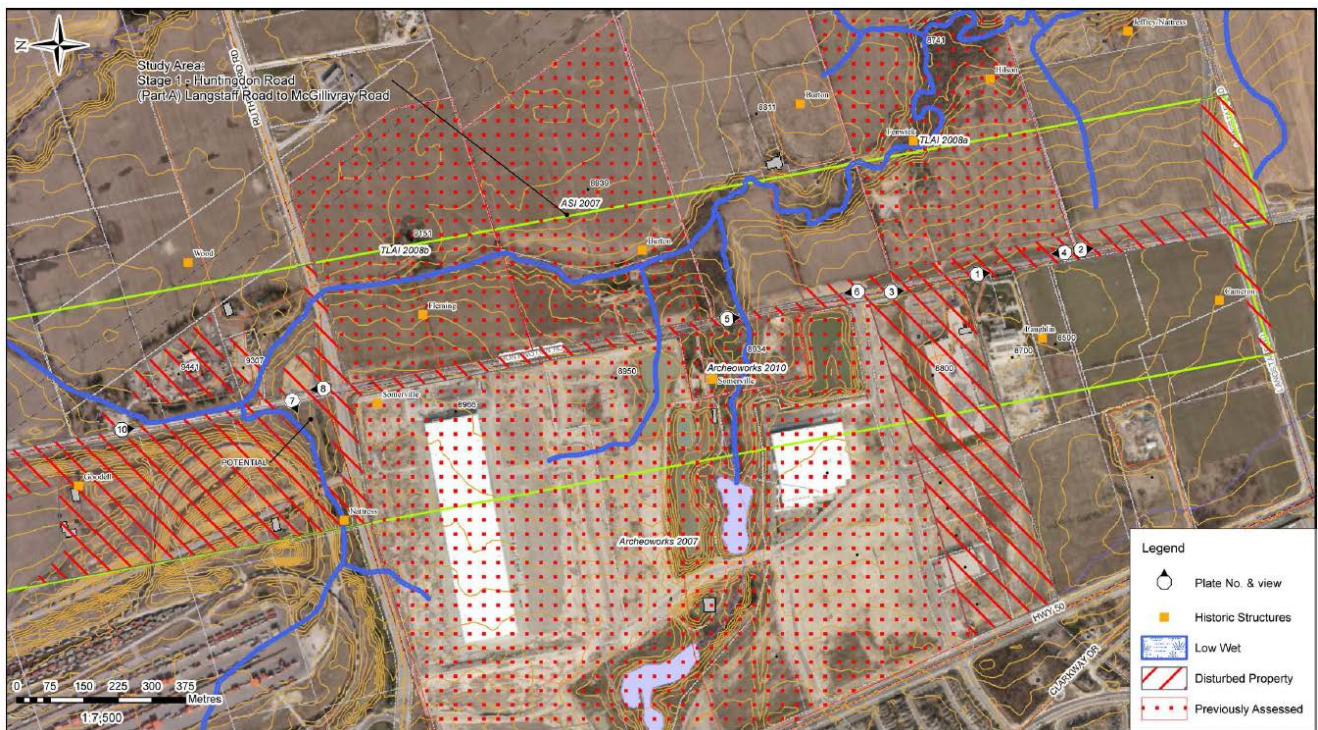


Figure 9: Archaeological Status of Huntington Road, south section Part A





Figure 10: Archaeological Status of Huntington Road, north section Part A

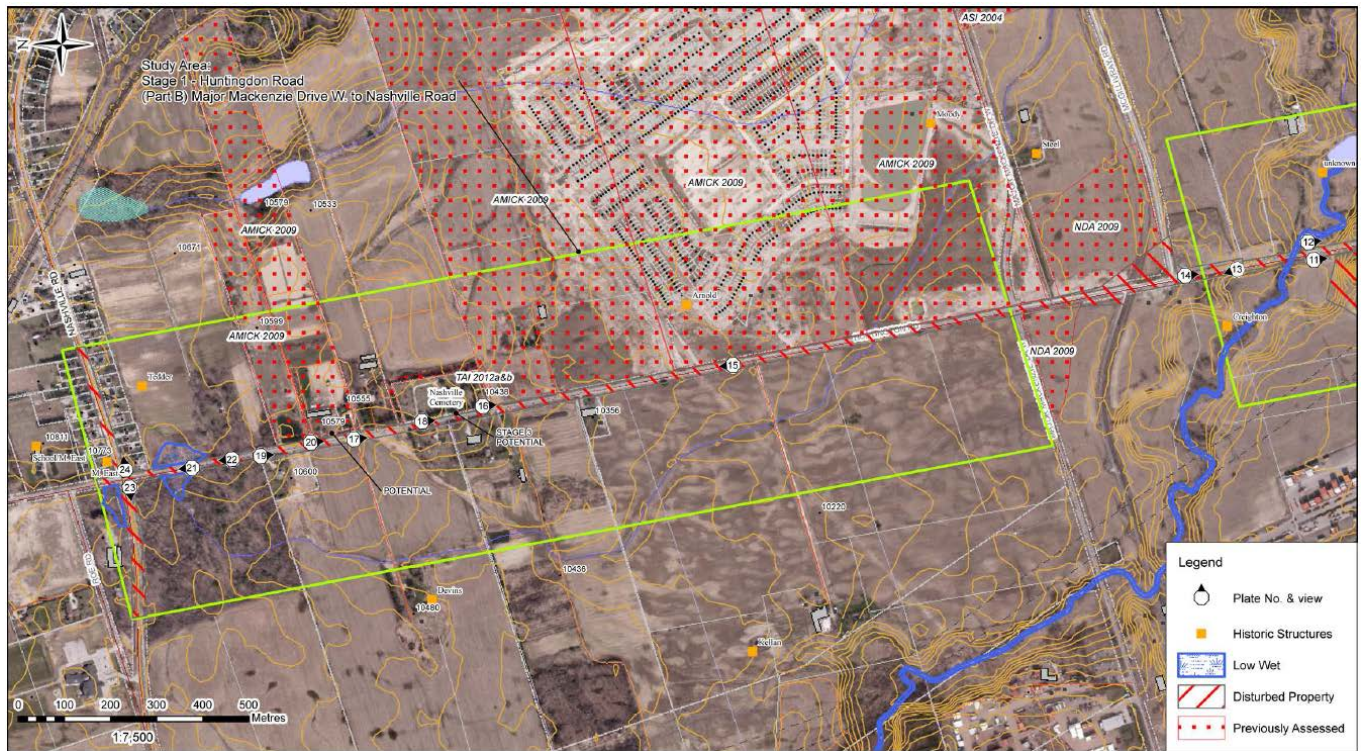


Figure 11: Archaeological Status of Huntington Road, Part B

**2.3.3 RELEVANT PROVINCIAL AND REGIONAL POLICIES**

A review of applicable planning policies was undertaken to understand the planning context of the study area. The Provincial Policy Statement (PPS), the Growth Plan for the Greater Golden Horseshoe, and the York Region Official Plan were consulted. The Huntington Road study area is situated in a Settlement Area of the PPS and in both the Conceptual Built-Up Area and Designated Greenfield Area of the Growth Plan. The policies generally indicate that growth and



development is encouraged in these areas, with a significant portion of new growth to be in the built-up areas (further intensification). Designated Greenfield Areas reflect existing developable land; new development in these areas must follow a complete communities approach that considers various modes of travel, public open spaces, and urban design standards.

The York Region OP identifies Part A of the study area as part of the Urban Area, while Part B is designated as Towns and Villages to the east and Agricultural Area to the west. The OP has also identified Part A as being a part of the Region’s Conceptual Strategic Employment Lands. In general, these policies reflect the existing land use of the area. Part A has experienced growth in employment uses while Part B maintains a more rural/agricultural environment. The following section discusses the relevant local policies that are shaping the land use of the corridor.

### 2.3.4 LAND USE

Understanding land uses surrounding Huntington Road is relevant in understanding the purpose the road will serve and what type of travel will occur along it, both currently and prospectively. A general survey of several planning documents, including official and secondary plans, were conducted to understand the land uses adjacent to Huntington Road. **Figure 12** shows a land use map of Huntington Road as shown in Schedule 13 of the Vaughan Official Plan (OP).

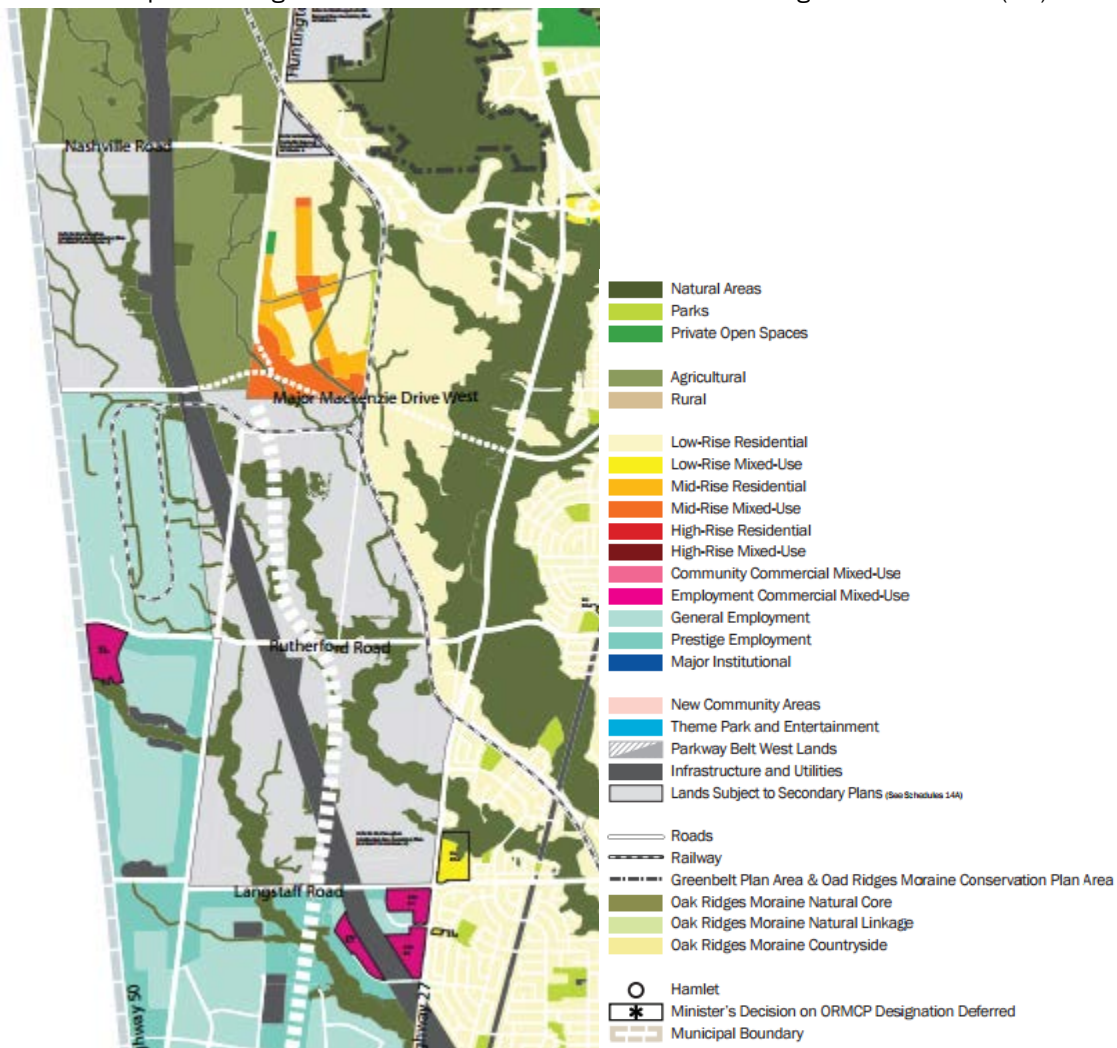


Figure 12: Land Use around Huntington Road

#### 2.3.3.1 Part A (Langstaff Road to McGillivray Road), Land Use

Employment land use is dominant to the east and west of Huntington Road. There are two employment types listed: General and Prestige. The General Employment designation is intended to accommodate employment uses that include industrial,



manufacturing and warehousing. These uses tend to produce noise, odour and other emissions and require outside storage, indicating it is not compatible with other uses and thus, cannot be accommodated within other designations. On the other hand, the Prestige Employment designation is to accommodate light industrial, manufacturing and warehousing uses that do not produce noxious emissions and do not require outside storage. This designation is often used to interface and buffer between more sensitive communities and heavy industrial areas under the General Employment designation.

The eastern portion of Part A is subject to a secondary plan for the West Vaughan Employment Area (WVEA) (**Figure 13**). The WVEA comprises 975 gross hectares and forms the northerly portion of the Vaughan Enterprise Zone. There are two main sections: the lands north of Langstaff Road, between Huntington Road and Highway 27, and the lands between Highway 50 and the hydro corridor between Major Mackenzie Road and Nashville Road (may be considered Part B). The major features found within the WVEA include the CP Rail line, the high voltage hydro corridor, the Highway 427 extension, and elements of the Natural Heritage Network. To protect lands for employment uses, the Vaughan OP restricts non-employment uses in designated Employment Areas, such as the WVEA, with the allowance of some small-scale employment-supportive retail uses.

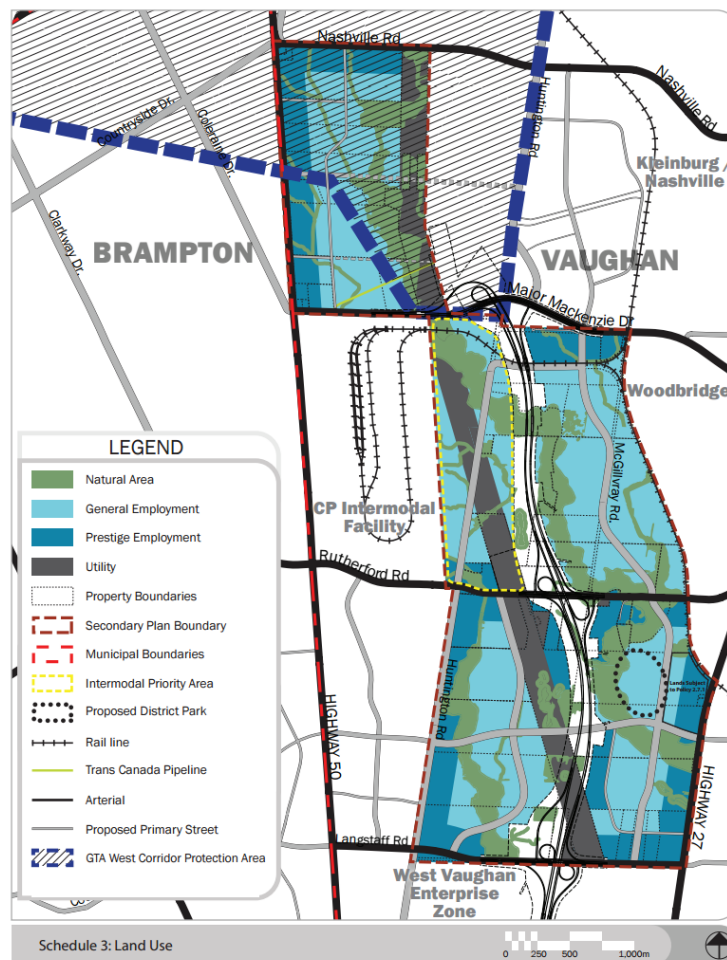


Figure 13: Land Use Map for the West Vaughan Employment Area (WVEA)

The WVEA secondary plan also sets out new road developments through Block 59, the block bounded by Rutherford Road, Huntington Road, Langstaff Road and Highway 27. This includes a proposed east-west collector street that extends from Trade Valley Drive and Huntington Road through Block 59, to accommodate and support the planned employment development. Two new, large warehouse and distribution centres are also proposed in Block 59. Planned employment use, including the addition of the two major distribution facilities, in Part A may suggest higher truck and freight-related traffic. Concerns over safety and the ability for the road alignment and network to support this traffic are associated with this development.

The designation of lands for employment may also generate a need for greater transit service to the area to provide service to the employees and workers in the area.

**2.3.3.2 Part B (Major Mackenzie Road to Nashville Road), Land Use**

Part B, as shown in **Figure 12**, is characterized by residential uses to the east of Huntington Road and predominantly agricultural uses to the west. A couple of area specific plans pertain to Part B, including Block 61 West Block Plan (Nashville Heights), and the Kleinburg-Nashville Heritage Conservation District.

The Block 61 West Block Plan is an area-specific plan created for the community of Nashville Heights, a relatively new subdivision spanning the block east of Huntington Road. The block plan lays out features in the area to support residential uses (e.g., parks, schools), including pedestrian and cycling paths and crossings, and traffic calming measures. The subdivision will be implemented in phases (**Figure 14**) and will bring a large number of residents to the area. A residential subdivision is also planned for Block 61 East.



Figure 14: Block 61 West Phasing Plan

As mentioned previously, a portion of the Kleinburg-Nashville Heritage Conservation District (HCD) is located to the north of our study area at the intersection of Huntington Road and Nashville Road. These heritage resources are discussed in Section 2.3.1.

The growth of residents brings increased traffic to the area and may affect commute times and travel volumes. Additionally, residential land use tends to generate more trips involving active transportation modes, such as walking and cycling due to an increase in parks, schools, sidewalks, and other leisure activities. The Block 61 West Block Plan and subdivision plan incorporate active transportation into their design. Increasing residential use would also warrant transit service to the area.

## 2.4 NATURAL ENVIRONMENT

### 2.4.1 NATURAL HERITAGE

A natural heritage study of the aquatic and terrestrial environment was conducted along Huntington Road by SLR Consulting (Canada) Ltd. The study area includes the roadway itself and the area 50 metres on either side of the roadway.

Different methods were employed to gather relevant information on the study area. A combination of desktop analysis, literature review, agency correspondence and field investigations were performed to develop a description and inventory of the natural environment and its resources.

The study area falls within the jurisdictional boundaries of the Toronto and Region Conservation Authority (TRCA) and the Aurora District of the Ontario Ministry of Natural Resources and Forestry (MNRF). Individuals from these organizations were contacted regarding natural heritage information about the study area.

Field investigations of the aquatic and terrestrial habitat were also conducted to identify, map, and document existing features. Specific to aquatic habitats, information on watercourse crossings such as fish surveys, critical habitat, morphology, and bank stability were inventoried. Terrestrial studies focused on classification of vegetation communities, bird surveys, wildlife, etc. For the full report, refer to **Appendix D**.

### 2.4.2 WATERSHED CONTEXT

The portions of Rainbow Creek and Robinson Creek in the study area are located in the Main Humber Subwatershed (Rainbow Creek Secondary Subwatershed) within the larger Humber River Watershed, which drains southwest towards the north shore of Lake Ontario. Rainbow Creek is classified as 'small riverine warmwater' and Robinson Creek is classified as 'small and intermediate riverine warmwater' according to the TRCA's Humber River Fisheries Management Plan (HRFMP).

The study area lies within the South Slope physiographic region, consisting of smooth, faintly drumlinized clay till plain that contains deeply incised stream valleys (HRSOW 2008). There is a band of the Peel Plain running from northwest to southeast across the area, through the north portion of Part A (HRSOW 2008). Surficial geology consists of coarse-textured glaciolacustrine deposits (sand, gravel, minor silt and clay) in the northern half of Part B. The southern half of Part B and most of Part A is fine-textured glaciolacustrine deposits (silt, clay, minor sand and gravel).

The land use surrounding Huntington Road for Part A is classified as Urban. For Part B, the east side is classified as Towns and Villages, and the west is not classified (rural).

### 2.4.3 AQUATIC ENVIRONMENT

The HRFMP states that the Rainbow Creek and Robinson creek segments are located within Management Zone 4, whose target fish species are Darter species. Downstream from these two systems, the watercourse transitions to coldwater habitat before entering the main Humber River. Combined, the two creeks consist of approximately 731 ha of riparian area, 43% natural cover and the remainder lacking natural cover. The sections of the creek associated with the Huntington Road study area consist of permanent and intermittent features, which primarily lack natural cover and are highly disturbed.

#### 2.4.3.1 Fish Communities

Fish community surveys were created through data received from Conservation Authorities and the Ministry of Natural Resources and Forestry (MNRF), and through fish community surveys conducted by SLR in both creeks in the study area. Within the watershed, 19 species were reported by various agencies. Within the study area, five species were captured during investigations completed by SLR. The species encountered by TRCA, MNRF and SLR are shown in **Table 13**. A dot indicates that the species was reported to be located within the creek and a checkmark indicates an actual encounter through surveys.

The fish present in the study area reflect typical cool/warmwater fish communities in southern Ontario. The communities are comprised of generalist and benthic feeding groups, inclusive of cyprinid, stickleback, darter, bullhead and catostomidae species. These fish are relatively tolerant of the stresses associated with urbanization. None of the species

captured during investigations are sensitive to habitat disturbance and poor water quality, and do not depend on specialized spawning habitats. The species within these systems are both resident and migratory, and fish collection seem to indicate that the study area can support cool water species as well.

Table 13: Fish Species Noted in Rainbow Creek and Robinson Creek

Fish Species Common Name	SLR		MNR		TRCA	
	Rainbow Creek	Robinson Creek	Rainbow Creek	Robinson Creek	Rainbow Creek	Robinson Creek
Blacknose Dace			•	•	•	✓
Blackside Darter			•	•	•	✓
Bluntnose Minnow			•	•	•	✓
Brook Stickleback	✓		•	•	✓	✓
Brown Bullhead	✓		•	•	✓	•
Common Shiner			•	•	•	✓
Creek Chub	✓		•	•	✓	✓
Fathead Minnow			•	•	✓	✓
Golden Shiner			•	•	•	✓
Green Sunfish			•	•	✓	•
Johnny Darter		✓	•	•	•	✓
Largemouth Bass			•	•	•	✓
Common Sunfish sp.			•	•	✓	•
Pumkinseed			•	•	✓	✓
Rock Bass			•	•		✓
Spottail Shiner			•	•	•	✓
Unknown YOY sp.			•	•	•	✓
White Sucker	✓		•	•	✓	✓
Yellow Perch			•	•	•	✓

### 2.4.3.2 Fish Species at Risk

The Ontario Natural Heritage Information Centre (NHIC) does not identify any fish species at risk within the study area. However, Fisheries and Oceans Canada’s (DFO) Distribution of Fish Species at Risk mapping indicated that Robinson Creek was designated as “under consideration for listing” for Redside Dace (*Clinostomus elongatus*) and/or American Eel (*Anguilla rostrata*). This means that one or both of these animals were being considered for addition to Schedule 1, an official list of wildlife species at risk in Canada for which specific protection and recovery measures are developed and implemented. Subsequently, through direct correspondence with MNR, it was determined that neither Robinson Creek nor Rainbow Creek are considered regulated habitat for Redside Dace.

### 2.4.3.3 Fish Habitat

A total of 11 watercourse crossings were identified in the study area using GIS mapping. These watercourses consist of permanent and intermittent warmwater features, and were found to contribute to one of five major watercourses: East Robinson Creek, Robinson Creek, Rainbow Creek, East Rainbow Creek, and West Rainbow Creek.

Table 14 provides a summary of the existing fish and fish habitat conditions observed by SLR or noted by agencies in the study area at the 11 watercourse crossings. Rainbow Creek is not listed in the table as it is comprised of East Rainbow Creek and West Rainbow Creek.

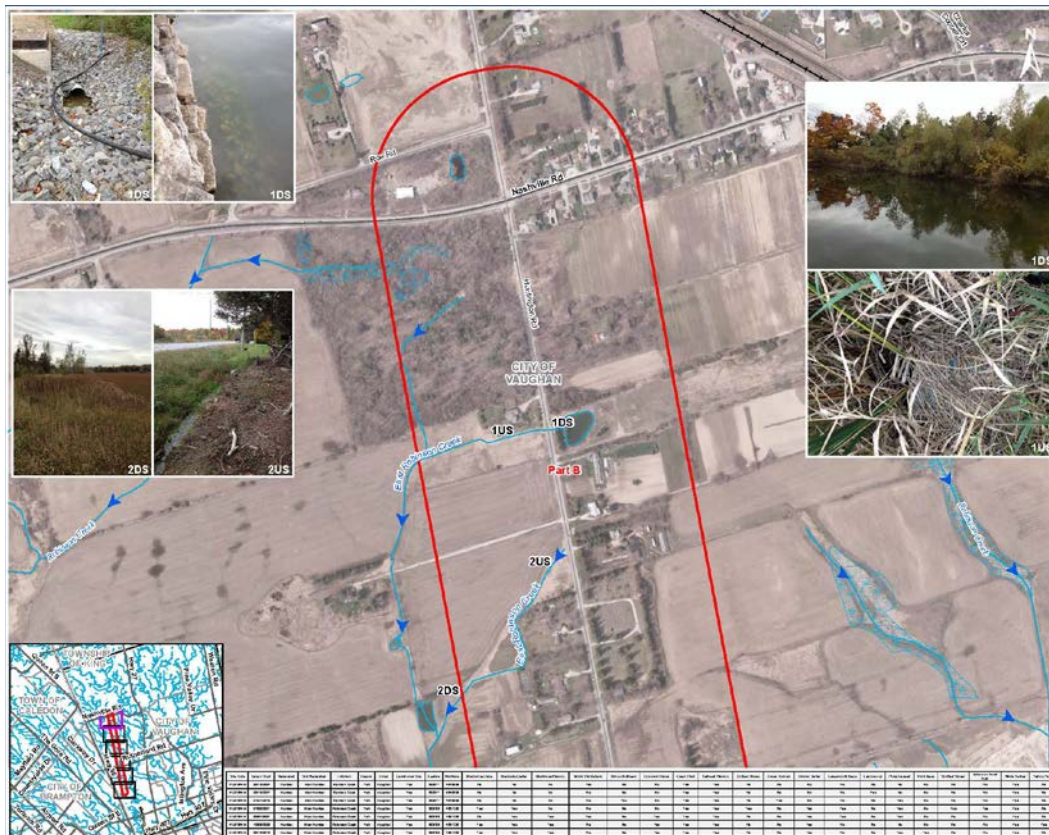
Table 14: Existing Fish Habitat Conditions Summary

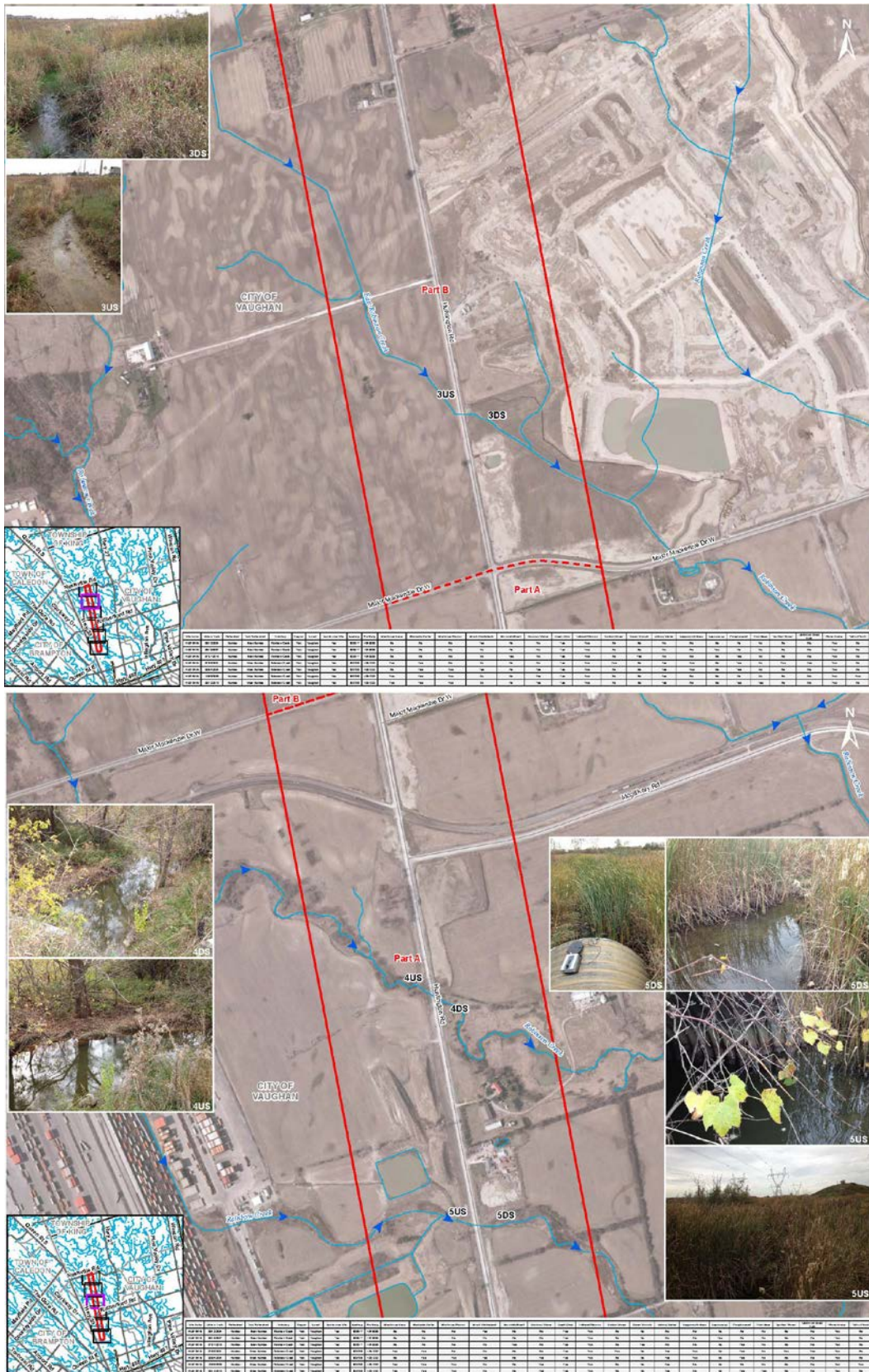
Waterbody	Discharge Regime	Thermal Regime	Substrate Type	Vegetation	Supports Fishery
East Robinson Creek	Main branch is permanent	Warm	Primarily cobble and gravel with sand and silt	Dense overhanging vegetation, instream grasses (Reid Canary Grass), banks of cattails and grasses	Crossing 1 Pond – direct Crossing 2 – indirect Crossing 3 – direct



Robinson Creek	Main branch is permanent	Warm	Hard pan shale with gravel and rubble	Overhanging grasses and trees, undercut banks and woody debris	Crossing 4 - direct
East Rainbow Creek	Main branch is permanent	Warm	Gravel and silt, organics in pool habitat	Reid Canary Grass, cattails, Chara, willows	Crossing 5 - direct Crossing 6 - direct Crossing 7 - direct Crossing 8 - indirect
West Rainbow Creek	Main branch is permanent	Warm	Cobble and gravel, sand and silt in pools	Overhanging vegetation, Chara	Crossing 9 - direct Crossing 10 - indirect Crossing 11 - indirect

**Figure 15** below shows the watercourses with their flow direction throughout the entire study area. A blue dot indicates TRCA Fish Data Sampling Locations.









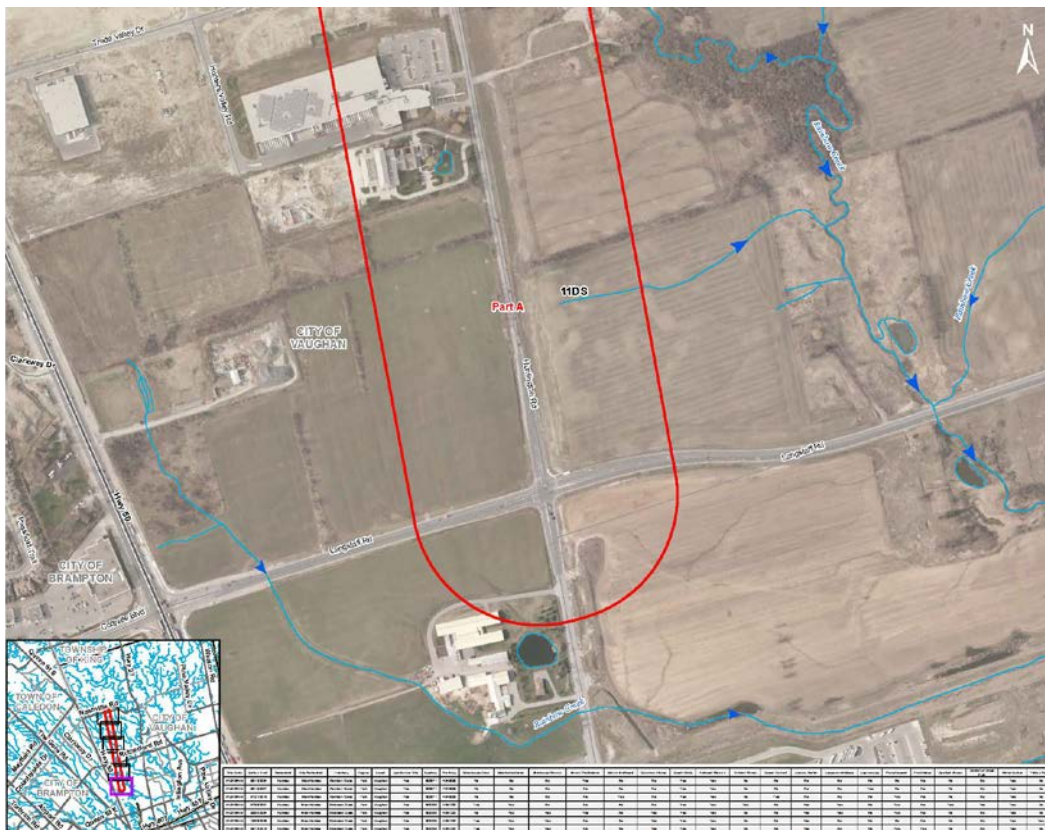


Figure 15: Aquatic Field Survey

**2.4.4 TERRESTRIAL ENVIRONMENT**

Based on the Humber River State of the Watershed Report, the terrestrial environment in the study area consists of agricultural and meadow areas with some urban and urbanizing areas. Part B also consists of agricultural and natural areas (forests). The natural environments along the study area range from poor to good quality.

Linkages or connections between natural areas are limited within the Humber River watershed due to the influence of agricultural, residential and industrial activities. Natural contiguous features are almost entirely limited to thin riparian areas along the river valley corridors, streams and ditches.

**2.4.4.1 Vegetation Communities**

A total of 42 vegetation polygons were identified in the study area and a description of each is provided in **Table 15** below. For a more detailed description of the polygons, please refer to the full report in Appendix D.

Table 15: Vegetation Polygons

Polygon	ELC Name	ELC Code	Area (ha)
1	Moist Sugar Maple - Yellow Birch Deciduous Forest	FOD6-3	0.88
2	Cattail Mineral Shallow Marsh	MAS2-1	1.01
3	Residential Property	CU	1.16
4	Fresh Sugar Maple Deciduous Forest Ecosite	FOD5	0.25
5	Fresh Poplar Deciduous Forest	FOD3-1	2.10
6	Jewelweed Organic Meadow Marsh	MAM3-8	0.16
7	Jewelweed Organic Meadow Marsh	MAM3-8	0.76
8	Fresh Sugar Maple Deciduous Forest Ecosite	FOD5	3.81
9	Fresh Sugar Maple Deciduous Forest Ecosite	FOD5	1.93
10	Watercourse Banks	CU	0.24
11	Cultural Meadow	Manicured	0.26



12	Commercial Property	CU	3.28
13	Hedge Row	CU	0.13
14	Hedge Row	CU	0.13
15	Moist Willow Lowland Deciduous Forest	FOD7-3	1.20
16	Cultural Meadow	CUM	0.70
17	Dry – Moist Old Field Meadow	CUM1-1	2.62
18	Cultural Meadow	CUM	0.66
19	Residential Property	CUM	0.19
20	Cattail Mineral Shallow Marsh	MAS2-1	0.75
21	Cattail Mineral Shallow Marsh	MAS2-1	0.93
22	Ditch	CU	0.49
23	Wetland	CU	0.30
24	Cultural Meadow	CUM	0.59
25	Cattail Mineral Shallow Marsh	MAS2-1	0.73
26	Thicket Swamp	SWT	0.22
27	Cattail Mineral Shallow Marsh	MAS2-1	0.08
28	Watercourse Banks	CU	0.10
29	Hedge Row	CU	0.27
30	Cultural Meadow	CUM	0.68
31	Watercourse Banks	CU	0.61
32	Cultural Meadow	CUM	1.12
33	Cultural Meadow	CUM	1.01
34	Cultural Woodland	CUW	3.39
35	Residential and Industrial Property	CU	0.97
36	Cultural Woodland	CUW	0.18
37	Cultural Meadow	CUM	0.49
38	Hedge Row	CU	0.27
39	Hedge Row	CU	0.17
40	Hedge Row	CU	0.26
41	Hedge Row	CU	0.23
42	Commercial Property	CU	0.38

According to the Ontario Natural Heritage Information Centre (NHIC), none of the above communities are significant or rare in Ontario.

## Flora

A complete list of the species observed can be found in Appendix D.

The NHIC database noted the Scarlet Beebalm (*Monarda didyma*) may be present within or immediately adjacent to the study area, however none were observed by SLR during their field investigations.

One Butternut (*Juglans cinerea*) individual, listed as ‘endangered’ according to the Ontario Species at Risk Act (SARA), was found at the northern extent of the study area within the Trembling Aspen dominated forest in Polygon 3. The butternut is in poor health, with canker surrounding the trunk and a large open wound exposing the heartwood. However, there is approximately 90% live crown.

### 2.4.4.2 Wildlife

#### Birds

The Bobolink (*Dolichonyx oryzivorus*) and the Cerulean Warbler (*Dendroica cerulea*) were identified by the MNR (2014) and listed by the SARA to be ‘threatened’ species, and have the potential to occur in the study area. The Bobolink habitat typically consists of grassland communities, with an abundance of grass species typical of old fields. Potential habitat for the Bobolink is identified to be present in the study area. Cerulean Warbler habitat typically consists of large tracts of mature deciduous forest with open understory. There are some areas of relatively mature forests in the north of the study

area but they are too small for Cerulean Warbler habitat. Neither of these species were observed within the study area by SLR field investigations in 2014.

In total, 39 bird species were observed by SLR at 16 locations throughout the study area in May and June of 2014. Of the 39 birds, the Eastern Wood Pewee (*Contopus virens*) and the Barn Swallow (*Hirundo rustica*) had special listings. All other birds identified during the field investigations in 2014 is common in mixed habitat in southern Ontario.

The Eastern Wood Pewee is a species of 'Special Concern' in Ontario. The observation was aurally noted on the edge of a deciduous forest on the northern portion of the study area. The Eastern Wood Pewee is ubiquitous in southern Ontario, but has been declining in population. The species is adapted to a wide variety of habitats, including forest clearings, edges, and woodlands.

The Barn Swallow is listed as 'Threatened' in Ontario, and was identified at multiple points in the study area. The species is protected as a Threatened species under Ontario's *Endangered Species Act, 2007*, in which Section 10 prohibits damaging or destroying the habitat of Species at Risk. A total of 21 observations (aural and visual) were made of Barn Swallows at five different survey points. Barn Swallows occupy a wide range of habitats including urban and rural environments, particularly where suitable built structures and open spaces combined with active animal husbandry. The Barn Swallow nests almost exclusively on human-made structures such as open barns, under bridges, in culverts, and ledges.

If nests are observed during detailed design within areas requiring disturbance, it is recommended that construction activities be scheduled to occur outside of the breeding bird window, which is approximately April 1 to August 31, to avoid destruction of active nests. Addressing the presence of the Barn Swallow and providing suitable habitat replacement may be required at Detailed Design. The MNRF streamlined approach under the MNRF Modernization of Approvals process would be a relevant and useful process for this activity. Provided active nesting is confirmed during the Detail Design stage, a suitable location for a Barn Swallow kiosk in the vicinity of the study area to compensate for nesting habitat loss will likely be required.

With the exception of Eastern Wood Pewee and Barn Swallow, the assemblage of birds identified by SLR in 2014 is common in mixed habitat in southern Ontario.

#### Amphibians & Reptiles

While invertebrate and amphibian field surveys were not completed, as such studies are typically beyond the scope of the Class EA, it is relevant to note the Eastern Ribbonsnake (*Thamnophis sauritus*), a species listed as 'Special Concern', has the potential to be present on or near the study area. However, limited potential Eastern Ribbonsnake habitat is present and none were observed in 2014 field investigations.

Blanding's Turtles (*Emydoidea blandingii*), a 'Threatened' species, have been recorded to be on or near the study area. However, the date of the observations is close to 30 years old and is considered historical.

#### **2.4.4.3 Designated Areas**

Areas can become designated under a variety of environmental and planning legislation as being environmentally significant, and thus afforded varying degrees of protection.

An Area of Natural and Scientific Interest (ANSI) is an area that contains natural features that are provincially or regionally significant. They are considered to be the best representation of a natural area within each site district and can be considered as an ecological benchmark. These areas are protected from development under the Provincial Policy Statement (PPS) (2014). There are no provincially or regionally designated ANSIs within or adjacent to the study area.

# PARSONS

Municipalities or Conservation Authorities may designate areas as an Environmentally Significant Area (ESA), and these often overlap with ANSIs. There are no ESAs in the study area according to the City of Vaughan OP. Similarly, the study area does not lie within the prescribed boundaries of the Oak Ridges Moraine or the Green Belt Plan area.

York Region and the City of Vaughan have designated portions of the forest within and adjacent to the study area as Woodlands. The York Region OP has designated the largest contiguous woodland in the study area, P5-2, with an area of 7.8 ha, and a woodland further south as Ecologically Significant Forest.

Lastly, the Terrestrial Natural Heritage System Strategy (TNHSS) is a regional strategy with a focus on terrestrial biodiversity and incorporated into the City of Vaughan's OP Natural Heritage System. This system is part of the larger York Region Greenlands System, which includes a portion that crosses the Study Area. This section is a riparian area along Robinson Creek.

## 2.4.4.4 Terrestrial Environment Sensitivity

As a summary, there is one contiguous forest present in the northern portion of the study area and is comprised of a mix of upland deciduous forest and marsh (Polygons 4-9). The forest acts as a buffer to the wetland. While both forest and wetland are common to southern Ontario, they are uncommon within our study area. The forest provides habitat for the Eastern Wood Pewee, a species of Special Concern, and one Butternut tree, an Endangered species in Ontario. Barn swallow, a 'Threatened' species, were also identified at multiple points in the study, though no nests were observed.

The significance of terrestrial resources in the rest of the study area is limited due to the high impact of agricultural, commercial, and residential activities. The dominant community type is Cultural Meadow, which is often dominated by invasive and early-successional species. Therefore, while these habitats are extremely common in southern Ontario, they are ecologically important to the study area as there are limited natural features.

## 2.4.5 PHASE I ESA & GEOTECHNICAL

A Phase I Environmental Site Assessment (ESA) was conducted for Part A (Langstaff Road to McGillivray) and B (Major Mackenzie Drive to Nashville Road) of Huntington Road by SPL Consultants Limited (SPL). The purpose of the Phase I ESA was to identify the presence or absence of potentially contaminating activities (PCA) within the study area, based solely on visual observations and a review of available or supplied factual data. The ESA does not include physical sampling or testing nor does it constitute as an audit of environmental management practices, indicate geotechnical conditions or identify geologic hazards. The findings of this initial Phase I ESA will help assess the need for additional investigation.

The ESA categorized the Huntington Road roadway as the "property" and the "study area" was determined by a 250 metre buffer around Parts A and B. Information was gathered from a variety of sources including a site visit, available regulatory information, maps, geological publications, and city directories. In particular, a records and regulatory agency database review was completed through a database search carried out by EcoLog ERIS to identify PCAs. The EcoLog ERIS report consists of a review of public and private database records. The key findings are summarized below; for a full list of the databases searched and their findings, please refer to the full Phase I ESA for Part A and B in Appendix E.

### 2.4.5.1 Geotechnical

SPL conducted a preliminary geotechnical and pavement investigation for the study area. The purpose of the investigation was to determine the existing pavement structure and subsurface conditions of the existing road at borehole locations and subsurface conditions at several culvert locations.

SPL conducted the field assignment in May 2015, in which 20 boreholes for Part A and 10 boreholes for Part B were drilled. A visual pavement condition survey was conducted in June 2015, which generally indicated uneven road surface, poor riding conditions, construction debris, and improper/no ditching in some areas. A summary of the existing pavement structure is presented below in **Table 16**. For a detailed description of the surface and subsurface conditions of the roadway, refer to the Geotechnical and Pavement Investigation Report in Appendix L.

Table 16: Summary of Existing Pavement Structure along Huntington Road

Section	Pavement Component	No. of Observations	Thickness (mm)	
			Range	Mean
Langstaff Road to Rutherford Road	Total HMA <sup>1</sup>	10	100-110	106
	Granular Base Material	10	150-465	316
	Granular Subbase Material	10	0-300	60
	Total Granular Material	10	255-600	376
	Average Existing GBE <sup>2</sup>			399
Rutherford Road to McGillivray Road	Total HMA <sup>1</sup>	9	0	0
	Granular Base Material	9	100-350	279
	Granular Subbase Material	9	0-610	401
	Total Granular Material	9	350-950	680
	Average Existing GBE <sup>2</sup>			409
Major Mackenzie Drive to Nashville Road	Total HMA <sup>1</sup>	7	60-90	81
	Granular Base Material	8	200-520	305
	Granular Subbase Material	8	0-420	245
	Total Granular Material	8	260-720	631
	Average Existing GBE <sup>2</sup>			452
	Total HMA in Shoulders	1	0	0
	Granular Base Material in Shoulders	1	400	400
	Granular Subbase Material in Shoulders	1	400	400
	Total Granular Material in Shoulders	1	800	800
	Average Existing GBE <sup>2</sup>			452

1 HMA = Hot Mix Asphalt; 2 GEB Factors: Existing Asphalt = 1.25, Existing Granular Base = 0.75, Existing Subbase = 0.5

Based on these numbers, **Table 17**: Design Values Representing the Existing Pavement Structure shows the design values to represent the existing pavement structure in pave and gravel sections of the road.

Table 17: Design Values Representing the Existing Pavement Structure

	Langstaff Road to Rutherford Road	Rutherford Road to McGillivray Road	Major Mackenzie Drive to Nashville Road
Hot Mix Asphalt (mm)	100	0	80
Granular Base (mm)	320	280	300
Granular Subbase (mm)	No Subbase	400	250
Total Structure (mm)	420	680	630

Based on City of Vaughan standards for Collector and Arterial Roads, the existing pavement structure within the project limits is inadequate to support future traffic.

**2.4.5.2 EcoLog ERIS Report, Key Findings**

The EcoLog ERIS searched was completed for Parts A and B. Part A and Part B returned a total of 60 records and 30 records within the study area, respectively. The key findings of this database search are listed below:

Dangerous Goods Accident

Part A: The Dangerous Goods Accident Information System (DGAIS) Database indicated an incident in 1993, involving a spill of 90 L of diphenylmethane 4-44' isocyanate on the railway tracks located within the municipal boundaries of the City of Vaughan. The Canadian Pacific Railway (CPR) runs approximately 1.3 km east of the property and crosses north of the Part A of the Huntington Road study. The CPR Vaughan Intermodal Terminal is located about 200 metres west of Huntington Road. The environmental impact on the property due to the past spill incidents is considered to be moderate due to the close proximity of the CPR and Intermodal Terminal to Part A.

Part B: Similar observations to Part A were made, however, the environmental impact on the property due to the past spills is not anticipated as the CPR and the Intermodal Terminal are down-gradient from Part B.

## Spills

Part A: The EcoLog ERIS Ontario Spills (1988-2011) indicated a spill incident in 1999 involving hydraulic oil onto Huntington Road, just south of Rutherford Road. In 2001, a spill incident was reported involving suspected antifreeze on Huntington Road, 300 metres south of Rutherford Road. In 2012, spill incidents were reported at 8800 Huntington Road involving N.O.S. gas into the atmosphere from Longo's warehouse. The environmental impact on the property as a result of the spills is considered to be low to moderate.

## Hazardous Waste

Part A: The EcoLog ERIS report identifies two properties within the study area registered as hazardous waste generators. One property at 8800 Huntington Road occupied by Longo Brothers Food Markets Inc. was registered in 2011. However, the waste classification for which they registered was not indicated. The property at 9307 Huntington Road was registered from 1996 to 2001 for the generation, use and/or storage of petroleum distillates and waste oils and lubricants. An environmental impact on the property as a result of these two properties and the generation, use and/or storage of hazardous wastes is considered to be low or moderate.

Part B: The EcoLog ERIS report identifies two properties within the study area registered as waste generators. The property at 10440 Huntington Road, owned by the City of Vaughan is listed as a cemetery and crematoria; they registered in 2004, though the waste classification for which they are registered is not indicated. The second property at 10555 Huntington Road is registered in 2005 for the generation, use and/or storage of waste oils and lubricants. An environmental impact on the property as a result of these two properties and the generation, use and/or storage of hazardous wastes is considered to be low.

## Areas of Natural Significance

A review of 8 databases, mostly from the Ministry of Natural Resources and Forestry and conservation plans, was conducted to determine if any Areas of Natural Significance are present on the property or study area of Parts A and B. The review indicated that the properties and study areas are not situated within an Area of Natural Significance or within an Environmentally Sensitive Area.

### **2.4.5.3 Site Reconnaissance**

A site visit to the study area was conducted to gather on-site observations and to assess the potential for PCAs in the Huntington Road study area. The following observations were made (apply to both Part A and B unless otherwise stated):

#### Water Sources

Municipal water services run throughout the property. A City Trunk Watermain is located on Huntington Road between Rutherford Road and south of Langstaff Road (located in Part A). A Regional Trunk Watermain is located on Huntington Road between Rutherford Road and Nashville Road (located in Part B).

#### Sewage Works

Municipal storm and sanitary sewers run throughout the property. A City Trunk Sanitary Sewer is located on Huntington Road between Major Mackenzie Drive to south of Langstaff Road.

#### Underground Utilities

An Enbridge marked gas line is located on the eastern side of Huntington Road. Storm water culverts were observed along the east and west sides of Huntington Road.

#### Asbestos Containing Materials (ACM)

As the property is a municipal roadway, it is unlikely that asbestos is present. However, underground utilities may be constructed of asbestos containing cement (commonly referred to as transite); these systems may be present underneath or in the vicinity of the property. Asphalt may also contain asbestos. If asbestos is identified during the development of Huntington Road, handling in accordance with O. Reg. 278/05 is required.

## Polychlorinated Biphenyls (PCBs)

Several pole-mounted transformers were observed. It is possible that these contain PCB oil, though an environmental impact on the property as a result of the pole-mounted transformers is considered to be low.

## Occupational Health and Safety Act – Designated Substances

A review of the site was also conducted to assess the potential for designated substances identified in the Occupational Health and Safety Act, Article 18(a). The following comments are provided for the potential presence of designated substances on the property:

- Acrylonitrile – potential present, within vehicle emissions along roadways
- Arsenic – potential not observed
- Benzene – potential not observed
- Coke oven emissions – potential not observed
- Ethylene Oxide – potential not observed
- Isocyanates – potential not observed
- UFFI – potential not observed
- Lead – lead paint may be present in paints used along the roadway
- Mercury – potential not observed
- Silica – any cementations materials could contain silica; analysis required to establish type
- Vinyl Chloride – potential not observed

## Sodium Absorption Ratio (SAR) and Electrical Conductivity (EC)

As the property is a municipal roadway that has been subject to seasonal de-icing activities, electrical conductivity (EC) and sodium absorption ratio (SAR) impacts will exist in subsurface soils in various degrees along the vicinity of the roadways. Under the regulations, if de-icing compounds are applied for the purpose of keeping the roadway safe for traffic under conditions of snow, ice or both, as provided for under section 2 of Regulation 339 of the Revised Regulations of Ontario, 1990, the applicable site condition standard is deemed not to be exceeded for the purpose of Part XV.1 of the Act. O. Reg. 153/04, s. 48(3). Under this clause, any salt impacted soil at the site would be deemed to meet the applicable standards.

## Potentially Contaminating Activities (PCAs)

Potentially Contaminating Activities observed during the site reconnaissance are as follows:

- Salting and de-icing activities on the property (Part A & B)
- Rail tracks associated with CPR Intermodal Terminal located west neighbouring to the roadway (Part A)
- Railway tracks located north (Part A) and south (Part B) neighbouring the property

### **2.4.5.4 Potentially Contaminating Activities & Areas of Potential Environmental Concern**

#### **Part A**

Using the information obtained from the database review and site reconnaissance, the following PCAs were identified:

#### Property

- De-icing activities on the property (low environmental concern);
- Potential use of fill material of unknown environmental quality, PCA-30 (low to moderate environmental concern).

#### Study Area

- North adjoining property occupied by railway, PCA-46 (low to moderate environmental concern);
- West neighbouring property occupied by a railway, PCA-46 (low to moderate environmental concern);
- East adjacent property registered as a pesticide storage site, PCA-40 (APEC not anticipated as contaminants of concern are not likely to migrate to property);



# PARSONS

- Generation, use and/or storage of hazardous wastes on the east adjacent property, PCA-58 (low to moderate environmental concern);
- Spill incident on the west adjoining property involving 22 L of hydraulic oil, PCA-other (low to moderate environmental concern).

From these identified PCAs, the following Areas of Potential Environmental Concern (APEC) were established (**Table 18**). The contaminants of potential concern were determined based on materials that are likely to be present as a result of these activities.

Table 18: Identified PCAs and APECs in Part A

APEC	Location of APEC	Potential Contaminating Activities (PCA)	Location of PCA (on or off site)	Contaminant of Potential Concern	Media Potentially Impacted
APEC-1	Entire area of the Part A Property	30. Fill material of unknown environmental quality	On-site	M&I, PHCs, VOCs, PAHs	Soil
APEC-2	Portion of Part A property north of Rutherford Road	46. rail yards, tracks, and spurs	Off-site	PAHs, M&I, VOCs, PHCs	Soil
		58. Waste disposal and waste management associated with generation, use and/or storage of hazardous wastes	Off-site	PHCs, VOCs, M&I	Soil
APEC-3	Portion of Part A property near Rutherford Road	Other: Spill incident involving hydraulic oil	Off-Site	PHCs, VOCs	Soil
APEC-4	Northern portion of Part A property	46. Rail yards, tracks and spurs	Off-site	PAHs, M&I, VOCs, PHCs	Soil

PHCs = Petroleum hydrocarbons, VOCs = Volatile organic compounds, PAHs = Polycyclic aromatic hydrocarbons, M&I = Metals and inorganics

## Part B

Similarly, the following PCAs were identified for Part B:

### Property

- De-icing activities on adjoining roadways and in parking areas on the property (low to moderate environmental concern);
- Potential use of fill material of unknown environmental quality, PCA-30 (low to moderate environmental concern).

### Study Area

- Generation, use and/or storage of hazardous wastes on the west adjacent property, PCA-58 (low environmental concern);
- South neighbouring property occupied by a railway, PCA-46 (low environmental concern);
- Pesticide and herbicide applications on the northeast neighbouring property, PCA-40 (low environmental concern).

From the above list, PCA-56 and PCA-40 are not expected to contribute to an APEC on the Part B property, as they are located approximately 170 metres down-gradient and 190 metres cross-gradient, respectively, from the property.

From these identified PCAs, the following Areas of Potential Environmental Concern (APEC) were established (**Table 19**). The contaminants of potential concern were determined based on materials that are likely to be present as a result of these activities.

Table 19: Identified PCAs and APECs for Part B

APEC	Location of APEC	Potential Contaminating Activities (PCA)	Location of PCA (on or off site)	Contaminant of Potential Concern	Media Potentially Impacted
APEC-1	Entire area of the Part B Property	30. Fill material of unknown environmental quality	On-site	M&I, PHCs, VOCs, PAHs	Soil Groundwater
APEC-2	Central portion of the Part B Property	58. Waste disposal and waste management associated with generation, use and/or storage of hazardous wastes including waste oils and lubricants	Off-site	PHCs, VOCs	Soil

PHCs = Petroleum hydrocarbons, VOCs = Volatile organic compounds, PAHs = Polycyclic aromatic hydrocarbons, M&I = Metals and inorganics

From these findings, a limited soil investigation is recommended for Part A and Part B, in order to evaluate the soil conditions on the property prior to excavation activities, within the APECs.

## 2.5 STORMWATER, DRAINAGE AND HYDROLOGY

A Drainage and Hydrology study was undertaken by Sanchez Engineering for the length of Huntington Road within the study area. A variety of background information was reviewed including existing studies from developments in the area, maps and photos, and design guidelines and criteria documents. For the full report, refer to Appendix F.

### 2.5.1 HYDROLOGY INVESTIGATIONS

Field inspections were conducted in September 2014 and August 2015 to examine the condition of the outside ditch drainage system. The five largest culvert crossings, which provide transverse drainage with the project limits, are summarized in **Table 20**. Smaller culverts, ranging from 600 mm to 750 mm diameter, provide local drainage and are listed in **Table 21**.

Table 20: Existing Watercourse Crossings Culverts

Watercourse	Station	Culvert Type	Rise or Diameter (mm)	Span (mm)
West Rainbow Creek	1+330	SPCSPA	3200	2100
Rainbow Creek Tributary	2+460	CSPA	1880	1280
East Rainbow Creek	3+320	SPCSPA	2240	1630
Robinson Creek	3+768	SPCSP	3000	
East Robinson Creek	4+687	CSP	1800	1200

Table 21: Existing Local Drainage Culverts

Station	Culvert Type	Diameter (mm)	Drainage Area (ha)
1+140	CSP	600	8.2
1+525	CSP	750	27.0
2+985	CSP	600	9.5
5+793	CSP	600	3.1
5+979	CSP	600	5.4
6+226	CSP	600	4.7

### 2.5.2 HYDRAULIC ANALYSIS

Peak flows at each of the major crossings were estimated using available information on land use, soil types and topography. The return period flows were calculated using the computer program Visual Otthymo. For the local drainage CSP culverts, the flows were calculated using the Rational Method and checked with the Visual Otthymo method. Subsequently, an analysis on the flows and capacity of each culvert was conducted. A fluvial geomorphological assessment was also conducted and the findings of the required widths of the watercourses were incorporated into the considerations for culvert sizes. The required culvert sizes to provide hydraulic capacity for the 25-year flood at each of the culverts are summarized in **Table 22**.

Table 22: Recommended Culvert Sizes for each Crossing

Watercourse	Station	No. of Barrels	Type	Rise or Diameter (mm)	Span (mm)	Length (m)
Local Drainage	1+140	1	CSP	1200		26
West Rainbow Creek	1+330	2	Concrete Box	1800	3950	26
Rainbow Creek Tributary	1+524	1	CSP	1500		26
Rainbow Creek Tributary	2+460	1	Concrete Box	1500	2700	26
Local Drainage	2+985	2	CSP	900		26
East Rainbow Creek	3+320	1	Concrete Box	1800	3100	26
Robinson Creek	3+768	2	Concrete Box	3000	4650	26
East Robinson Creek	4+687	2	Concrete Box	1200	1850	26
Local Drainage	5+793	1	CSP	900		26
Local Drainage	5+979	1	CSP	900		26
Local Drainage	6+226	1	CSP	900		26

It is noted that the culvert listing for Station 4+687 may not be required depending on the timing of construction of the Highway 427 extension, as this section would be removed to accommodate the highway. For fisheries protection, some of the culverts will need to be countersunk to provide a streambed for fish passage. This will be determined during the design of the culverts.

**2.5.3 EXISTING DRAINAGE AND STORMWATER MANAGEMENT**

Currently the majority of the roadway has a rural cross-section and is drained by roadside ditches. The project will modify the road to an urban section with curb and gutter. The effect of the proposed changes in the roadway cross-section will be to increase peak flows, but the net effect to the receiving watercourses will not be significant in terms of stormwater quantity. The significant effects will be the potential impact that the proposed cross-section changes will have on water quality.

From Sta. 0+200 to the south, Huntington Road is drained by storm sewer. From Sta. 0+200 to Sta. 0+620, the road drains to the south in roadside ditches. The drainage enters the storm sewer system at ditch inlets located at approximately Sta. 0+200.

From Sta. 0+620 northerly to the northern study limit, the road is drained at present by roadside ditches and culverts. Visual examination of the ditches did not reveal any areas of particular drainage deficiency or erosion/scour issues. As the road is urbanized, the roadside ditches and culverts will be replaced with storm sewers with outlets at the major watercourses.

**2.6 FLUVIAL GEOMORPHOLOGY**

Site inspections and a geomorphic survey were completed by Water’s Edge in September 2015. The study area is located in the Peel Plain physiographic region and in the beveled till plains landform. Geologic material underlying the plain is a till which is clay to silt textured and is generally derived from glaciolacustrine deposits. The creeks in this study are all part of Rainbow Creek and Robinson Creek, which are located in the Humber River watershed. The study area includes eleven culverts, which all pass under Huntington Road, though the study focuses mainly on Culverts 4, 5, 6, 7 and 9 (shown in the Water’s Edge report in Appendix G). A summary of the surveys done at each crossing are shown in Table 23.

Table 23: Summary of Survey, Each Crossings' Geomorphic Parameters

Parameter	Cu-4	Cu-5	Cu-6	Cu-7	Cu-9
Bankfull Width (m)	1.66	5.24	1.47	1.07	2.81
Bankfull Mean Depth (m)	0.03	0.48	0.22	0.05	0.23
Bankfull Max Depth (m)	0.03	0.78	0.35	0.10	0.43
Bankfull Area (m <sup>2</sup> )	0.05	2.61	0.30	0.05	0.62
Wetted Perimeter (m)	1.67	5.73	1.76	1.11	3.96
Hydraulic Radius (m)	0.06	0.44	0.17	0.05	0.17
Width-Depth Ratio	55.33	10.82	7.10	21.40	13.53
Entrenchment Ratio	1.61	2.50	6.89	1.58	2.27
Bankfull Slope (m/m)	0.003	0.0028	0.0031	0.0051	0.0078
Channel Substrate D <sub>50</sub> (mm)	Grassed vegetation	37.3	0.06	Grassed vegetation	39.9
Channel Substrate D <sub>84</sub> (mm)		86.7	0.24		86.3
Rosgen Classification	B	C4	E4	B	C4

Creek stability was assessed using a Rapid Geomorphic Assessment (RGA), which focuses entirely on the geomorphic component of a river system. A Rapid Stream Assessment Technique (RSAT) evaluation was also conducted, which focuses on conditions reflecting aquatic-system response to watershed urbanization. The results of the RGA and RSAT are provided in **Table 24**.

Table 24: RGA and RSAT Scores and Interpretation

Crossing	RGA Score	RGA Interpretation of Stability	Average RSAT Score	RSAT Score (Interpretation)
Cu-4	0.21	Channel morphology within the range of variance of similar rivers but evidence of instability is frequent.	20.0	Poor
Cu-5	0.36		21.0	Fair
Cu-6	0.21		23.5	Fair
Cu-7	0.26		21.0	Fair
Cu-9	0.26		31.3	Good

Bankfull discharge rates and channel flows were also assessed. The bankfull discharge rates for Culverts 5, 6, and 9 are 2.9 m<sup>3</sup>/s, 0.56 m<sup>3</sup>/s, and 0.76 m<sup>3</sup>/s, respectively. A meander belt width and 100-year erosion assessment was also undertaken according to TRCA's Belt Width Delineation Protocol (2004). The results of this assessment produced minimum culvert size recommendations that were then taken into account through the drainage and hydrology study. The Fluvial Geomorphological and Meander Beltwidth Assessment Report can be found in Appendix G.

## 2.7 SOURCE WATER

Under the 2006 Clean Water Act (Act), municipalities are required to conform to Source Protection Plans (SPPs) to protect surface and groundwater sources to municipal drinking water systems. The Huntington Road Widening Project is within the Toronto SPP area and the 2015 Approved Source Protection Plan: CTC Source Protection Region report (the CTC Report) is applicable. The CTC Report shows where there is potential for significant threat to the quality and quantity of groundwater.

For the Huntington Road Class EA, the area from the intersection of Huntington Road and Nashville Road to approximately 1.2 km south of the intersection is within the Wellhead Protection Area (WHPA) – D for Well 4 Kleinburg. The SPP prohibits handling and storage of dense non-aqueous phase liquids (DNAPLs) due to being within a Significant DNAPL Threat Area and its location within a Highly Vulnerable Aquifer (HVA) area, unless a risk management plan is developed in accordance with the Act.

While no formal requirements are required for this study, Best Management Practices will be employed during construction work to prevent contaminants from entering the groundwater throughout the whole study area. This can include spill kits where there is storage of fuel or chemicals, spill cleanup, etc.

The Act also requires Significant Groundwater Recharge Areas (SGRAs) and Intake Protection Zones (IPZs) to be considered. Huntington Road is within a SGRA, ranging from mostly low to high vulnerability throughout the study area. The high vulnerability areas generally correlate with surface water bodies. There are no IPZs in the area.

The area along Huntington Road from Nashville Road to approximately 200 metres south of Rutherford Road is also classified as a WHPA-Q1/Q2 groundwater quantity area. WHPA-Q1 refers to an area where activities that take water without returning it to the same source may be a potential threat. A WHPA-Q2 refers to an area where activities that reduce recharge may be a potential threat. The Huntington Road Class EA will not affect the quantity of groundwater available because there is unlikely to be significant dewatering and groundwater recharge is also unlikely to be affected.

## 2.8 UTILITIES

ON1Call was contacted for a utilities mark-up within the study area of Huntington Road. The following utility agencies have indicated facilities within the study area:

- TransCanada Pipelines
- York Region Water and Sanitary Sewer
- City of Vaughan Water and Sanitary Sewer
- Enbridge Gas
- Rogers Communications
- Bell
- 360 Networks/Group Telecom

Please refer to Appendix H for utility composite plan for approximate utility locations. Mark-up plans and other information received are also available in Appendix H.

## 3. DESCRIPTION OF THE PROBLEM

Following an inventory of Huntington Road and its adjacent areas, the current condition and configuration of Huntington Road requires improvements to accommodate the planned growth of directly adjacent lands. Improvements are required to handle an increase in traffic volume (short and long term) and support and enhance the area by providing appropriate and effective service.

According to the traffic studies conducted, several improvements and signalization recommendations were suggested for Huntington Road. The intersections along Huntington Road operated at very poor levels until improvements were applied in the traffic model. In addition, the anticipated land use of surrounding areas are expected to generate high levels of vehicle traffic. Thus, a problem statement has been developed for the Huntington Road study, which will become the basis for the identification and evaluation of alternative solutions in the subsequent phases of the Municipal Class EA:

**Ongoing and planned development in the vicinity of the study area requires the need to provide additional capacity along Huntington Road in order to alleviate future congestion.**

Addressing the issues now regarding the future of Huntington Road is timely, as the Highway 427 extension, a provincial initiative, will have an impact on the use of the road. Additionally, increased residential and industrial on-ground construction is taking place in both Part A and B of the study, thus, the impacts of traffic increase will certainly be felt in the short term. That being said, this study also offers a great Opportunity Statement:

**In addressing the planned population and employment growth and shift to a more urban landscape, changes to the road and corresponding infrastructure is needed to provide access to adjacent development lands while supporting a variety of transportation function and uses, including transit and active transportation (cyclists and pedestrians).**

## 4. ALTERNATIVE SOLUTIONS

### 4.1 IDENTIFICATION AND DESCRIPTION OF THE ALTERNATIVE SOLUTIONS

A range of solutions were considered to address the problem and opportunity statements based on common practices to handle road capacity and traffic demand. Five alternative solutions were identified:

Alternative 1: Do Nothing

Alternative 2: Travel Demand Management (TDM) Initiatives

Alternative 3: Improve Other Parallel Roadways

Alternative 4: Roadway Capacity and Operational Improvements

Alternative 5: Urbanize Cross-section

A 'Do Nothing' alternative, or the "null" alternative, is typically included in the evaluation of alternatives that represents the status quo option. In other words, the 'Do Nothing' alternative represents the scenario in which no improvements are made and traffic conditions continue to proceed as forecasted. This scenario provides a benchmark against the other alternatives to highlight the differences if no changes were to occur to the current Huntington Road configuration.

#### 4.1.1 ALTERNATIVE 1: DO NOTHING

Assumes that no improvements would be made to this section of Huntington Road, other than regular maintenance operations.

#### 4.1.2 ALTERNATIVE 2: TRAVEL DEMAND MANAGEMENT (TDM) INITIATIVES

Travel demand management (TDM) techniques reduce vehicular trips and miles traveled by employing alternative methods to influence travel patterns. Managing demand by changing travel patterns and incentives, can be a cost-effective alternative to increasing road capacity. In general, TDM initiatives can include improving facilities for other travel modes, encouraging flexible work schedules, working from home, and carpooling, to name a few.

This alternative could divert traffic travel across a wider time frame and reduce vehicles on the road, resulting in lower traffic volumes anticipated.

#### 4.1.3 ALTERNATIVE 3: IMPROVE OTHER PARALLEL ROADWAYS

Undertaking improvements on parallel roadways could be used to offset and reduce traffic on Huntington Road. The specific improvements would be defined at a later stage.

This alternative could result in lower traffic volumes by diverting traffic to other road options.

#### 4.1.4 ALTERNATIVE 4: ROADWAY CAPACITY AND OPERATIONAL IMPROVEMENTS

Improvements would be made to Huntington Road to enhance its traffic capacity by adding travel/turning lanes, and geometric and signal timing improvements. This would allow more vehicles to use Huntington Road and provide more efficient traffic movements.

This alternative could result in Huntington Road being able to handle the projected traffic increases into 2034.

#### 4.1.5 ALTERNATIVE 5: URBANIZE CROSS-SECTION

Alternative 5 provides for improvements such as providing curbs, gutters, catch basins and an enclosed drainage system, as is typical for a cross-section comprising urban specifications.

This alternative could result in better capacity and driving conditions, creating a more efficient roadway capable of handling higher traffic volumes.



## 4.2 CRITERIA AND EVALUATION OF ALTERNATIVE SOLUTIONS

After outlining the five main alternative solutions for Huntington Road, several criteria were developed using the broad definition of the environment in the EA Act. The 'environment' was divided into five main categories: the transportation system, the natural environment, policies and governance, social and cultural environment, and economic.

These broad categories were further subdivided into more specific criteria based on their ability to identify the potential environmental impacts of the alternative solutions on the existing conditions. This allows the evaluation of the alternative solutions to more clearly identify the strengths and weaknesses between the options.

The evaluation criteria were then applied to each of the Alternative Solutions to identify the potential effects of the alternative solution on the specific criterion being applied. Mitigation measures are considered and incorporated into the decision-making to determine a net positive or negative effect of the alternative solution on the environment. A separate evaluation was conducted for Part A and Part B, as there were some differences between the two roadways. **Table 25** and **Table 26** show the evaluation of the alternative solutions against the selected criteria for Parts A and B, respectively.

Once an evaluation has been conducted for all Alternative Solutions against all evaluation criteria, the relative advantages and disadvantages of each alternative can be determined based on the net environmental effects.

Table 25: Evaluation of Alternative Solutions, Part A (Langstaff Road to McGillivray Road)

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>The Transportation System</b>						
<b>Mobility and Accessibility</b>	Potential to accommodate the projected traffic demand by 2031 as a result of planned growth and new developments.	The existing roadway capacity cannot accommodate the projected traffic demand resulting from employment growth planned adjacent to Huntington Road. Without any improvements, Huntington Road will experience significant traffic delays under 2031 conditions.	A reduction in demand on Huntington Road through TDM improvements may address some traffic growth, but this solution alone will not accommodate the projected increase in traffic.	Improvements to parallel roads – through operational enhancements or widenings – may reduce travel demand on Huntington Road by diverting traffic elsewhere; however, it will have little effect on traffic – especially commercial traffic – that will be reliant on Huntington Road to provide direct access to-and-from its destination.	This solution affords the best option to accommodate projected travel demand on Huntington Road. Widening Huntington Road is anticipated to accommodate the projected traffic demand over the planning horizon (2031). Also, intersection and operational improvements will enhance safety, mobility and accessibility along Huntington Road and intersecting roadways.	Urbanizing the cross-section can lead to improved mobility and driving conditions on the roadway can lead to a more efficient roadway, capable of handling higher volumes. However, this solution alone will not accommodate the projected increase in traffic.
<b>Safety</b>	Potential to improve travel safety between the construction date and 2031.	Increased traffic demand –both by commuters and commercial vehicles – will reduce roadway safety without any improvements to Huntington Road. The corridor would experience more collisions than expected, possibly due to extended queuing, increased commercial traffic and frequent side street access from new developments.	Despite TDM measures, traffic demand and congestion is projected to increase resulting in reduced roadway safety for motorists, pedestrians and cyclists.	Improvements to parallel roads – through operational enhancements or widenings – may improve safety on Huntington Road by diverting traffic elsewhere; however, Huntington Road safety will still be a challenge as it copes with increased traffic resulting from new growth and several planned commercial developments.	By accommodating the projected traffic demand, this alternative provides the greatest opportunity to manage traffic safety as travel demand increases through to 2031. Operational improvements can enhance safety for roadway users, pedestrians and cyclists along Huntington Road and at intersecting roadways.	Improving the physical infrastructure of the roadway will result in greater safety for all users of the roadway which includes motorists, pedestrians and cyclists.
<b>Sustainable Transportation</b>	Potential to incorporate improvements for cyclists, pedestrians, transit riders, and streetscaping on Huntington Road.	This section of Huntington Road currently lacks both sidewalks and cycling lanes, so safety is a concern as planned growth and traffic increase; transit service does not currently operate on Huntington Road, although service is likely, given planned growth. However, given the existing alignment of Huntington Road, future increased traffic and limited space for bus stops, Huntington Road would not facilitate transit use in its current state.	Even with TDM measures in place, the existing roadway does not physically or safely accommodate sidewalks, cycling paths or transit stops.	Improvements on parallel roadways will not enable incorporating cyclist, pedestrian, transit, or streetscaping improvements on Huntington Road.	This alternative would allow for the incorporation of cycling, pedestrian and transit facilities, and streetscaping improvements along Huntington Road. Intersection and operational improvements will enhance safety, mobility and accessibility for pedestrians and cyclists along Huntington Road and at intersecting roadways.	Taking steps to urbanize the cross-section allows for the incorporation of improvements for cyclists, pedestrians, transit riders, and streetscaping. Urbanizing the roadway will provide better facilities for these users and also upgrade the road to match surrounding uses through streetscaping. This alternative will facilitate sustainable transportation.
<b>The Natural Environment</b>						
<b>Aquatic and Terrestrial Environment</b>	Potential for altering existing watercourses; Potential impact on vegetation; Potential impact on wildlife and habitat	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat.	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat.	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat on Huntington Road.	Widening Huntington Road could impact some water crossings; vegetation and wildlife may be affected. Some geometric and operational improvements could impact watercourses, vegetation and wildlife habitat. Suitable mitigation measures would have to be identified to minimize impacts to the greatest extent possible.	Urbanizing Huntington Road (by adding curbs and gutters, catch basins, etc.) could impact some water crossings; vegetation and wildlife may be affected. Suitable mitigation measures would have to be identified to minimize impacts to the greatest extent possible.
<b>Groundwater</b>	Potential impact on water supply and groundwater quality	No impacts to groundwater supply and quality.	No impacts to groundwater supply and quality.	No impacts to groundwater supply and quality on Huntington Road.	The additional impervious surface, including some intersection and operational improvements (i.e., adding turning lanes), could cause impacts to groundwater quality and quantity.	Urban cross-sections are typically characterized by the presence of curb and gutter that define the edge of the road and channel stormwater runoff. Typically, drainage is handled by a system of storm sewers that ultimately discharge the runoff into established waterways.
<b>Policies and Governance</b>						
<b>Municipal and Regional Policies</b>	Consistent with the intent of the Vaughan	Does not support the City`s Vision for the West Vaughan Employment Area or the recommendations made in	Vaughan`s Transportation Master Plan indicates strong support for TDM programs and initiatives: “Active	York Region`s recently completed Western Vaughan Transportation Improvements Individual Environmental	Vaughan`s Transportation Master Plan recommends the need to add capacity to Huntington Road “to meet the travel	Supports area planning initiatives and policies

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
	Transportation Master Plan (2011); Supports the objectives of Vaughan's Community Sustainability and Environmental Master Plan (Green Directions Vaughan); Consistent with the intent of the Transportation Plan for the West Vaughan Employment Area (WVEA) Secondary Plan; Supports growth identified in Blocks 59, 61 and 64.	Vaughan's Transportation Master Plan. Recognizing the planned growth in the area, the "Do Nothing" alternative overlooks the need to provide more efficient transportation options to existing and future residents.	transportation and Transportation Demand Management (TDM) are anticipated to become increasingly important elements of the City of Vaughan's transportation system." TDM is also consistent with the West Vaughan Employment Area (WVEA) Secondary Plan's requirement to "promote, encourage and facilitate bicycle and pedestrian activity to and within the WVEA" and "to work with the appropriate agencies to support effective transit service to the WVEA..."	Assessment (IEA) recommended several improvements to parallel and adjacent roads, including widening Rutherford Road, Major Mackenzie Drive, Highway 27 and other Regional roads in western Vaughan. Vaughan's Transportation Master Plan recommends several road improvements (including new roads) in Blocks 59 and 60 that would increase mobility and accessibility for motorists, pedestrians and cyclists	demands of a major new employment area." The master plan suggests that "as a major collector, Huntington Road is expected to accommodate significant bus service and facilitate cycling and pedestrian movements in the corridor." Vaughan's Transportation Master Plan identifies broad intersection and design guidelines to improve operations for motorists, pedestrians and cyclists. The WVEA Secondary Plan broadly identifies the need to develop a street network that is safe, efficient, and balances user needs – including motorists, truck traffic, pedestrians and cyclists.	
<b>Social and Cultural Environment</b>						
<b>Land Use</b>	Supports existing and future developments.	The existing corridor would not support planned commercial developments planned in Blocks 59, 60 and 64.	TDM initiatives will support local commercial land uses by providing more feasible options to commute to work.	Improvements to parallel roads – through operational enhancements or widenings – may reduce travel demand on Huntington Road by diverting traffic elsewhere; however, it will have little effect on commercial traffic that will be reliant on Huntington Road to provide direct access to-and-from its destination.	This solution affords the best option to accommodate employee and commercial traffic projected to operate on Huntington Road through 2031. Intersection and operational improvements will enhance safety, mobility and accessibility for commercial uses along Huntington Road and intersecting roadways.	Urbanization of the roadway supports local land uses by upgrading the roadway to support and meet the needs of the commercial/industrial land uses planned for the area.
<b>Property</b>	Potential for requiring private property.	Private property would not be required.	Private property would not be required.	Private property may be required to implement roadway improvements on parallel roads. No property required on Huntington Road.	Private property may be required in some locations to accommodate additional road capacity, including cycling, pedestrian and transit facilities, and streetscaping improvements. Private property may be required in some locations to implement intersection and operational improvements (i.e., turning lanes, geometric improvements, etc.) on some sections of Huntington Road.	Private property may be required in some locations to accommodate road improvements, including cycling, pedestrian and transit facilities, and streetscaping improvements.
<b>Air Quality</b>	Potential impact on air quality and/or greenhouse gas emissions.	Some impacts - this alternative would experience congestion and queuing issues, while potential transit service on Huntington Road would not be feasible.	TDM initiatives may help reduce the rate of increase in traffic congestion, which would alleviate some emissions. That said, commuter traffic is projected to grow significantly along Huntington Road resulting in increased greenhouse gas emissions overall.	Improvements to parallel roads may help reduce traffic congestion and air emissions along those routes. However, the projected commercial and commuter traffic growth along Huntington Road will result in locally high congestion levels and increasing air emissions.	An increase in road capacity will address the projected increase in traffic over time, resulting in the least impact on air quality through 2031. Increased capacity means better traffic flow, less idling and less acceleration/deceleration. Intersection and operational improvements will improve traffic flows along Huntington Road, thereby reducing some emissions. However, commuter traffic is projected to grow significantly along Huntington Road resulting in increased greenhouse gas emissions overall.	Urbanizing this section of Huntington Road would provide safety and functional improvements, helping to lower air emissions.

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>Noise Effects</b>	Potential effects of noise on the adjacent community.	As traffic demand and congestion increase over time without any other improvements to Huntington Road, adverse noise effects on the adjacent land uses may increase.	TDM initiatives may help reduce the rate of increase in traffic congestion, which would alleviate some noise. That said, commuter traffic is projected to grow significantly along Huntington Road resulting in increased vehicular noise emissions.	Improvements to parallel roads may help reduce traffic congestion and noise along those routes. However, the projected commercial and commuter traffic growth along Huntington Road will result in locally high congestion levels and increasing noise emissions.	An increase in road capacity will address the projected increase in traffic over time, resulting in the least impact on noise through 2031. Increased capacity means better traffic flow, less idling and less acceleration/deceleration, specific concerns related to commercial vehicles. Intersection and operational improvements will improve traffic flows along Huntington Road, thereby reducing some noise. However, commuter traffic is projected to grow significantly along Huntington Road resulting in increased noise overall.	Urbanizing this section of Huntington Road will improve traffic flows along Huntington Road, thereby reducing noise emissions.
<b>Stormwater</b>	Potential impact on water runoff, water quality and quantity.	No impacts to stormwater.	No impacts to stormwater.	No impacts to stormwater on Huntington Road.	The additional impervious surface could significantly increase water runoff; as a result, suitable mitigation measures should be identified to minimize impacts to stormwater. Some intersection and operational improvements (i.e., adding turning lanes) could increase water runoff as a result of the additional impervious surface.	The additional impervious surface could increase water runoff, but overall upgrading the roadway will enhance the drainage system through gutters, catch basins and other improvements.
<b>Construction Impacts</b>	Potential for construction related effects such as noise, dust and odours on area residents, businesses and roadway users.	No construction-related effects on area residents, businesses and roadway users.	No construction-related effects on area residents, businesses and roadway users.	Potential short-term construction effects on parallel roads can be mitigated with noise, dust, and odour mitigation. No construction on Huntington Roads results in no construction-related impacts.	Potential short-term construction effects related to increasing the capacity of Huntington Road can be mitigated with noise, dust, and odour mitigation and a suitable traffic control plan. Potential short-term construction effects anticipated by implementing intersection and operational improvements; mitigation measures would include a traffic control plan that would ensure continuous access to properties and limited impact to commuters.	Potential short-term construction effects anticipated by implementing road improvements; mitigation measures would include a traffic control plan that would ensure continuous access to residential properties and limited impact to commuters.
<b>Built and Cultural Heritage</b>	Potential impact on built heritage resources and/or cultural heritage landscapes.	No Impacts to built heritage resources and/or cultural heritage landscapes.	No impacts to built heritage resources and/or cultural heritage landscapes.	Improvements to parallel roads could impact built heritage resources and/or cultural heritage landscapes on those particular roadways – but not on Huntington Road.	An increase in road capacity and/or intersection and operational improvements could result in significant impacts to built heritage resources and/or cultural heritage landscapes on Huntington Road, depending on the measures and the locations of the road widening and built heritage feature(s).	Road improvements could impact built heritage resources and/or cultural heritage landscapes on Huntington Road, depending on the measures implemented and the locations of the improvement(s).
<b>Archaeology</b>	Potential impact on archaeological resources.	The “Do Nothing” alternative would result in no impacts to archaeological resources.	No impacts to archaeological resources.	Improvements to parallel roads could impact archaeological resources on those particular roadways – but not on Huntington Road.	An increase in road capacity and/or intersection and operational improvements could result in significant impacts to archaeological resources on Huntington Road, depending on the measures, the locations of the road widening and archaeological potential.	Road improvements could impact archaeological resources on Huntington Road, depending on the measures implemented and the locations of archaeological potential.
<b>First Nations</b>	Potential impact on First Nation lands and resources.	The “Do Nothing” alternative would result in no First Nations impacts.	No impacts to First Nation land.	Potential impact on First Nation lands and resources but would be on adjacent roadways.	Potential for impact on First Nation lands and resources. Those First Nations groups will be contacted and will be involved throughout the study.	Limited potential for impact on First Nation lands and resources.

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>Economic</b>						
<b>Economic Development</b>	Potential impact on existing business operation and support for economic growth	This alternative would inhibit the potential for business development and growth, by reducing the mobility of commercial vehicles that must be accommodated by Huntington Road.	TDM initiatives would support future economic growth by serving as a tool to increase mobility of commercial vehicles while providing practical transportation modes for area employees.	Improvements to parallel roads would not foster economic growth to commercial and industrial interests along Huntington Road; while safety, access and mobility would improve on adjacent roads, commercial vehicles would be impeded by traffic on Huntington Road.	An increase in road capacity and/or intersection and operational improvements would support future economic growth by improving the safety, access and mobility for commercial vehicles; construction of any road widening may inhibit some business operations in the short-term and will require a detailed plan to mitigate economic impacts.	This alternative would support future economic growth by increasing mobility for commercial vehicles and providing improved transportation infrastructure for all users in the area.
<b>Capital Costs</b>	Potential capital cost of implementation.	No capital costs.	No capital costs.	Significant capital cost may be required to implement roadway improvements on alternate routes.	Significant capital cost may be required to add capacity to Huntington Road. Some capital cost may be required to implement intersection and operational improvements.	Moderate capital costs may be required to urbanize this section of Huntington Road.
<b>Summary of Key "Pros"</b>		<ul style="list-style-type: none"> <li>No impacts as a result of doing "nothing" along Huntington Road, although this is counterbalanced by the increased congestion, noise and air emissions that would result from a congested road.</li> <li>No capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>Promotes sustainable travel while providing practical commute options for local employees.</li> <li>Enhances pedestrian and cyclist safety.</li> <li>Supports local and regional planning initiatives and policies.</li> <li>Limited impacts to adjacent lands.</li> <li>No capital cost.</li> </ul>	<ul style="list-style-type: none"> <li>Improvements to parallel roads may help reduce traffic congestion and air emissions along those routes.</li> <li>May help divert some traffic from Huntington Road to the parallel routes.</li> </ul>	<ul style="list-style-type: none"> <li>Partially addresses increased growth and travel demand projected along Huntington Road through 2031.</li> <li>Operational improvements would modestly improve traffic flows along Huntington Road, especially at key intersections.</li> <li>Allows for the incorporation of cycling, pedestrian and transit facilities, and streetscaping improvements, providing enhanced safety, mobility and accessibility for different travel modes.</li> <li>Improved access to local businesses.</li> <li>Supports the recommendations identified in the Vaughan Transportation Master Plan and other initiatives.</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced pedestrian and cyclist safety.</li> <li>Improves roadway drainage and stormwater management requirements.</li> <li>Supports area planning initiatives and policies.</li> </ul>
<b>Summary of Key "Cons"</b>		<ul style="list-style-type: none"> <li>Would not accommodate projected traffic on Huntington Road through 2031.</li> <li>As a result of increased traffic along Huntington Road, this alternative would inhibit the potential for business development and growth.</li> <li>Would not facilitate sustainable travel modes safely and efficiently.</li> </ul>	<ul style="list-style-type: none"> <li>By itself, it would not fully address the challenges resulting from increased growth and travel demand.</li> </ul>	<ul style="list-style-type: none"> <li>Would not accommodate projected traffic along Huntington Road through 2031.</li> <li>As a result of increased traffic along Huntington Road, this alternative would inhibit the potential for business development and growth.</li> <li>Does not support area planning initiative and policies.</li> <li>Private property may be required.</li> <li>Significant capital cost.</li> </ul>	<ul style="list-style-type: none"> <li>By itself, it would not fully address the challenges resulting from increased growth and travel demand.</li> <li>Significant capital cost resulting from widening Huntington Road.</li> <li>Potential impacts that need to be appropriately mitigated.</li> <li>Private property may be required.</li> </ul>	<ul style="list-style-type: none"> <li>By itself, would not fully address the challenges from increased growth and travel demand.</li> <li>Moderate capital cost.</li> </ul>
<b>Overall Summary</b>		Does not address the problem, and has no potential to incorporate the opportunities.	Partially addresses the study requirements. Consider combining with other alternative(s).	Does not address the problem, and has no potential to incorporate the opportunities.	Partially addresses the study requirements. Consider combining with other alternative(s).	Partially addresses the study requirements. Consider combining with other alternative(s).
<b>Recommendation</b>		<b>Not Recommended.</b>	<b>Recommended as part of a package of improvements combined with Alternative #4 and #5.</b>	<b>Not Recommended.</b>	<b>Recommended as part of a package of improvements combined with Alternative #2 and #5.</b>	<b>Recommended as part of a package of improvements combined with Alternative #2 and #4.</b>



Table 26: Evaluation of Alternative Solutions, Part B (Major Mackenzie to Nashville Road)

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>The Transportation System</b>						
<b>Mobility and Accessibility</b>	Potential to support the projected population growth, residential land uses and traffic demand by 2031 as a result of new residential developments.	The existing roadway capacity cannot safely accommodate the projected traffic demand, and cycling and pedestrian infrastructure needed to support residential growth in Block 61.	A reduction in demand on Huntington Road through TDM improvements may address some traffic growth, but this solution alone will not accommodate the projected increase in traffic nor address potential safety and functional issues that will be required as a result of residential growth.	Improvements to parallel roads – through operational enhancements or widenings – may reduce travel demand on Huntington Road by diverting traffic elsewhere; however, it will have no effect on the safety and functional capabilities of Huntington Road.	This solution would accommodate projected travel demand on Huntington Road through 2031, although traffic projections suggest widening this section of Huntington Road is not warranted because of closures north and south of Major Mackenzie Drive.  Intersection and operational improvements would provide safety and functional improvements (i.e. turning lanes, enclosed drainage system, sidewalks, etc.) to Huntington Roads in support of new residential developments and increased traffic. However, this solution alone will not address all of the safety and functional requirements resulting from adjacent residential growth.	This solution would provide safety and functional improvements (i.e. curbs, enclosed drainage system, sidewalks, etc.) along Huntington Road in support of new residential developments and increased traffic.
<b>Safety</b>	Potential to improve travel safety between the construction date and 2031.	Increased traffic demand will reduce roadway safety without any improvements to Huntington Road. The corridor would experience more collisions than expected, possibly due to extended queuing, and frequent side street access from new residential developments. The lack of sidewalks along Huntington Road also raises some alarms.	Despite TDM measures, traffic demand and congestion is projected to increase resulting in reduced roadway safety for motorists, pedestrians and cyclists.	Improvements to parallel roads – through operational enhancements or widenings – may improve safety on Huntington Road by diverting traffic elsewhere; however, Huntington Road safety will still be a challenge as it copes with increased traffic resulting from new growth and several planned residential developments.	By accommodating the projected traffic demand, this alternative would enhance traffic safety as travel demand increases through to 2031. However, projections suggest widening this section of Huntington Road may not be warranted because of closures north and south of Major Mackenzie Drive. Operational improvements will enhance safety for roadway users, pedestrians and cyclists along Huntington Road and at intersecting roadways.	This solution would provide safety improvements (i.e. curbs, sidewalks, etc.) along Huntington Road in support of new residential developments and increased traffic.
<b>Sustainable Transportation</b>	Potential to incorporate improvements for cyclists, pedestrians, transit riders, and streetscaping on Huntington Road.	This section of Huntington Road currently lacks both sidewalks and cycling lanes, so safety is a concern as planned residential growth and traffic increase; transit service does not currently operate on Huntington Road, although service is likely given planned growth. However, given the existing alignment of Huntington Road, future increased traffic and limited space for bus stops, Huntington Road would not facilitate transit use in its current state.	Even with TDM measures in place, the existing roadway does not physically or safely accommodate sidewalks, cycling paths or transit stops.	Improvements on parallel roadways will not enable incorporating cyclist, pedestrian, transit, or streetscaping improvements on Huntington Road.	This alternative would allow for the incorporation of cycling, pedestrian and transit facilities, and streetscaping improvements along Huntington Road. Intersection and operational improvements will enhance safety, mobility and accessibility for pedestrians and cyclists along Huntington Road and at intersecting roadways; however, this solution alone does not address how to improve the functionality of Huntington Road for all users -which is a safety concern for cyclists and pedestrians in itself.	This solution would provide safety and functional improvements for pedestrians, cyclists and transit users, as well as motorists. Several safety and operational improvements would also be included as part of this alternative.
<b>The Natural Environment</b>						
<b>Aquatic and Terrestrial Environment</b>	Potential for altering existing watercourses; Potential impact on vegetation; Potential impact on wildlife and habitat;	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat.	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat.	No alteration of existing watercourses, and no impacts on vegetation or wildlife and habitat on Huntington Road.	Widening Huntington Road could impact some water crossings; vegetation and wildlife may be affected. Some geometric and operational improvements could impact watercourses, vegetation and wildlife habitat. Suitable mitigation measures would have to be identified to minimize impacts to the greatest extent possible.	Urbanizing Huntington Road (by adding curbs and gutters, catch basins, etc.) could impact some water crossings; vegetation and wildlife may be affected. Suitable mitigation measures would have to be identified to minimize impacts to the greatest extent possible.



Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>Groundwater</b>	Potential impact on water supply and groundwater quality	No impacts to groundwater supply and quality.	No impacts to groundwater supply and quality.	No impacts to groundwater supply and quality on Huntington Road.	The additional impervious surface from new roads and some intersection and operational improvements could cause impacts to groundwater quality and quantity.	Urban cross-sections are typically characterized by the presence of curb and gutter that define the edge of the road and channel stormwater runoff. Typically, drainage is handled by a system of storm sewers that ultimately discharge the runoff into established waterways.
<b>Policies and Governance</b>						
<b>Municipal and Regional Policies</b>	Consistent with the intent of the Vaughan Transportation Master Plan (2011); Supports the objectives of Vaughan's Community Sustainability and Environmental Master Plan ( <i>Green Directions Vaughan</i> ); Consistent with the intent of the Transportation Plan for the West Vaughan Employment Area (WVEA) Secondary Plan; Supports growth identified in Block 61 (Nashville Heights).	Does not support the City's Vision for the West Vaughan Employment Area or the recommendations made in Vaughan's Transportation Master Plan. Recognizing the planned growth in the area, the "Do Nothing" alternative overlooks the need to provide more efficient transportation options to existing and future residents.	Vaughan's Transportation Master Plan indicates strong support for TDM programs and initiatives: "Active transportation and Transportation Demand Management (TDM) are anticipated to become increasingly important elements of the City of Vaughan's transportation system." Consistent with the West Vaughan Employment Area (WVEA) Secondary Plan's requirement to "promote, encourage and facilitate bicycle and pedestrian activity to and within the WVEA" and "to work with the appropriate agencies to support effective transit service to the WVEA..."	York Region's recently completed Western Vaughan Transportation Improvements Individual Environmental Assessment (IEA) recommended several improvements to parallel and adjacent roads, including widening Rutherford Road, Major Mackenzie Drive, Highway 27 and other Regional roads in western Vaughan. Vaughan's Block 61 Secondary Plan (Nashville Heights) recommends several new roads that would increase mobility and accessibility for motorists, pedestrians and cyclists.	Vaughan's Transportation Master Plan recommends the need to add capacity and/or urbanize Huntington Road. The master plan suggests that Huntington Road will accommodate significant bus service and facilitate cycling and pedestrian movements in the corridor. Vaughan's Transportation Master Plan identifies broad intersection and design guidelines to improve operations for motorists, pedestrians and cyclists. The WVEA Secondary Plan broadly identifies the need to develop a street network that is safe, efficient, and balances user needs – including motorists, truck traffic, pedestrians and cyclists.	Vaughan's Transportation Master Plan recommends the need to add capacity and/or urbanize Huntington Road. The master plan suggests that Huntington Road will accommodate significant bus service and facilitate cycling and pedestrian movements in the corridor. Vaughan's Transportation Master Plan identifies broad intersection and design guidelines to improve operations for motorists, pedestrians and cyclists. The WVEA Secondary Plan broadly identifies the need to develop a street network that is safe, efficient, and balances user needs – including motorists, truck traffic, pedestrians and cyclists.
<b>Social and Cultural Environment</b>						
<b>Land Use</b>	Supports existing and future developments.	The existing corridor would not support residential developments planned in Block 61 (Nashville Heights).	TDM initiatives will support existing and future residents of Nashville Heights by providing more feasible options to commute to work.	Improvements to parallel roads – through operational enhancements or widenings – may improve safety on Huntington Road by diverting traffic elsewhere; however, Huntington Road safety will still be a challenge as it copes with increased traffic resulting from new growth and several planned residential developments in Nashville Heights.	Widening this section of Huntington Road would enhance connectivity and accessibility to residents of Nashville Heights. However, projections suggest widening this section of Huntington Road may not be warranted because of closures north and south of Major Mackenzie Drive. Intersection and operational improvements will enhance safety, mobility and accessibility for residential uses along Huntington Road and intersecting roadways, this solution alone will not address how to improve the functionality of Huntington Road for all users.	Urbanizing this section of Huntington Road would provide safety and functional improvements (i.e. curbs, enclosed drainage system, sidewalks, etc.) in support of new residential developments and increased traffic.
<b>Property</b>	Potential for requiring private property.	Private property would not be required.	Private property would not be required.	Private property may be required to implement roadway improvements on parallel roads. No property required on Huntington Road.	Private property may be required in some locations to accommodate additional road capacity, including cycling, pedestrian and transit facilities, and streetscaping improvements. Private property may be required in	Private property may be required in some locations to accommodate road improvements, including cycling, pedestrian and transit facilities, and streetscaping improvements.

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
					some locations to implement intersection and operational improvements (i.e., turning lanes, geometric improvements, etc.) on some sections of Huntington Road.	
<b>Air Quality</b>	Potential impact on air quality and/or greenhouse gas emissions.	Some impacts - this alternative would result in increased air emissions produced primarily from Nashville Heights traffic. The “Do Nothing” alternative would not enhance transit services, cycling and pedestrian infrastructure.	TDM initiatives may help reduce the rate of increase in traffic congestion, which would alleviate some emissions.	Improvements to parallel roads may help reduce traffic congestion and air emissions along those routes. However, the traffic projected along Huntington Road as a result of growth in Nashville Heights will lead to higher emissions.	While it is not likely that the level of traffic will justify widening Huntington Road, increased capacity means better traffic flow, less idling and less acceleration/deceleration. Intersection and operational improvements will improve traffic flows along Huntington Road, thereby reducing some emissions.	Urbanizing this section of Huntington Road would provide safety and functional improvements, helping to lower air emissions.
<b>Noise Effects</b>	Potential effects of noise on the adjacent community.	As traffic demand and congestion increase over time without any other improvements to Huntington Road, adverse noise effects on the adjacent residential land uses may increase.	TDM initiatives may help reduce the rate of increase in traffic congestion, which would alleviate some noise. That said, commuter traffic is projected to grow along Huntington Road resulting in increased vehicular noise emissions.	Improvements to parallel roads may help reduce traffic congestion and noise along those routes. However, the projected residential and commuter traffic growth along Huntington Road will result in higher congestion levels and increasing noise emissions.	An increase in road capacity will address the projected increase in traffic (and noise) over time. However, widening this section of Huntington Road may not be warranted as projected travel demands should be suitably accommodated by a two or three lane cross-section. Intersection and operational improvements will improve traffic flows along Huntington Road, thereby reducing some noise.	Urbanizing this section of Huntington Road will improve traffic flows along Huntington Road, thereby reducing noise emissions.
<b>Stormwater</b>	Potential impact on water runoff, water quality and quantity.	No impacts to stormwater.	No impacts to stormwater.	No impacts to stormwater on Huntington Road.	The additional impervious surface from widening and operational improvements could significantly increase water runoff; as a result, suitable mitigation measures should be identified to minimize impacts to stormwater.	The additional impervious surface could increase water runoff, but should enhance the drainage system through gutters, catch basins and other improvements.
<b>Construction Impacts</b>	Potential for construction related effects such as noise, dust and odours on area residents, businesses and roadway users.	No construction-related effects on area residents, and roadway users.	No construction-related effects on area residents and roadway users.	Potential short-term construction effects on parallel roads can be mitigated with noise, dust, and odour mitigation. No construction on Huntington Roads results in no construction-related impacts.	Potential short-term construction effects related to increasing the capacity of Huntington Road can be mitigated with noise, dust, and odour mitigation, as well as a suitable traffic control plan. Potential short-term construction effects anticipated by implementing intersection and operational improvements; mitigation measures would include a traffic control plan that would ensure continuous access to properties and limited impact to commuters.	Potential short-term construction effects anticipated by implementing road improvements; mitigation measures would include a traffic control plan that would ensure continuous access to residential properties and limited impact to commuters.
<b>Built and Cultural Heritage</b>	Potential impact on built heritage resources and/or cultural heritage landscapes.	No Impacts to built heritage resources and/or cultural heritage landscapes.	No impacts to built heritage resources and/or cultural heritage landscapes.	Improvements to parallel roads could impact built heritage resources and/or cultural heritage landscapes on those particular roadways – but not on Huntington Road.	An increase in road capacity and operational improvements could result in significant impacts to built heritage resources and/or cultural heritage landscapes on Huntington Road, depending on the measures and locations of the road widening and built heritage feature(s).	Road improvements could impact built heritage resources and/or cultural heritage landscapes on Huntington Road, depending on the measures implemented and the locations of the improvement(s).
<b>Archaeology</b>	Potential impact on archaeological resources	The “Do Nothing” alternative would result in no impacts to archaeological resources.	No impacts to archaeological resources.	Improvements to parallel roads could impact archaeological resources on those particular roadways – but not on Huntington Road.	An increase in road capacity and operational improvements could result in significant impacts to archaeological resources on Huntington Road, depending on the locations of the road widening and archaeological potential.	Road improvements could impact archaeological resources on Huntington Road, depending on the measures implemented and the locations of archaeological potential.

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
<b>First Nations</b>	Potential impact on First Nation lands and resources	The “Do Nothing” alternative would result in no First Nations impacts.	No impacts to First Nation land.	Potential impact on First Nation lands and resources but would be on adjacent roadways.	Potential for impact on First Nation lands and resources. Those First Nations groups will be contacted and will be involved throughout the study.	Limited potential for impact on First Nation lands and resources.
<b>Economic</b>						
<b>Economic Development</b>	Potential impact on existing business operation and support for economic growth	Minimal impact – this section of Huntington Road will primarily provide access to residential developments in Nashville Heights.	Minimal impact – this section of Huntington Road will primarily provide access to residential developments in Nashville Heights.	Improvements to parallel roads could foster economic growth to commercial and industrial interests in the community, but not along this section of Huntington Road where residential activity is the primary land use.	Minimal impact – this section of Huntington Road will primarily provide access to residential developments in Nashville Heights.	Minimal impact – this section of Huntington Road will primarily provide access to residential developments in Nashville Heights.
<b>Capital Costs</b>	Potential capital cost of implementation.	No capital costs.	No capital costs.	Significant capital costs may be required to implement roadway improvements on alternate routes.	Significant capital costs may be required to add capacity to Huntington Road. Some capital costs may be required to implement intersection and operational improvements on Huntington Road.	Moderate capital costs may be required to urbanize this section of Huntington Road.
<b>Summary of Key “Pros”</b>		<ul style="list-style-type: none"> <li>No impacts as a result of doing “nothing” along Huntington Road, although this is counterbalanced by the need to address the road’s safety, design and function for all modes and users recognizing new residential growth in Nashville Heights.</li> <li>No construction-related impacts.</li> <li>No capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>Promotes sustainable travel while providing practical commute options for local residents.</li> <li>Enhances pedestrian and cycling safety.</li> <li>Supports local and regional planning initiatives and policies.</li> <li>Limited capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>Improvements to parallel roads may help reduce traffic congestion and air emissions along those routes.</li> <li>May help divert some traffic from Huntington Road to the parallel routes.</li> </ul>	<ul style="list-style-type: none"> <li>Addresses the need to respond to increased growth and travel demand projected along Huntington Road through 2031.</li> <li>Operational improvements would modestly improve traffic flows along Huntington Road, especially at key intersections.</li> <li>Would enhance safety, mobility and accessibility for pedestrians and cyclists along Huntington Road and at intersecting roadways.</li> <li>Improved access to local residences.</li> <li>Allows for the incorporation of cycling, pedestrian and transit facilities, and streetscaping improvements along Huntington Road.</li> </ul>	<ul style="list-style-type: none"> <li>Reconstruction of the road to urban specifications will enhance stormwater management requirements and roadway drainage.</li> <li>Improve safety and operations for all users, and provide access and infrastructure for pedestrians, cyclists and transit users.</li> </ul>
<b>Summary of Key “Cons”</b>		<ul style="list-style-type: none"> <li>Based on projected residential growth, the “No Build” alternative would not provide a safe, functional means of travel along Huntington Road recognizing its rural character.</li> <li>Roadway drainage and stormwater management requirements not addressed.</li> <li>Area planning initiatives and policies not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>By itself, it would not fully address the challenges resulting from increased residential growth and travel demand, nor does it speak to the road design justified for the Nashville Heights community.</li> <li>Roadway drainage and stormwater management requirements not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Does not address the infrastructure needs of Huntington Road recognizing new development pressures within the Nashville Heights community.</li> <li>Improvements to parallel roadways will have little impact on the accessibility and mobility needs of Nashville Heights’ residents.</li> <li>Roadway drainage and stormwater management requirements not addressed.</li> <li>Private property may be required.</li> <li>Significant capital cost.</li> </ul>	<ul style="list-style-type: none"> <li>By itself, it would not fully address the need to improve the standards for Huntington Road – as the area will be changing from a rural to more urban or suburban character.</li> <li>Roadway drainage and stormwater management requirements not addressed.</li> <li>Widening not warranted and projected travel demands indicate a two to three lane cross-section will accommodate growth.</li> <li>Significant capital cost resulting from widening Huntington Road.</li> <li>Potential impacts that need to be appropriately mitigated.</li> <li>Private property may be required.</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts that will need to be mitigated (construction, natural heritage, etc.).</li> <li>Private property may be required.</li> </ul>
<b>Overall Summary</b>		Does not address the problem, and has no potential to incorporate the opportunities.	Partially addresses the study requirements. Consider combining with other alternative(s).	Does not address the problem, and has no potential to incorporate the opportunities.	Addresses the problem and has the potential to incorporate the opportunities, but travel demand projections do not justify widening this section of Huntington Road through 2031. Operational improvements	Partially addresses the study requirements. Consider combining with other alternative(s).

Factor	Evaluation Criteria	Alternative Solutions				
		Alternative 1: Do Nothing	Alternative 2: Travel Demand Management (TDM) Initiatives	Alternative 3: Improve Other Parallel Roadways	Alternative 4: Roadway Capacity and Operational Improvements	Alternative 5: Urbanize Cross-section
					partially addresses the study requirements. Consider combining with other alternative(s).	
<b>Recommendation</b>		Not Recommended	Recommended as part of a package of improvements combined with Alternative #4 and #5.	Not Recommended	Recommended as part of a package of improvements combined with Alternative #2 and #5.	Recommended as part of a package of improvements combined with Alternative #2 and #4.

## 4.3 IDENTIFICATION OF THE RECOMMENDED ALTERNATIVE SOLUTION

To summarize the findings of the evaluation, below is a short review on the alternative solutions:

### Alternative 1: Do Nothing

The 'Do Nothing' represents a status quo, meaning no changes would be made to the existing roadway and configuration. While doing so would have no immediate impacts and no capital costs, longer term impacts due to congestion will surely be felt with increased traffic over the next 20 years. Other negative impacts of the 'Do Nothing' alternative include decreased safety for all travel modes and overall negative impact to the environment such as air quality and noise. Therefore, this alternative was not recommended.

### Alternative 2: Travel Demand Management (TDM) Initiatives

TDM initiatives can help to offset some traffic and slow the rate of traffic increase, however will not be fully able to address the projected traffic growth along Huntington Road. While it partially touches on the Problem Statement, TDM cannot address the opportunity statement. Therefore, Alternative 2 will go forward as part of the recommended solution, in combination with other alternatives.

### Alternative 3: Improve Other Parallel Roadways

Improving other parallel roadways may help divert some traffic away from Huntington Road. However, issues pertaining to Huntington Road itself, such as local traffic, access and egress points for businesses, and safety, would not be addressed. In particular, most traffic traversing Huntington Road is local traffic that must use Huntington Road to reach their destinations, especially now that the road is split in two sections. This alternative seems to provide more benefits for the parallel roadway itself rather than generating positive impacts on Huntington Road. As a result, this alternative is not recommended.

### Alternative 4: Roadway Capacity and Operational Improvements

Improving roadway capacity on Huntington Road is the most effective alternative to address the projected traffic increase. Increasing capacity and providing operational improvements can address both the problem and the opportunity statement, by accommodating more traffic, incorporate other modes of transportation, and streetscaping. Therefore, Alternative 4 would offer the best solution to the problem/opportunity statements. However, it is noted that Alternatives 2 and 5, in conjunction with Alternative 4, offers a good comprehensive solution and would work best in combination with each other.

### Alternative 5: Urbanize Cross-section

Urbanizing the cross-section will improve stormwater management and roadway drainage, a provision other alternatives do not offer. In addition to stormwater improvements, an urbanized cross-section can also offer safer and better access for transit users, cyclists and pedestrians. While Alternative 5 only partially addresses the Problem Statement, this solution will help move the Opportunity Statement forward. Therefore, Alternative 5 will be part of the recommended solution in combination with Alternatives 2 and 4.

Based on the evaluation of the alternative solutions, the recommended solution for Huntington Road (Parts A and B) is a combination of:

- Travel Demand Management (TDM) initiatives;
- Roadway capacity and operational improvements; and,
- Urbanization of the roadway corridor.

A Public Information Centre (PIC) was also conducted in conjunction with this milestone in the Huntington Road Study to share and discuss the evaluation and alternative solutions selection process with the public and other stakeholders. More information is provided in Section 7 of this report.



## 5. ALTERNATIVE DESIGN CONCEPTS

### 5.1 IDENTIFICATION AND DESCRIPTION OF THE ALTERNATIVE DESIGNS

Following the selection of the recommended solutions in Phase 2 of the Municipal Class EA process, Phase 3 commenced. This involved development of alternative design concepts to achieve the selected alternative solutions, and the evaluation and presentation of the alternative designs to the public and technical agencies for comment.

Alternative designs were developed according to the existing and future traffic and development conditions of Part A and Part B separately, as the traffic volumes and uses of the road were recognized to be different. Initially, several alternative designs were considered and were then narrowed down based on feasibility, suitability, and need. The next sections discuss the alternative designs considered for Part A and Part B, respectively.

#### 5.1.1 ALTERNATIVE DESIGNS FOR PART A

The traffic report showed that Part A of the study area would experience a high increase in traffic volumes and congestion and would warrant additional lanes. The traffic report also recommended signaling several intersections to facilitate turning movements, thus urbanizing the roadway corridor and providing sufficient turning lanes should be incorporated into the alternative design. Lastly, to accommodate different modes of transportation, either a sidewalk and/or multi-use trail should be considered. If only one is selected, it should be located on the east of Huntington Road, where most of the development is planned to occur.

Based on the needs of Part A (mentioned above), 3 alternative designs were developed in addition to the 'Do Nothing' option. These alternative designs include various combinations of additional lanes, a multi-use trail, and a sidewalk, and are described in further detail below - illustrated cross-sections of each (facing north) are shown in **Figure 16**. As per City of Vaughan standards and requirements, a 26 metre right-of-way will be designed for, regardless of the actual roadway width. This would include additional greenspace along the boulevards to meet the 26 metre right-of-way width. According to the City of Vaughan Pedestrian and Bicycle Master Plan, a multi-use trail will be 3 metres wide and a sidewalk will be 1.5 metres wide.

##### Alternative 1: Do Nothing

Assumes that no improvements would be made to this section of Huntington Road, other than regular maintenance operations.

##### Alternative 2: Two-Lane Urban Roadway with Multi-Use Trail and Sidewalk

No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City's standards.

##### Alternative 3: Four-Lane Urban Roadway with Multi-Use Trail and Sidewalk

Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. A 26 metre right-of-way will be incorporated into the design per the City's standards.

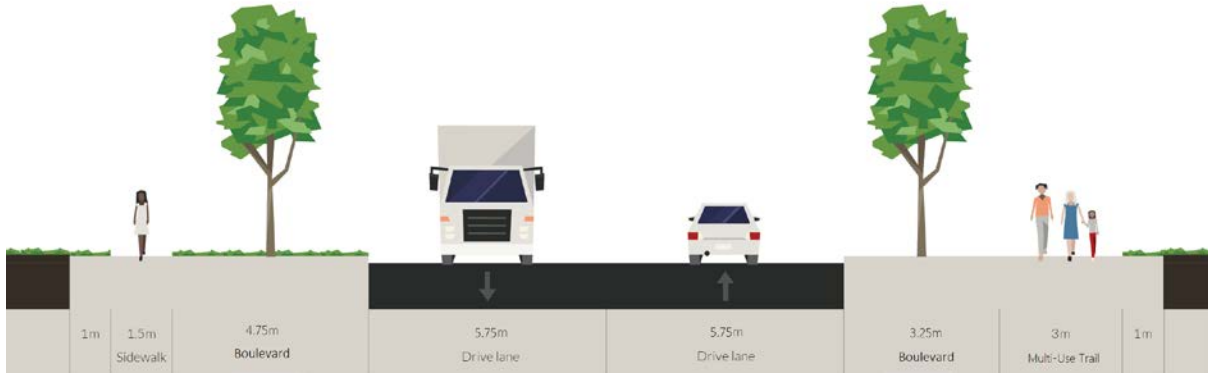
##### Alternative 4: Four-Lane Urban Roadway with Multi-Use Trail

Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and a multi-use trail included only on the east side of the street. A vegetated boulevard will be included adjacent to the roadway, particularly on the east side to act as a buffer to the multi-use trail. A 26 metre right-of-way will be incorporated into the design per the City's standards.

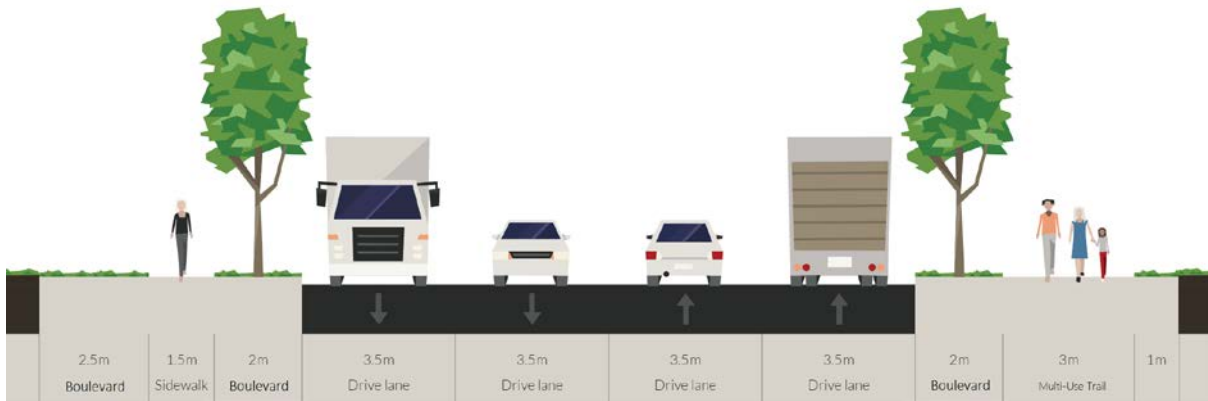




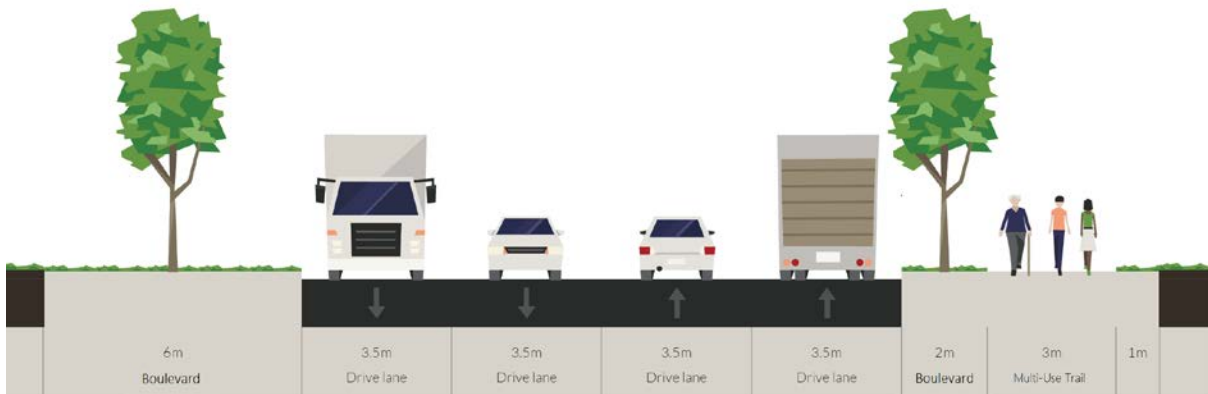
Alternative 1: Do Nothing



Alternative 2: Two-Lane Urban Roadway with Multi-use Trail and Sidewalk



Alternative 3: Four-Lane Urban Roadway with Multi-Use Trail and Sidewalk



Alternative 4: Four-Lane Urban Roadway with Multi-use Trail

Figure 16: Illustrated Design Alternatives for Part A

## 5.1.2 ALTERNATIVE DESIGNS FOR PART B

The traffic report for Part B of the study showed that this section of Huntington Road would not experience significant traffic volumes and congestion, and consequently would not warrant additional lanes. The report also stated that most of the future intersections on Huntington Road, between Major Mackenzie Drive and Nashville Road, would operate well under stop sign control. Signalized intersections are needed at the Major Mackenzie Drive and Nashville Road intersections. Lastly, to accommodate different modes of transportation, either a sidewalk and/or multi-use trail should be considered. If only one is selected, it should be located on the east of Huntington Road, where residential development is currently occurring.

Based on the needs of Part B (mentioned above), 3 alternative designs were developed in addition to the 'Do Nothing' option. These alternative designs include various combinations of additional lanes, a multi-use trail, and a sidewalk, and are described in further detail below - illustrated cross-sections of the roadway for each alternative design (facing north) are shown in **Figure 17**. As per City of Vaughan standards and requirements, a 26 metre right-of-way will be designed for, regardless of the actual roadway width. This would include additional greenspace along the boulevards to meet the 26 metre right-of-way width. According to the City of Vaughan Pedestrian and Bicycle Master Plan, a multi-use trail will be 3 metres wide and a sidewalk will be 1.5 metres wide.

### Alternative 1: Do Nothing

Assumes that no improvements would be made to this section of Huntington Road, other than regular maintenance operations.

### Alternative 2: Four-Lane Urban Roadway with Multi-Use Trail and Sidewalk

Widening of Huntington Road to four lanes (one additional lane per direction). The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. A 26 metre right-of-way will be incorporated into the design per the City's standards.

### Alternative 3: Two-Lane Urban Roadway with Multi-Use Trail and Sidewalk

No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, one on each side of the street. A vegetated boulevard will be included adjacent to the roadway to act as a buffer to the multi-use trail/sidewalk. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City's standards.

### Alternative 4: Two-Lane Urban Roadway with Multi-Use Trail

No additional lanes will be added to Huntington Road. The roadway will be urbanized, operational improvements and turning movements incorporated, and active transportation facilities included, and a multi-use trail included only on the east side of the street. A vegetated boulevard will be included adjacent to the roadway, particularly to act as a buffer to the multi-use trail. The lanes will be widened to 5.75 metres and a 26 metre right-of-way will be incorporated into the design per the City's standards.

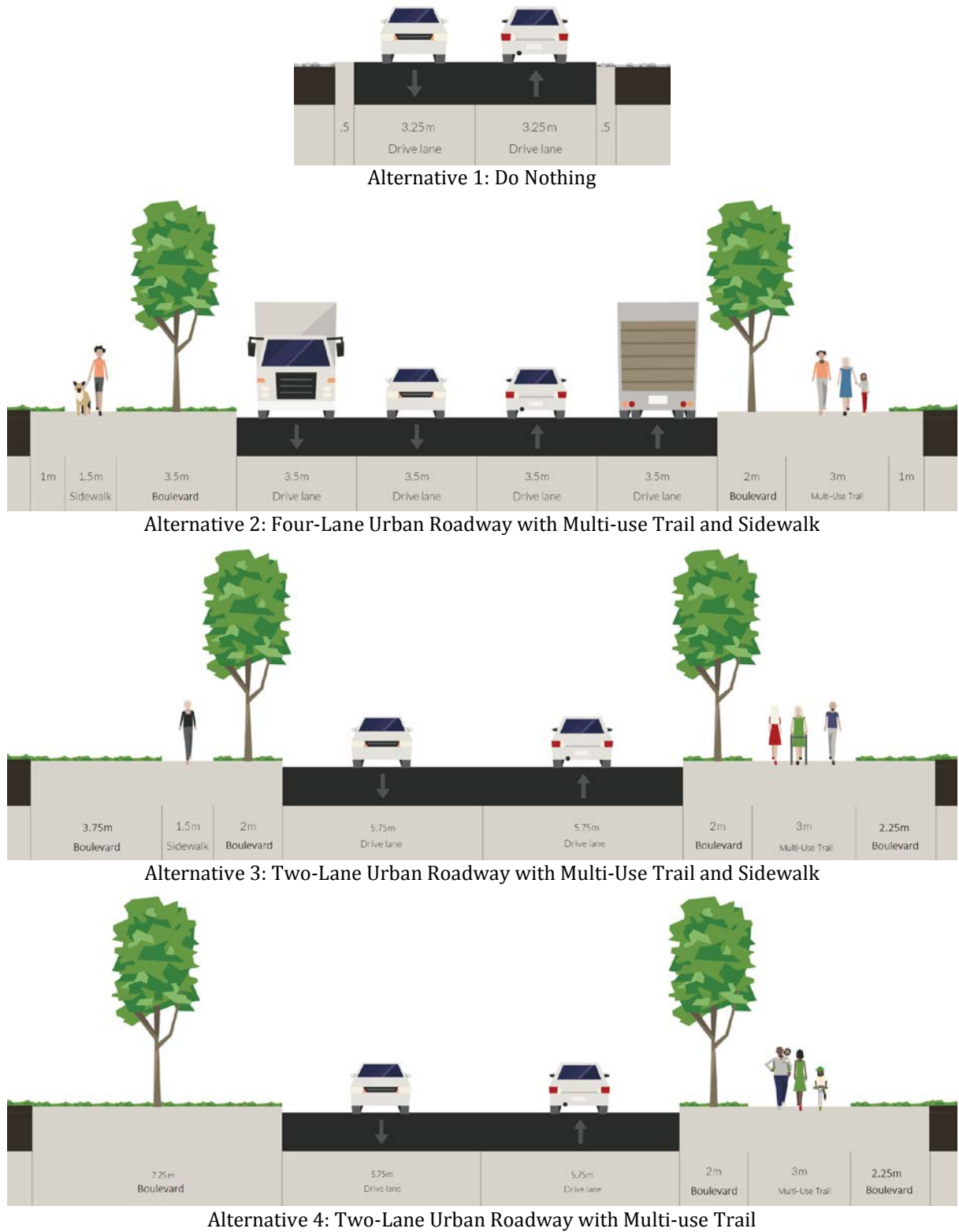


Figure 17: Illustrated Design Alternatives for Part B

## 5.2 CRITERIA AND EVALUATION OF ALTERNATIVE DESIGNS

Following the development of the alternative design concepts for Part A and Part B, criteria were developed to be used in the evaluation to determine the preferred alternative design. While similar criteria to those in the evaluation of alternative solutions were used, several changes were made to reflect the more detailed, site-specific alternative designs rather than the conceptual alternative solutions. In other words, since the alternative designs are ways to carry out the recommended alternative solutions, some criteria did not need to be evaluated again and new criteria might be more relevant.

The 'Policies and Governance' section was not included in this evaluation as that has already been satisfied through the selection of the alternative solutions. A 'Utilities' section was included to account for the need to relocate and reinstate specific utility facilities while widening and urbanizing the road. Several other criteria were added, such as 'Roadway Design Guidelines' and "Freight Traffic", to address the specific challenges and context of the study area.

In general, the specific criteria in the evaluation were selected based on their ability to identify the potential environmental impacts of the alternative designs on the existing conditions. This allows the evaluation of the alternative designs to more clearly identify the strengths and weaknesses between the alternatives. **Table 27** and **Table 28** below show the evaluation of the Alternative Design Concepts for Part A and Part B, respectively.

Table 27: Evaluation of Alternative Design Concepts, Part A (Langstaff Road to McGillivray Road)

Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail
<b>Transportation</b>					
<b>Traffic Capacity</b>	Ability to suitably address projected future traffic volumes to 2034	Under 2034 traffic conditions, unsignalized intersections on Huntington Road will experience significant delay. Long queues on Huntington Road will propagate due to stop sign control. Huntington Road's intersections and two-lane rural roadway will work at oversaturated condition with unacceptable traffic operations.	Urbanizing the roadway will provide some operational benefits, but a two-lane roadway will still work at oversaturated conditions with unacceptable traffic operations. Signalization of specific intersections will also help, however, two lanes will not be able to support projected traffic volumes.	Under 2034 traffic conditions, adding one lane per direction to Huntington Road from Rutherford Road to Langstaff Road could significantly reduce delay and provide adequate capacity to Huntington Road. Huntington Road is projected to experience reasonable traffic operations under four-lane condition. Signalization of specific intersections will also help manage traffic.	Under 2034 traffic conditions, adding one lane per direction to Huntington Road from Rutherford Road to Langstaff Road could significantly reduce delay and provide adequate capacity to Huntington Road. Huntington Road is projected to experience reasonable traffic operations under four-lane condition. Signalization of specific intersections will also help manage traffic.
<b>Roadway Design Guidelines</b>	Ability to meet City of Vaughan road design standards	Existing Huntington Road geometry is below required design speed of 80 km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80 km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80 km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80 km/h.
	Potential improvement to Driver's Comfort	Below design speed profile curves results in bumpy road. Extra driver attention is required for inconsistent roadway width.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Standard 5.75 m roadway width will enhance driver's comfort.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Four standard 3.5 m roadway lane will enhance driver's comfort.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Four standard 3.5 m roadway lane will enhance driver's comfort.
<b>Safety</b>	Potential to improve roadway safety	Two-lane roads with high traffic volumes and a wide mixture of heavy truck and passenger vehicles will increase the demand for overtaking slower vehicles, which may result in a higher risk of severe collisions. Some locations along Huntington Road do not meet 80 km/h safety requirement.	Two-lane roads with high traffic volumes and wide mixture of heavy truck and passenger vehicles will increase the demand for overtaking slower vehicles, which may result in a higher risk of severe collisions. Geometric improvements will meet 80 km/h safety requirements. Provision of illumination will enhance roadway safety for night time traffic.	Four-lane roads will minimize collisions caused by overtaking vehicles. Geometric improvements will meet 80 km/h safety requirements. Provision of illumination will enhance roadway safety for night time traffic.	Four-lane roads will minimize collisions caused by overtaking vehicles. Geometric improvements will meet 80 km/h safety requirements. Provision of illumination will enhance roadway safety for night time traffic.
	Potential to improve intersection safety	Unsignalized intersections have large conflict areas where severe collisions can occur. Rear-end collisions are more likely to occur with shared turn/through movements.	Signalized intersections will minimize conflict areas. Rear-end collision can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be enhanced.	Signalized intersections will minimize conflict areas. Rear-end collision can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be enhanced.	Signalized intersections will minimize conflict areas. Rear-end collision can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be enhanced.
	Potential to improve pedestrian and cyclists' safety	High risk of accidents for pedestrians and cyclist on Huntington Road.	Huntington Road will provide separated pedestrian/cyclist facilities, which enhance pedestrian and cyclist safety.	Huntington Road will provide separated sidewalk and multi-use trail, which will enhance pedestrian and cyclist safety.	Huntington Road will provide separated pedestrian/cyclist facilities, which will enhance pedestrian and cyclist safety.
<b>Transit</b>	Ability to accommodate transit service	The existing infrastructure along Huntington Road will not support improved transit service to employment lands, nor will it accommodate sidewalks/trails to facilitate transit use.	Urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).	Widening and urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).	Widening and urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).
<b>Freight Traffic</b>	Ability to meet capacity and design requirements	Significant share of heavy vehicles in traffic flow reduces the roadway capacity. Under 2034 conditions, when major commercial developments are in operation, heavy vehicle share in traffic composition will dramatically increase. This could deteriorate traffic conditions on Huntington Road and signify lack of capacity. A two-lane rural road may also be dangerous for freight traffic, lead to significant delays, and be difficult for heavy vehicles to operate.	Significant share of heavy vehicles in traffic flow reduces the roadway capacity. Under 2034 conditions, when major commercial developments are in operation, heavy vehicle share in traffic composition will dramatically increase. This could deteriorate traffic conditions on Huntington Road and signify lack of capacity. A two-lane urban road may lead to significant delays and be difficult for heavy vehicles to operate.	Huntington Road will experience heavy vehicle traffic growth under future conditions due to major commercial developments. A four-lane roadway could contribute to provide more reasonable traffic levels of service compared to a two-lane roadway by providing more capacity.	Huntington Road will experience heavy vehicle traffic growth under future conditions due to major commercial developments. A four-lane roadway could contribute to provide more reasonable traffic levels of service compared to a two-lane roadway by providing more capacity.
<b>Pedestrians and Cyclists</b>	Ability to provide pedestrian and bicycle-friendly streets / infrastructure	The existing infrastructure along Huntington Road will not support safe cycling and pedestrian use, due to a lack of sidewalks, trails and on-street cycling lanes.	Proposed improvements will support safe cycling and pedestrian use by providing a multi-use trail and sidewalk on opposite sides of the street.	Proposed improvements will support safe cycling and pedestrian use by providing a multi-use trail and sidewalk on opposite sides of the street. A sidewalk to the west would not be needed from Rutherford to McGillivray due to the CP Rail facility. A sidewalk to the west from Langstaff to Rutherford would support potential future development.	Proposed improvements will support safe cycling and pedestrian use by providing a multi-use trail on one side of the street. More suitable for Rutherford to McGillivray as a sidewalk would not be needed on the west due to the CP lands.
<b>Phasing and Implementation</b>	Potential disruptions of existing travel	No disruption of existing travel.	Narrowed lane width, temporary daily reduction to one traffic lane, and the use of flagging is expected. Minor disruption of existing traffic.	Traffic in both directions can be maintained at all times with roadway widening on one side. Minimal disruption of existing traffic.	Traffic in both directions can be maintained at all times with roadway widening on one side. Minimal disruption of existing traffic.



Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail
<b>Natural Environment</b>					
<b>Aquatic</b>	Fish Habitat – Degree of impact to aquatic wildlife and their habitat	No impacts.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Rd and Rutherford Rd. Fish habitat and wildlife conditions would be improved through the creek realignment design.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Rd and Rutherford Rd. Fish habitat and wildlife conditions would be improved through the creek realignment design.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Rd and Rutherford Rd. Fish habitat and wildlife conditions would be improved through the creek realignment design.
	Channel Stability – Potential impacts to alter watercourses and channel stability	No impacts.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Road and Rutherford Road. Creek stability will be maintained or improved through the creek realignment design.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Road and Rutherford Road. Creek stability will be maintained or improved through the creek realignment design.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability. Extending the right-of-way to 26 metres requires realignment of a watercourse on the northeast corner of Huntington Road and Rutherford Road. Creek stability will be maintained or improved through the creek realignment design.
<b>Terrestrial</b>	Vegetation/Flora – Degree of impact to surrounding vegetation and terrain	No impacts.	1.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.	1.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.	1.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.
	Wildlife – Degree of impact to wildlife and their habitat	No impacts.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provides and enhances wildlife crossing opportunities, particularly for small mammals.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provides and enhances wildlife crossing opportunities, particularly for small mammals.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provides and enhances wildlife crossing opportunities, particularly for small mammals.
<b>Groundwater</b>	Potential to alter groundwater quality and quantity	No impacts.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.
<b>Stormwater</b>	Potential impact	No impacts.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.
<b>Socio-Economic Environment</b>					
<b>Archaeological Resources</b>	Potential to impact areas of archaeological significance	No archaeological impacts.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design.
<b>Built/Cultural Heritage</b>	Potential to impact built heritage and cultural resources	No impacts to built and cultural heritage.	No direct impacts of widening on built and cultural heritage. Indirect impacts on the entrance drive to several properties. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).	No direct impacts of widening on built and cultural heritage. Indirect impacts on the entrance drive to several properties. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).	No direct impacts of widening on built and cultural heritage. Indirect impacts on the entrance drive to several properties. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).
<b>First Nations</b>	Potential to impact First Nations' Lands	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.
<b>Property</b>	Potential property acquisition required	No impacts.	Approximate 2.3 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 6.0 Ha of property for grading beyond 26m R.O.W.	Approximate 2.3 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 6.0 Ha of property for grading beyond 26m R.O.W.	Approximate 2.3 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 6.0 Ha of property for grading beyond 26m R.O.W.
<b>Land Use</b>	Supports existing and future surrounding land uses	Will not support existing and planned commercial developments as a result of substandard infrastructure and the lack of cycling and pedestrian facilities.	Does not support the City's Transportation Master Plan and will not support existing and planned commercial developments as it will not accommodate projected traffic and employment growth.	Supports the City's Transportation Master Plan and existing and planned commercial developments by accommodating projected traffic and employment growth. Having cycling and pedestrian facilities on both sides of the roadway is beneficial from Langstaff to Rutherford to support potential future development to the west.	Supports the City's Transportation Master Plan and existing and planned commercial developments by accommodating projected traffic and employment growth. Having cycling and pedestrian facilities to the east of Huntington Road is beneficial from Rutherford to McGillivray, as development will only

Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Four-lane Urban Roadway with Multi-use Trail
					occur to the east, due to existing CP lands on the west.
<b>Noise and Vibration</b>	Degree of noise and vibration impacts on adjacent communities	Significant noise impacts due to heavy congestion as a result of the roadway being unable to handle increased traffic demand.	Significant noise impacts due to heavy congestion as a result of the roadway being unable to handle increased traffic demand.	Some impacts due to increased traffic volumes. Widening would improve flow and reduce the noise impacts on the corridor. No major mitigation measures needed.	Some impacts due to increased traffic volumes. Widening would improve flow and reduce the noise impacts on the corridor. No major mitigation measures needed.
<b>Air Quality</b>	Degree of air quality / greenhouse gas impacts on adjacent lands	Traffic growth resulting from increased commercial activity will result in several queues and delay throughout the corridor, resulting in increased emissions in the long term.	Traffic growth resulting from increased commercial activity will result in several queues and delay throughout the corridor, resulting in increased emissions; some greenhouse gas emissions offset by increased transit, cycling and pedestrian use.	Widening Huntington Road will reduce queues at key intersections as well as overall delay, thereby minimizing greenhouse gas emissions; some greenhouse gas emissions offset by increased transit, cycling and pedestrian use.	Widening Huntington Road will reduce queues at key intersections as well as overall delay, thereby minimizing greenhouse gas emissions; some greenhouse gas emissions offset by increased transit, cycling and pedestrian use.
<b>Utilities</b>					
<b>Utilities</b>	Potential impact on utilities resulting from design alignment	No impacts.	Utilities impact: <ul style="list-style-type: none"> <li>Hydro/Bell Poles</li> <li>Watermain</li> <li>Power Stream</li> <li>Gasmain</li> </ul>	Utilities impact: <ul style="list-style-type: none"> <li>Hydro/Bell Poles</li> <li>Watermain</li> <li>Power Stream</li> <li>Gasmain</li> </ul>	Utilities impact: <ul style="list-style-type: none"> <li>Hydro/Bell Poles</li> <li>Watermain</li> <li>Power Stream</li> <li>Gasmain</li> </ul>
<b>Financial</b>					
<b>Capital Costs</b>	Potential capital cost of implementation	No capital costs.	Approximately \$19.6 M.	Approximately \$51.0 M.	Approximately \$50.5 M.
<b>Operation and Maintenance Costs</b>	Potential cost of operating and maintaining infrastructure improvements	Operation and maintenance costs would increase over time due to the increased use of Huntington Road as a result of more traffic.	Minor increase to operation and maintenance costs with widened pavement and winter maintenance of sidewalk. Multi-use trail is expected to be closed in the winter.	Highest operation and maintenance cost with 4-lane roadway and winter maintenance of sidewalk. Multi-use trail is expected to be closed in the winter.	High operation and maintenance cost with 4-lane roadway and winter maintenance of multi-use trail.
<b>Summary</b>					
<b>Summary of Key "Pros"</b>		<ul style="list-style-type: none"> <li>No impacts as a result of doing "nothing" along Huntington Road, although this is counterbalanced by the need to address the road's safety, design and function for all modes and users recognizing new residential growth in Nashville Heights.</li> <li>No construction-related impacts.</li> <li>No capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>Urbanizing the roadway will improve travel and safety along the corridor for vehicles.</li> <li>Improve pedestrian/cycling travel.</li> <li>Addresses drainage and stormwater management requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Can accommodate projected growth and traffic along the corridor.</li> <li>Will improve safety and travel, particularly for freight.</li> <li>Area planning initiatives and policies are addressed.</li> <li>Sidewalk on the west would best accommodate future development from Langstaff to Rutherford.</li> </ul>	<ul style="list-style-type: none"> <li>Can accommodate projected growth and traffic along the corridor.</li> <li>Will improve safety and travel, particularly for freight.</li> <li>Area planning initiatives and policies are addressed.</li> <li>Best suited for Rutherford to McGillivray where a sidewalk is not needed on the west due to existing CP lands.</li> </ul>
<b>Summary of Key "Cons"</b>		<ul style="list-style-type: none"> <li>Based on projected residential growth, the "Do Nothing" alternative would not provide a safe, functional means of travel along Huntington Road, recognizing its rural character.</li> <li>Roadway drainage and stormwater management not addressed.</li> <li>Area planning initiatives and policies not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Will not be able to accommodate projected growth and traffic along the corridor and may present operational challenges for freight traffic.</li> <li>Area planning initiatives and policies not addressed.</li> <li>Moderate impacts to the natural and socio-economic environment.</li> </ul>	<ul style="list-style-type: none"> <li>Moderate impacts to the natural and socio-economic environment.</li> <li>Highest capital and maintenance costs.</li> </ul>	<ul style="list-style-type: none"> <li>Moderate impacts to the natural and socio-economic environment.</li> <li>High capital and maintenance costs.</li> </ul>
<b>Overall Summary</b>		<b>Does not address the problem, and has no potential to incorporate the opportunities.</b>	<b>Does not address the problem, and partially incorporates the opportunities.</b>	<b>Addresses the problem and has the potential to incorporate the opportunities.</b>	<b>Addresses the problem and has the potential to incorporate the opportunities.</b>
<b>Recommendation</b>		<b>Not Recommended.</b>	<b>Not Recommended.</b>	<b>Recommended for Langstaff Road to Rutherford Road.</b>	<b>Recommended for Rutherford Road to McGillivray Road.</b>

Table 28: Evaluation of Alternative Design Concepts, Part B (Major Mackenzie Drive to Nashville Road)

Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail
<b>Transportation</b>					
<b>Traffic Capacity</b>	Ability to suitably address projected future traffic volumes to 2034	Under 2034 traffic conditions, the unsignalized intersections along Huntington Road from Nashville Road to Major Mackenzie Drive will operate at a reasonable level of service and Huntington Road movements will not experience significant delay except for the intersection of Huntington Road and Nashville Road. Long queues for stop controlled movements on Huntington Road will propagate. Future volumes could be suitably provided for by one lane per direction.	High traffic volume is not expected on Huntington Road from Major Mackenzie Drive to Nashville Road. Widening the two-lane roadway to a four-lane roadway may only slightly improve traffic operations along Huntington Road with minor changes in delay.	Under 2034 traffic conditions, the unsignalized intersections along Huntington Road from Major Mackenzie Drive to Nashville Road will operate at a reasonable level of service and Huntington Road movements will not experience significant delay. Signalization of Huntington Road's intersections at Nashville Road will result in reasonable traffic operations. Urbanizing the roadway will improve traffic operations and flow. Future volumes could be suitably provided for by one lane per direction.	Under 2034 traffic conditions, the unsignalized intersections along Huntington Road from Major Mackenzie Drive to Nashville Road will operate at a reasonable level of service and Huntington Road movements will not experience significant delay. Signalization of Huntington Road's intersections at Nashville Road will result in reasonable traffic operations. Urbanizing the roadway will improve traffic operations and flow. Future volumes could be suitably provided for by one lane per direction.
<b>Roadway Design Guidelines</b>	Ability to meet City of Vaughan road design standards	Existing Huntington Road geometry is below required design speed of 80 km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80km/h.	Huntington Road will be upgraded to meet geometric requirement for design speed of 80km/h.
	Potential improvement to Driver's Comfort	Below design speed profile curves results in bumpy road. Extra driver attention is required for inconsistent roadway width.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Standard 5.75 m roadway width will enhance driver's comfort.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Four standard 3.5 m roadway lane will enhance driver's comfort.	Geometric upgrades will provide smoother profile to enhance driver's comfort. Four standard 3.5 m roadway lane will enhance driver's comfort.
<b>Safety</b>	Potential to improve travel safety for all modes of transportation	Under 2034 traffic conditions, a two-lane collector roadway with a posted speed limit of 60 km/h and rather low traffic volume provides reasonable safety levels and low collision risk. Some locations along Huntington Road do not meet 80 km/h design speed safety requirements.	Conversion of a two-lane roadway to a four-lane roadway could result in crash reduction overall. However, widening of two-lane roadways with rather low volumes could result in a speed increase due to excessive capacity and traffic free flow conditions. This situation may lead to safety risks which is undesirable, especially for a residential area. Geometric improvements will meet 80 km/h design speed safety requirements. Provision of illumination will enhance roadway safety for night time traffic.	Under 2034 traffic conditions, a two-lane collector roadway with a posted speed limit of 60 km/h and rather low traffic volume provides reasonable safety levels and low collision risk. Geometric improvements will meet 80 km/h design speed safety requirements. Provision of illumination will enhance roadway safety for night time traffic.	Under 2034 traffic conditions, a two-lane collector roadway with a posted speed limit of 60 km/h and rather low traffic volume provides reasonable safety levels and low collision risk. Geometric improvements will meet 80 km/h design speed safety requirements. Provision of illumination will enhance roadway safety for night time traffic.
	Potential to improve intersection safety	Unsignalized intersections have large conflict areas where severe collisions can occur. Rear-end collisions are more likely to occur with shared turn/through movements at the Nashville Road intersection.	Signalized intersection at Nashville Road will minimize conflict areas. Rear-end collisions can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be improved.	Signalized intersection at Nashville Road will minimize conflict areas. Rear-end collisions can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be improved.	Signalized intersection at Nashville Road will minimize conflict areas. Rear-end collisions can be reduced with the provision of turning lanes. Overall safety for vehicles, pedestrians and cyclists will be improved.
	Potential to improve pedestrian and cyclists' safety	High risk of accidents for pedestrians and cyclists on Huntington Road.	Huntington Road will provide separated pedestrian/cyclist facilities, which enhance pedestrian and cyclist safety.	Huntington Road will provide separated sidewalk and multi-use trail, which will enhance pedestrian and cyclist safety.	Huntington Road will provide separated pedestrian/cyclist facilities, which will enhance pedestrian and cyclist safety.
<b>Transit</b>	Ability to accommodate transit service	The existing infrastructure along Huntington Road will not support improved transit service to planned and existing residential lands, nor will it accommodate sidewalks/trails to facilitate transit use.	Widening and urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).	Urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).	Urbanizing Huntington Road will support transit service enhancements through improved service and transit infrastructure (i.e., sidewalks, shelters, etc.).
<b>Freight Traffic</b>	Ability to meet capacity and design requirements	By 2034, Part B of the study area will be predominantly occupied by residential units and retail land uses. Therefore, a rather low volume of heavy vehicles is anticipated and can be reasonably served by a two-lane roadway.	Huntington Road will not experience a high volume of heavy vehicle traffic under future conditions due to major residential developments in Part B of the study area. A four-lane roadway could provide excessive capacity, attracting more heavy vehicles as a less congested alternative to major arterials.	By 2034, Part B of the study area will be predominantly occupied by residential units and retail land uses. Therefore, a rather low volume of heavy vehicles is anticipated and can be reasonably served by a two-lane roadway.	By 2034, Part B of the study area will be predominantly occupied by residential units and retail land uses. Therefore, a rather low volume of heavy vehicles is anticipated and can be reasonably served by a two-lane roadway.
<b>Pedestrians and Cyclists</b>	Ability to provide pedestrian and bicycle-friendly streets / infrastructure	The existing infrastructure along Huntington Road will not support safe cycling and pedestrian use resulting from the lack of sidewalks, trails and on-street cycling lanes.	Proposed improvements will support safe cycling and pedestrian use by providing a multi-use trail and sidewalk on opposite sides of the street.	Proposed improvements will support safe cycling and pedestrian use by providing a multi-use trail and sidewalk on opposite sides of the street.	Proposed improvements will modestly support safe cycling and pedestrian use by providing a multi-use trail on one side of the street.
<b>Phasing and Implementation</b>	Potential disruptions of existing travel	No disruption of existing travel.	Traffic in both directions can be maintained at all times with roadway widening on one side. Minimal disruption of existing traffic.	Narrowed lane width, temporary daily reduction to one traffic lane and use of flagging are anticipated. Minor disruption of existing traffic.	Narrowed lane width, temporary daily reduction to one traffic lane and use of flagging are anticipated. Minor disruption of existing traffic.

Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail
<b>Natural Environment</b>					
<b>Aquatic</b>	Fish Habitat – Degree of impact to aquatic wildlife and their habitat	No impacts.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies.	Due to culvert replacement, fish habitat will be directly impacted in the study area. It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies.
	Channel Stability – Potential impacts to alter watercourses and channel stability	No impacts.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability.	Minimal impacts to channel stability. Erosion and sediment control (ESC) measures will be employed to minimize impacts to channel stability.
<b>Terrestrial</b>	Vegetation/Flora – Degree of impact to surrounding vegetation and terrain	No impacts.	2.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.	2.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.	2.2 hectares of vegetation will be disturbed and/or removed with the proposed 26 metre right-of-way. Impacts are generally not significant. The impacts can be considerably minimized by reducing grading requirements at specific locations and replanting.
	Wildlife – Degree of impact to wildlife and their habitat	No impacts.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provide and enhances wildlife crossing opportunities, particularly for small mammals.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provide and enhances wildlife crossing opportunities, particularly for small mammals.	Road widening creates a wider linear barrier across the landscape. However, the proposed replacement culverts provide and enhances wildlife crossing opportunities, particularly for small mammals.
<b>Groundwater</b>	Potential to alter groundwater quality and quantity	No impacts.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.	The proposed improvements are not anticipated to affect either the quantity or the quality of groundwater resources in the study area.
<b>Stormwater</b>	Potential impacts to stormwater quantity and quality	No impacts.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.	No significant impacts to stormwater quantity. Stormwater quality will be improved with the application of water quality protection options.
<b>Socio-Economic Environment</b>					
<b>Archaeological Resources</b>	Potential to impact areas of archaeological significance	No archaeological impacts.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design. Road design aligns road to the west of Nashville Cemetery, avoiding potential archaeological impacts.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design. Road design aligns road to the west of Nashville Cemetery, avoiding potential archaeological impacts.	Some potential archaeological impacts to areas requiring Stage 2 archaeological assessment. Will be further determined in detailed design. Road design aligns road to the west of Nashville Cemetery, avoiding potential archaeological impacts.
<b>Built/Cultural Heritage</b>	Potential to impact built heritage and cultural resources	No impacts to built and cultural heritage.	No direct impacts to built/cultural heritage. Some indirect impacts to entrance drives and cultural heritage district. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).	No direct impacts to built/cultural heritage. Some indirect impacts to entrance drives and cultural heritage district. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).	No direct impacts to built/cultural heritage. Some indirect impacts to entrance drives and cultural heritage district. Impacts will be mitigated through a Cultural Heritage Resource Impact Assessment (CHRIA).
<b>First Nations</b>	Potential to impact First Nations' Lands	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.
<b>Property</b>	Potential property acquisition required	No property impacts.	Approximate 1.2 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 2.4 Ha of property for grading beyond 26m R.O.W.	Approximate 1.2 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 2.4 Ha of property for grading beyond 26m R.O.W.	Approximate 1.2 Ha of property acquisition required to accommodate 26m R.O.W. Potential additional 2.4 Ha of property for grading beyond 26m R.O.W.
<b>Land Use</b>	Supports existing and future surrounding land uses	Will not support existing and planned residential developments as a result of substandard infrastructure and the lack of cycling and pedestrian facilities.	Supports the City's Transportation Master Plan and existing and planned residential developments by accommodating projected traffic and population growth as well as cycling and pedestrian facilities.	Supports the City's Transportation Master Plan and existing and planned residential developments by accommodating projected traffic and population growth as well as cycling and pedestrian facilities.	Supports the City's Transportation Master Plan and existing and planned residential developments by accommodating projected traffic and population growth as well as cycling and pedestrian facilities.
<b>Noise and Vibration</b>	Degree of noise and vibration impacts on adjacent communities	Minimal impacts resulting from increased local traffic. No major mitigation measures needed.	Some impacts resulting from adding one lane per direction, which may draw more traffic. No major mitigation measures needed.	Minimal impacts resulting from increased local traffic. No major mitigation measures needed.	Minimal impacts resulting from increased local traffic. No major mitigation measures needed.
<b>Air Quality</b>	Degree of air quality / greenhouse gas impacts on adjacent lands	Minimal impacts resulting from increased local traffic.	Minimal impacts resulting from increased local traffic; some greenhouse gas increases offset by increased transit, cycling and pedestrian use.	Minimal impacts resulting from increased local traffic; some greenhouse gas increases offset by increased transit, cycling and pedestrian use.	Minimal impacts resulting from increased local traffic; some greenhouse gas increases offset by increased transit, cycling and pedestrian use.



Evaluation Criteria	Alternatives	1	2	3	4
	Descriptions	Do Nothing	Four-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail and Sidewalk	Two-lane Urban Roadway with Multi-use Trail
<b>Utilities</b>					
<b>Utilities</b>	Potential impact on utilities resulting from design alignment	No impacts.	Utilities impact: <ul style="list-style-type: none"> <li>• Hydro/Bell Poles</li> <li>• Watermain</li> <li>• Power Stream</li> <li>• Gasmain</li> </ul>	Utilities impact: <ul style="list-style-type: none"> <li>• Hydro/Bell Poles</li> <li>• Watermain</li> <li>• Power Stream</li> <li>• Gasmain</li> </ul>	Utilities impact: <ul style="list-style-type: none"> <li>• Hydro/Bell Poles</li> <li>• Watermain</li> <li>• Power Stream</li> <li>• Gasmain</li> </ul>
<b>Financial</b>					
<b>Capital Costs</b>	Potential capital cost of implementation	No capital costs.	Approximately \$25.5 M.	Approximately \$9.8 M.	Approximately \$9.3 M.
<b>Operation and Maintenance Costs</b>	Potential cost of operating and maintaining infrastructure improvements	Operating and maintenance costs would increase over time due to increased use of Huntington Road as a result of more traffic.	Highest operation and maintenance cost with 4-lane roadway and winter maintenance of sidewalk. Multi-use trail is expected to be closed in the winter.	Minor increase to operation and maintenance costs with widened pavement and winter maintenance of sidewalk. Multi-use trail is expected to be closed in the winter.	Minor increase to operation and maintenance costs with widened pavement and winter maintenance of multi-use trail.
<b>Summary</b>					
<b>Summary of Key “Pros”</b>		<ul style="list-style-type: none"> <li>• No impacts as a result of doing “nothing” along Huntington Road, although this is counterbalanced by the need to address the road’s safety, design and function for all modes and users recognizing new residential growth in Nashville Heights.</li> <li>• No construction-related impacts.</li> <li>• No capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Will accommodate projected growth and traffic along corridor, providing more capacity than is needed.</li> <li>• Urbanizing the roadway will improve travel and safety along the corridor for vehicles.</li> <li>• Improve pedestrian/cycling travel.</li> <li>• Area planning initiatives and policies are addressed.</li> </ul>	<ul style="list-style-type: none"> <li>• Can sufficiently accommodate projected growth and traffic along the corridor.</li> <li>• Will improve safety and travel for all users.</li> <li>• Area planning initiatives and policies are addressed.</li> </ul>	<ul style="list-style-type: none"> <li>• Can sufficiently accommodate projected growth and traffic along the corridor.</li> <li>• Will improve safety and travel for all users.</li> <li>• Area planning initiatives and policies are addressed.</li> </ul>
<b>Summary of Key “Cons”</b>		<ul style="list-style-type: none"> <li>• Based on projected residential growth, the “Do Nothing” alternative would not provide a safe, functional means of travel along Huntington Road, given its rural character.</li> <li>• Roadway drainage and stormwater management not addressed.</li> <li>• Area planning initiatives and policies not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate impacts to the natural and socio-economic environment.</li> <li>• Highest capital and maintenance costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate impacts to the natural and socio-economic environment.</li> <li>• Moderate capital and maintenance costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate impacts to the natural and socio-economic environment.</li> <li>• Moderate capital and maintenance costs.</li> </ul>
<b>Overall Summary</b>		Does not address the problem, and has no potential to incorporate the opportunities.	Addresses the problem but provides more than required and at a significantly higher cost.	Addresses the problem and has the potential to incorporate the opportunities.	Addresses the problem and has the potential to incorporate the opportunities. Supports current and planned developments. The west side can be further refined in detailed design.
<b>Recommendation</b>		<b>Not Recommended.</b>	<b>Not Recommended.</b>	<b>Not Recommended.</b>	<b>Recommended.</b>



## 5.3 IDENTIFICATION OF THE RECOMMENDED ALTERNATIVE DESIGN

Based on the evaluation and summary in Section 5.2, the following were recommended:

Two alternatives were recommended for two sections in Part A. From Langstaff Road to Rutherford Road, the recommended alternative design is **Alternative 3: Four-lane Urban Roadway with Multi-use Trail and Sidewalk**. This alternative is able to meet the growing traffic demand and development along Huntington Road, including providing operational and safety improvements for an increase of freight traffic. Having pedestrian/cycling facilities to the west and the east will support development on both sides of the roadway.

From Rutherford Road to McGillivray Road, the recommended alternative design is **Alternative 4: Four-lane Urban Roadway with Multi-use Trail**. This alternative is able to meet the growing traffic demand along the corridor and also provides adequate facilities for other road users, such as pedestrians and cyclists to the east, where development is planned to occur. A sidewalk was deemed unnecessary along this portion of Part A as there would be no development to the west due to the existing CP lands.

For Part B, from Major Mackenzie Drive to Nashville Road, the recommended alternative design is **Alternative 4: Two-lane Urban Roadway with Multi-use Trail**. Part B will see lower traffic demand than Part A, thus a widening to four lanes was not warranted. Similarly, a multi-use trail was sufficient to meet pedestrian and cycling needs for the corridor, thereby also reducing capital and maintenance costs of an additional sidewalk. Any pedestrian/cycling facilities on the west side of Huntington Road will be revisited further in detailed design, pending future development to the west.

All the selected alternatives would have similar impacts to the natural and socio-economic environment as both will have a 26 metre right-of-way. While no major terrestrial features are impacted by the right-of-way, several water crossings and streams will be impacted. This includes fitting appropriate culverts over water crossings that traverse the corridor and realignment of a portion of a stream to the east of Huntington Road and north of Rutherford Road. Careful consideration will be given to the habitat and fish species at these locations.

Described above are the preliminary recommended alternative design concepts. Following this stage, the City held Public Information Centre No. 2 to engage in consultation with the public to solicit their feedback on the recommendation. After comments were received and relevant changes made, the City of Vaughan finalized the Preferred Alternative Design.

## 6. THE RECOMMENDED ALTERNATIVES (PART A AND B)

### 6.1 THE RECOMMENDED ALTERNATIVE DESIGN CONCEPT

The Recommended Alternative Design Concept includes:

#### Part A (Langstaff Rd to McGillivray Rd)

- Implement a 26 metre right-of-way;
- One additional lane in each direction (total of four lanes);
- Intersection Improvements (Signal, left/right turn lane(s) installation);
- Urbanize roadway and upgrade to urban cross-section;
- Illumination installation;
- Add a 3 metre multi-use trail on the east side of Huntington Road;
- Provide grass/trees boulevards on both sides;
- A sidewalk on the west side (only Langstaff Road to Rutherford Road); and,
- Utility upgrades (Sanitary, watermain, etc.).

#### Part B (Major Mackenzie Dr to Nashville Rd)

- Implement a 26 metre right-of-way;

- Intersection Improvements (Signal, left/right turn lane(s) installation);
- Urbanize roadway and upgrade to urban cross-section;
- Illumination installation;
- Add a 3 metre multi-use trail on the east side of Huntington Road;
- Provide grass/trees boulevards on both sides; and,
- Utility upgrades (Sanitary, watermain, etc.).

The full plan (plates) and profile are shown in Appendix I. The following sections provide a more detailed description of the preferred design concept.

## 6.1.1 GEOMETRICS

Huntington Road is classified as a Major Collector Road. The proposed design will urbanize Huntington Road with a curb, gutter, and a vegetated boulevard, and will require a 26 metre right-of-way. Based on the City of Vaughan's Transportation Master Plan 2012, the recommended design speed for a collector road is 80km/h which is 20km/h above the posted speed. Huntington Road will be upgraded to meet the design criteria shown in **Table 29** and **Table 30**.

Table 29: Design Criteria, Part A (Langstaff Road to McGillivray Road)

	Existing Condition	Design Standard	Proposed Design
Road Type	Rural Major Collector	Urban Major Collector	Urban Major Collector
Design Speed (km/h)	100	80	80
Maximum Posted Speed (km/h)	80	60	60
Minimum Stopping Sight Distance (m)	143	140	140
Minimum Horizontal Curve Radius (m)	>440	250	N/A
K-Crest minimum (m)	11	35	50
K-Sag minimum (m)	N/A	20	40
Confort Control			
Minimum C/L Grade (%)	0.04%	0.50%	0.50%
Maxmum C/L Grade (%)	2.79%	5%	2%
Minimum Pavement Width (m)	3.5	3.5	2 @ 3.5
Minimum Shoulder Width (Right / Left) (m)	1	N/A	N/A
Maximum Crossfall	10%	4%	2%
R.O.W. Width (m)	20	26	26

Table 30: Design Criteria, Part B (Major Mackenzie to Nashville Road)

	Existing Condition	Design Standard	Proposed Design
Road Type	Rural Major Collector	Urban Major Collector	Urban Major Collector
Design Speed (km/h)	100	80	80
Maximum Posted Speed (km/h)	80	60	60
Minimum Stopping Sight Distance (m)	94	140	140
Minimum Horizontal Curve Radius (m)	>440	250	5000 (Normal Crown)
K-Crest minimum (m)	35	35	50
K-Sag minimum (m)	N/A	20	40
Confort Control			
Minimum C/L Grade (%)	0.05%	0.50%	0.50%
Maxmum C/L Grade (%)	3.40%	5%	3.20%
Minimum Pavement Width (m)	3.25	3.5	5.75

Minimum Shoulder Width (Right / Left) (m)	0.5	N/A	N/A
Maximum Crossfall	6%	4%	2%
R.O.W. Width (m)	20	26	26

### 6.1.1.1 Horizontal and Vertical Alignment

The horizontal alignment of Huntington Road will remain the same between Langstaff Road to McGillivray Road. Since Huntington Road will be disconnected at Major Mackenzie Drive due to the future Highway 427 extension, a direct connection through McGillivray Road is proposed. With the close proximity of the Highway 427 overpass structure, the connection is restricted to a design speed of 60 km/h with a radius of 120 metre. The proposed design had also included proper spiral parameter and superelevation according to MTO's Geometric Design Standard Manual for a safer and smoother transition. Driveway access from Huntington Road will be provided for the CP rail facility.

From Major Mackenzie Drive to Nashville Road, the alignment is shifted approximately 3 metres to the west near the Nashville Cemetery with 5000 metre radii back to back curves. This design will minimize impacts to the cemetery and provide a 3.0 metre multi-use trail on the east side.

Proposed vertical alignment will be improved to meet 80km/h design speed standards. A K-Sag value for comfort was used in the design as illumination will be provided along Huntington Road. The vertical alignment was designed to match the existing road profile where possible while also meeting the geometric standards requirement for the class of the road. North of Rutherford Road, the roadway profile is raised by approximately 1 metre to avoid flooding by the 100 year storm.

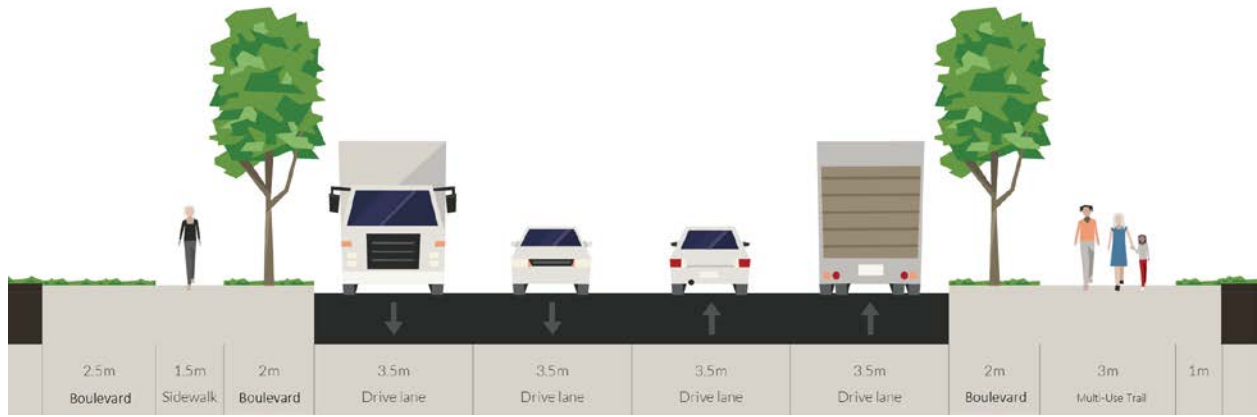
The proposed design plan and profile is provided in Appendix I.

### 6.1.1.2 Cross-Section

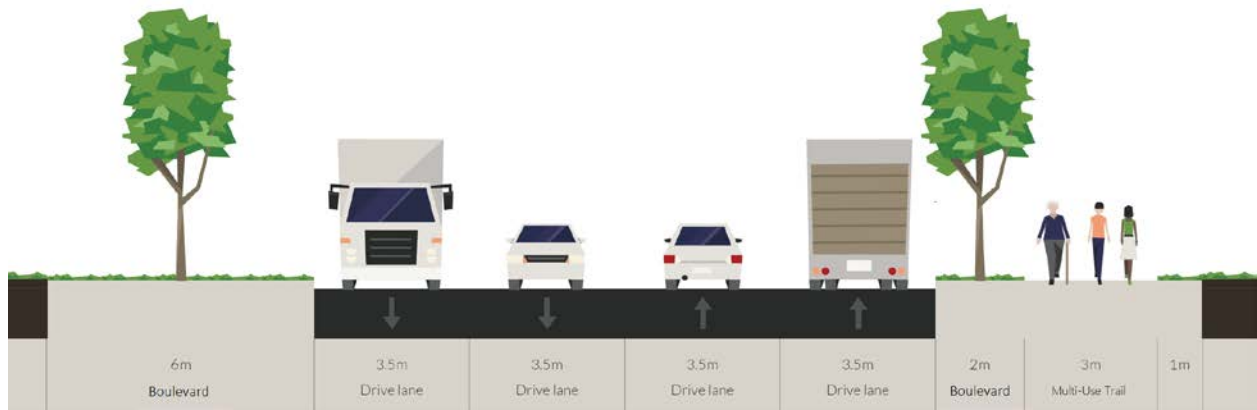
Proposed design cross-sections are shown in **Figure 18**. For Part A, there will be four 3.5 metre lanes, and a 6 metre boulevard on both sides, which includes a 3.0 metre multi-use trail on the east boulevard, and 1.5 metre sidewalk on the west side between Langstaff Road to Rutherford Road. With the 6 metre boulevard on the west side, additional sidewalk can be implemented between Rutherford Road and McGillivray Road depending on the pedestrian demand. There will be a minimum 2 metre buffer between sidewalk/MUT and through traffic. An additional 3.5 metre left turn lane is also proposed at intersections.

For Part B, there will be two 5.75 metre through lanes, and a 7.25 metre boulevard on each side, which includes a 3.0 metre multi-use trail on the east boulevard. With the 7.25 metre boulevard in the west side, additional sidewalk can be implemented between Rutherford Road and McGillivray Road depending on the pedestrian demand. There will be a minimum 2 metre buffer between the sidewalk/MUT and through traffic. Additional 3.5 metre left and right turn lanes are also proposed at East's Corner Boulevard and Algoma Drive intersections.

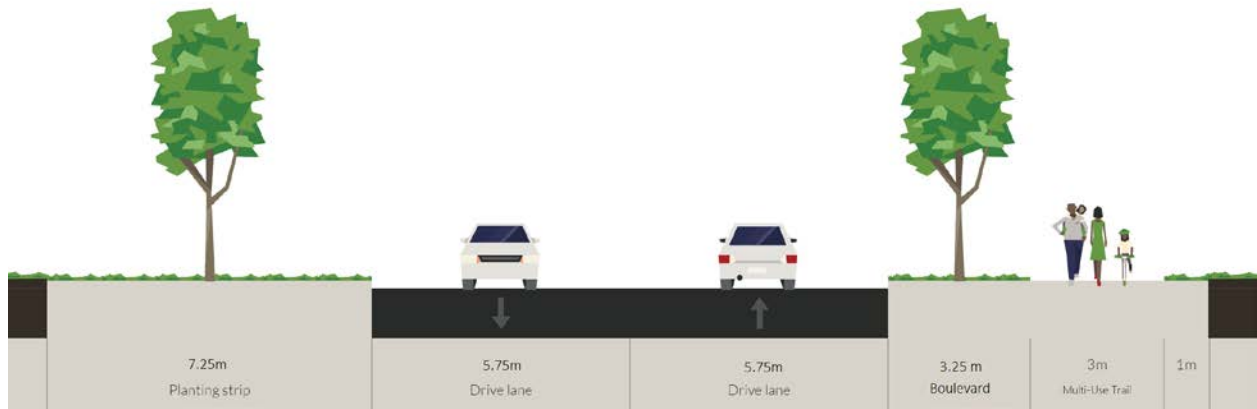
Depending on the time frame of the developments along Huntington Road, it is required to have additional grading beyond the 26 metre R.O.W. to match existing ground elevation and a 1 metre flat bottom swale to capture surface drainage. Since Huntington Road will be urbanized and the grading beyond the boulevard is outside of the clear zone width, 2:1 foreslope and backslope is proposed. As developments are being built, proposed ground should match boulevard elevation and surface swale is not necessary. For the safety of pedestrians and potential errant vehicles near high fill areas, guiderail installation shall be examined in detail design.



Part A: Langstaff Road to Rutherford Road



Part A: Rutherford Road to McGillivray Road



Part B: Major Mackenzie Drive to Nashville Road

Figure 18: Preliminary Recommended Alternative Design Concepts

**6.1.2 PAVEMENT**

Pavement recommendations for Huntington Road were prepared by SPL based on the preliminary recommended alternative design concepts. The minimum required Granular Base Equivalency (GBE) and Structural Number (SN) for new construction and rehabilitation on Huntington Road will conform to the AASHTO design and are laid out in **Table 31**. Both a “no grade raise” option and a “partial depth reconstruction with grade raise” option were presented. For further details on the different options, refer to the Geotechnical Report in Appendix L.

Table 31: Pavement Thickness Design

Roadway Section	No Grade Raise Option	Grade Raise Option
Huntington Road from Langstaff Road to Rutherford Road	Excavate from the existing grade to the required depth to accommodate 830 mm new pavement structure (for existing roadway and widening section) <ul style="list-style-type: none"> <li>Place 500 mm Granular Subbase (Granular B Type I *)</li> <li>Place 150 mm Granular Base (Granular A *)</li> <li>Pave 180 mm Hot Mix Asphalt (50 mm SP 12.5 FC1 **surface course over 60 mm of SP19.0 upper binder course over 70 mm SP 19.0 **lower binder course)</li> </ul>	Pulverize existing asphalt and underlying granular base to a depth of 300 mm <ul style="list-style-type: none"> <li>Place 100 mm New Granular Base (Granular A *) over the pulverized material</li> <li>Pave 190 mm Hot Mix Asphalt (50 mm SP 12.5 FC1 **surface course over 140 mm SP19.0 **binder course in two lifts)</li> </ul>
Huntington Road from Rutherford Road to McGillivray Road (Gravel Section)	Excavate from the existing grade to the required depth to accommodate 770 mm new pavement structure (for existing roadway and widening section) <ul style="list-style-type: none"> <li>Place 500 mm Granular Subbase (Granular B Type I *)</li> <li>Place 150 mm Granular Base (Granular A *)</li> <li>Pave 120 mm Hot Mix Asphalt (50 mm SP 12.5 FC1 **surface course over 70 mm of SP19.0 **binder course)</li> </ul>	Excavate 100 mm from the top of existing granular <ul style="list-style-type: none"> <li>Place 150 mm New Granular Base (Granular A *)</li> <li>Pave 120 mm Hot Mix Asphalt (50 mm SP 12.5 FC1 **surface course over 70 mm SP19.0** binder course) *</li> </ul>
Major Mackenzie Drive to Nashville Road	Excavate from the existing grade to a depth 380 mm to accommodate 380 mm new pavement structure <ul style="list-style-type: none"> <li>Place 200 mm New Granular Base (Granular A *)</li> <li>Pave 180 mm Hot Mix Asphalt (50 mm SP 12.5 FC1** surface course over 60 mm of SP19.0** upper binder course over 70 mm SP 19.0 lower binder course)</li> </ul>	Pulverize existing asphalt and underlying granular base to a depth of 250 mm <ul style="list-style-type: none"> <li>Pave 150 mm Hot Mix Asphalt (50 mm SP 12.5 FC1 **surface course over 100 mm SP19.0 ** binder course in two lifts)</li> </ul>

\* 20 mm Crusher Run Limestone (CRL) could be substituted for Base material.

\*\* SP12.5 FC1 can be substituted by HL1 and SP19.0 by HDBC.

Ultimately, the no grade raise option was selected. The majority of Huntington Road will not be raised, with the exception of a one metre grade raise in the roadway profile by the proposed creek realignment.

**6.1.3 STORMWATER MANAGEMENT AND DRAINAGE**

The stormwater management (SWM) and drainage report proposes draining the roadway to outside grassed swales, rather than collecting the runoff in storm sewers for discharge to the watercourses. The proposal is to use curb and gutters to side concrete spillways, which will direct the runoff to the side concrete spillways, which will direct the runoff to the side swales and then convey the runoff in the swales to the watercourses.

An analysis on the change in imperviousness levels was conducted. Given the relatively small proportion of the total drainage areas to Huntington Road that the right-of-way represents, it can be concluded by inspection that the additional imperviousness area resulting from road improvements will have no significant effect on the peak discharge or volume of runoff in the receiving watercourse and its peak flows. It is recommended that no storm water quantity controls be implemented for this project, aside from the water quantity reductions that are incidental to the stormwater quality measures.

Low Impact Development (LID) is a method of SWM to address stormwater quality controls by attempting to replicate in the post-development environment the pre-development hydrologic regime. This is accomplished by reducing the runoff volume, peak discharge, and associated pollutant loads near the source of runoff, using techniques that intercept and hold runoff. LID aims to use vegetation and infiltration to reduce the runoff volumes and increase the time of travel of runoff.



Several LID and end-of-pipe measures were considered for this project but due to the nature of the underlying soils and the shallow bedrock, many were precluded from use. Based on the analysis, stormwater quality controls can be achieved by provision of a combination of bio-retention, catch basin controls, grassed swales, and oil/grit separators. Additionally, the City of Vaughan plans to treat portions of the runoff produced by Huntington Road south of Rutherford Road at two proposed SWM ponds located on the west side of Huntington Road, between Rutherford Road and Trade Valley Drive, as part of other developments.

The report also recommends that all existing culverts be replaced as per the dimensions in **Table 22** in Section 2.5.2 to accommodate projected flows and to meet design criteria for watercourse crossings.

## 6.1.4 FLUVIAL GEOMORPHOLOGY

In order to accommodate the road widening works, it is essential that the portion of East Rainbow Creek that at present runs alongside Huntington Road, just north of Rutherford Road, be realigned. The conceptual creek realignment plan is shown in **Figure 19**. Further details include:

- The creek realigned is approximately 260 meters long;
- The recommended alignment is at least 12 meters away from the existing road edge of pavement;
- The creek is to be a series of riffles and pools with a bankfull width of 3.4 meters;
- The planview alignment of the creek is designed such that as much as possible, the existing trees are to be left standing.

A vegetation survey is to be completed for the area surrounding the creek realignment to determine what existing vegetation, adjacent to the proposed creek realignment, needs to be retained, removed or compensated for.



Figure 19: Conceptual plan for Creek Realignment

## 6.1.5 HYDROGEOLOGY

A hydrogeological assessment was undertaken by Parsons for the study area. In summary, the proposed improvements to Huntington Road Part A and B is not anticipated to affect either the quantity or the quality of groundwater resources in the study area. Available information indicates the proposed work will be completed in the low permeable fine grained

# PARSONS

glaciolacustrine deposits and the similarly textured underlying Halton Till that are aquitards and generally unsuitable for water supply and are protective of deep aquifers. Further, the seasonally deepest groundwater table is evidently also shallow, and within these fine textured formations, thereby preventing the formation of secondary porosity that would increase the permeability from the low norms expected for these fine-grained formations. There was no evidence of perched aquifers in the study area. The full report and background details of the assessment are included in Appendix M.

An assessment for contamination and dewatering were also considered as part of the study. The native lacustrine soils in the area and Halton Till are both predominantly fine textured geologic formations that will not likely yield significant groundwater during excavation that would require dewatering. However, the water table in the area is relatively shallow all year and the widening work may intersect some shallow and coarse grained fill soils locally that might require some dewatering; however, this would not likely require a sustained (i.e., continuous pumping) effort. It is unlikely that the volumes of groundwater required to dewater would require a Permit-to-Take-Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC) and, if dewatering is required it could be using the new MOECC Environmental Activity and Sector Registry approval process.

Groundwater contamination is not expected to be of significant concern within the study area. The most significant potential contaminant source is the CP Vaughan Intermodal Terminal where numerous railway containers are present and where maintenance activities are likely occurring. If dewatering and discharge to the environment is required in proximity and downgradient of the Terminal, then analysis should be for a wide range of potential contaminants. There is also a relatively lower potential for contaminants in association with trucks and industrial activity visible at 9667 Huntington Road (Tedescon Infrastructure Ld. Environmental). Site conditions are unknown for both properties.

Construction dewatering is more likely to be required where deep excavations occur that intersect the shallow water table in variable textures and, therefore, potentially more permeable fill soils. The shallowest water table conditions are more probable in relatively low areas, close to wetlands and at watercourse crossings. Additional subsurface investigation could be completed to better evaluate the need and extent of dewatering. Dewatering is considered more likely in the Part B to the north, within 900 metres south of Nashville Road due to the coarser soils.

## 6.1.6 UTILITIES

With the proposed roadway widening and urbanization, some existing utilities along Huntington Road will need to be buried and/or relocated. Potential utilities being impacted include:

- Sanitary Sewer
- Watermain
- Gas Line
- Bell
- Hydro
- Cables

To support development along Huntington Road, other utility installations may be implemented along with roadway construction improvements. Potential improvements to consider include storm sewers, watermain and sanitary sewer installation and connection to developments along Huntington Road. Utility locations and design will be confirmed in detail design.

## 6.1.7 ELECTRICAL/ILLUMINATION

The proposed design includes two new signalized intersections in Part A and two new signalized intersection in Part B. There is currently only one existing signalized intersection at Langstaff Road. New signalized intersections include:

- Trade Valley Drive
- Rutherford Road
- Major Mackenzie Drive (and the proposed Future Road that forms the southern point of Part B)
- Nashville Road

Full illumination is proposed along Huntington Road. Details will be based on York Region and City of Vaughan standards and will be confirmed in during detail design.

## 6.1.8 PROPERTY REQUIREMENTS

Based on City of Vaughan’s Official Plan, Major Urban Collector roads require a 26 metre right-of-way. Additional property is required for widening and grading beyond the 26 metre right-of-way. Grading easements may be discussed with property owners or future developers. Where future development applications have been submitted or are pending, applicants should investigate the plans to match the proposed Huntington Road 26 metre right-of-way grades. Refer to preliminary design drawings in Appendix I for approximate property requirements.

## 6.1.9 ESTIMATED PROJECT COSTS

The cost estimate for Part A is approximately \$20.24M and the cost for Part B is approximately \$6.84M. The estimated total cost of improvements recommended through the Huntington Road Class EA is \$27.08M. These costs are broken down in **Table 32** and **Table 33** below.

Table 32: Estimated Project Costs for Part A

Cost Component	UOM	Quantity	Unit Rate	Cost
<b>Construction Cost</b>				
Excavation - New Construction	M3	36000	\$20.00	\$720,000
Backfill-New Clean Fill	M3	8000	\$4.00	\$32,000
Granular B	M3	32181	\$50.00	\$1,609,072
Granular A	M3	9654	\$60.00	\$579,240
Concrete Barrier Curb with Standard Gutter	M	7800	\$60.00	\$468,000
Median Concrete Slabs and Islands	M2	480	\$130.00	\$62,400
1.5m Concrete Sidewalk	M	3900	\$122.00	\$475,800
Black Superpave 12.5 FC2	t	7916	\$120.00	\$949,954
Superpave 19.0	t	16765	\$90.00	\$1,508,885
3.0m Multi-Use-Trail Asphalt	M	3900	\$95.00	\$370,500
4.8m Span Creek Crossing	M	26	\$5,000.00	\$130,000
6.0m Span Creek Crossing	M	26	\$8,000.00	\$208,000
9.3m Span Creek Crossing	M	26	\$20,000.00	\$520,000
7.9m Span Creek Crossing	M	26	\$10,000.00	\$260,000
900 Dia. CSP	M	52	\$1,600.00	\$83,200
1200 Dia. CSP Culvert	M	26	\$1,870.00	\$48,620
1500 Dia. CSP Culvert	M	26	\$2,000.00	\$52,000
Creek Realignment	M	320	\$2,500.00	\$800,000
Rural Property (To be determined)	Ha	9.11		\$0
Asphalt Removal for Intersection Reconstruction	M2	27300	\$8.00	\$218,400
Drainage (CB/MH and Sewers, if required)	EA	1	\$1,975,350.00	\$1,975,350
Top Soil and Seeding	EA	1	\$198,900.00	\$198,900
Pavement Markings and Signage	EA	1	\$22,025.00	\$22,025
Traffic Control and Temporary Signage	EA	1	\$400,000.00	\$400,000
<b>SUB-TOTAL</b>				<b>\$11,692,346</b>
<b>Minor Items</b>	%	<b>0.10</b>		<b>\$1,169,235</b>
<b>Landscaping Costs</b>	%	<b>0.10</b>		<b>\$1,169,235</b>
<b>Electrical Costs</b>	%	<b>0.05</b>		<b>\$584,617</b>
<b>Engineering Design Costs</b>	%	<b>0.05</b>		<b>\$584,617</b>
<b>SUB-TOTAL</b>				<b>\$15,200,049</b>
<b>Estimating Contingency</b>	%	<b>0.20</b>		<b>\$3,040,010</b>
<b>Utilities Relocation Cost</b>	EA	<b>1.00</b>	<b>\$2,000,000</b>	<b>\$2,000,000</b>
<b>TOTAL</b>				<b>\$20,240,059</b>

Table 33: Estimated Project Costs for Part B

Cost Component	UOM	Quantity	Unit Rate	Cost
<b>Construction Cost</b>				
Excavation - New Construction	M3	2000	\$20.00	\$40,000
Backfill-New Clean Fill	M3	20700	\$4.00	\$82,800
Granular B	M3	836	\$50.00	\$41,800
Granular A	M3	5330	\$60.00	\$319,800
Median Concrete Slabs and Islands	M2	240	\$130.00	\$31,200
Black Superpave 12.5 FC2	t	1333	\$160.00	\$213,200
Superpave 19.0	t	3465	\$150.00	\$519,675
3.0 m Multi-Use-Trail Asphalt	M	1560	\$100.00	\$156,000
3.7m Span Creek Crossings	M	26	\$5,000.00	\$130,000
900 Dia. CSP	M	78	\$1,600.00	\$124,800
Rural Property (To be determined)	Ha	2.36		\$0
Asphalt Removal for Intersection Reconstruction	M2	12600	\$9.00	\$113,400
Concrete Curb & Gutter (if required)	M	3600	\$60.00	\$216,000
Drainage (CB/MH and Sewers, if required)	EA	1	\$1,060,020.00	\$1,060,020
Top Soil and Seeding	EA	1	\$116,100.00	\$116,100
Pavement Markings and Signage	EA	1	\$6,110.00	\$6,110
Traffic Control and Temporary Signage	EA	1	\$250,000.00	\$250,000
<b>SUB-TOTAL</b>				<b>\$3,420,905</b>
<b>Minor Items</b>	%	0.10		<b>\$342,091</b>
<b>Landscaping Costs</b>	%	0.10		<b>\$342,091</b>
<b>Electrical Costs</b>	%	0.05		<b>\$171,045</b>
<b>Engineering Design Costs</b>	%	0.05		<b>\$171,045</b>
<b>SUB-TOTAL</b>				<b>\$4,447,177</b>
<b>Estimating Contingency</b>	%	0.20		<b>\$889,435</b>
<b>Utilities Relocation Cost</b>	EA	1.00	\$1,500,000	<b>\$1,500,000</b>
<b>TOTAL</b>				<b>\$6,836,612</b>

**6.2 SUMMARY OF ENVIRONMENTAL IMPACTS**

**6.2.1 NATURAL ENVIRONMENT**

Due to the nature of the proposed undertaking and the existing conditions within the study area, culvert replacement and road widening will have the potential to impact the aquatic and terrestrial environment. For the full natural heritage impact assessment refer to Appendix D.

**6.2.1.1 Impacts to the Aquatic Environment**

The purpose of this section is to assess the potential impacts to fish and fish habitat associated with the proposed Huntington Road improvements. Ultimately, this information is used to determine the likelihood of the proposed works resulting in serious harm to fish.

The legislation for the conservation and management of fisheries and fish habitat is the *Fisheries Act*. Project components, such as alteration to river banks and bed and the removal of riparian vegetation are considered to cause serious harm to fish and fish habitat require *Authorization* from DFO under Section 35 of the *Fisheries Act* and must be obtained prior to beginning construction activities. The proposed work activities were screened using DFO's Self-Assessment process to determine if project works require review by DFO. The Self-Assessment process determined that some project activities avoided serious harm to fish and thus require no further assessment. Other project activities did not meet DFO's criteria

and were further assessed by identifying the potential effects to fish habitat and the appropriate methods for eliminating or mitigating the impacts.

Through the DFO screening, it was determined that the severity of potential impacts due to works occurring at watercourse crossings ID No. 1, 2, 6, 10, and 11 is Low. Therefore, the submission of a Project Review Form to DFO is not required for works at the above mentioned locations.

At the remaining six watercourse crossings ID No. 3, 4, 5, 7, 8, and 9, the existing culverts will be replaced with new culverts to accommodate roadway widening. Due to the nature of the works proposed at these six watercourse crossings and the sensitivity of fish and fish habitat within these watercourses, it was determined that the works do not meet the Self-Assessment criteria described above and further assessment was required. The following provides a detailed evaluation of potential impacts. In general, these potential effects fall into two broad categories of site preparation and construction (short to moderate duration) and longer term effects from channel modifications and structures that remain post-construction.

East Robinson Creek – Crossing No. 3: This watercourse crossing directly supports a warm water fish community. However, the creek is poorly or variably defined, with limited to no morphological development. Substrate composition was primarily comprised of cobble and gravel with some sand and silt in pool habitat. Riparian vegetation was dense and included Reed Canary Grass and Cattails. Currently East Robinson Creek is conveyed through a CSPA culvert under Huntington Road.

A new concrete box culvert is proposed at this crossing. The new culvert will be approximately 9.5 metres longer than the existing culvert and will result in an overall increase in footprint of approximately 24.5 m<sup>2</sup>. This design will result in a lengthened segment of the watercourse shaded by artificial material. The new culvert is not expected to cause any passage issues, and will maintain fluvial functions. Furthermore, the affected reach provides low quality habitat and lacks attributes suitable for functions such as spawning or rearing. The majority of impacts to fish and fish habitat are likely to occur in the short term at the construction phase of the project.

Robinson Creek – Crossing No. 4: This creek is a well-defined warmwater watercourse dominated by pool and run habitat throughout the Study Area. During field investigations, localized evidence of groundwater inputs was observed at this crossing. During fish collections, juvenile and adult Johnny Darter was captured. The creek has been interpreted by MNR as Low sensitivity. Currently Robinson Creek is conveyed through a CSP culvert under Huntington Road.

A new concrete box culvert is proposed at this crossing. The new culvert will be approximately 4.5 metres longer than the existing culvert and will result in an overall increase in footprint of approximately 80.7 m<sup>2</sup>. This design will result in a lengthened segment of the watercourse shaded by artificial material. The new culvert is not expected to cause any passage issues, and will maintain fluvial functions.

During construction, downstream flow and connection to the upstream reaches will be maintained and where possible, works will be completed in the dry. This strategy will reduce potential adverse effects to fish and fish habitat. The potential for encountering groundwater during construction should be further investigated during detailed design.

East Rainbow Creek – Crossing No. 5, 7, 8: East Rainbow Creek (Crossings 5 & 7) is a well-defined warmwater watercourse dominated by pool and run habitat throughout the study area. Substrate composition was dominated by gravel and silt with organics. The creek has been interpreted by MNR as Low sensitivity. Currently East Rainbow Creek is conveyed through a CSPA culvert under Huntington Road.

A new concrete box culvert is proposed at Crossings 5 and 7. At Crossing 5, the new culvert will be approximately 7 metres longer than the existing culvert and will result in an overall decrease in footprint of approximately 5 m<sup>2</sup>. At Crossing 7, the new culvert will be approximately 9.4 metres longer than the existing culvert and will result in an overall decrease in footprint of approximately 0.5 m<sup>2</sup>. This design will result in a lengthened segment of the watercourse shaded by artificial material. At these watercourse crossing locations, pool habitat was observed upstream and downstream of Huntington



Road. Species observed utilizing these refuge pools included young-of-year and juvenile Creek Chub, White Sucker, Stickleback, and Brown Bullhead. As a result of culvert lengthening, the upstream and downstream pool habitat will be overprinted resulting in a direct loss to fish habitat. It is recommended that pool habitat is replaced upstream and / or downstream of the new culverts within a suitable reach to counterbalance the loss of available refuge habitat.

In the vicinity of Crossing 7, approximately 260 metres of open channel length will be realigned through lands currently classified as cultural and hedgerow to accommodate the 26 metre right-of-way. The proposed conceptual channel realignment will replace the existing channel with an equal length of natural designed channel, thereby maintaining channel and habitat area. The conceptual channel alignment meanders through existing trees with the objective of integrating as many of the larger hedgerow associated trees as possible into the riparian area of the new channel.

The affected reach provides moderate quality fish habitat, including pool/riffle morphology, coarse substrates and sparse woody debris cover. Fish species observed through this reach were common, tolerant species. Many fish were captured in a relatively large pool downgradient of Crossing 7. Investigations during detailed design should further assess this habitat feature and representation of pools through the subject reach and in up and downstream reaches to further assess just how limiting/represented pool habitat is along the broader reach and assess opportunities for enhancement of existing pools or creation of new pools.

It is further recommended that the following enhancement opportunities be considered where appropriate in the natural channel design:

- enhancement of morphology (specifically riffle habitat), substrate diversity and woody cover elements;
- re-stabilization of eroding banks within, up and downstream of the realigned sections where minor erosion has occurred; and,
- enhancing pools, instream cover or overhanging cover in up or downstream reaches.

The use of natural channel design to create an enhanced and dynamically stable channel of equal length to the existing reach combined with the purposeful enhancement of fish habitat is anticipated to achieve the fish habitat protection objectives of the *Fisheries Act*, although a need for an authorization from DFO should be determined through a Request for Project Review during detail design.

East Rainbow Creek located at crossing 8 was dry at the time of investigations and indirectly supports fish and fish habitat. The creek has been interpreted by MNR as Low sensitivity. Currently East Rainbow Creek is conveyed through a CSP culvert under Huntington Road. A new concrete box culvert is proposed at crossing 8. The new culvert will be approximately 13 metres longer than the existing culvert and will result in an overall increase in footprint of approximately 37 m<sup>2</sup>. This design is not expected to cause any passage issues, and will maintain fluvial functions.

West Rainbow Creek – Crossing No. 9: Through the Study Area, crossing 9 was typified as a permanent warmwater creek and characterized as a Low sensitivity watercourse by MNR. The channel was relatively narrow (1.5 to 2 metres) with run and pool habitat. Substrate was comprised of cobble and gravel in the channel. Sand and silt was also observed, primarily in banks and pools. During field investigations, water was observed breaching inside of the culvert, which may suggest evidence of groundwater upwelling, however no vegetative evidence or staining was observed. Currently, the creek is conveyed through a CSPA culvert under Huntington Road.

A new concrete box culvert is proposed at this crossing. The new culvert will be approximately 7 metres longer than the existing culvert and will result in an overall increase in footprint of approximately 23.5 m<sup>2</sup>. This design will result in a lengthened segment of the watercourse shaded by artificial material. The new culvert is not expected to cause any passage issues, and will maintain fluvial functions.

Short term impacts, such as temporary avoidance of the area by fish, are likely to occur at the construction phase of the project. During construction, downstream flow and connection to the upstream reaches will be maintained and where

possible, works will be completed in the dry. This strategy will reduce potential adverse effects to fish and fish habitat. Due to the nature of this work, the potential for the occurrence of significant residual impacts is anticipated to be low.

In summary, a total of 147 m<sup>2</sup> of fish habitat will be directly impacted in the study area. **Table 34** provides a summary of potential impacts at each crossing. It is recommended that a Request for Project Review Form be prepared and submitted to DFO in Detailed Design, prior to construction.

It is anticipated that fish and fish habitat can be sufficiently protected through the proper design and implementation of standard mitigation strategies, such as the use of appropriate timing windows for in-water construction, erosion and sediment control, completing works in-the-dry, and maintaining channel connectivity and downstream flow (i.e. maintenance of fish passage). Disturbed vegetation will be rehabilitated immediately following the completion of works using native herbaceous and woody plant material.

### **6.2.1.2 Impacts to the Terrestrial Environment**

Generally, due to the nature of the proposed undertaking and the existing conditions within the study area, significant impacts to terrestrial features are not anticipated to occur as result of this project. Designated features such as ANSIs, ESAs and PSWs do not occur within the study area. The majority of vegetation throughout the study area has been culturally influenced by agriculture, rural residents, and routine roadway maintenance. The vegetation units being affected by the preferred alternative are generally not part of larger habitat patches, are isolated on the landscape through the roadway corridor, and contain low species diversity with many non-native species. Further details are discussed below.

Encroachment onto existing roadside vegetation will occur as part of the preferred alternative, which involves widening of the road right-of-way. The majority of the vegetation communities affected throughout the study area have been identified as Cultural Communities which have a low species diversity comprised of common, tolerant, and often invasive species. Such communities are typical of previously disturbed roadside communities and are common throughout southern Ontario. There is minor encroachment into an ecological significant forest in Part B and one crossing of the York Region Greenlands system in Part A of the study area. Both of these areas are also under consideration (i.e. unapproved) as Core Areas of the City of Vaughan's Natural Heritage Network. The following discussion addresses the potential impacts to vegetation and vegetation communities due to construction of the proposed preferred alternative. The following discussion provides an assessment of potential impacts together with a determination of significance and proposed mitigation.

Cultural Upland Vegetation (meadow, hedgerow): This community class is the most dominant vegetation form/polygon in the study area and very common along roadways in southern Ontario. Dominant species within these areas are almost entirely adapted to previously disturbed areas and are typically successional species, tolerant of disturbance. Removal of portions of these community polygons is not considered a significant impact and many of the species will naturally re-establish along the new margin improved roadway following construction.

Lowland Deciduous Forest (FOD7-3 Willow): One area of lowland deciduous forest associated with the riparian corridor along Robinson Creek (Crossing 4) will be removed and/or disturbed as a result of the proposed roadway improvements. This vegetated corridor in Part A is part of the York Region Greenlands system. Being dominated by Crack Willow with occasional Manitoba maple and basswood trees in association with tall goldenrod, and Jewelweed along the banks, this community is typical of many low lying riparian communities in Southern Ontario. The proposed encroachment of removal of a portion of this community is not considered significant due to the dominance of common species and often non-native species and their inherent resilience to disturbance. Furthermore, is anticipated that tree species within this type of community will naturally re-establish along the new margin of the new roadway in low lying areas following construction. For this reason, replacement plantings should target the introduction of native woody species in newly exposed areas and amongst the remaining trees along this corridor.

Wetland Vegetation (MAS2-1): MAS Shallow Marsh Ecosite polygons occur sporadically throughout the study area on both sides of the roadway. Two (2) small units will be encroached upon in the proposed roadway improvements. These units have relatively low species diversity and species dominance varies between Common Reed and cattail species. Removal

# PARSONS

of portions of these small community polygons, especially those dominated by the aggressive Common Reed is not considered a negative impact. Many of the species within this type of community will naturally re-establish along the new margin of the new roadway in low lying areas following construction.

MAM3-8: The small marsh MAM community is contiguous with adjacent forest communities which together comprise the forest consisting of Polygons 4 and 5, an identified ecological significant forest (Region of York) in the Official Plan. This marsh unit contains a variety of wetland indicator species although this community is primarily dominated by Reed Canary Grass and Cattail with evidence of Common Reed and sparse Crack Willow in the area adjacent to the roadway and within the proposed footprint of the proposed roadway improvements. Encroachment and removal of a portion of this unit will reduce local habitat variability but is not considered a significant impact due its relatively small area and composition of dominant plant species to be affected.

Forest Units (FOD5, FOD3-1): The forest area positioned in the most northern limit of the study area in Part B is designated as an ecological sensitive forest (Region of York) in the Official Plan. Being comprised of multiple smaller forest community units, encroachment in two forest units (FOD5 and FOD 3-1) will occur as a result of the proposed roadway improvements. The FOD 3-1 community is dominated by trembling aspen in association with Sugar Maple, Green Ash, Black Walnut and American Elm. FOD 5 is dominated by Sugar Maple with abundance of Yellow Birch. Although both of these ELC communities commonly occur in southern Ontario, their low representation in the study area together with the Regional designation as an ecological sensitive forest raises the significance of this forest and the proposed impacts. Although impacts to this forest are likely unavoidable as a result of the proposed roadway improvements, reduction in corridor width and grading requirements should be considered during detailed design to limit the proposed incursion and disturbance to this feature. The resulting reduction in forest cover shall require planting of similar forest species both along newly created edges and in adjacent opportunity lands. Unless replacement planting can occur along the remaining perimeter of this forest unit, a reduction in ecological sensitive forest area will occur as a result of the proposed improvements.

The proposed roadway improvements also have the potential to reduce habitat connectivity for wildlife by creating a wider linear barrier across the landscape. Fortunately, the proposed replacement culverts have been designed with consideration to the provision and enhancement of wildlife crossing opportunities. Based on the proposed new culvert dimensions, wildlife passage for small mammals should be maintained or enhanced in both study areas Part A and Part B and will be further investigated in detailed design.

In summary, as a result of roadway widening and culvert improvements, a total of 3.64 ha (Part A – 1.26 ha and Part B – 2.38 ha) of vegetation will be disturbed and/or removed. **Table 35** provides a summary of anticipated direct and indirect impacts to the terrestrial ecosystem.

Mitigation measures for aquatic and terrestrial impacts are detailed further in Section 8.0 of this report.

Table 34: Summary of Anticipated Impacts to the Aquatic Environment

Watercourse	Existing Conditions				Structure Type		Existing		Proposed		Overall Change in Footprint	
	Crossing ID No.	Thermal Regime	Support a Fishery	MNRF Sensitivity Rating	Existing	Proposed	Length (m)	Area (m <sup>2</sup> )	Length (m)	Area (m <sup>2</sup> )	Length (m)	Area (m <sup>2</sup> )
West Rainbow Creek	9	warm	Directly	Low	CSPA	Concrete Box	19	70.3	26	93.6	-7	-23.3
Rainbow Creek Tributary	8	warm	Indirectly	Low	CSP	CSP	13.2	15.5	26	39	-10.5	-23.5
Rainbow Creek Tributary	7	warm	Directly	Low	CSPA	Concrete Box	16.6	39.5	26	39	-9.4	0.5
East Rainbow Creek	5	warm	Directly	Low	CSPA	Concrete Box	18.9	51.8	26	46.8	-7.1	5
Robinson Creek	4	warm	Directly	Low	CSP	Concrete Box	21.5	75.3	26	156	-4.5	-80.7
East Robinson Creek	3	warm	Directly	Low	CSPA	Concrete Box	16.5	37.9	26	62.4	-9.5	-24.5
Total											-48	-146.5

Table 35: Summary of Terrestrial Ecosystem Impacts and Mitigation

Feature	Effect		Mitigation
	Part A	Part B	Part A&B
Cultural Upland Vegetation (meadow, hedgerow)	0.63 ha of CU will be removed and/or encroached upon. Predominantly non-woody meadow species including Tall Goldenrod, Wild Carrot and other common meadow species interspersed with Buckthorn.	0.418 ha of CU will be removed and/or encroached upon. Community is predominantly non-woody meadow species including Tall Goldenrod, Wild Carrot and other common meadow species interspersed with Buckthorn.	Refinements to grading limit and silt fence during Detailed Design and construction phases may limit removals of this community type.
Lowland Deciduous Forest (FOD7-3 Willow)	0.12 ha of riparian vegetation (Robinson Creek) will be removed and/or disturbed. Dominated by Crack Willow, in association with Tall Goldenrod, and Jewelweed along the banks. Other occasional species include Manitoba maple and basswood.	0 ha of direct disturbance or encroachment.	Consider reducing the requirement for grading and disturbance adjacent to these features during Detailed Design. Install tree hoarding (i.e. tree protection fence) and enhance the area with restoration plantings where feasible as part of the Landscape Plan.
Wetland Vegetation (MAS2-1) (CUW)	0.26 ha of wetland vegetation will be removed and/or disturbed including 0.07 ha of MAS2-1 associated with East Rainbow	0.14 ha of wetland vegetation, dominated by Cattail with sparse Crack Willow canopy will	Consider reducing the requirement for grading and disturbance over the

	Creek. This feature is dominated by Cattail, with Sparse Crack Willow canopy and occurrence of Common Reed.	be disturbed and/or removed. Dead Ash is common throughout this community.	riparian area. Reconstruction of a wetland of similar area may be required.
MAM3-8	0 ha of direct disturbance or encroachment.	0.20 ha of community will be removed and/or disturbed. This marsh community is contiguous with the adjacent forest communities of Polygons 4 and 5; an identified ecological significant forest (Region of York) in the Official Plan. Adjacent to the road, this community is primarily dominated by Reed Canary Grass and Cattail with evidence of Common Reed and sparse Crack Willow.	Consider reducing the requirement for grading and disturbance of the meadow marsh area. Locate staging areas, stockpiles, fueling areas etc. outside of community units.
Forest Units (FOD5, FOD3-1)	0 ha of direct disturbance or encroachment.	0.42 ha of forest will be removed and/or disturbed. This forest area is comprised of two forest units (FOD5 and FOD3-1) and is designated as an ecological sensitive forest (Region of York) in the Official Plan. FOD 3-1 is dominated by trembling aspen in association with Sugar Maple, Green Ash, Black Walnut and American Elm. FOD5 is dominated by Sugar Maple and abundance of Yellow Birch. These ELC communities are not rare and are common in southern Ontario.	Delineate all work zones and erect Tree Protection Fence up to the where the treed / vegetation buffer occurs. Locate staging areas, stockpiles, fueling areas etc. outside of forest units. Removal of riparian vegetation, particularly woody vegetation, should be kept to the minimum necessary for the project works and site preparation, including close cut clearing and grubbing, should be performed immediately prior to commencement of instream construction activities to minimize erosion. Reduction in forest cover shall require planting of similar forest species to compensate for loss of canopy cover.
Wildlife Habitat	Removal of habitat for urban tolerant species		Areas should be recovered with restoration where feasible within the Regional right-of-way.
Linkages and Corridors	No Regional corridors affected. There is one crossing within the Regional Greenlands System adjacent to Robinson Creek (Crossing 4).		Consideration should be given to the provision and enhancement of wildlife crossing within the new culvert. Where culverts are replaced, wildlife passage should be maintained or enhanced. Based on new culvert dimensions, the openness ratio will provide enhanced wildlife passage for small mammals.



**6.2.2 SOCIO-ECONOMIC ENVIRONMENT**

**6.2.2.1 Noise**

A noise assessment was conducted by Novus Environmental Inc. to assess the change in noise levels that would result from implementation of the preferred alternative. The noise assessment considered both operational noise (i.e. road traffic noise related to the undertaking) and construction noise. A summary of the findings is provided below. For the full report, refer to Appendix J.

Operational Noise

A “noise impact” is defined as the difference in projected noise levels at the start of construction and the projected noise levels 10 years after construction. The year 2015 was selected as the start of the construction year and represents the “no-build” existing conditions scenario. The future year of 2034 was selected as the future “build” scenario, based on best available traffic data. Traffic data for the analysis was provided by Parsons Inc. 17 receptor locations were modelled in the noise assessment, which represent a number of Noise Sensitive Areas (NSAs). **Table 36** below shows the results of the noise assessment when ranked in terms of changes in sound level.

Table 36: Ranking of Change in Sound Levels

Future “Build” $L_{eq}$ (16h)		# of Receptors in this Category	Number of NSA Represented
Increase in Sound Level	> 15 dBA	0	0
	> 10 to 15 dBA	0	0
	> 5 to 10 dBA	1	4
	0 to 5 dBA	16	92
Decrease in Sound Level	-5 to < 0 dBA	0	0
	-10 to < -5 dBA	0	0
	-15 < -10 dBA	0	0
	< -15 DBA	0	0

At one of the receptor locations, the results show that the change in sound exposures resulting from the proposed project are expected to be slightly in excess of 5dBA. This receptor is representative of four NSAs, which are all single residences that front Huntington Road. Placement of noise barriers on the driveway/right-of-way might be technically feasible to provide a greater than 5 dBA noise reduction, however they are not considered to be economically feasible. Based on the projected sound levels at the remaining receptor locations, changes in sound exposure levels are not expected to be 5 dBA or greater. As a result, further investigation of mitigation measures is not required.

Construction Noise

An analysis of the potential worst-case construction noise levels was conducted based on generic data and assumed construction configurations. Construction noise impacts are temporary in nature but will be noticeable at times at residential NSAs. Methods to minimize construction noise impacts will be included into the contract documentation for construction as laid out in Section 8 of this report that discusses proposed mitigation work.

**6.2.2.2 Air Quality**

While no formal air quality assessment was carried out for this study, the project is not anticipated to have significant impacts to air quality. Generally, the existing Huntington Road does not carry large volumes of traffic and thus does not generate significant adverse air quality impacts. Air quality in the area is mostly impacted by the surrounding uses, which include industrial and manufacturing uses.

The implementation of these improvements to Huntington Road will facilitate travel not only to motorists, but also for cycling, walking, and transit, which may help offset worsening air quality due to growth in the area. Improving the roadway will also facilitate more efficient travel compared to the existing rural road, which may be more difficult to traverse, particularly for larger transport vehicles.

Air quality may also be affected by works undertaken during construction. Specific air quality mitigation measures will need to be employed during construction to ensure minimal impacts; this is further detailed in Section 9.

### 6.2.2.3 Cultural and Built Heritage

The Cultural Heritage Assessment Report (CHAR) determined there are no direct impacts to the cultural heritage resources that were identified in the existing conditions. However, there are indirect impacts to 13 sites and potential for impact on one site as a result of the road improvements and urbanization associated with the preferred design alternative. **Table 37** provides a summary of the potential impacts and the recommended mitigation measures for each site with potential indirect impacts. In general, these indirect impacts are a result of property acquisition and urbanization affecting the entrance drives of the identified cultural heritage sites. Most of the recommendations involve the completion of a Cultural Heritage Resource Impact Assessment (CHRIA) with the City of Vaughan. The CHRIA will be completed in detailed design when the exact impacts are known.

The CHAR also recommends some general mitigation actions that can be taken. These include keeping construction noise and vibration to a minimum in the vicinity of the cultural heritage sites listed. Landscaping plans should also be developed in the vicinity of the identified heritage resources identified.

Table 37: Potential Cultural Heritage Impacts and Mitigation Required

Site #	Resource Category	Resource Type	Location	Impact	Mitigation
1	BHR	Residential: Former Farmhouse	8700 Huntington Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 3 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
2	BHR	Residential: Former Farmhouse	8741 Huntington Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 3 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
3	CHL	Agricultural: Former Farm Complex	8811 Huntington Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 3 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
4	BHR	Residential	8934 Huntington Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 3 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
6	BHR	Residential	6666 Rutherford Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 3 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
7	CHL	Agricultural: Farm Complex	9571 Huntington Road	<b>Indirect Impact</b> The Part A: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.

8	CHL	Agricultural: Farm Complex	10220 Huntington Road	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
9	CHL	Agricultural: Farm Complex	10436 Huntington Road	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and improvements to Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
10	CHL	Funerary: Cemetery	10655 Huntington Road  Nashville Cemetery	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates the alignment of Huntington Road has been realigned to minimize impacts to the cemetery.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
11	CHL	Agricultural: Farm Complex	10533 Huntington Road	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and the urbanization of Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
12	CHL	Agricultural: Farm Complex	10540 Huntington Road	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and the urbanization of Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
14	BHR	Residential	10671 Huntington Road	<b>Indirect Impact</b> The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of the entrance drive due to property acquisition and the urbanization of Huntington Road.	City heritage staff has indicated the requirement of a CHIRA. Review Final Design to confirm design has not changed in this area and update CHRIA as required.
15	CHL	Transportation: Roadscape	Huntington Road	<b>Indirect Impact</b>  The Part B: Preferred Alternative Design: Alternative 4 indicates there will be changes to the character and setting of Nashville Road at the intersection with Huntington Road due to property acquisition and the urbanization of Huntington Road and the intersection. The eastern portion of the property at 6850 Road in the northwest corner and the southwest corner of Huntington Road and Nashville Road in the historical settlement of Nashville are designated under Part V of the OHA as part of the Kleinburg-Nashville HCD.	All development within the Kleinburg-Nashville HCD must be in keeping with the historical streetscape and conform to the HCD Plan and design guidelines.  Consultation with the City of Vaughan is required. The Final Design should be reviewed to confirm it follows the HCD Plan and design guidelines.

16	CHL	Historical Settlement	Nashville	The Part B: Preferred Alternative Design: Alternative 4 indicates potential for changes to the character and setting of two (2) properties located at 970 and 975 Nashville Road within the Kleinburg-Nashville due to property acquisition and the urbanization of Huntington Road and the intersection.	All development within the Kleinburg-Nashville HCD must be in keeping with the historical streetscape and conform to the HCD Plan and design guidelines. Property acquisition on the west side of 975 Nashville Road will significantly alter the character and setting of the residence. Property acquisition on the west side of 970 Nashville Road will alter the character and setting of the residence. Both properties are situated within the Kleinburg-Nashville HCD. Changes to the environment must be in keeping with the historical streetscape and conform to the HCD Plan and design guidelines.  Consultation with the City of Vaughan is required. The Final Design should be reviewed to confirm it follows the HCD Plan and design guidelines.
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#### 6.2.2.4 Archaeology

Based on the Stage 1 Archaeological Assessment, any impacts to lands determined to have archaeological potential should be preceded by a Stage 2 Archaeological Assessment to determine if archaeological resources exist. To determine which lands are considered to have archaeological potential, please refer to Appendix C for the Stage 1 Archaeological Assessment. Any impacts to the area between the Nashville Cemetery fence and the roadway should be preceded by a Stage 3 investigation for any burials that may extend beyond the cemetery boundary. Both the Stage 2 and Stage 3 assessments will be pursued during detailed design when the exact lands to be impacted will be determined. Based on the findings of these studies, further archaeological assessments may be required such as Stage 3 and 4 assessments.

## 7. THE CONSULTATION PROCESS

Consultation is an important component of the environmental assessment process and involves communication between the proponent and interested parties or persons regarding the undertaking. The Municipal Class EA has three mandatory points of contact: after the development of alternative solutions; after the development of alternative designs; and finally, after an ESR is completed and published for public review. This section will document the consultation taken throughout the Huntington Road EA Study. A Record of Consultation, with copies of the materials discussed in this Section, can be found in Appendix K.

A **Notice of Commencement** was issued and advertised in the *Vaughan Citizen* and the *Thornhill Liberal* on November 13<sup>th</sup> and 20<sup>th</sup>, 2014. The Notice provided information on the study background and process, the contact information of the project managers, as well as the information for Public Information Centre No. 1. Letters were also sent out with the Notice to key agencies and stakeholders with further information on the project and as an invitation for further comment.

At the end of the study, a **Notice of Completion of Environmental Study Report (Notice of Completion)** was issued in the **newspapers** on **dates**. This Notice advised the public and those with an interest in the study, that an Environmental Study Report (ESR) had been completed for the project and was available for review. The Notice also detailed how public comments can be submitted, the review period, and the right to request a Part II Order.

### 7.1 INTERESTED AGENCIES AND STAKEHOLDERS

The stakeholder list was generated from an initial list of potential stakeholders. Additional parties were added to the list based on potential interest in the undertaking and those referenced by other stakeholders. Stakeholders are generally comprised of federal and provincial agencies, Indigenous communities, school boards, civil services, municipalities, conservation authorities, utility groups, transportation agencies, and ratepayer associations. Additionally, property and business owners within a 200 metre radius along Huntington Road were included. A formal technical agency committee

was determined not to be needed due to the context of the study area; the Highway 427 extension already necessitated constant communication between the key stakeholders in the area, particularly between the City of Vaughan, MTO, and CP Rail.

The City of Vaughan conducted meetings with key stakeholders throughout the project. Short descriptions of the meetings are provided below. The meeting minutes can be found in Appendix K.

#### Meeting with TACC Developments

A meeting between TACC Developments (TACC), the developers of the Nashville Heights Community in Block 61 West, and the City of Vaughan took place on March 24, 2014 at the City of Vaughan. A traffic engineer from Poulos & Chung Ltd., who conducted traffic studies on the area, and Parsons (consultant) staff were present. Key issues discussed mostly related to road configurations. The representative from TACC also provided some key stakeholders who should be contacted. The representative from Poulos & Chung provided some additional traffic and road studies regarding the Nashville Community and major roads nearby.

#### Meeting with MTO

A meeting between the Ministry of Transportation and the City of Vaughan took place on April 30, 2014 at the MTO Office. Staff from Parsons was also present. Most of the discussions were focused on MTO's progress on the Highway 427 extension. Other projects in the area were also discussed, including a pipeline and a secondary plan for Block 59.

#### Meeting with CP Rail

A meeting between CP Rail and the City of Vaughan took place on May 16, 2014 at the CP Rail Vaughan Terminal. Staff from MTO, York Region, and Parsons were also present. CP Rail discussed their future plans for reconfiguration of the rail tracks and the expected increase in throughput at the Vaughan Terminal. Truck traffic intended to and from the Terminal are not expected to use Huntington Road. The topic of Huntington Road closures due to the rail tracks and Highway 427 were also mentioned.

#### Toronto and Region Conservation Authority (TRCA)

Two meetings were held with TRCA on January 12, 2016 and June 13, 2016. The first meeting was to review the project details, including background information, studies outlining the existing conditions, and the preliminary preferred alternative designs. TRCA staff provided additional information on the study area based on their previous knowledge of the corridor. The second meeting included reviewing more specific drainage and stream realignment designs and communicating and resolving potential concerns.

## **7.2 PUBLIC INFORMATION CENTRE (PIC) NO. 1**

The first Public Information Centre (PIC) was held in the Town of Kleinburg at the Ecole Elementaire La Fontaine on Tuesday, November 25, 2014 from 5:00pm to 8:00pm. The PIC operated in an open house drop-in format, with staff from the City of Vaughan and the consultant (Parsons Inc.) present to engage attendees and answer questions.

Advance notifications of the PIC was provided to potentially interested residents and stakeholders using a variety of methods. These notices provided the purpose, time and location of the PIC and also some background on the study and the Class EA process. Points of contact from the City of Vaughan and the consultant were also given.

In total, 18 individuals attended the event and included both residents and agency stakeholders. Information regarding the Huntington EA study was presented to the attendees on display boards (see Appendix K). The display boards included information on:

- Purpose of the Class EA study;
- The Problem and Opportunity Statement that identifies why the study is being undertaken;
- An overview of the Class EA planning process (including key phases, points of consultation);
- Study area existing conditions;



- Preliminary results of the evaluation of alternative solutions to the problem;
- Alternative solutions, and evaluation criteria and results; and
- Next steps in the planning process.

During the course of the PIC, attendees were encouraged to provide comments/questions on a “Comment Form”. While no comment forms were received, the Project Team was able to gather general thoughts and comments from the public based on the discussions during the PIC. These comments generally supported the project and related to connections surrounding the Highway 427 interchange and other north-south routes. For full details on PIC No. 1, refer to the Summary Report found in Appendix K.

### **7.3 PUBLIC INFORMATION CENTRE (PIC) NO. 2**

The second Public Information Centre (PIC) was held in the Town of Kleinburg at the Kleinburg Library on Wednesday, June 29, 2016 from 5:00pm to 8:00pm. The PIC operated in an open house drop-in format, with staff from the City of Vaughan and the consultant (Parsons Inc.) present to engage attendees and answer questions.

Advance notifications of the PIC was provided to potentially interested residents and stakeholders using a variety of methods. These notices provided the purpose, time and location of the PIC and also some background on the study and the Class EA process. Points of contact from the City of Vaughan and the consultant were also given.

In total, approximately 20 individuals attended the event and primarily included residents and property owners near the study area. Attendees were asked to sign in and could opt to be added to the project mailing list. Information regarding the Huntington EA study was presented to the attendees on display boards (see Appendix K). The display boards included information on:

- Study background, including the purpose of the study and the Class EA process
- Study Area context and future/planned developments
- Recap of PIC No. 1 and the recommended solutions
- Alternative designs for Part A and Part B, including the evaluation and the preliminary preferred alternative designs and their potential impacts
- General property acquisition process
- Next steps following the PIC

During the course of the PIC, attendees were encouraged to provide comments/questions on a “Comment Form”. While only 2 comment forms were received, the Project Team was able to gather additional thoughts and comments from the public based on the discussions during the PIC. These comments generally supported the preferred alternative and related to connections surrounding the Highway 427 interchange and other north-south routes. For full details on PIC No. 2, refer to the Summary Report found in Appendix K.

### **7.4 CONSULTATION WITH INDIGENOUS COMMUNITIES**

Indigenous communities were first notified at the onset of the study. Indigenous Communities identified were sent a Notice of Commencement and PIC No. 1 along with a letter on November 18, 2014 to notify them of the study and its background. One response was received from Curve Lake First Nation, who wished to be notified if any archaeological remains are found within the study area. Notice of PIC No. 2 and Notice of Study Completion were also sent to Indigenous communities. Documentation of this correspondence can be found in Appendix K.

The Indigenous communities that were contacted include:

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| • Chippewas of Georgina Island      | • Six Nations of the Grand River |
| • Mississaugas of Scugog Island FN  | • Munsee-Delaware Nation         |
| • Delaware Nation                   | • Chippewas of the Thames FN     |
| • Mississaugas of the New Credit FN | • Oneida Nation of the Thames    |
| • Bay of Quinte Mohawk              | • Hiawatha FN                    |

- Alderville FN
- Curve Lake FN
- Chippewas of Rama FN
- Beausoleil FN
- Moose Deer Point FN
- Wahta Mohawk
- Wasauksing FN
- Chippewas of Nawash Unceded FN
- Saugeen FN
- Williams Treaties FN

## 7.5 SUMMARY OF COMMENTS RECEIVED & RESPONSES

A summary of the comments received and how the Project Team responded or incorporated the comments into the study are included in **Table 38**. The table includes a summary of the comment received; for the full correspondence, please refer to the Record of Consultation in Appendix K.

Table 38: Summary of Comments Received and Responses

Public/Agency/ Interest Group	Comment Summary	Date	Project Team's Response or Consideration of Comments
MOECC	MOECC provided additional information on several areas of interest related to the project, such as environmental factors, planning and policy, and consultation.	November 26, 2014	Project Team noted these comments and will incorporate into the study moving forward.
	MOECC staff provided comments on the draft ESR and associated studies relating to various environmental factors, such as land use planning, air quality, soil management, source water protection and consultation.	April 10, 2017	Project Team addressed the comments through revision to the ESR and additional commitments through detailed design.
MTO	MTO staff provided further details, particularly around the Highway 427 extension and the alignment of Major Mackenzie Drive.	April 30, 2014	Project Team incorporated the results of the Highway 427 Extension study into this EA. Parsons and the City will continue to liaise with MTO regarding future developments of Highway 427.
	MTO staff provided comments on the traffic operational analysis report about future roads mentioned in the report.	April 6, 2017	Project Team revised the report to reflect MTO's concerns.
MNRF	Following a request for information from the Project Team, MNRF provided information on natural heritage features and element occurrences on or adjacent to the study area.	August 28, 2014	Project Team incorporated these findings into the natural heritage study.
	MNRF confirm to the sub-consultant that Redside Dace (RSD) downstream of the study area has not been documented for 20+ years, thus neither Robinson nor Rainbow Creek is considered regulated habitat for RSD.	January 28, 2016	Project Team incorporated these findings into the natural heritage study.
MTCS	MTCS requested the PIC No. 2 boards and materials.	June 24, 2016	Project Team sent an electronic copy of the PIC No. 2 boards to the MTCS contact.
	MTCS staff provided comments on the archaeological resources and the built heritage and cultural heritage landscapes.	April 13, 2017	Project Team acknowledged the comments and made revisions in the ESR and the CHAR as needed.
CPR	CPR staff discussed the background of the project and the future plans and volumes for the CP Rail facility and future link possibilities with the closure of Huntington Road.	May 16, 2014	Project Team will move forward with the termination of Huntington Road due to the Highway 427 extension. Parsons and the City will continue to be kept up to date with possible future connections, though the development of such links will be outside of the scope of this study.

TRCA	TRCA outlined their interests in the study and also identified other agencies that may require involvement. TRCA provided additional materials relating to EAs that may be helpful to completing the study based on TRCA interests.	December 11, 2014	The Project Team acknowledged the contents of the letter and will continue to keep TRCA informed. All relevant materials will be provided to TRCA for their review.
	<p>TRCA staff provided the following comments:</p> <ul style="list-style-type: none"> <li>• Multi-use trail should connect to other transportation networks</li> <li>• A draft ESR should be provided for their review</li> <li>• Suggested that most culverts/structures would require replacement or extension</li> <li>• Wildlife corridor considerations may be needed</li> <li>• CSP should be bigger to accommodate aquatic habitat and channel design and width should be studied in a fluvial assessment</li> <li>• Identified potential concerns for excavation in the vicinity of Hunting Road and the CN Rail crossing due to previous construction</li> <li>• Noted that the City should consider opportunities to address run off and that stormwater and creek flow should be separate</li> <li>• Identified a section of creek that runs parallel to the roadway that will require realignment due to widening</li> <li>• Identified potential impacts to other facilities</li> <li>• Identified some other studies and guidelines that may be helpful</li> </ul>	January 12, 2016	<p>Project Team acknowledged their TRCA's concerns and incorporated where applicable into the drainage and hydrology report. A fluvial geomorphological assessment was done for the study area as well as the creek realignment.</p> <p>The Project Team will provide the draft ESR for TRCA's review.</p>
	<p>TRCA staff provided the following comments:</p> <ul style="list-style-type: none"> <li>• Parsons should investigate moving the cul-de-sac north of Tributary 6 to avoid culvert replacement and opportunities to restore channel</li> <li>• Noted that the City should consider opportunities to address run-off and minimize stormwater discharging into existing watercourses. Potential mitigating measures to investigate include bio wale and storm tech chambers</li> <li>• Expressed concern over the property ownership at the realigned creek. Would be best to minimize potential impact to the creek and investigate opportunities to install fence along the property line to avoid unnecessary disturbance to the creek</li> </ul>	June 20, 2016	<p>Project Team incorporated changes as appropriate.</p> <p>Stormwater quality controls recommended for this project include bio-retention, catch basin controls, gutter filters, grassed swales and oil/grit separators.</p> <p>Project Team initiated correspondence with the property owner at the creek realignment and discussed their plans regarding driveway access.</p> <p>A floral survey is laid out in the ESR as part of additional work that will need to be completed in detailed design.</p>

	<ul style="list-style-type: none"> <li>• Floral survey needed for the creek realignment in detailed design and documented in the ESR</li> </ul>		
	TRCA staff requested that the Project Team provide the HEC-RAS model used in the study's assessment. Also, reiterated TRCA's commitment to the 30 day review time.	April 5, 2017	Project Team provided a HEC-RAS model and a geoHEC-RAS model.
	TRCA provided comments relating to the water resources of the study. This is mostly comprised of the drainage, hydrology, SWM and fluvial geomorphology work.	May 9, 2017	Project Team revised the Drainage Report and the Fluvial Geomorphology Report according to TRCA's comments.
	TRCA provided additional comments on the ecology / natural heritage work done for the study.	July 4, 2017	Project Team revised the Natural Heritage Report and ESR according to TRCA's comments.
TACC	TACC staff provided details on several local development projects and key issues. TACC staff also provided several studies completed for Block 61, which includes traffic studies completed for the new development and Huntington Road.	March 24, 2014	Project Team incorporated the major developments into the EA. Staff also reviewed the background studies provided by the developer and incorporated into the traffic study for the EA.
Curve Lake First Nation	Expressed their concern over ancestral remains and associated artefacts during excavation and construction.	December 11, 2014	Project Team will immediately notify and contact Curve Lake First Nation and the nearest FN Government about the findings before proceeding further with removal and the project.
Nashville Area Ratepayers Association (NARA)	NARA individual requested additional information on the background of the study and also inquired about the Huntington Road alignment. The individual also emailed Ward Councillor about the EA study.	August 22, 2014	Project Team provided response with background information and contact will be notified of the first PIC.
	NARA individual further inquired about considering the "New Huntington Road Alignment" for the study.	September 2, 2014/ November 18, 2014	Project Team noted that the "New Huntington Road realignment" is being considered as part of the GTA West Transportation Corridor EA. The Huntington Road Class EA will not be addressing the realignment as part of this study.
Kleinburg and Area Ratepayers' Association (KARA)	Strong support for upgrading Major Mackenzie Drive, enabling the building of the Highway 427 extension, and realigning Huntington Road/Nashville Road to the west.	September 17, 2014	Project Team acknowledged the support and the proposed ideas and incorporated into their consideration of design alternatives as appropriate.
Walker, Nott, Dragicevic Associates (WND)	WND staff requested to be updated with regards to future notices relating to the Huntington Road EA.	September 15, 2014	WND contact added to project mailing list.
9411 Huntington Road, landowner	Discussion with the Project Team regarding the creek realignment on the property and incorporation of their design for driveway / access alignment.	May – August 2016	Project Team met and followed up with the landowner and their engineering consultant multiple times in order to reach a consensus on the design and resolve any outstanding issues. In the end, the property was sold and this issue resolved.

## 8. PROPOSED MITIGATION AND MONITORING

Due to potential environmental impacts resulting from construction and implementation of the final design, it is recommended that various mitigation measures and monitoring be employed to reduce potential impacts.

During construction, mitigation encompasses implementation of all relevant standard and nonstandard / site-specific protection measures and management practices including Operational Constraints and Construction Specifications. Relevant Ontario Provincial Standards Specifications (OPSS) including: OPSS 201 (Clearing and Grubbing), OPSS 503 (Site Preparation), OPSS 565 (Tree Protection), OPSS 182 (Environmental Protection for Construction in Waterbodies and on Waterbody Banks) are to be followed.

These measures and all the site-specific measures will continue to be refined and detailed as the design evolves through subsequent design phases. The mitigation measures will be finalized based on the final design, and its effects on aquatic and terrestrial environment. In addition, comprehensive construction mitigation involves recognition and implementation of additional control measures that may be identified through good construction practices and environmental inspection.

### Fish Protection

All in-water and near-water activities will be conducted within the applicable in-water construction timing windows, as identified by MNR, to protect the resident fishery life functions as outlined below. Fish protection measures include:

- The MNR classifies the majority of watercourses in the study area as warmwater and therefore, in-water work in many of watercourses should only occur between the months of July 1 to March 31.
- Timing windows for in-water works should be confirmed with MNR/TRCA prior to the commencement of construction as these windows are subject to change where species at risk or migratory corridors exist.
- All in-water activities shall be performed in the dry. This will require construction to occur behind water tight isolation barriers (coffer dam, Aqua-Dam, sheet piling, etc.).
- The water tight work zones shall not occupy more than one third of the active channel at any point in time to maintain downstream flow and fish passage.
- Any fish stranded within the temporary in-water work zones will be removed and relocated using appropriate techniques by a qualified fisheries specialist possessing a valid Scientific Collector's Permit.

### Terrestrial

Mitigation measures will be applied during clearing and grubbing activities to minimize removal of native vegetation, minimize impact to retained features, maintain water balance and avoid native soil disturbance. Examples of measures that should be applied where applicable include:

- Removal of natural vegetation should take place outside of the breeding bird window (April 1 - to August 31) in order to avoid disturbance of migratory breeding birds protected by the *Migratory Birds Convention Act (1994)*.
- Tree removal should be restricted to the working area and minimized where possible.
- Trees should be felled into the ROW to avoid damaging other standing vegetation. Trees will be felled away from any watercourse where it is safe to do so.
- Trees along newly created edges of forests should be flush cut (not grubbed) to stimulate suckering regeneration along remaining forest edge. This is particularly relevant in Part B - FOD units.
- Tree hording fence (i.e. tree protection fence) should be established along the edge of disturbance to prevent intrusion and stockpiling of materials into adjacent forest areas.

### Grading

- The need for grading should be narrowed where possible during Detailed Design within and adjacent to the ecological sensitive forest.
- Mitigation measures will be used during grading to minimize the overall grading footprint and keep gradients low.



## Restoration

- Restoration and landscaping plans should use only native species, and ideally those found within the watersheds of TRCA. Vegetation should be sourced from appropriate local genetic stock where possible.
- Use a variety of seeding and planting methods, multiple species and relatively high planting densities for woody species to build natural redundancy into the restoration plans.

### Construction Access, Site Controls and Operational Constraints

The construction access and work areas to be confined to the extent required for the construction activities, and these areas are to be defined in the field using appropriately installed protective fencing or other suitable barriers.

- Removal of riparian vegetation, particularly woody vegetation, will be kept to the minimum necessary for the project works. The woody vegetation that will likely require removal should be replaced with appropriate native species.
- Any temporarily stockpiled material, construction or related materials will be properly contained (e.g. within silt fencing) in areas separated a minimum of 30 metres from any waterbody.
- All construction materials and debris will be removed and appropriately disposed of following construction.
- Every effort will be made to retain as much of the natural vegetation as reasonably possible to help ensure bank stability, control erosion and expedite the re-colonization of vegetative cover.
- Removal of natural vegetation should take place outside of the breeding bird window (April 1-July 31) in order to avoid disturbance of migratory breeding birds protected by the *Migratory Birds Convention Act (1994)*.
- Removed shoreline vegetation from watercourses is to be replaced using native vegetation along the newly created shoreline at a ratio that exceeds the removal of woody stock.
- All activity will be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants / deleterious substances, in addition to sediment as outlined above, to any waterbody. No storage, maintenance or refueling of equipment will be conducted near any waterbody. A Spills Prevention and Response Plan will be developed and kept on site at all times.

### Protection During Culvert Replacement Activities

- Appropriate containment systems (e.g. coffer dams, Aqua-Dam, sheet piling, etc.) will be designed and implemented during the removal of the existing structures to prevent entry of debris into watercourses. This system(s) will address large materials and fine particulates, and will be regularly monitored to remove and appropriately dispose of accumulated material.
- Materials that fall in the water will be carefully retrieved to minimize disturbance.
- All excavated material shall be removed and deposited in an area above the high water mark of the shoreline and be contained behind properly installed and maintained sediment barriers or devices.

### Erosion and Sediment Control

Erosion and sediment control (ESC) during the construction stage will be governed by OPSS 805 – Construction Specification for Temporary Erosion and Sediment Control Measures. ESC measures will comprise the following minimum measures:

- The site will be enclosed with silt fence before construction starts.
- Only areas strictly required to proceed with construction will be stripped. These areas will be stabilized as soon as practical.
- Any disturbed area will be stabilized as soon as practical, especially swales and ditches.
- Areas stripped of vegetation will be surrounded by silt fence.
- A vegetated buffer will be maintained between disturbed areas and neighbouring properties where practical.
- Drainage ditches and swales will be provided with check dams which will be properly installed and anchored in accordance with Ontario Provincial Standards. Straw bale check dams will not be used; alternative check dams, such as rock or silt dams, will be further evaluated and refined in detailed design.
- Site access will be covered with clear stone and/or rip rap to reduce tracking of mud by truck tires.

ESC measures are also to be implemented to prevent sediment laden runoff from the construction zone to the creek and include:

- Perimeter silt fence installed between the work areas and along the banks of watercourses within the area of construction (where feasible).
- Temporary silt fence placed around inlets and outlets of existing culverts in the drainage system (where feasible).
- Silt fence properly installed and regularly inspected and maintained. It will be left in place and maintained until all surfaces contributing drainage to these watercourses are fully stabilized.
- All exposed and newly constructed surfaces will be stabilized using appropriate means in accordance with the characteristics of the soil material. These surfaces will be fully stabilized and re-vegetated as quickly as possible following completion of the proposed works.
- Contingency procedures, materials and notification procedures will be readily available for use in the event of a silt release and for general application in regular maintenance and repair.

#### Noise

Specific mitigation and monitoring efforts should be taken to minimize noise-related impacts, particular during construction. Such measures are listed below:

- Construction should be limited to the time periods allowed by the locally applicable bylaws. If construction activities are required outside of these hours, the Contractor must seek permits/exemptions directly from the City of Vaughan in advance
- There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the Municipality for all work done by Contractors
- All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- The Contract documents should contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with MOECC NPC-115 guidelines, as outlined in Section 3
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

#### Air Quality and Dust Control

Specific mitigation measures and Best Management Practices should be employed during construction to minimize any air quality impacts caused by construction dust. These should be determined by the Contractor based on project specific work and in reference to “Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities”. Such measures include, but are not limited to:

- Dust and debris control measures to control roadway dust through application of water or non-chloride based compounds, stabilization or covering of material storage piles to prevent wind erosion, and covering of fine particulate materials during transportation to and from the site
- Using well-maintained equipment and machinery that are fitted with emission control systems/muffler/exhaust system baffles and engine covers

#### Source Water Protection

Best management practices should be employed during construction to minimize impacts to and protect source water in the study area. Such practices include locating fuel storage, refueling and maintenance of construction equipment away from watercourses or preparing contingency plans prior to construction to control or clean up a spill should one occur.

#### Rehabilitation Following Construction

- All of the areas disturbed during construction will be restored, stabilized and revegetated as soon as the works are completed to prevent migration of fine material to watercourses during runoff events, as well as minimizing the opportunity for colonization of the area by invasive species.
- Only native plants, compatible with site conditions will be used.

#### Site Inspection and Monitoring

Monitoring must be undertaken during construction so that all the environmental commitments as detailed in this ESR and the contract document are fulfilled and adhered to.

A qualified Certified Inspector of Sediment and Erosion Control (CISEC) should conduct regular inspections of the environmental protection measures (ESCs, containment measures, etc.) and identify deficiencies. The inspector will ensure all environmental mitigation and design measures are properly installed / constructed and maintained, and appropriate contingency and response plans are in place and implemented if required.

## **9. ADDITIONAL WORK, APPROVALS AND FOLLOW UP COMMITMENTS**

This Class EA study identified some additional work that will need to be carried out in detailed design when the exact impacts to property and other environmental features are identified. Listed below is the additional work to be completed in subsequent stages of this undertaking.

#### Detailed Design

Additional work is required through detailed design to confirm various technical components of the design. They include:

- Confirm the road profile, alignment, and grading to a higher level of detail
  - Specifically the intersection at Huntington Road / Nashville Road and the area between stream crossings 8 and 9 to try to minimize and avoid natural features where possible
- Determine illumination requirements along the corridor
- Determine utility design and relocation requirements
- Determine Stormwater Management requirements and related Culvert Crossings designs, including hydrogeology investigations as required at culvert locations
- Determine Pavement Design & ground water conditions
- Develop a construction staging and traffic management plan
- Determine detailed property requirements and begin negotiations with affected property owners
- Confirm the approvals and permits needed
- Confirm need for active transportation facilities on the west side of Huntington Road, pending future development and growth
- Determine opportunities for streetscaping and landscaping installations within the project limits
- Evaluate and confirm the alternative check dams to be used for Erosion and Sediment Control measures

#### Additional Archaeological Assessments (MTCS)

The widening of Huntington Road will encroach on land that has been determined to have archaeological potential. Therefore, once the exact lands to be impacted are determined in detailed design, a **Stage 2 Archaeological Assessment (AA)** will have to be conducted for those areas requiring further study as outlined in the Stage 1 AA completed for this study. In addition, any proposed impacts to the grassy strip between the Nashville Cemetery fence and the road should be preceded by a **Stage 3 AA investigation** for any burials that may extend beyond the cemetery boundary into the right-of-way. Stage 3 and 4 AAs may be required pending the findings of these investigations.

Should any archaeological artefacts or remains be found, the Ministry of Tourism, Culture and Sport (MTCS), appropriate Indigenous communities, and other relevant stakeholders will be contacted before any further work is done.

#### Cultural Heritage Resource Impact Assessments (CHRIAs) for impacted cultural heritage properties (City of Vaughan)

Generally, the implementation of the preferred alternative design will result in indirect impacts affecting the entrance drives of several identified cultural heritage sites. When the exact impacts are known through detailed design, the CHAR recommends that the Project Team meet with the City of Vaughan to determine the need for a Cultural Heritage Resource Impact Assessment (CHRIA) for each impacted site. The Project Team will also consult with the City of Vaughan regarding road improvements near the Kleinburg-Nashville HCD and ensure that streetscape conforms to the HCD Plan and design guidelines.

#### Additional Field Surveys

**Vegetation Survey (TRCA)** - A vegetation survey was required by TRCA to determine what existing vegetation, adjacent to the proposed creek realignment, needs to be retained, removed or compensated for. Background reports and resources were reviewed to gauge existing vegetation in the area of the realignment and it was determined that it would be unlikely that the findings of the vegetation survey will impact the creek realignment as the area is highly altered. The vegetation survey will be conducted in detailed design and a replanting plan will be put together in later stages based on the findings of the survey.

**Fish Surveys (TRCA)** – Spring fish surveys will be completed in detailed design as per TRCA requirements to determine if streams are seasonal habitat and to confirm previous findings and the presence of species of concern.

**Amphibian Surveys (TRCA)** – Amphibian surveys will be completed in detailed design as the findings may impact the road alignment and wildlife crossings.

**Bird Surveys (MNRF)** – Additional bird surveys to be conducted in detailed design to confirm presence/habitat/nests for bird SAR. If surveys confirm presence or habitat, suitable habitat replacement and nesting kiosks may be required.

**Bat Surveys (MNRF)** – Additional bat surveys are to be completed in detailed design to confirm the presence of SAR in the study area. The surveys will also confirm the presence of bat roosts.

#### Wildlife Crossings

Wildlife passages will be further assessed in detailed design pending the findings of the field surveys. In particular, crossings #4 and #9 will be assessed for to allow for wildlife passage. The design of the wildlife crossings will be according to TRCA's Crossings Guideline for Valley and Stream Corridors, 2015.

#### Natural Environment Compensation

Compensation for natural areas that are impacted by the preferred alternative design must be determined during detailed design. This includes quantifying the amount of natural areas removed and identifying areas to be improved and the appropriate amount of compensation required (replanting, rehabilitation, etc.). Tree planting of similar forests species to compensate for loss of canopy cover is required.

#### Soil Management

As discussed in Section 2.4.5 and based on the Phase 1 ESA, it was determined that there are PCAs and APECs associated with the current and historical activities in and adjacent to the study area. Consequently, a limited soil investigation is recommended to evaluate the soil conditions, prior to excavation activities, within the APECs. Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken in detailed design.

Activities involving the removal or management of excess soils should be undertaken in accordance with the MOECC's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014). If the soils are contaminated, the contractor should determine how and where soils are to be disposed of, consistent with Part XV.1 of the Environmental Protection Act (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details

the new requirements related to site assessment and clean up. MOECC's York-Durham District Office should be contacted for further consultation if contaminated sites are present.

#### Further Consultation

Consultation with key agencies should continue in subsequent stages of this work. Particularly, continual communication with MNRF and DFO should occur as requirements may change regarding Robinson Creek and Rainbow Creek, although neither were considered to be contributing Redside Dace habitat.

### **9.1 PERMITS**

#### Permit-to-Take-Water (MOECC)

A Permit-to-Take-Water (PTTW) may be required as some of the roadwork may intersect some shallow and coarse grained fill soils that might require some dewatering. It is unlikely that the volumes of groundwater required to dewater would require a PTTW from the MOECC; if it is required, it could be using the new MOECC Environmental Activity and Sector Registry approval process. Construction dewatering is more likely to be required where deep excavations occur that intersect the shallow water table. Additional subsurface investigation could be completed to better evaluate the need and extent of dewatering. Generally, dewatering is considered more likely in Part B to the north, within 900 metres south of Nashville Road due to the coarser soils.

#### Request for Project Review Form (DFO)

Due to the need for culvert replacement at six major watercourse crossings and an eastward realignment of a portion of East Rainbow Creek, these project activities did not meet DFO's criteria under the Self-Assessment process. Consequently, a Request for Project Review Form for DFO is to be submitted so that DFO can review the proposed works when the culverts have been confirmed and refined in Detailed Design.

#### Environmental Compliance Approval (MOECC)

An Environmental Compliance Approval (ECA) will be required from the MOECC for SWM controls for municipal roads.

#### Species at Risk (SAR) Permits

Pending the findings of the field surveys for the presence of SAR, a SAR permit may need to be obtained from MNRF under the *Endangered Species Act* (ESA) and/or Environment and Climate Change Canada (ECCC) or DFO under the *Species at Risk Act* (SARA) depending on the listed species.

### **9.2 ANTICIPATED PROJECT TIMELINE**

Following completion of the Class EA study, the City of Vaughan is anticipating to begin the Detailed Design phase in 2018, completing it no later than late 2019. Construction is anticipated to begin shortly after completion of Detailed Design, with Part A scheduled to be completed in 2021 and Part B in 2022. These dates are an estimation and may be adjusted pending other delays or priorities.



# Appendix A

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Traffic Operations Analysis Report

# Appendix B

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Cultural Heritage Assessment Report

# Appendix C

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Stage 1 Archaeological Assessment

# Appendix D

Natural Heritage Report

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# Appendix E

Phase One ESA

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# Appendix F

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Drainage and Hydrology Report

# **Appendix G**

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Fluvial Geomorphology Assessment and Meander Beltwidth Assessment

# Appendix H

Utility Composite Plan

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# Appendix I

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Design Plan and Profile

# Appendix J

Noise Assessment Report

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# Appendix K

Record of Consultation

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# Appendix L

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Preliminary Geotechnical and Pavement Investigation

# Appendix M

Hydrogeological Assessment

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