



# Schedule 'C' Environmental Study Report for Kennedy Road

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*Kennedy Road Environmental Assessment Study  
between Steeles Avenue and Major Mackenzie Drive*

Regional Municipality of York

March 2021



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# Executive Summary

## Introduction

The Regional Municipality of York (York Region) is responsible for monitoring its transportation network and implementing required improvements in a timely manner. As such, under the 2016 Transportation Master Plan (YR-TMP), York Region's transportation and roadway management strategies have identified future road network needs for Kennedy Road (Y.R. 3) from Steeles Avenue to Major Mackenzie Drive within the City of Markham. Implementation of works on Kennedy Road is scheduled to be staged over different construction years as per York Region's 2020 approved 10-Year Roads and Transit Capital Construction Program.

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

The Environmental Study Report (ESR) documents the MEA Schedule 'C' Class EA process completed for the Kennedy Road EA study, summarizing Phases 1 through 4 of the MCEA Schedule 'C' EA process.

## Study Area

Kennedy Road between Steeles Avenue and Major Mackenzie Drive is a four-lane, north-south Regional arterial road located in the City of Markham. It continues as Kennedy Road in the City of Toronto south of Steeles Avenue. The Kennedy Road Class EA spans approximately 8 kilometres of this regional road and is illustrated in **Exhibit ES-1**.



Exhibit ES-1: Kennedy Road Study Area and Study Corridor

## Public, Agency and Indigenous Consultation

Stakeholder input was key role in the Kennedy Road EA study. The project team engaged the general public, agencies, and Indigenous communities online, through mail and email notifications, and in-person meetings (Open House) to ensure opportunity for participation in the planning process. Key consultation milestones are provided in **Table ES-1**.

Table ES-1: Key Consultation Events

Consultation Event	Date
Notice of Study Commencement	May 2017
Notice of Open House #1	February 2018
Open House #1	February 2018
Notice of Open House #2	November 2019
Open House #2	November and December 2019
Notice of Study Completion	March 2021

Communication with agencies, stakeholders, Indigenous communities and the public took place through:

- Letters
- Emails
- Meetings
- Phone calls
- Notices
- Online surveys
- Road Signs
- Open Houses
- Newspaper advertisements (Markham Economist and Sun, Ming Pao Daily Newspaper, and Sing Tao)
- Project website ([www.York.ca/KennedyRoad](http://www.York.ca/KennedyRoad))
- York Region website ([www.york.ca](http://www.york.ca))
- Digital advertisements ([www.yorkregion.com](http://www.yorkregion.com))
- Social Media (York Region Facebook, York Region Twitter)

Residents living along the study corridor received mailed notices directly. Following the study commencement, individuals who expressed interest in the project and as requested, were added to the project mailing list (mail or email) to receive regular updates on the study progress.

To maximize public awareness, efforts such as roadside signage, social media posts (Facebook and Twitter), and regular updates to the project website provided information to the “silent majority” – the members of the public interested in the project, but opt for a more passive role. Online feedback forms (online surveys) were available on the project website, which allowed individuals to remotely participate in the study.

Stakeholders including adjacent residents, businesses, landowners, developers, community and interest groups, business associations, and educational institutions were identified through the Stakeholder Sensitivity Analysis and/or by requests submitted to the project team.

A Technical Advisory Committee (TAC) was formed comprising of representatives from York Region, City of Markham, City of Toronto, Metrolinx, Canadian National (CN) Rail, 407ETR, Ministry of Transportation (MTO), Toronto & Region Conservation Authority (TRCA), Ministry of the Environment, Conservation and Parks (MECP), and Ministry of Natural Resources and Forestry (MNRF). TAC meetings were held to discuss input, concerns, and technical details at various decision-making points throughout the study. TAC meetings took place on June 21, 2017, January 11, 2018, and October 30, 2019. Individual agency meetings were held as required throughout the project including meetings with YRRTC.

A Stakeholder Group (SHG) was also formed consisting of residents, representatives of resident associations, property owners, and commuters along the corridor who expressed interest in the SHG. Meetings with the SHG and project team provided a forum for focused discussion and to obtain feedback at key points during the study.



Meetings with the SHG were held on October 24, 2017, January 11, 2018, June 20, 2018, and November 14, 2019.

Indigenous communities were engaged throughout the study and were provided with study notices through regular mail and email, and follow-up phone calls. They were invited to participate in the study by providing input and feedback and review Open House materials available on the project website.

## **Problem and Opportunity Statement**

There are opportunities to improve Kennedy Road between Steeles Avenue and Major Mackenzie Drive for all travel modes – cyclists, pedestrians, transit users, and motorists. The EA transportation assessment confirmed the recommendations from the York Region Transportation Master Plan (YR-TMP), 2016 for the need for capacity improvements, continuous cycling and pedestrian facilities, and improved transit service along the corridor to support Kennedy Road as part of the Frequent Transit Network. It also builds on the transit supportive strategies as outlined in the Region's *Towards Great Regional Streets – a Path to Improvement* in order to help encourage ridesharing and to be supportive of regional transit initiatives. These improvements actively support regional objectives outlined in the YR-TMP including, development of a world class transit system, creation of a road network fit for the future, and integration of active transportation into urban areas. A summary of the problems and opportunities identified for the study corridor are provided in the following table. The problems and opportunities identified will consider impacts to the transportation, natural, cultural, and socio-economic environments.

**Table ES-2: Summary of Problems / Opportunities**

Problem	Opportunities
<b>Existing road segments and intersections between Steeles Avenue and Major Mackenzie Drive cannot accommodate projected traffic volumes</b>	Improve Kennedy Road to accommodate projected traffic demand and provide sufficient north-south transportation capacity
<b>With regional roads at capacity, there is the potential for increased traffic on local roads</b>	Improve Kennedy Road to provide sufficient capacity to mitigate potential traffic infiltration and traffic increases on local roads
<b>Lack of continuous pedestrian and cyclist facilities for all users</b>	Provide pedestrian and cyclist facilities to accommodate existing users and growth as a result of future development, especially across the 407ETR and Rouge River bridge
<b>Existing infrastructure does not support enhanced transit service and results in delays to transit users</b>	Evaluate for potential addition of transit/HOV lanes to support Kennedy Road as a Frequent Transit Network Corridor
<b>Anticipated delays at the existing at-grade Stouffville GO Line crossings</b>	Evaluate for potential grade separation (underpass or overpass) or improvements to at-grade crossings
<b>Safety and operational concerns at various locations, including the Stouffville GO Line crossings</b>	Evaluate intersection-related countermeasures and treatments, particularly at major arterial intersections and the Stouffville GO crossings, to improve the safety performance and operational efficiency for all modes of transportation at critical locations along the study corridor

## Alternative Solutions

The Alternative Solutions, evaluation methodology, evaluation and selection of the Preferred Solution were completed as part of the YR-TMP and reconfirmed through the EA study. The Alternative Solutions developed to address the Problems and Opportunities of Kennedy Road are:

1. “Do Nothing”
2. Optimize Existing Facility with Intersection Improvements
3. Widen to 6 Lanes for Capacity Improvements
4. Widen to 6 Lanes for Transit/HOV
5. Widen to Implement Rapid Transit
6. Widen Parallel/Adjacent Corridor

The EA study adopted the system-wide approach from the YR-TMP to assess the Alternative Solutions. The evaluation first assessed Network-Level Capacity and then reviewed the preferred alternative against its alignment with five YR-TMP Objectives. Based on the Region's TMP Network-Level Capacity assessment, **Alternative 4 – Widen to Six Lanes for Transit / HOV** was recommended to be carried forward to measure its alignment with the TMP objectives. **Alternative 4 - Widen to Six Lanes for Transit / HOV** for the Kennedy Road study corridor was then determined to meet all five of the objectives of the YR-TMP.

In 2005, York Region Rapid Transit Corporation (YRRTC) completed the Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements Environmental Assessment (EA), which identified the preferred solution as “**Widen to Implement Rapid Transit**”.

The Kennedy Road EA study evaluated the alignment options for the rapidway between Warden Avenue and Kennedy Road, and recommended a rapidway alignment on Kennedy Road between YMCA Boulevard and Highway 7 to service the Unionville GO Station in Downtown Markham.

The EA study then measured the YR-TMP Preferred Solution **Alternative 4 - Widen to Six Lanes for Transit / HOV** and the YRRTC preferred Solution **Alternative 5 – Widen to Implement Rapid Transit** against the corridor-specific Problem and Opportunity Statement. The YR-TMP Preferred Solution was confirmed to align with the identified opportunities for the Kennedy Road EA study as follows:

- Transit/HOV lanes to maximize person-carrying capacity and improve the efficiency and reliability of transit through supporting Kennedy Road as a Frequent Transit Network;
- Facilitation of York Region's Finer Grid Network where feasible;
- Separated active transportation facilities to encourage other modes of transportation to reduce congestion and single occupancy vehicle (SOV) use;
- Alternative design concepts following the Preferred Solution for the Stouffville GO Rail Crossing to improve the crossing and reduce delays and congestion; and,
- Accommodate the safety, performance, and operational efficiency for all modes.

The Preferred Solution was identified to be:

- Widening of Kennedy Road between Steeles Avenue and Major Mackenzie Drive to six lanes for Transit/HOV;
- Widening of Kennedy Road between YMCA boulevard and Highway 7 to support the Highway 7 Rapidway; and,

- Provision of continuous and separated active transportation facilities, and improvement of sidewalks and streetscaping.

## Alternative Designs

The development and evaluation of Alternative Designs was undertaken to address the Preferred Solution. To apply a Context Sensitive approach to minimize impacts, typical cross-sections were developed for the corridor and at constrained locations based on recommended element widths.

**Roundabout Screening:** This alternative was considered at all intersections along the study corridor. Based on the review, roundabouts were not carried forward as treatment for intersection improvements due to the number of lanes recommended for the Preferred Solution (3 lanes in each direction) and the anticipation of future pedestrian demand.

**Reversible Lanes Screening:** This alternative was brought forward from public feedback and was also considered during the development of the Region's Transportation Master Plan 2016. Based on the review, reversible lanes were not recommended as reversible lanes:

- are generally not as safe as a dedicated lane due to increased risk of drivers using the lane incorrectly (such as driving the wrong way in the lane);
- require the elimination of dedicated left-turn lanes, leading to increased delays for vehicles going straight through the intersections and a greater possibility of rear-end collisions at intersections;
- are most effective on corridors with long stretches between intersections, whereas Kennedy Road intersections are generally 250m to 300m apart and have high left-turn volumes with significant queues;
- present conflicts with centre pier bridge designs;
- require installation of overhead illuminated signage at regular intervals; and,
- eliminate opportunities for streetscaping in the median.

## **Road Widening Alternatives & Evaluation:**

The Road Widening alternatives considered were:

- Alternative 1: Widening About the Centreline
- Alternative 2: Widening to the West
- Alternative 3: Widening to the East

**Alternative 1: Widen About the Centreline** was recommended because this option achieves the transportation, economic, environmental, and social objectives of the

study. Balancing the impacts on both sides of Kennedy Road will minimize impacts on either side of the street. The potential for property acquisition will be minimized as impacts are balanced on both sides of Kennedy Road as opposed to exclusively widening to the east or west.

### **Active Transportation Alternatives & Evaluation:**

Alternatives with on-road facilities (conventional bike lanes and separated bike lanes with marked buffers) were screened out as the separation from vehicles is relatively minor, results in additional conflict points with vehicles, and are inconsistent with YR-TMP recommendations for separated facilities for the Kennedy Road corridor. The AT alternatives that were carried forward for consideration on the boulevard were:

- Alternative 1: Cycle Track and Sidewalk on both sides
- Alternative 2: Dual Multi-Use Path
- Alternative 3: Sidewalk one side and Multi-Use Path one side

**Alternative 2: Dual Multi-Use Path** was Recommended. This AT facility alternative provides the greatest physical separation between AT users and vehicles, while maintaining continuity through constrained locations. Separated cycle tracks and sidewalks on both sides was not selected given that the facility type would not be possible in some of the highly constrained areas along the Kennedy Road corridor.

### **GO Transit Stouffville Railway Corridor Crossing North of Clayton Drive Alternatives & Evaluation:**

The alternatives considered at the GO Transit Stouffville Railway corridor crossing north of Clayton Drive were:

- Alternative 1: Modified Typical Section – At-Grade Crossing with AT Improvements
- Alternative 2: Underpass – Modified Typical Section with AT Improvements
- Alternative 3: Overpass – Modified Typical Section with AT Improvements

**Alternative 1: Modified Typical Section – At-Grade Crossing with AT Improvements** was Recommended because this option provides improved active transportation facilities and dedicated Transit / HOV lanes. However, it does not address vehicle queuing caused by increased GO Train service or safety of at-grade crossing for pedestrians and cyclists. The Recommended alternative will be considered until such time that GO rail service increases. **Alternative 2: Underpass – Modified Typical Section with AT Improvements** is the Ultimate Vision because this option provides improved active transportation facilities, dedicated Transit / HOV lanes, and mitigates vehicle queuing caused by increased GO Train service. Pedestrians and

cyclists also travel along a raised platform to minimize travelling distance and are grade separated from the rail crossing.

## **GO Transit Stouffville Railway Corridor Crossing North of Austin Drive**

### **Alternatives & Evaluation:**

The alternatives considered at the GO Transit Stouffville Railway corridor crossing north of Austin Drive were:

- Alternative 1: Modified Typical Section – At-Grade Crossing with AT Improvements
- Alternative 2: Underpass – Modified Typical Section with AT Improvements
- Alternative 3: Overpass – Modified Typical Section with AT Improvements

### **Alternative 1: Modified Typical Section – At-Grade Crossing with AT**

**Improvements** was Recommended because this option provides improved active transportation facilities and dedicated Transit / HOV lanes. However, it does not address vehicle queuing caused by increased GO Train service or safety of at-grade crossing for pedestrians and cyclists. The Recommended alternative will be considered until such time that GO rail service increases. Alternatives 2 and 3, **Future Grade Separation** (Overpass or Underpass) is the **Ultimate Vision** because it eliminates vehicle queues from increased GO Train service, and it removes rail conflicts with pedestrians and cyclists. However, there is insufficient information available at the time of this EA Study to make a determination for overpass or underpass, and as a result a **separate study** will be completed in the future to identify the appropriate solution for the grade separation.

### **Rouge River Structure Alternatives & Evaluation:**

Due to the proximity of the Rouge River to the GO Transit Stouffville Railway Corridor crossing north of Austin Drive, alternatives at the Rouge River crossing must also accommodate the recommended grade separation recommendations.

Until more information becomes available to determine an overpass or underpass, the Recommended Design at the GO Transit Stouffville Railway Corridor crossing north of Austin Drive is to provide an at-grade crossing for the widened Kennedy Road. To accommodate this recommendation results in widening the Rouge River bridge to provide two additional traffic lanes and multi-use paths for Active Transportation. The following alternatives were carried forward to accommodate Rouge River structure for the Recommended Design of the At-Grade Crossing north of Austin Drive.

- Alternative 1A: AT Facilities on Both Sides – Full Bridge Replacement
- Alternative 1B: AT Facilities on Both Sides – Superstructure Replacement

- Alternative 2: Separate Bridges

Based on the hydraulic considerations, **Alternative 1B** widening the bridge to accommodate Kennedy Road widening and AT improvements was the recommended approach where the superstructure is replaced to maintain the same elevation as the existing structure (with 1% cross fall) and reduced width.

### **Hagerman Cemeteries Alternatives & Evaluation:**

The alternatives considered at Hagerman Cemeteries were:

- Alternative 1A: Reduced Lane Width, Narrow MUP and Sidewalk, Best Fit Approach
- Alternative 1B: Reduced Lane Width, Dual Narrow MUP, Best Fit Approach
- Alternative 2: Standard Lane Width, Dual MUP, Best Fit Approach

**Alternative 1B, Reduced lane width, dual narrow MUP, best fit approach** was recommended because this option provides improved active transportation facilities on both sides, dedicated Transit/ HOV lanes, and avoids direct impacts to grave sites on cemetery lands. Narrower lanes may result in a reduction in vehicle speed creating a safer environment for all users. Relocation of Thomas Morley House would retain the building's heritage attributes and presents an opportunity for rehabilitation and adaptive reuse.

### **St. Philip's on-the-hill and Bethesda Lutheran Cemeteries Alternatives & Evaluation:**

The alternatives considered at St. Philip's on-the-Hill and Bethesda Lutheran Cemeteries were:

- Alternative 1A: Reduced Lane Width, Narrow MUP and Sidewalk, Best Fit Approach
- Alternative 1B: Reduced Lane Width, Dual Narrow MUP, Best Fit Approach
- Alternative 2: Standard Lane Width, Dual MUP, Best Fit Approach

**Alternative 1B, reduced lane width, dual narrow MUP, best fit approach** was recommended because this option provides improved active transportation facilities on both sides, dedicated Transit/ HOV lanes and avoids direct impacts to grave sites on cemetery lands. Narrower lanes may result in a reduction in vehicle speed creating a safer environment for all users. Modifications to Thomas Lownsbrough House would retain the building's heritage attributes and connection to Hunter's Corners.

### **Miller Avenue Extension Alternatives & Evaluation:**

The alternatives considered at Miller Avenue were:

- Option 1: Maintain Markham EA Preferred Alignment K-1A
- Option 2: Loop with Bridge Extension
- Option 3: Buttonhook with New Bridge
- Option 4: Markham EA Option K-2

**Option 1: Maintain Markham EA Preferred Alignment K-1A** was recommended because traffic operations permit full movement access to Kennedy Road at Duffield Drive signalized intersection allowing for northbound and southbound travel. AT users are also accommodated with protected crossings at this signalized intersection.

### **CN Rail Overpass Alternatives & Evaluation:**

It was determined that the CN Rail bridge overpass will need to be replaced to accommodate the road widening from four to six lanes for transit/HOV and Active Transportation facilities as the existing opening is insufficient to accommodate the improvements. The construction of the replacement of the bridge will be undertaken in stages. It requires a rail detour to maintain the railway traffic and will require construction of a temporary rail bridge to support the detour. The options considered for the rail detour were:

- Option 1: North Rail Detour
- Option 2: South Rail Detour

**Option 1: North Rail Detour** was carried forward as it meets the current vertical clearance requirements for the structure. Replacement and widening of the CN Rail Overpass structure is recommended to accommodate Kennedy Road improvements only, as the Miller Avenue Extension will have no impact on the CN Rail Overpass.

### **407ETR Interchange Alternatives & Evaluation:**

The alternatives considered at the 407ETR Interchange were:

- Alternative 1: No structure widening, 1 MUP (Road Shift)
- Alternative 2: No structure widening, 1 MUP in Median (No Road Shift)
- Alternative 3: Structure Widened by 1 Girder, 1 MUP + 1 Sidewalk (No Road Shift)
- Alternative 4.1: Structure Widened by 1 Girder, 2 MUPs (Road Shift)
- Alternative 4.2: Structure Widened by 1 Girder, 2 MUPs (No Road Shift)

- Alternative 5.1: Structure Widened by 2 Girders/1 pier, Sidewalks and Cycle Tracks on Both Sides (Road Shift)
- Alternative 5.2: Structure Widened by 2 Girders/1 pier, Sidewalks and Cycle Tracks on Both Sides (No Road Shift)
- Alternative 6: No Structure Widening with Separate AT Bridge(s)

**Alternative 6: No Widening with Separate AT Bridge(s)** adjacent to existing structure was Recommended because this option provides separated active transportation bridge(s) over the 407ETR on both sides, provides the greatest separation from automobiles, and will not impede rehabilitation of the vehicular bridge over Highway 407 in the future. This option also does not impact the road alignment and ramps. Building on the Recommended, an Ultimate Vision was identified in consultation with 407ETR / MTO to provide additional AT bridges over the 407ETR on-ramps to reduce conflict points between vehicles and pedestrians and cyclists crossing the ramps.

### **Viva Rapidway Alternatives & Evaluation:**

The alternatives considered for the Viva Rapidway were:

- Alternative 1: Median Viva Rapidway with AT Facilities
- Alternative 2: Median Viva Rapidway with Transit/HOV Curb Lanes, with AT Facilities
- Alternative 3: Shift Viva Rapidway to Share Transit/HOV Curb Lane, with AT Facilities

**Alternative 3 – Shift Viva Rapidway to share Transit / HOV curb lane with AT facilities** was selected as the **Recommended Design** as this option provides continuous pedestrian and cyclist facilities with street planting opportunities throughout. It requires minimal impacts to businesses (property requirements), and no business displacement. This option reduces congestion and provides transit connectivity for YRT buses in Transit/HOV lanes; however, Viva buses are required to share the Transit/HOV lanes.

**Alternative 1 - Median Viva rapidway with AT facilities (modified Highway 7 Transit EA)** is the **Ultimate Vision** as this option provides continuous pedestrian and cyclist facilities with street planting opportunities throughout this segment while minimizing potential impacts to businesses (property and parking loss), and no anticipated business displacement. This option will result in increased congestion in the general-purpose lanes; but will allow for Viva buses to operate within the median rapidway and protects for future LRT. This option may negatively impact YRT service if operating from curb side transit stops due to congested general-purpose lanes; but has the potential to mitigate this impact if YRT operates from the median rapidway.

## Preferred Design

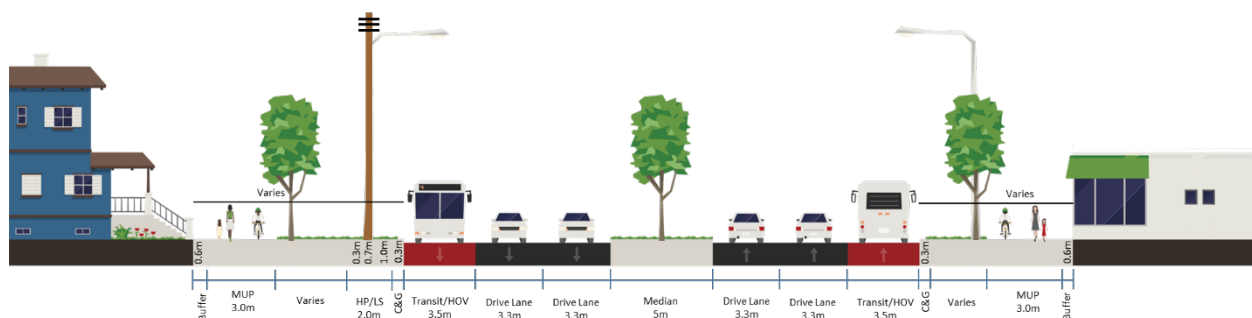
The preferred design for Kennedy Road was identified in consideration of transportation service for all road users (pedestrians, cyclists, transit riders and motorists) and potential impacts to the natural environment, community, cultural heritage, operations, aesthetics, driveway access, property requirements, and capital construction and maintenance costs. The preferred design concept best meets the goals of the project with regards to transportation service improvements, while also considering the overall impact of the project and mitigation measures. The preferred design was selected, developed, and refined through extensive consultation with agencies, stakeholders, impacted property owners, and the public. The following details will be refined in the next phase, Detailed Design:

- Horizontal alignment for a 60km/h design speed of Kennedy Road as an urban cross-section generally following the existing centreline with localized shifts east and west to minimize impacts to adjacent properties and features
- Vertical alignment with a 60km/h design speed matches the existing road profile where possible and meets the applicable clearance requirements. Between Clayton Drive and Gorvette Road, the Ultimate Vision for the Underpass design provides the required vertical clearances at the rail crossing adhering to Metrolinx design standards, with 5% slopes for vehicular travel, and 2.6% to 3.1% slopes where possible for pedestrian and cyclist travel
- Four 3.3m general purpose vehicular lanes (two in each direction measured to edge of pavement) with two 3.5m Transit / HOV curb lanes (one in each direction), and auxiliary left turn lanes at intersections
- Reduced lane widths at the cemeteries (Four 3.0m general purpose vehicular lanes (two in each direction) with two 3.2m Transit/HOV curb lanes (one in each direction)).
- 2.4m to 3.0m multi-use path on both sides
- 1.5m to 5.0m raised median where feasible (the median width also accommodates left-turn lanes at intersections)
- From YMCA Boulevard to Highway 7, the raised median will vary (the median width also accommodates left-turn lanes at intersections, with additional width to protect for the future conversion to the Ultimate Vision Rapidway)
- Landscaping within the boulevard and median as feasible, allowing for space to accommodate utilities and bus pads
- 0.3m modified curb and gutter with 0.6m grading buffer
- Accessibility for Ontarians with Disabilities (AODA) compliant intersections
- New signalized intersection proposed at Kennedy Road and Wilfred Murison Avenue

- Raised median restricts full access to individual properties, only right-in-right-out (RIRO) access is accommodated. U-turns are permitted at signalized intersections. The introduction of the raised centre median will result in changes to access to right-in-right-out only throughout the Kennedy Road corridor. At select locations, median gaps will provide access as indicated on the Preferred Design drawings
- A “combined crossride”, for both pedestrians and cyclists to share, is proposed to provide north-south crossings along both approaches and east-west crossings along one approach of every signalized cross street with or without a formalized/dedicated cycling facility, and a crosswalk provided along the other east-west approach of the cross-street for movement
- Replacement to CN Rail Structure with north rail detour
- Separated AT bridge(s) at the 407ETR Interchange
- Modification to existing Rouge River Structure (superstructure replacement and abutment widening)
- At-grade Crossing (Recommended) and Underpass (Ultimate Vision) at the GO Transit Stouffville Railway Corridor Crossing North of Clayton Drive
- At-grade Crossing (Recommended) and grade separation (Ultimate Vision) at the GO Transit Stouffville Railway Corridor Crossing North of Austin Drive
- Noise barriers along Kennedy Road right-of-way at select locations which meet the Region’s noise policy requirements and feasible
- Illumination throughout the corridor in compliance with York Region standards
- Potential transit stop locations, bus bays, and transit infrastructure in consultation with York Region Transit (YRT)
- Property requirements with grading generally contained within the proposed right-of-way where feasible. Temporary and permanent easements for construction, maintenance, and grading purposes
- Utility relocations

The preferred design typical cross-section for corridor is shown in **Exhibit ES-2**.

### Exhibit ES-2 – Kennedy Road Typical Section



## Preliminary Cost Estimate

Based on preliminary estimates, the cost of the recommended improvements is estimated to be approximately **\$240M**. This preliminary cost estimate includes costs for road work, bridge and retaining wall construction, utility relocation, addition of streetlights and traffic signals, bridge and culvert replacement, underpass north of Clayton (Ultimate Vision), landscaping, traffic control, and engineering services; however, property acquisition costs are not included in the estimate. The cost of the road and rail detours for the construction of the Metrolinx underpass north of Clayton Drive, and the cost of the CN rail detour bridge and rail detour is also not included in this estimate. At the 407ETR Interchange the cost estimate includes the two AT bridges over the 407ETR (east and west side of Kennedy Road) (Recommended) but does not include the cost for the additional AT bridges over each of the on-ramps (Ultimate Vision at this location) as the costs for this improvement is not yet funded.

## Environmental Impacts and Mitigation

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

- Land Use and Socio-Economic Impacts
- Archaeology and Cultural Heritage
- Noise
- Property Requirements
- Climate Change
- Air Quality
- Source Water Protection
- Streetscaping / Urban Design
- Utilities
- Construction Detours / Temporary Lane Restrictions
- Vegetation and Vegetation Communities
- Fisheries and Aquatic Habitat
- Wildlife and Wildlife Habitat
- Groundwater / Hydrogeology
- Surface Water
- Soil Removal and Contaminants



## Commitment of Future Work

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

## Timing of Improvements

Timing of improvements will be confirmed during Detailed Design. Construction timing is anticipated to follow the timing outlined in the Region's current (2020) 10-year Roads and Transit Capital Construction Program. This plan is reviewed and approved annually by Regional Council and is subject to change.

Recommended Design and Ultimate Vision are identified for key improvements as follows:

- **GO Transit Stouffville Railway Corridor Crossing North of Clayton Drive:** An At-Grade Crossing with AT Improvements (Recommended Design) will be considered until such time that GO rail service increases. An Underpass (Ultimate Vision) will be determined in consultation with Metrolinx to accommodate timing of implementation of additional train services.
- **GO Transit Stouffville Railway Corridor Crossing North of Austin Drive:** An At-Grade Crossing with AT Improvements (Recommended Design) will be considered until such time that GO rail service increases. A grade separation (Ultimate Vision) will be determined in a future study in consultation with Metrolinx.
- **407ETR:** Separate active transportation bridges (Recommended Design) adjacent to the existing structure over the 407ETR on both sides of Kennedy Road to provide the greatest separation from automobiles. Building on the Recommended Design, additional AT bridges over the on-ramps (Ultimate Vision) on one or both sides to eliminate conflict points at the on-ramps has been identified. Timing of implementation of the Recommended Design and Ultimate Vision will be determined in consultation with 407ETR, MTO, and the City of Markham during detailed design.
- **Viva Rapidway:** Shifting the Viva Rapidway to share Transit/HOV curb lanes (Recommended) will be considered until the time of implementation of the Ultimate Vision. YRRTC in consultation with YRT and YR will review and confirm the identified elements and associated widths and revise as required based on the information and design standards available at the time.



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# 1. Introduction

The Regional Municipality of York (York Region) is responsible for monitoring its transportation network and implementing required improvements in a timely manner. As such, York Region's transportation and roadway management strategies under the 2016 Transportation Master Plan (YR-TMP) have identified future road network needs for Kennedy Road (Y.R. 3) from Steeles Avenue to Major Mackenzie Drive within the City of Markham. Implementation of works on Kennedy Road is scheduled to be staged over different construction years as per York Region's 2020 approved 10-Year Roads and Transit Capital Construction Program.

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

The Environmental Study Report (ESR) documents the MEA Schedule 'C' Class EA process completed for the Kennedy Road EA study, summarizing Phases 1 through 4 of the MCEA Schedule 'C' EA process.

## 1.1 Study Purpose

The purpose of the Kennedy Road Class EA study is to determine specific improvements to accommodate the current and future transportation needs of pedestrians, cyclists, transit users and motorists along the Kennedy Road corridor from Steeles Avenue to Major Mackenzie Drive.

## 1.2 Study Area

Kennedy Road between Steeles Avenue and Major Mackenzie Drive is a four-lane, north-south Regional arterial located in the City of Markham. It continues as Kennedy Road in the City of Toronto south of Steeles Avenue. The Kennedy Road Class EA spans approximately 8 kilometres of this regional road and is illustrated in **Exhibit 1-1**.



Exhibit 1-1: Kennedy Road Study Area and Study Corridor

## 1.3 Environmental Assessment Process

An overview of the Environmental Assessment Act of Ontario (EAA), the Municipal Class Environmental Assessment (MCEA) process, and the Canadian Environmental Assessment Act, 2012 (CEAA 2012) is provided in this section as they relate to the Kennedy Road Class EA.

### 1.3.1 Municipal Class Environmental Assessment Process

The Environmental Assessment Act of Ontario (EAA) provides for the protection, conservation, and management of the environment in Ontario. The EAA applies to municipalities and to activities including municipal road projects. Activities with common characteristics and common potential effects may be assessed as part of a “class” and are therefore approved subject to compliance with the pre-approved Class EA process.

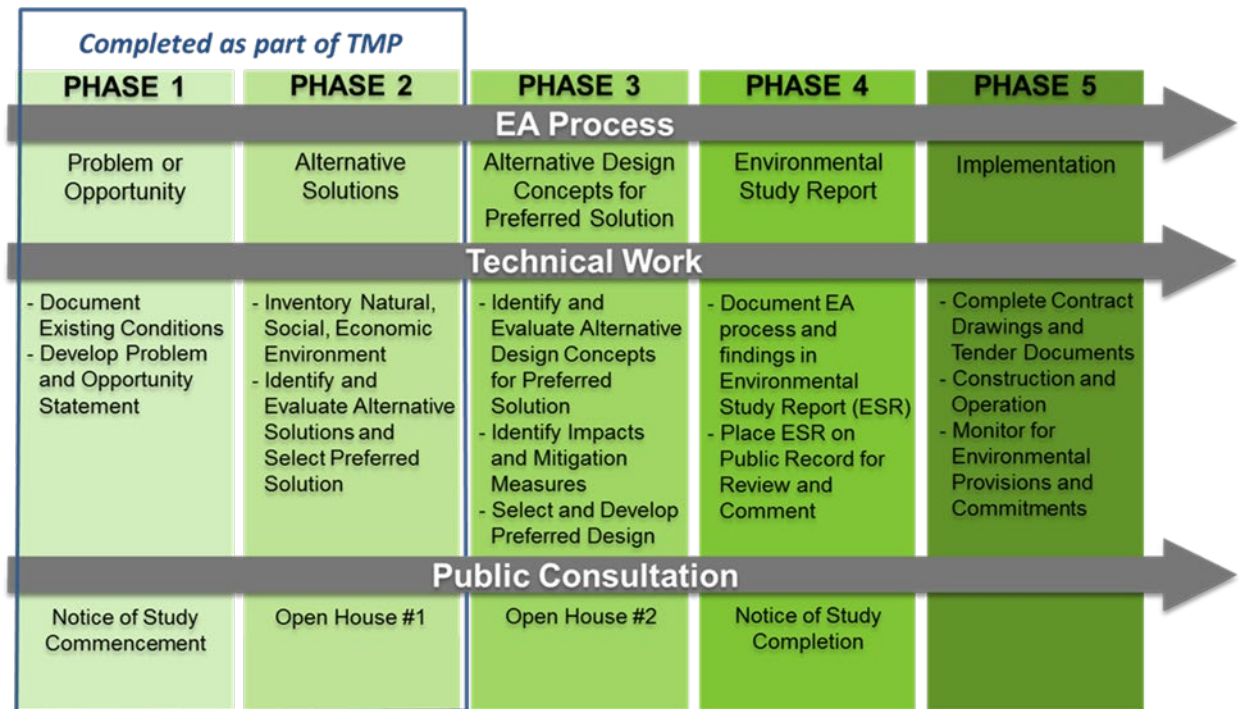
The Municipal Class Environmental Assessment (MCEA) process is an approved Class EA process that applies to municipal infrastructure projects including roads, water, and

wastewater. This process provides a comprehensive planning approach to consider alternative solutions and evaluate their impacts on a set of criteria (e.g. technical, environmental, social, cost) and determine mitigating measures to arrive at a preferred alternative for addressing the problem (or opportunity). The Class EA process involves a rigorous public consultation component that includes various provincial and municipal agencies, Aboriginal communities, and the public, at each of the project stages.

The Kennedy Road Class EA study is being undertaken in accordance with the guidelines of the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). Due to the type of project, anticipation for potential effects, and estimated capital costs, the Kennedy Road Class EA is defined as a Schedule 'C' project. A Schedule 'C' project involves either the construction of new facilities or major modifications to existing facilities. Modifications to existing facilities could include a road widening, intersection improvements, and/or other operational improvements.

**Exhibit 1-2** illustrates the sequence of activities within the approved Class EA process leading to project implementation. The phases for this study are described below:

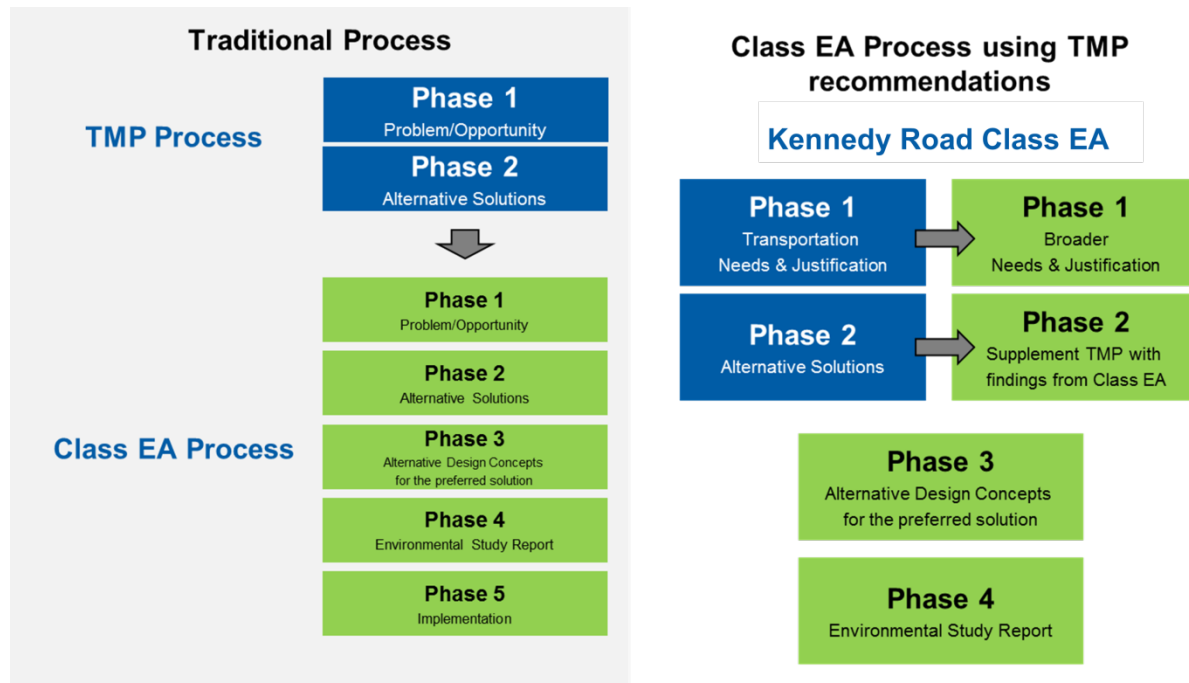
- **Phase 1 (Problem and Opportunity)** – Identify the problem (deficiency) or opportunity;
- **Phase 2 (Alternative Solutions)** – identify alternative solutions to address the problem or opportunity considering the existing environment, and establish the preferred solution taking into account public and review agency input;
- **Phase 3 (Alternative Design Concepts for Preferred Solution)** – Examine alternative methods of implementing the preferred solution, based on the existing environment, public and review agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects;
- **Phase 4 (Environmental Study Report)** – Document in an Environmental Study Report (ESR) a summary of the study background, problem statement, alternative solutions, alternative designs, and the public consultation process. Place the ESR on public record for a minimum 30 calendar days for review, and notify completion of the ESR and opportunity for Part II Order requests; and,
- **Phase 5 (Implementation)** involving detailed design and the preparation of contract/tender documents followed by construction, operation, and monitoring, is not within the scope of the Kennedy Road EA study.



**The needs assessment and alternative evaluation supporting Phase 1 and Phase 2 of the Class EA for Kennedy Road has been completed as Part of York Region's 2016 TMP**

**Exhibit 1-2: Municipal Class Environmental Assessment Process**

A Transportation Master Plan (TMP) is conducted to examine the overall transportation system in order to outline a framework for planning for subsequent projects. The York Region Transportation Master Plan (YR-TMP) (approved 2016) addressed Phases 1 and 2 of the Municipal Class EA process. this study is building on the recommendations from the YR-TMP to form the basis of Phases 1 and 2 of this Class EA. Undertaking of the Class EA Process using TMP recommendations provides an enhanced understanding of the transportation needs of the corridor in line with those of the overall regional transportation system. The traditional process compared to the process being implemented for this Class EA is illustrated in **Exhibit 1-3**.



**Exhibit 1-3: Traditional Class EA and Class EA Process using TMP Recommendations**

This study builds on the findings from the YR-TMP and reconfirms the needs and justification more closely at the corridor-level in terms of corridor-specific engineering, natural and social environmental constraints and issues, including detailed investigation of the corridor.

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

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

Any outstanding concerns are to be directed to the proponent (York Region) for a response, and in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests

on those matters may be addressed in writing to the Minister of the Environment, Conservation and Parks and the Director of the Environmental Assessment Branch.

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

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

The Minister's decision on a Part II Order request is final.

### **1.3.2 Canadian Environmental Assessment Act**

Under the Canadian Environmental Assessment Act, 2012 (CEAA 2012), a federal environmental assessment study may be required to comply with the physical activities that constitute a “designated project”, under the project list identified in the Regulations Amending the Regulations Designating Physical Activities, 2013. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts to matters of federal jurisdiction.

The Kennedy Road Class EA study does not constitute a “designated project” and therefore, does not require an environmental assessment under the CEAA, 2012. However, the Minister of the Environment, Conservation and Parks may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

## 2. Planning and Policy Context

A summary of the Provincial, Regional, and Municipal planning and policy context is provided in this section as they related to the Kennedy Road Class EA.

### 2.1 Provincial Planning Context

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

**Table 2-1: Provincial Planning Context**

Provincial Planning Document	Description/Relevance
<b>Provincial Policy Statement (2020)</b>	<p>Provides direction on land use planning and development as well as the transportation system, including:</p> <ul style="list-style-type: none"> <li>• Providing appropriate development while protecting resources, public health and safety, and the natural and built environments</li> <li>• Building strong, healthy communities by supporting density and land uses which support active transportation (AT), are transit-supportive, are freight-supportive</li> <li>• Developing safe, energy efficient, transportation systems that move people and goods</li> <li>• Encourage integration of transportation and land use at all stages of the planning process</li> <li>• Use of travel demand management (TDM) strategies to maximize efficiency and reduce reliance of automobiles</li> <li>• Promoting land use pattern, density, and mix of uses to support transportation choices that increase the use of transit and active transportation</li> </ul>
<b>Oak Ridges Moraine Conservation Plan (2017)</b>	<p>Originally published in 2002, the ORMCP provides direction on how to protect the Moraine's ecological and hydrogeological features. No section of the study corridor falls within the boundary of the Oak Ridges Moraine.</p>

Provincial Planning Document	Description/Relevance
<b>Greenbelt Plan (2017)</b>	<p>Updated in 2017 as a result of the Co-ordinated Land Use Planning Review, the Greenbelt Plan identifies environmentally and agriculturally protected lands within the Greater Golden Horseshoe, where urbanization should not occur, in order to protect ecological features. The majority of the study area falls outside of the settlement area of the Greenbelt Plan however the Rouge River watercourse crossing falls within the boundaries of the Urban River Valley designation and therefore policies set out in Section 6 of the Greenbelt Plan apply.</p> <p>The goals of the Urban River Valley System include:</p> <ul style="list-style-type: none"> <li>• Protection of natural and open space lands along river valleys in urban areas which will assist in ecologically connecting the rest of the Greenbelt Area to the Great Lakes and other inland lakes</li> <li>• Protection of natural heritage and hydrologic features and functions along urban river valleys, including coastal wetlands</li> <li>• Conservation of cultural heritage resources</li> <li>• Provision of a gateway to the rural landscape of the Greenbelt</li> <li>• Provision of a range of natural settings on publicly owned lands for recreational, cultural and tourism uses, including parkland, open space land and trails</li> </ul>
<b>Places to Grow Act / Growth Plan for the Greater Golden Horseshoe (2006, 2020)</b>	<p>Originally adopted in 2006, the 2020 amendment sets forth a framework for implementing the Government of Ontario's 2051 vision for building stronger, prosperous communities by better managing growth in the region. Within York Region, four Regional Centres (Markham, Richmond Hill/Langstaff Gateway, Vaughan Metropolitan, and Newmarket) are designated as Urban Growth Centres. The land around the Kennedy Road corridor is classified as a 'built-up' area in the plan.</p>

Provincial Planning Document	Description/Relevance
<b>The Big Move (2008, Approved Changes 2013)</b>	Identifies a 25-year plan for the Regional Rapid Transit and Highway Network and sets forth a vision for the GO Expansion, formerly referred to as the Regional Express Rail (RER). Within the study area, the plan identifies several improvements to Regional Rapid Transit and Highway Network including rapid transit on Highway 7 throughout York Region, regional rail with all-day two-way service along the Go Transit Stouffville Railway Corridor (every 15 minutes between Union Station and Unionville Station), and rapid transit along 407ETR. Currently, Metrolinx has no plans in the 10 year GO Expansion program to double track the Go Transit Stouffville Railway Corridor past Unionville Station.
<b>#CycleON: Ontario's Cycling Strategy (2013)</b>	Provides a route map to support and encourage growth in cycling to 2033 and beyond. The Kennedy Road EA study will explore options that are cyclist-friendly in accordance with the recommendations of Ontario's Cycling Strategy.

## 2.2 Regional Planning Context

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

Table 2-2: Regional Planning Context

Regional Planning Document	Description/Relevance
<b>York Region Official Plan (YR-OP) (2010, amended 2013)</b>	<p>Provides direction to guide economic, environmental, and community-building decisions to manage growth. YR-OP incorporates the Planning for Tomorrow study, undertaken to identify how York Region will accommodate the several provincial planning initiatives. The main theme of the YR-OP is to move York Region towards sustainability, completed through policies that emphasize a reduction in automobile reliance and an increase in active transportation facilities.</p> <p>The YR-OP transportation road network (Map 12 Street Network) designates a right-of-way (ROW) width of:</p> <ul style="list-style-type: none"> <li>• up to 45.0 m between YMCA Boulevard and Highway 7</li> <li>• up to 43.0 m between Steeles Avenue and YMCA Boulevard and between Highway 7 and Major Mackenzie Drive</li> </ul>
<b>York Region Strategic Plan (Vision 2051) (2011)</b>	<p>Vision 2051 is York Region's long-term strategy. It identifies eight goal areas that will guide policies to create strong, caring, and safe communities designed with sustainability in mind. The Vision identifies actions to help achieve these goals, several pertaining to the design of future transportation facilities and the importance of their positive contribution to vibrant communities.</p>
<b>York Region Transportation Master Plan (YR-TMP) (2016)</b>	<p>Provides infrastructure and policy requirements for a 25-year outlook that allows York Region to achieve its strategic vision of an advanced, interconnected system of mobility within the Region. Further information pertaining to transportation infrastructure improvements as documented in the YR-TMP is described within <b>Section 2.2.1</b> of this report.</p>
<b>York Region's Sustainability Strategy (2007)</b>	<p>York Region's sustainability strategy is a guide to provide local municipal governments with long-term frameworks to balance economic growth with the natural environment and healthy communities. The thrust of the Sustainability Strategy as it pertains to transportation is to ensure that there is integration between land use planning, growth and transportation; promoting public transit and active modes of transportation; and, ensuring that the system is integrated with the local, intra and inter-regional transportation systems.</p>

Regional Planning Document	Description/Relevance
<b>York Region's Pedestrian and Cycling Master Plan (2008)</b>	Provides direction to guide the development of improved active transportation infrastructure on Regional roads. To support a more sustainable Region, York Region is actively taking steps to promote alternative transportation choices that will benefit residents by improving public health and air quality while reducing dependence on the private automobile.
<b>York Region Pedestrian and Cycling Planning and Design Guidelines (2018)</b>	These guidelines are an update to the 2008 Planning & Design Guidelines developed as part of York Region's first Pedestrian & Cycling Master Plan. This document provides a comprehensive guide for the planning and design of active transportation facilities and reflects an emphasis on updated facility types, emerging design treatments for intersections, and better integration with other York Region planning & design initiatives.
<b>York Region Transit 2016 Annual Service Plan</b>	The purpose of the York Region Transit (YRT) 2016 Annual Service Plan is to advance the goals and objectives of the 2016 to 2020 4-year service plan. It provides an overview of the main service initiatives for 2016 and the proposed rapid transit network plan up to 2020.
<b>York Region Towards Great Regional Streets (2008)</b>	Provides guidelines to improve Regional streets based on a thorough examination of the various needs and objectives within the right-of-way and road design standards.
<b>York Region 10-Year Roads and Transit Capital Construction Program (2020)</b>	Approved on December 19, 2019, this program outlines the planned road and transit improvements required to accommodate growth in population and employment within York Region in the next ten years. Plans within this program include upgrading existing transportation infrastructure to meet current Regional design standards and are updated on an annual basis. The current plan provides estimated construction timelines for the various planned improvements, including a segment of the Kennedy Road study corridor. Capital improvements are programmed for 2023 for the section of Kennedy Road between 14th Avenue and Highway 7.

### 2.2.1 York Region Transportation Master Plan 2016

The purpose of the York Region Transportation Master Plan (YR-TMP), 2016, is to support growth in York Region to the year 2041 by defining a long-term transportation vision based on integrated road and transit network planning. The plan aims for “more

livable communities” and “safe, efficient and effective transportation” for people and goods.

The YR-TMP has five objectives that apply to the Kennedy Road study corridor:

- Create a world class transit system
- Develop a road network fit for the future
- Integrate active transportation in Urban Areas
- Maximize the potential of Employment Areas
- Make the last mile work

These five objectives are streamlined into five main policy areas that will affect the development of preliminary design alternatives for the Kennedy Road corridor. These policy areas include developing a finer grid network, corridor evolution, commuter parking management, goods movement network, and boulevard jurisdiction. The Kennedy Road EA considered key aspects of these policy areas including the utilization of regional roads to maximize capacity to move people and providing multi-modal transportation options at the fringes of urban areas.

The YR-TMP’s proposed improvements for Kennedy Road between Steeles Avenue and Major Mackenzie Drive for 2041 are as follows:

- Frequent transit network (mode undefined) and one rapid transit segment between YMCA Boulevard and Highway 7, as shown in **Exhibit 2-1**.
- Widening to 6 lanes as shown in **Exhibit 2-2**.
- Separated cycling facility as shown in **Exhibit 2-3**. A separated facility as defined by the TMP includes facilities that provide physically separate space for cyclists, including cycle tracks, raised bike lanes, or multi-use paths as opposed to dedicated facilities like bike lanes and buffered bike lanes.

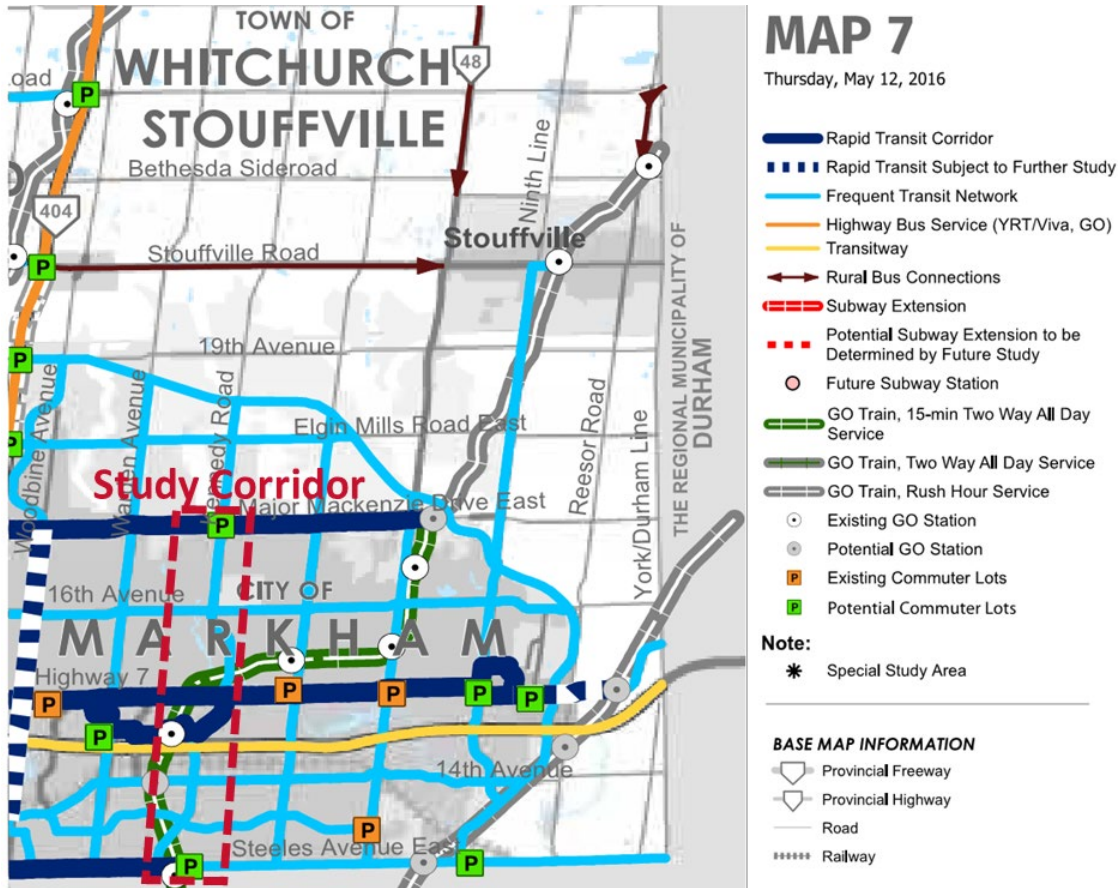


Exhibit 2-1: York Region TMP Map 7 - Proposed 2041 Transit Network

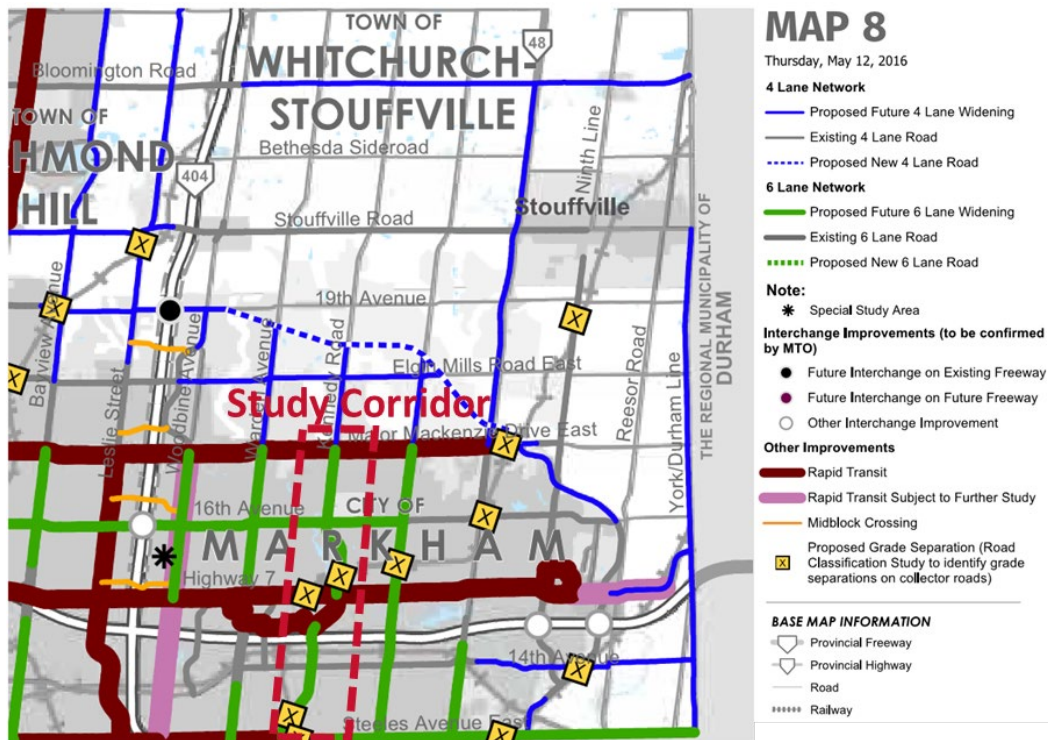


Exhibit 2-2: York Region TMP Map 8 - Proposed 2041 Road Network

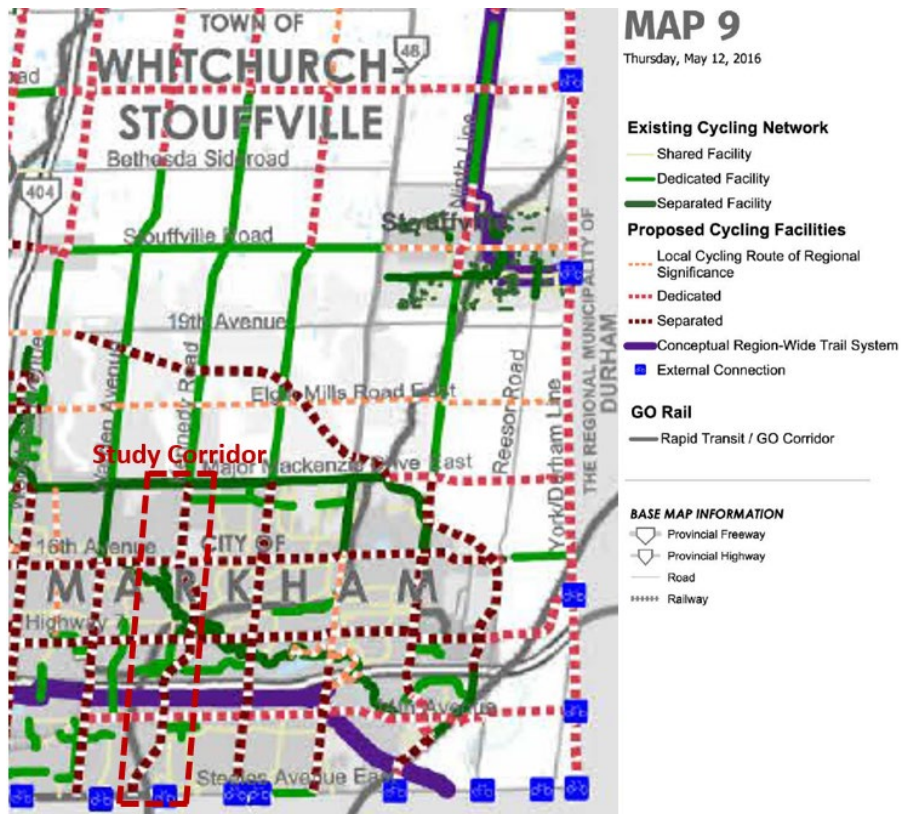


Exhibit 2-3: York Region TMP Map 10 - Proposed 2041 Cycling Network

## 2.2.2 A Road Network Fit for the Future

The 2016 York Region Transportation Master Plan (YR-TMP) established that the vehicular road network alone cannot accommodate future travel needs; therefore, the plan aims to manage the growth in travel demand and to use the road and transit networks as efficiently as possible. The YR-TMP also includes a strategy for improving transit services and guidelines to facilitate transit-supportive development.

The YR-TMP supports the Regional Official Plan (YR-OP) goal of strengthening the connections between the natural and built environment, economic vitality, and healthy communities through developing holistic mobility systems for the corridors of York Region. In addition, the plan elaborates on the YR-OP policies' integrated approach to transit, land use/transportation integration, parking, walking and cycling.

The YR-TMP expands on the 2010 YR-OP's policy direction to promote transit and reduce automobile dependence. The direction is based on several key policies including:

- Reducing auto dependence by planning communities with enhanced active transportation opportunities;

- Creation of an active transportation system that encourages walking, cycling and transit use;
- Ensuring streets are designed to support all modes of transportation.

These policies are summarized in a Transportation Demand Management program that is focused on making use of existing and future transportation infrastructure with an emphasis on active transportation options while reducing reliance on single-occupant automobiles.

Another aspect of the multi-modal strategy is the introduction of Transit/High Occupancy Vehicle (HOV) Lanes. The Region's Towards Great Regional Streets – a Path to Improvement also outlines transit supportive strategies. The report states that once no other viable options exist except to widen Regional streets to six/seven lanes, consideration should be given to allocating the additional lanes to HOV and/or transit lanes in order to help encourage ridesharing and be supportive of transit initiatives. The six-lane cross-section identified in the Towards Great Regional Streets report recommends using the two curb lanes as Transit/HOV lanes.

## 2.3 Municipal Planning Context

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

**Table 2-3: Municipal Planning Context**

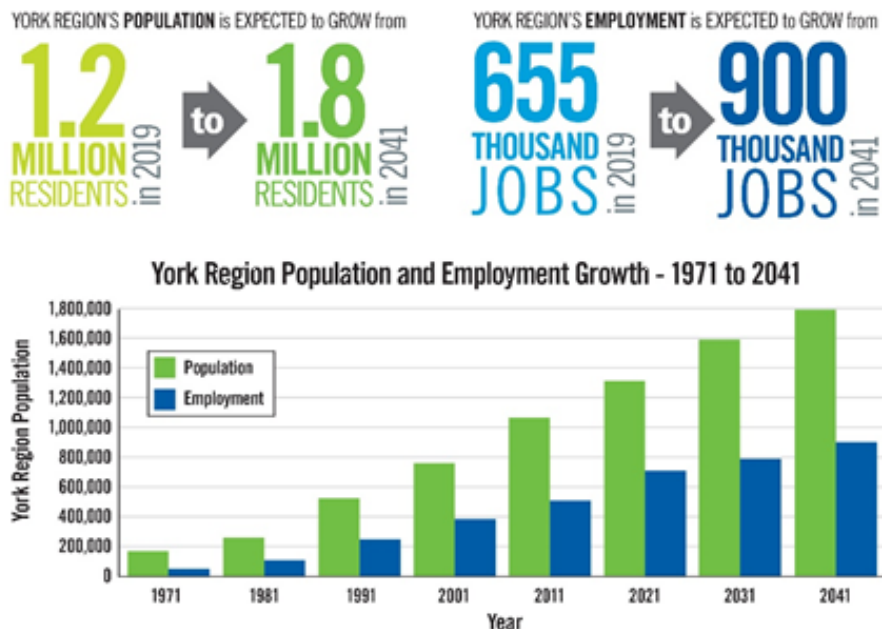
Municipal Planning Document	Description/Relevance
<b>City of Markham Official Plan (2014)</b>	Provides guidance on responsible future development in the City of Markham through several guiding principles, including growth management, environmental stewardship, economic prosperity, and transportation/transit development. It provides a framework for decision-making regarding land-use planning, and the requirement of municipal services to support growth.
<b>City of Markham Transportation Planning Study (2002)</b>	This study identifies and addresses several key constraints facing the City's future, including: the need to reduce congestion to maintain a high quality of life for resident through addressing changing travel patterns, and the continuing development of Markham's business community to maintain economic prosperity. It addresses these issues through its development of a multi-modal transportation solution up to 2021.

Municipal Planning Document	Description/Relevance
<b>City of Markham Cycling Master Plan (2010)</b>	Provides direction towards a growing need for a city-wide cycling network. Recognition of a growing popularity for cycling both as a recreational activity and a mode of transportation for short distance trips has spurred a plan to develop a connected cycling network.
<b>City of Markham Active Transportation Master Plan (on-going)</b>	The ATMP is a long-term strategic plan to improve walking, cycling, and other modes of active transportation for everyone. The ATMP will identify a well-connected and safe active transportation network and recommend infrastructure projects, policies and strategies with an action-oriented phasing plan.

### 3. Regional and Local Context and Growth

#### 3.1 Population and Employment Growth

York Region is one of the fastest growing municipalities in the GTA. Since 1971, York Region's population has increased nearly seven-fold. Population and employment growth are expected to continue across the Region. As such, the transportation system and other infrastructure must be prepared to accommodate future growth. As illustrated in **Exhibit 3-1**, by 2041 the regional population will approach 1.8 million, while employment will approach 900,000.



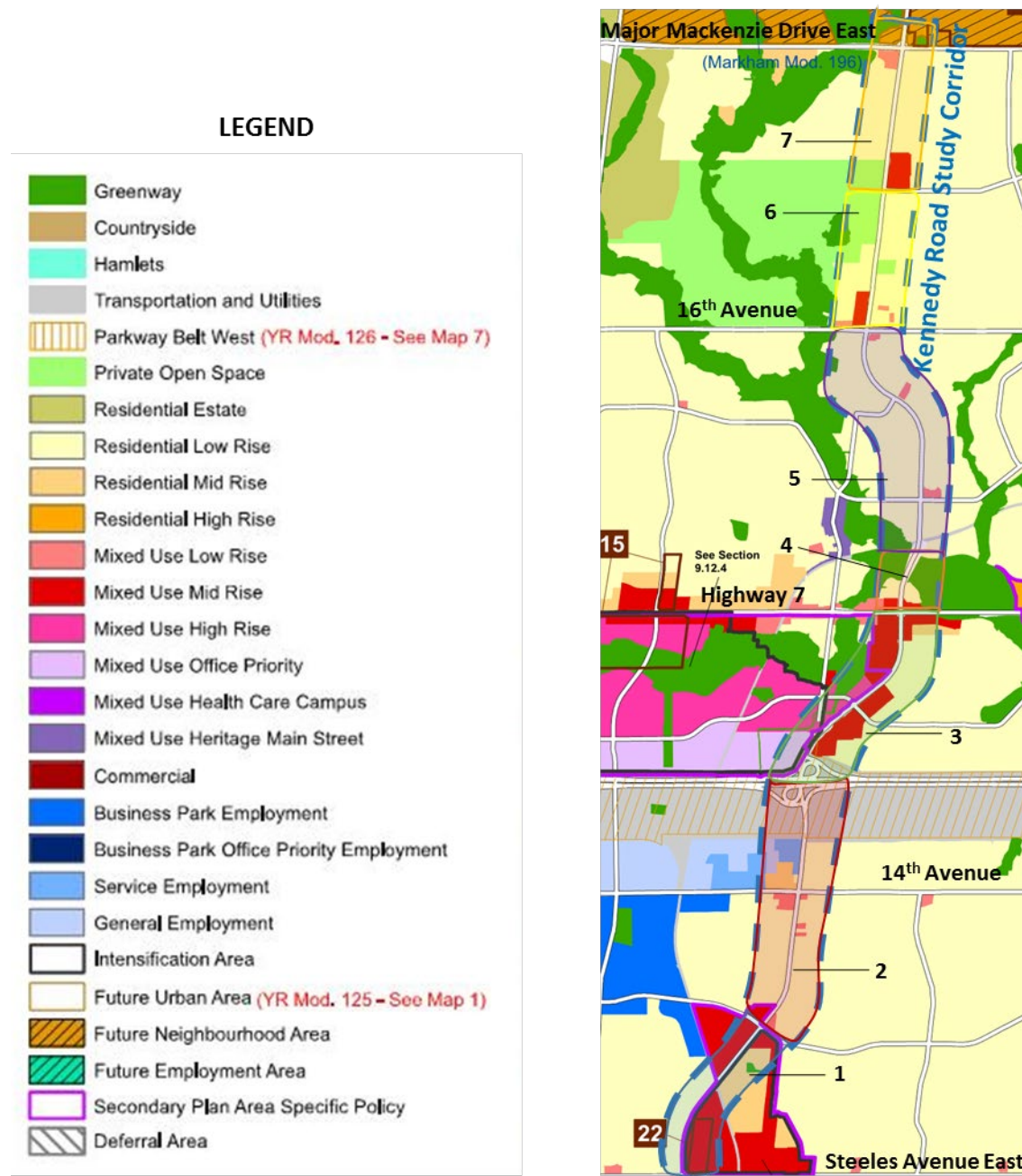
**Exhibit 3-1: York Region Population and Employment Growth between 1971 and 2041**

The City of Markham is experiencing tremendous growth. According to York Region November 2015 forecasts, Markham's population is expected to grow by 184,100 people, reaching 535,100 in 2041. Meanwhile, employment is projected to increase from 170,000 in 2014 to approximately 275,000 in 2041. Growth in Markham is anticipated to account for 30% of York Region's overall employment and population growth according to York Region 2041 draft growth scenarios.

#### 3.2 Land Use and Future Development Context

Land uses adjacent to Kennedy Road through the study limits are generally a mix of residential, industrial, or agricultural. **Exhibit 3-2** shows the land use designations along

the corridor and surrounding area, as well as proposed development locations within and near the study area as listed in the Markham Official Plan.



(Map 3 – Land Use) modified and approved by York Region on June 12, 2014.

#### Exhibit 3-2: City of Markham Official Plan Map 3 - Land Use

The following list describes the land uses along the corridor by section as defined on Exhibit 3-2.

1. **Steeles Avenue to Denison Street:** Primarily residential low-rise, with planned mixed-use mid-rise at major intersections including Steeles Avenue and Denison Street.
2. **Denison Street to 407ETR:** Primarily residential low rise with commercial plazas fronting onto Kennedy Road, lands south of 407ETR to north of 14<sup>th</sup> Avenue set aside for utilities and future transportation development.
3. **407ETR to Denby Court:** Lands surrounding Kennedy Road are predominantly mixed-use mid-rise, with the west side of Kennedy Road adjacent to the Markham Centre Secondary Plan boundary.
4. **Denby Court to Austin Drive:** Greenway on both sides of Kennedy Road, the Rouge River intersects this segment of the study corridor.
5. **Austin Drive to 16<sup>th</sup> Avenue:** Predominantly low-rise residential land use surrounding the Kennedy Road study corridor with exception at major intersections such as 16<sup>th</sup> Avenue where mixed-use mid-rise commercial plazas are present.
6. **16<sup>th</sup> Avenue to Bur Oak Avenue:** Primarily residential low-rise, with a mixed-use mid-rise commercial plaza fronting onto Kennedy Road at Bur Oak Avenue. On the west side of Kennedy Road in this segment, is the York Downs Re-development.
7. **Bur Oak Avenue to Major Mackenzie Drive:** Primarily low-rise residential with a mixed-use low rise commercial plaza fronting onto Kennedy Road at Major Mackenzie Drive.

### 3.2.1 Milliken Centre Secondary Plan

The Milliken Centre Secondary Plan Area is composed of the lands between Kennedy Road and GO Transit Stouffville Railway Corridor on the west, Denison Street to the north, Old Kennedy Road and the existing subdivision to the east, and Steeles Avenue to the south.

Secondary Plans form part of Markham's 2014 Official Plan, providing further direction on specific land use policies to be undertaken in areas to which significant is expected. The land use objectives for the Milliken Centre Secondary Plan is to provide a focal point for the larger Milliken community, through sustainable, compact, connected, pedestrian oriented, complete community at transit supportive densities that provides a balance and diversity of residential, retail, office commercial, and public uses and community amenities, while ensuring that identified natural and cultural heritage resources are protected and enhanced.

The City is currently preparing an update to the Milliken Centre Secondary Plan. This includes studies to assess and identify retail and servicing needs, assess and determine infrastructure to accommodate growth, and identify Natural Heritage features for protection and possible compensation. Of particular interest to the purposes of this ESR, potential Natural Heritage features occupy lands that are adjacent to the east and west sides of the study corridor where Kennedy Road intersects the GO Transit Stouffville Railway Corridor crossing. The results of these studies will inform the Milliken Centre Secondary Plan.

### **3.2.2 Markham Centre Secondary Plan**

The Markham Centre Secondary Plan Area encompasses the lands east of Rodick Road, west of Kennedy Road, north of 407ETR, and south of Highway 7. The Secondary Plan Area boundary is adjacent to the study corridor between north of Unionville Gate/South Unionville Avenue, and 407ETR.

The land use objectives for the Markham Centre Secondary Plan is to provide a mixed-use Regional Centre that functions as an urban growth centre for intensification while supporting a diverse mix of residential, commercial, and office uses within a Regional Rapid Transit corridor. The Markham Centre Secondary Plan Update is on-going and will provide direction on the Viva rapidway alignment and station locations within Markham Centre.

In conjunction with Metrolinx, the City of Markham has undertaken a Joint Mobility Hub Study in 2016 to develop a transit plan for all transit aspects in the area, including the Viva alignment study for the Markham Centre Secondary Plan Area. However, this study has been suspended. Output from the Mobility Hub Study is being used to formulate the road and rapid transit network in the Markham Centre Secondary Plan Study.

### **3.2.3 Angus Glen and Robinson Glen Secondary Plans**

The Angus Glen lands are bound by Major Mackenzie Drive to the south, Warden Avenue to the west, Elgin Mills Road to the north, and Kennedy Road to the east. These lands include Greenway System lands as determined by Bruce Creek and Bruce Creek Tributary, a designation by the City of Markham's Official Plan and the Provincial Greenbelt Plan for the Bruce Creek portion.

The Robinson Glen lands are bound by Major Mackenzie Drive to the south, Kennedy Road to the west, Elgin Mills Road to the north, and the Greenway System to the east as designated by the City of Markham's Official Plan and the Provincial Greenbelt Plan.

New residential developments are being planned for both of these lands and will accommodate an increase in the number of people and units within the area. These developments will achieve densities that are driven by Provincial policy in contrast to Markham's traditional suburban communities south of Major Mackenzie Drive that were planned at 40-50 residents and jobs per hectare.

The new developments in both these communities are planned to be transit-supportive, which together with a comprehensive active transportation system, will increase the number of transit, pedestrian, and cyclist trips, while reducing the number of travelled auto-trips. Additionally, residential areas will accommodate a broad range of housing types and provide a complete complement of community uses and retail services to ensure residents have full access to facilities to meet their daily needs.

### 3.2.4 York Downs Proposed Redevelopment

The York Downs proposed redevelopment lands are located in the southern portion of the City of Markham concession block bound by Warden Avenue, Major Mackenzie Drive East, Kennedy Road, and 16<sup>th</sup> Avenue. There are existing historic estate large-lot residential developments in the Glenburn Park and Cachet Parkway areas. The surrounding area at this location consists of low density residential developments, with the Berczy Glen and Upper Unionville neighbourhoods to the east, historic Unionville to the south, Cachet to the west, and Angus Glen Village and the southern portion of the Angus Glen Golf Course to the north.

The proposed redevelopment plan for the York Downs lands consists of a new, predominantly low density residential neighbourhood on the developable portions of the property. This includes single detached and townhouse residential units, some with direct vehicular frontage on a road, and some with vehicular access from a lane. Several residential mid-rise blocks and one mixed-use mid-rise block are proposed for areas of the property adjacent to the surrounding regional arterial roads (Kennedy Road and 16<sup>th</sup> Avenue). These blocks are planned at higher density than the surrounding low density areas in order to take advantage of the proximity to the arterial road network and associated transit opportunities.

### 3.2.5 Active Developments

York Region's record of active developments, as of August 2020, along the study corridor is shown in **Table 3-1**.

**Table 3-1: Active Developments along the Kennedy Road Study Corridor (N-S)**

Development/Proponent Name	Description	Status	Location
Kalexia Developments Corp.	<ul style="list-style-type: none"> <li>Proposed development of 32 townhouse units and relocation of an existing heritage dwelling</li> </ul>	Approved and Under construction	Approved and Under construction
Sixteenth Land Holdings Inc. (York Downs, see section 3.2.4)	<ul style="list-style-type: none"> <li>Official Plan Amendment</li> </ul>	Approved and Under construction	4134 16 <sup>th</sup> Avenue, east of Warden Avenue
Kylemore Communities (Yorkton) Ltd.	<ul style="list-style-type: none"> <li>Proposed Plan of Condominium</li> </ul>	Approved and Under construction	9350-9392 Kennedy Road
1297482 Ontario Ltd. – Alai Gardens Condominium	Proposed development of a 4-storey residential condominium	Approved	7713 Kennedy Road, South-east quadrant of Kennedy and 14 <sup>th</sup> Avenue
Chris and Louis Balkos	<ul style="list-style-type: none"> <li>Proposed draft plan of subdivision</li> </ul>	Under Review	North-east quadrant of Kennedy Road and Steeles Avenue

### 3.3 Local and Regional Connectivity

Kennedy Road is a continuous north-south regional arterial road that extends from the City of Toronto through four local municipalities in York Region. The road begins in Scarborough and runs the length of the City of Markham, Town of Whitchurch-Stouffville and Town of East Gwillimbury, ending in the Town of Georgina. Kennedy Road is discontinuous at the Bendor and Graves Tract in Whitchurch-Stouffville, continuing north at Herald Road. Kennedy Road plays a key role in regional north-south connectivity between the City of Markham and the Town of Whitchurch-Stouffville and provides an important transportation link locally within York Region.

Within the study area, Kennedy Road intersects several key east-west roads, including Steeles Avenue, 14<sup>th</sup> Avenue, 407ETR, Highway 7, 16<sup>th</sup> Avenue, and Major Mackenzie Drive. There are several physical and natural constraints which may pose challenges for widening Kennedy Road in the future, including four cemeteries north of 14<sup>th</sup> Avenue and north of 16<sup>th</sup> Avenue, CN Rail crossing just north of 14<sup>th</sup> Avenue, the 407ETR and proposed 407 Transitway/Markham Centre Mobility Hub, the Rouge River, and the Go



Transit Stouffville Railway Corridor crossings north of Clayton Drive and north of Austin Drive.

## 4. Consultation

The Municipal Class EA process for Schedule 'C' projects requires three mandatory points of contact with the public and review agencies, held at key points throughout the study. The consultation requirement ensures that interested persons have an opportunity to voice their concerns on projects that may impact them or their environment.

The consultation undertaken for the Class EA Study has exceeded the minimum mandatory requirements and is outlined herein.

### 4.1 Consultation Approach

Public input is an important part of the Class EA process. The public was presented opportunities to participate in the planning process through a number of public and stakeholder consultation activities. Key consultation events undertaken throughout the EA study are listed in **Table 4-1** and are further explained in the following sections. Copies of the notices and Open House summary reports are provided in **Appendix B**.

**Table 4-1: Key Consultation Events**

Consultation Event	Date
Notice of Study Commencement	May 2017
Notice of Open House #1	February 2018
Open House #1	February 2018
Notice of Open House #2	November 2019
Open House #2	November and December 2019
Notice of Study Completion	March 2021

A variety of methods were used to update and inform the public, agencies, stakeholders, and Indigenous groups about the study progress, including:

- Letters
- Emails
- Meetings
- Phone calls
- Notices
- Newspaper advertisements in Markham Economist and Sun, Ming Pao Daily Newspaper, and Sing Tao
- Digital advertisements ([www.yorkregion.com](http://www.yorkregion.com))

- Social Media (York Region Facebook, York Region Twitter)
- Project website ([www.York.ca/KennedyRoad](http://www.York.ca/KennedyRoad))
- York Region website ([www.york.ca](http://www.york.ca))
- Online surveys
- Roadside signage (Northbound at Clayton Drive near Pacific Mall, Northbound at Castan Avenue between Highway 7 & YMCA Boulevard, Southbound south of Gorvette Road, and Southbound at 16<sup>th</sup> Avenue)
- Two rounds of Open Houses

Residents living along the study corridor directly received mailed notices. Following the study commencement, individuals who expressed interest in the project and as requested, were added to the project mailing list (mail or email) to receive regular updates on the study progress.

To maximize public awareness, efforts such as roadside signage, social media posts (Facebook and Twitter), and regular updates to the project website provided information to the “silent majority” – the members of the public interested in the project, but opt for a more passive role. Online feedback forms (online surveys) were available on the project website, which allowed individuals to remotely participate in the study.

A Technical Advisory Committee (TAC) consisting of key technical agencies was formed for the study. In addition, a Stakeholder Group (SHG), consisting of public representatives who expressed interest in the study, was formed to gather feedback at key milestones in the process. Further details are provided in **Section 4.3** and **Section 4.4**.

## 4.2 Consultation Events

### 4.2.1 Notice of Study Commencement – May 2017

The Notice of Study Commencement was mailed to all identified stakeholders on May 18, 2017, including residents living within 250m of the study corridor, agencies, and property owners. The general public was also notified via social media, roadside signage, the Region’s website, and newspaper advertisements.

Newspaper advertisements were published in the Ming Pao Daily Newspaper, Markham Economist and Sun, and the Sing Tao Newspaper, on the dates listed in **Table 4-2**.

**Table 4-2: Notice of Commencement Newspaper Advertisements**

Newspaper	Date
Markham Economist and Sun	May 8, 2017
	May 15, 2017
Ming Pao Daily Newspaper	May 8, 2017
	May 15, 2017
Sing Tao	May 8, 2017
	May 15, 2017

#### 4.2.2 Open House #1 – February 2018

The Notice of Open House #1 was mailed on February 8, 2018 to all identified stakeholders, agencies, Indigenous Communities, and those on the mailing list. The general public was notified via direct mail and email, social media posts on February 21, 22, and 27, 2018, roadside signage, updates to the project website, and newspaper advertisements.

Multiple methods of communication were used to update the public, stakeholder and agencies about the Kennedy Road Class Environmental Assessment study and invite them to the open houses, including:

- Direct mail notice of open house to 4,353 members of the public, including property owners and residents along the study corridor
- Direct mail, email, and notice of open house to 92 agency representatives and 29 stakeholder group representatives
- Direct mail, email, and notice of open house to Indigenous Community representatives from 5 different communities
- Email notification to 45 individuals on the project email list – developed through previous responses to project notifications
- Updates to project website, including notification of open houses, open house material, and online comment form (survey) on project website:  
[www.york.ca/Kennedyroad](http://www.york.ca/Kennedyroad)
- Notice and Region Media Release posted on [www.York.ca](http://www.York.ca) and [www.York.ca/kennedyroad](http://www.York.ca/kennedyroad)
- Social media updates: YR Twitter posts on February 21 and 22, 2018 and YR Facebook post on February 27, 2018
- Newspaper advertisements (Notice of Open House) on February 8 and 15, 2018 in the following newspapers:

- Markham Economist and Sun
- Ming Pao
- Sing Tao

The first round of public open houses was held in two locations as follows:

- Wednesday, February 21<sup>st</sup>, 2018 at Milliken Mills Community Centre in the City of Markham, from 6:30 PM to 8:30 PM
- Thursday, February 22<sup>nd</sup>, 2018 at Angus Glen Community Centre in the City of Markham, from 6:30 PM to 8:30 PM

Each Open House included the following information:

- 40 display boards, including:
  - Overview of the study corridor and study objectives
  - Summary of the study process
  - Planning policy in the provincial, regional, and municipal context
  - Existing land uses and proposed development within the study area
  - Summary of consultation activities and feedback received to date
  - Existing traffic, transit, cycling and pedestrians conditions and opportunities
  - Physical and environmental features and constraints along the study corridor
  - Summary of problems and opportunities
  - Summary of alternative solutions considered, and the preferred solution identified in York Region's Transportation Master Plan (YR-TMP)
  - Alternative design concepts for typical 43m and 36m cross-sections (including a dot exercise for attendees to indicate their preference)
  - Alternative design concepts (cross-sections) for the following physical constraints (including a dot exercise for attendees to indicate their preference):
    - Stouffville GO Rail Crossing North of Clayton Drive
    - Miller Avenue Extension

- CN Rail Overpass
- Highway 407 ETR interchange
- Viva Rapidway
- Rouge River Crossing
- Stouffville GO Rail Crossing North of Austin Drive
- Hagerman Cemeteries
- St. Philips and Bethesda Cemeteries
- Evaluation criteria
- Schedule and Next Steps
- Roll plans showing existing conditions (aerial photographs and existing property lines) for the full corridor divided into segments on tables
  - Members of the public were encouraged to write their comments and/or concerns on the plans directly or on post-it notes
- A looping video presentation of the display boards
- Hard copies of the Survey/Comment Form
- Interactive activities where participants could build their preferred cross-section for the Kennedy Road corridor

Members of the York Region and HDR study team were in attendance and interacted with the public to answer questions, discuss concerns, and document comments. A sign-in table was located at the entrance to record attendance and for members of the public to sign up for the project mailing list, and were provided with comment sheets to obtain their feedback on the materials presented. Forty-five (45) people attended the open house on February 21, 2018 and thirty-eight (38) people attended the open house on February 22, 2018.

Electronic versions of the Open House materials were posted online following the open house sessions, allowing members of the public not in attendance to access the information at their convenience. In addition, an online comment form was posted for the public to provide their input on the study.

#### 4.2.2.1 KEY MESSAGES HEARD

Many concerns were raised at the open house, most notably traffic and safety issues. A summary of the comments and key message heard is provided:

- Concerns regarding noise as a result of the preferred solution
- Local businesses and residents concerned with left-turn access if a landscaped median is implemented
- Concerns that widening Kennedy Road to 6 lanes will create more congestion and pollution, and decrease safety for vulnerable users
- Concern that people will not use pedestrian/cycling facilities
- Concerns about cost and phasing/timing of construction

Key responses to comments received at the Open Houses include:

- Noise impact assessment is being completed as part of the Kennedy Road EA study and will assess potential areas of concern in accordance with the guidelines set by York Region's Standard Operating Procedure (SOP) for noise mitigation. Impacts resulting from the proposed recommendations and potential mitigation measures will be identified
- Access management is a component of the preferred design to be examined at a later stage of the study
- The additional lane is proposed for Transit/HOV to increase the efficiency of the transit system as part of the Frequent Transit Network, which is to provide transit service up to every 15 minutes. Impacts to air quality as a result of the proposed recommendations and potential mitigation measures will be identified. Where possible, the preferred design will maximize separation between active transportation facilities and vehicular lanes
- The introduction of dedicated pedestrian and cyclist facilities will provide a safe alternative to traveling by automobile and will promote the use of active transportation. Intersection improvements will be carried out as part of this study that will improve safety for all road users
- The proposed construction dates are identified based on the Region's 10-Year Road and Transit Capital Construction Program which at the time of the Open House the current plan was 2018, which is updated annually by Region staff and reviewed and approved by Council

#### 4.2.2.2 ONLINE SURVEY FEEDBACK

In addition to the two venues for the Open House, an electronic version of the display boards was posted online, allowing members of the public to view the Open House material at their convenience and fill out an online comment form (survey) to provide their input. Five (5) members of the public provided comments through the online survey during the commenting period (February 21, 2018 to March 22, 2018).

Key comments received through the online survey include:

- Concerns that road widening to six lanes is not the right solution and widening should only occur at key locations to allow buses to bypass traffic
- Concerns that Transit/HOV lanes will be underutilized
- Concerns about grave relocations
- Concerns about noise

Key responses to comments received from the online survey include:

- Widening is recommended to service the Frequent Transit Network for transit vehicles and HOV, not for single occupancy vehicles. Queue jump lanes would not provide connectivity in the Transit/HOV network
- Transit service is identified as part of the Frequent Transit Network along Kennedy Road for transit service up to every 15 minutes
- Opportunities to minimize impacts to cemetery lands are under consideration. Options that require relocation of plots are under consideration; however, there are also options that do not require relocation of plots
- A noise impact assessment is being completed as part of the Kennedy Road EA study and will assess potential areas of concern in accordance with York Region's Traffic Noise Mitigation Policy

Additional comments received at the Open Houses and through the online survey, and responses from the project team, are included in **Appendix B**.

#### 4.2.3 Open House #2 – November and December 2019

The Notice of Open House #2 was mailed on November 14, 2019 to all identified stakeholders, agencies, Indigenous Communities, and those on the mailing list. The general public was also notified via direct mail and email, social media posts, roadside signage, updates to the project website, and newspaper advertisements.

Multiple methods of communication were used to update the public about the Kennedy Road Class Environmental Assessment study and invite them to the open houses, including:

- Direct mail notice of open house to 4,277 members of the public, including property owners and residents along the study corridor
- Direct mail, email, and notice of open house to 64 agency representatives and 28 stakeholder group representatives
- Direct mail, email, and notice of open house to 10 Indigenous Community representatives from 5 different communities
- Email notification to 58 individuals on the project email list – developed through previous responses to project notifications
- Updates to project website, including notification of open houses, open house material, and online comment form (survey) on project website: [www.york.ca/Kennedyroad](http://www.york.ca/Kennedyroad)
- Notice and Region Media Release posted on [www.York.ca](http://www.York.ca) and [www.york.ca/Kennedyroad](http://www.york.ca/Kennedyroad) on November 14, 2019
- Social media updates: YR Twitter and YR Facebook posts went live on November 15, 22, and 29, 2019 promoting the Open House
- A news story went live on [www.York.ca](http://www.York.ca) November 15, 2019 promoting the Open House
- Newspaper advertisements (Notice of Open House) on November 14 and 21, 2019 in the following newspapers:
  - Markham Economist and Sun
  - Ming Pao
  - Sing Tao
- Road signs: Decals with Open House dates were installed on existing project road signs on November 15, 2019.

The second round of public open houses was held in two locations as follows:

- Monday, November 25<sup>th</sup>, 2019 at Milliken Mills Community Centre in the City of Markham, from 6:30 PM to 8:30 PM

- Monday, December 2<sup>nd</sup>, 2019 at Pan Am Centre in the City of Markham, from 6:30 PM to 8:30 PM

Each Open House included the following information:

- 28 display boards, including:
  - Welcome
  - Overview of the study area, study objectives, and study process
  - Purpose of open house two and preferred solution
  - What we've heard so far
  - Key technical studies and evaluation criteria
  - Road widening approach
  - Active Transportation facilities
  - Design considerations, alternatives, evaluation, and recommendation for Stouffville GO Rail Crossing North of Clayton Drive
  - Design considerations, alternatives, evaluation, and recommendation for CN Rail Crossing and Miller Avenue Extension
  - Design considerations, alternatives, evaluation, and recommendation for Highway 407 ETR interchange
  - Background, design considerations, alternatives, evaluation, and recommendation for Viva Rapidway
  - Design considerations, alternatives, evaluation, and recommendations for Stouffville GO Rail Crossing North of Austin Drive
  - Design considerations and recommendations for Rouge River Crossing
  - Design considerations, alternatives, evaluation, and recommendations for Hagerman Cemeteries and St. Philips and Bethesda Cemeteries
  - Noise Barriers
  - Recommended design, timing of improvements, and Next Steps
- Roll plans showing recommended design for the full corridor divided into 4 segments on tables

- Members of the public were encouraged to write their comments and/or concerns on the plans directly or on post-it notes
- A looping video presentation of the display boards
- Hard copies of the Survey/Comment Form

Members of the York Region and HDR study team were in attendance and interacted with the public to answer questions, discuss concerns, and document comments. A sign-in table was located at the entrance to record attendance and for members of the public to sign up for the project mailing list and were provided with comment sheets to obtain their feedback on the materials presented. Forty-five (45) people attended the open house on November 25, 2019 and thirty-nine (39) people attended the open house on December 2, 2019.

In addition to the two open houses, an electronic version of the display boards was posted online at [www.york.ca/kennedyroad](http://www.york.ca/kennedyroad), allowing members of the public to view the open house material online at their convenience and fill out an online comment form to provide their input. The display boards, looping presentation and roll plans of the recommended design were posted on the project website on November 25, 2019.

#### **4.2.3.1 KEY MESSAGES HEARD**

A summary of key comments and key message heard is provided from the Open House:

- General agreement with the preferred design to widen the road to six lanes for Transit/HOV lanes, multi-use paths (MUP) on both sides, narrower section to minimize impacts to cemetery lands, maintain the Markham EA approved alignment for Miller Avenue Extension, separate AT bridges at the 407ETR crossing, underpass at the crossing north of Clayton Drive, and deferring the grade separation for the crossing north of Austin to a future study.
- General agreement with Recommended Solution for the Viva rapidway transit vehicles to operate in the proposed Transit/HOV lanes shared with YRT vehicles, and some disagreement with the Ultimate Solution for the rapidway as it will cause more disruption to local transit service operating in mixed use lanes for a relatively short span of road.
- Concerns with inability to make u-turns at intersections with traffic congestion.
- Concerns about locations of bus bays.
- Concerns about the centre median and impacts to EMS access to properties.

- Concern about vibration and noise.

Key responses to comments received at the Open Houses include:

- Median installation is necessary to minimize conflict points with left-turning vehicles at unsignalized locations. Signal timing phases can be reviewed to provide green time to permit advance left-turns and u-turns.
- Far-side bus bays were requested by York Region Transit as they help to prevent right-turn blockage at intersections.
- The design will be revised to incorporate a depressed median with mountable curb or semi-mountable curb and flexible delineators at select locations to permit EMS access and will be reviewed with EMS during Detailed Design to confirm the locations for this treatment.
- Noise impact assessment is being completed as part of the Kennedy Road EA study and will assess potential areas of concern in accordance with the guidelines set by York Region's Standard Operating Procedure (SOP) for noise mitigation.

#### **4.2.3.2 ONLINE SURVEY FEEDBACK**

In addition to the two venues for the Open House, an electronic version of the display boards was posted online, allowing members of the public to view the Open House material at their convenience and fill out an online comment form (survey) to provide their input. In total eight (8) members of the public provided comments through the online survey during the commenting period (November 25, 2019 to December 28, 2019).

Key comments received through the online survey include:

- Disagreement with widening for Transit/HOV lanes;
- Preference for separated sidewalks and cycle tracks instead of MUPs;
- General agreement with separate bridges over the 407ETR; however, concerns about conflict points at the on-ramps;
- General agreement with the recommended and ultimate solution for the GO Rail crossing north of Clayton Drive;
- General agreement with the recommended solution to provide an at-grade crossing and ultimate solution to undertake a future study to determine the grade separation for the GO Rail crossing north of Austin Drive;

- Concerns about noise; and
- Concerns about the centre median and impacts to EMS access to properties.

Key responses to comments received from the online survey include:

- Widening is recommended to service the Frequent Transit Network for transit vehicles and HOV, not for single occupancy vehicles.
- Separated cycling facilities along Kennedy Road may not fit continuously along the corridor due to the number of constrained sections along the corridor. At these constrained sections, a narrow path is recommended on both sides. Therefore, an MUP on both sides is proposed throughout the entire corridor to maintain consistency in facility type to avoid changing back and forth between facility types.
- The Recommended Design at the 407ETR is for AT bridges over the 407ETR only. However, based on consultation with 407ETR and feedback from the Open House, an Ultimate Vision has been identified to include separate AT bridges over the on-ramps and will be reviewed and confirmed during Detailed Design in consultation with 407ETR, MTO, City of Markham and York Region.
- A noise impact assessment is being completed as part of the Kennedy Road EA study and will assess potential areas of concern in accordance with York Region's Traffic Noise Mitigation Policy.
- The design will be revised to incorporate a depressed median with mountable curb or semi-mountable curb and flexible delineators at select locations to permit EMS access and will be reviewed with EMS during Detailed Design to confirm the locations for this treatment.

Additional comments received at the Open Houses and through the online survey, and responses from the project team, are included in **Appendix B**.

#### 4.2.4 Additional Public and Property Owner Meetings

Individuals whose property was identified as being potentially impacted by the proposed designs were contacted and invited to meet with the project team. Approximately 34 individual property owner meetings were held between November 25, 2019 and October 28, 2020. These meetings were structured so that individuals could review the draft preliminary design drawings and discuss their concerns and ideas with the project team. Additional meetings with individual property owners were held as necessary.

On September 11, 2019 members of the project team presented to the Heritage Markham Committee at the City of Markham Civic Centre to discuss the

recommendations to three heritage home properties (Thomas Morley House, George Hunter House, and Thomas Lownsbrough House) and the anticipated impacts and mitigation measures resulting from the proposed Kennedy Road improvements. A second meeting with the Heritage Markham Committee is to be confirmed with the City of Markham.

#### 4.2.5 Notice of Completion

The Notice of Study Completion will be published as follows:

- Markham Economist and Sun circulations on March 18 and March 25, 2021
- Ming Tao circulations on March 18 and March 25, 2021
- Sing Tao circulations on March 18 and March 25, 2021

The notice will be directly mailed to those on the mailing list, including properties within the study corridor, stakeholders and agencies, and it will be placed on the study website.

### 4.3 Agency Consultation

#### 4.3.1 Technical Advisory Committee

A Technical Advisory Committee (TAC) was formed comprising representatives from York Region, City of Markham, City of Toronto, Metrolinx, Canadian National (CN) Rail, 407ETR, Ministry of Transportation (MTO), Toronto and Region Conservation Authority (TRCA), Ministry of the Environment, Conservation and Parks (MECP), and Ministry of Natural Resources and Forestry (MNR). TAC meetings were held to discuss input, concerns, and technical details at various decision-making points throughout the study. TAC meetings took place on June 21, 2017, January 11, 2018, and October 30, 2019. Members of the committee were also invited to participate in the Open Houses, and individual meetings with agencies were held as required throughout the duration of the project.

Key agency meeting minutes are included in **Appendix C**.

#### 4.3.2 Other Agencies

In addition to TAC, other agencies including federal departments, provincial ministries, municipalities, and utilities were contacted for information, comments, and input to the study. The list of agencies contacted includes:



### **Federal Agencies and Stakeholders**

- Environment and Climate Change Canada
- Health Canada
- Fisheries and Oceans Canada
- Transport Canada
- Parks Canada
- Canadian Environmental Assessment Agency
- Canadian National Rail

### **Provincial Agencies and Stakeholders**

- Ministry of Transportation (MTO)
- Ministry of Health and Long-Term Care
- Ministry of the Environment Conservation and Parks (MECP)
- Ministry of Natural Resources and Forestry (MNR)
- Ministry of Infrastructure
- Ministry of Municipal Affairs
- Ministry of Housing
- Ministry of Tourism, Culture and Sport
- Infrastructure Ontario (IO)
- Metrolinx / GO Transit
- Ontario Provincial Police
- 407ETR

### **Local and Regional Municipalities and Stakeholders**

- Regional Municipality of York

- City of Markham
- City of Toronto
- Toronto and Region Conservation Authority (TRCA)
- Toronto Transit Commission (TTC)
- York Region Transit (YRT)
- York Region Rapid Transit (YRRTC)
- York Region Catholic District School Board
- York Region District School Board
- York Regional Police District 5 Headquarters
- City of Markham Fire and Emergency Services – Fire Station 95
- Markham Cycling and Pedestrian Advisory Committee
- Markham Municipal Heritage Committee
- Markham Cemetery Board

### **Utilities and Services**

- Hydro One Networks Inc.
- Telus Networks
- Bell Canada
- Rogers Communication Canada Inc.
- Cogeco Data Services Inc.
- Zayo Group
- Powerstream Inc.
- Netricom
- Enbridge Gas Distribution Inc.
- Union Gas
- FVB Energy

Based on correspondence with the agencies, the following were removed from the mailing list as per their request:

- Canadian Environmental Assessment Agency
- Health Canada

## 4.4 Stakeholder Consultation

Stakeholders including adjacent landowners, residents, ratepayer groups, business associations, developers, and political representatives were identified through the Stakeholder Sensitivity Analysis and/or by requests submitted to the Project Team. The contact list was updated as the study progressed, and as additional stakeholders expressed their interest in the project. The list of stakeholders includes:

### Property Stakeholders

- Residents adjacent to the study corridor
- Property owners adjacent to the study corridor

### Ratepayer and Community Associations

- South Unionville Community Association (SUCA) (Ward 3)
- Angus Glen Ratepayers Association
- South Unionville Resident Forum (Ward 3)
- Unionville Ratepayers Association (Ward 3)
- Unionville Villagers' Association (Ward 3)
- Unionville Historical Society
- Agincourt Village Community Association
- Aldergrove Ratepayer Association (Ward 8)
- Downtown Markham Ratepayer Association (Ward 8)
- Milliken Mills East Ratepayers Association (Ward 8)
- Markham Action Group for Improved Community (MAGIC)

### Interest Groups

- Smart Commute Markham-Richmond Hill

- Markham Municipal Heritage Committee
- Markham Conservation Committee
- York-Simcoe Naturalists
- Save the Rouge Valley
- Friends of the Rouge Watershed
- York Region Cycling Coalition
- Canadian Automobile Association (CAA), South Central Ontario
- First Student Inc.

### Local Business Associations

- Markham Board of Trade
- Richmond Hill and Markham Chinese Business Association

### Housing / Developer Groups

- The Remington Group
- Sixteenth Land Holdings Inc.
- Kylemore Homes
- Greenlife Midtown Markham Condominiums
- Casa Del Sol Condominiums
- Bethany Manor
- Hagerman Corners Community Homes

### Businesses adjacent to the study corridor include but are not limited to

- Pacific Mall
- Market Village

- Denison Centre
- Goldbright Plaza
- Town+Country BMW
- Markham Ford Lincoln
- Markham Honda
- Esso Gas Station
- Shell Gas Station
- Petro Gas Station
- Peachtree Centre
- TD Bank

#### **Educational Institutions**

- Angus Glen Montessori School
- Unionville Montessori Private School
- Kennedy Montessori School
- Town Centre Montessori Private School

#### **Places of Worship**

- St. Philips on the Hill
- Bridle Trail Baptist Church
- Unionville Gospel Hall
- Fellowship Baptist Church
- Milliken Wesleyan Methodist Church

#### **Political Representatives**

- Regional Chairman and CEO, York Region
- Mayor, City of Markham
- Deputy Mayor, City of Markham
- Regional Councillors, City of Markham
- Ward 3 Councillor, City of Markham
- Ward 6 Councillor, City of Markham
- Ward 8 Councillor, City of Markham

In addition, a Stakeholder Group (SHG) was formed consisting of select members of the public who expressed an interest in actively participating in the study. The SHG included residents, representatives of resident associations, property owners, and commuters along the corridor. Meetings with the SHG and the project team were held to provide a forum for focused discussions and to obtain feedback at key points during the study. Meetings with the SHG were held on October 24, 2017, January 11, 2018, June 20, 2018, and November 14, 2019 at Milliken Mills Community Centre. Meeting summaries are included in **Appendix C**.

#### **4.4.1 Stakeholder Group Meeting #1**

The first Stakeholder Group (SHG) meeting was held on October 24, 2017. The SHG was held between 6:30PM and 8:30PM, at Milliken Mills Community Centre in the City of Markham. The purpose of the first SHG meeting was to present background relating to the project, including information regarding the YR-TMP, key features and challenges unique to the Kennedy Road corridor, and obtain feedback from stakeholders. Members of the York Region and HDR study team attended the SHG to present, answer questions, record comments, and discuss issues relating to Kennedy Road.

A total of seventeen (17) members of the public attended the SHG meeting at Milliken Mills Community Centre. The most common comments included:

- General support for improvements to Kennedy Road

- Support for active transportation improvements but mixed support for the type of active transportation facility
- Concerns about widening at several constrained locations along the study corridor
- Concerns regarding construction timing

Responses to these comments include:

- During Phase 3 of the Kennedy Road study, the development and evaluation of alternative design concepts will be completed, and the types of active transportation facilities will be evaluated based on evaluation criteria and feedback provided by technical agencies and stakeholders
- There are several locations along the study corridor where the ROW is a constraint. The typical ROW planned for Kennedy Road according to the York Region Official Plan (2010) is 43 m between Steeles Avenue and YMCA Boulevard, and Highway 7 to Major Mackenzie Drive. Between YMCA Boulevard and Highway 7, the Official Plan ROW is up to 45 m. In the development of alternative design concepts, the project team will be creating typical cross-sections for both 36 m and 43 m ROW
- York Region's current 10-Year Roads Capital Construction Plan (Capital Construction Plan) outlines the timelines for delivery on all regional capital works projects. The Capital Construction Program outlines Kennedy Road between 14<sup>th</sup> Avenue and Highway 7 to begin construction in 2023. The Capital Construction Program is subject to review annually to reprioritize regional transportation projects. Due to the number of challenges identified within the Kennedy Road corridor, it is unlikely the study can be expedited

#### 4.4.2 Stakeholder Group Meeting #2

The second Stakeholder Group (SHG) meeting was held on January 11, 2018. The SHG was held between 6:00PM and 8:00PM, at Milliken Mills Community Centre in the City of Markham. The purpose of the second SHG meeting was to present information regarding findings of the project including design concepts for consideration, typical cross-sections, unique segment cross-sections, and the preliminary evaluation criteria. Members of the York Region and HDR study team attended the SHG to present, answer questions, record comments, and discuss issues relating to Kennedy Road.

A total of fourteen (14) members of the public attended the SHG meeting at Milliken Mills Community Centre. The most common comments included:

- Mixed support for improvements to Kennedy Road
- General support for active transportation (AT) improvements but mixed support for AT treatment along the study corridor;
- Support for streetscaping and corridor beautification along Kennedy Road;
- Concerns about widening at specific locations along the study corridor (i.e. cemetery areas).

Responses to these comments include:

- Cross-section elements such as the active transportation (AT) component will be evaluated and selected based on several criteria, including available ROW, adjacent land use and consistency of AT treatment. Continuous dedicated active transportation facilities are preferred. Consistency of the preferred section will be dependent on available ROW and constraints.
- The project team includes cultural heritage specialists who identify the cultural significance of features within the corridor, including the Thomas Morley House. Heritage impacts will be determined during preliminary design and a Heritage Impact Assessment (HIA) may be undertaken to further understand impacts and assist in evaluating alternative designs.

#### 4.4.3 Stakeholder Group Meeting #3

The third Stakeholder Group (SHG) meeting was held on June 20, 2018. The SHG was held between 6:00PM and 8:00PM, at the Milliken Mills Community Centre in the City of Markham. Members of the York Region and HDR study team attended the SHG to present, answer questions, record comments, and discuss issues relating to Kennedy Road.

A total of eleven (11) members of the public attended the SHG meeting at the Milliken Mills Community Centre. The most common comments included:

- Support for protected active transportation (AT) facilities at cemetery segments due to narrow right-of-way and proximity to vehicular traffic
- Support for grade separation options for both Metrolinx crossings to reduce traffic congestion
- Concerns about timing of improvements in particular, York Region's 10-Year Roads and Transit Capital Construction Plan and the priority of projects

Responses to these comments include:

- The narrowest multi-use path to be considered for a cycling facility would be 2.4 m for short stretches. Any dimension that is less cannot be classified as a cycling facility
- Regional staff review the plan annually and present recommendations for Council approval. The plan is subject to change based on factors such as road usage, safety factors, balancing other Regional priorities and costs

#### 4.4.4 Stakeholder Group Meeting #4

The fourth Stakeholder Group (SHG) meeting was held on November 14, 2019. The SHG was held between 6:00PM and 8:00PM, at the Milliken Mills Community Centre in the City of Markham. Members of the York Region and HDR study team attended the SHG to present, answer questions, record comments, and discuss issues relating to Kennedy Road.

A total of sixteen (16) members of the public attended the SHG meeting at the Milliken Mills Community Centre. The most common comments included:

- Desire for separated cycle tracks and sidewalks instead of a Multi-Use Path on both sides
- Concerns about pedestrian and cyclist safety issues at the 407ETR ramps
- Concerns about pedestrian and cyclist safety issues at intersections
- Concerns about reduced lane widths in constrained areas

Responses to these comments include:

- Kennedy Road is much more constrained compared to other corridors (for example McCowan Road which is also being studied in a separate Class EA). Due to the location of the cemeteries (two north of 14th Avenue and two north of 16th Avenue) and other locations with limited opportunities to acquire additional property, a cycle track and sidewalk on both sides is not feasible. In order to fit AT facilities on both sides of the road, MUPs are recommended in order to maintain a consistent facility type throughout the study corridor.
- Regional staff review the plan annually and present recommendations for Council approval. The plan is subject to change based on factors such as road usage, safety factors, balancing other Regional priorities and costs

## 4.5 Indigenous Consultation

Indigenous groups who may have an interest in the study area were identified through a search on the Aboriginal and Treaty Rights Information System (ATRIS) and verified through mail correspondence with the Ministry of Environment, Conservation and Parks. These communities were included in the mailing list and received study notices through regular mail and email. They were invited to participate in the study by providing input and feedback and also reviewing Open House materials available on the project website. The Project Team conducted follow-up calls with the Indigenous Communities who did not respond through mail or email. A summary of correspondence with Indigenous Communities is provided in **Appendix D**. The Indigenous Communities groups that were contacted are:

- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Huron-Wendat First Nation

Alderville First Nation and Huron-Wendat First Nation requested a copy of the Archaeological Assessment for review and were provided it in July 2018.

No other Indigenous representatives identified any further concerns regarding the project.

## 5. Transportation Conditions

This section documents the findings from the YR-TMP, a summary of existing and future conditions with respect to transportation infrastructure and multi-modal level of service, including vehicular traffic, transit, cycling, and pedestrian level of service. This section also includes a traffic safety review and grade separation assessment at the Go Transit Stouffville Railway Corridor crossings. Further information can be found in the detailed Transportation Technical Report (TTR) #1 under **Appendix E**.

### 5.1 Findings of Analysis from York Region Transportation Master Plan

The rapidly evolving nature of York Region affects the transportation choices of the people who live and work within York Region. Origin and destination patterns, mode choice preferences, and magnitude of trips are changing as York Region becomes more urbanized. The following section summarizes the results of the transportation analysis with respect to future travel patterns, modal share, and transit ridership, conducted as part of the YR-TMP, as well as planned improvements identified as a part of the study.

#### 5.1.1 2041 Future Travel Patterns

Over the next 30 years, travel demand is expected to grow about 2% per year, equating to a growth of 61% across York Region. As York Region becomes progressively urbanized, it has also become more self-contained. Internal York Region to York Region trips will continue to be the most significant growth segment as intra-regional trips are predicted to grow by over 200,000 trips. This growth alone accounts for 28% of all future trips in York Region, and accounts for 75% of future growth in trips originating from York Region.

In 2041, York Region will continue to be a net exporter of trips in the AM peak period. That is, there remains a component of York Region that remains a commuter suburb to Toronto. However, looking forward, the growth in new trips destined to York Region exceeds that of new trips originating in York Region. In the last 25 years, more trips stay within York Region (the proportion of which grows from 44% to 60% of total trips destined to York Region). This significant change can be attributed to those formerly commuting to York Region relocating to also live in York Region.

The origin-destination trends for the AM peak hour indicate that York Region is developing into a more established urban area where more residents can choose to live, work and play. This suggests that Kennedy Road will continue to serve its primary role as intra-regional north-south corridor.

### 5.1.2 2041 Modal Share

A comparison of the percent of trips from, to, and within York Region by the various modes of transportation between 2011 and 2041 were analyzed in the YR-TMP and supplemented by the findings in the Background Report D - Pedestrian and Cycling Plan Development Report.

It was found that the auto mode continues to be the Region's most popular method of transportation by far, whereas transit mode share continues to grow for trips within and outside of York Region.

The combined mode share between auto and transit greatly outweighs other modes such as pedestrians and cyclists. For example, historically, cycling trips have increased substantially in the last decade, but their overall share remains less than 1% of the AM peak period total. Therefore, future auto and transit mode shares are the primary focus of the analysis conducted in the YR-TMP.

Internal York Region trips are the most significant component of travel in York Region, representing over 517,000 total trips in the AM peak period. However, internal York Region trips are predominantly made by the automobile, either as a driver or passenger. If current travel trends continue, the travel demand forecast model predicts that the 2041 transit share for internal York Region trips will increase slightly, but will continue to remain low, at about 5%. In comparison, there has been a significant shift in travel by transit from York Region to other municipalities. For example, transit share for trips to downtown Toronto is anticipated to increase from 74% in 2011 to 82% in 2041. The increased transit share to downtown Toronto is a significant achievement and supports increased capacity that will be provided by the Toronto York Spadina Subway Extension and the planned Yonge North Subway Extension and GO Expansion.

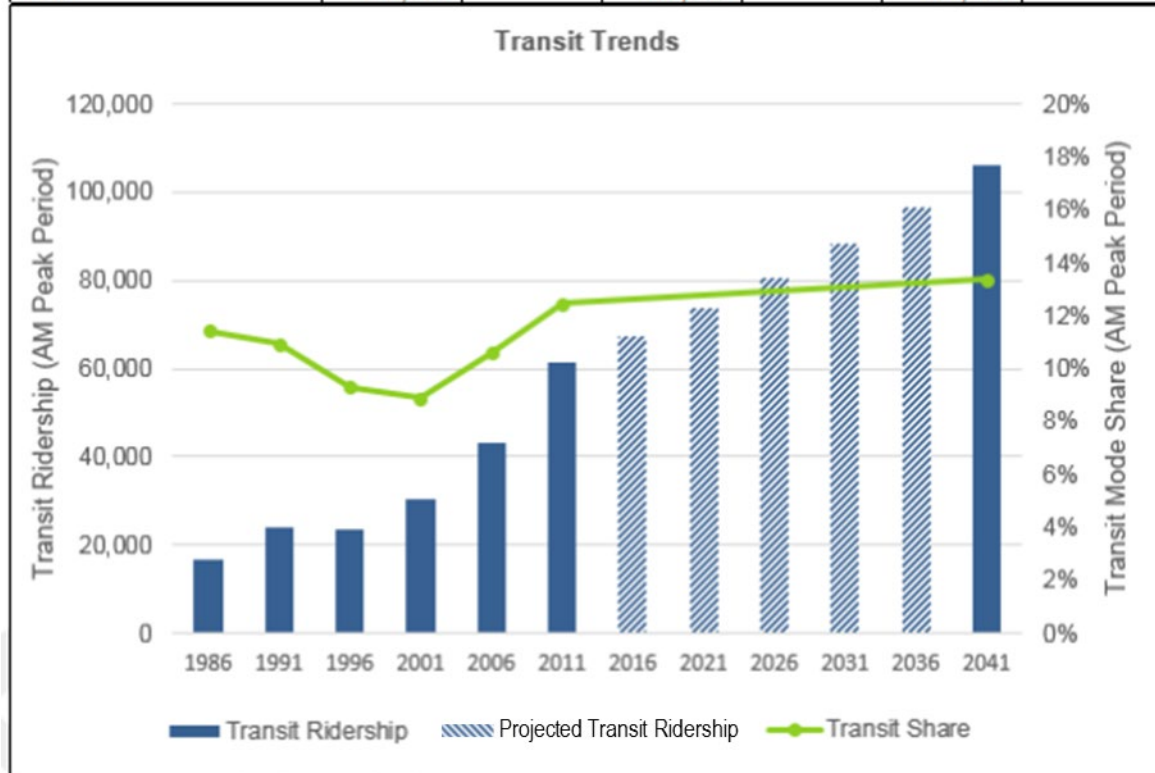
### 5.1.3 2041 Transit Ridership

York Region Transit has made significant progress on expanding transit networks and service hours. Overall, transit service hours increased by 12% over the five year period from 2009 to 2014. Service levels on the GO Train have even more rapid increases with a 33% increase in seats provided. Looking forward, the predicted change in transit share over the next 30 years is similar to past growth as projected in the York Region Model's base case estimation and existing trends and travel characteristics upon which the model was calibrated.

Existing and future transit ridership levels across York Region are summarized in **Table 5-1**. Transit trips across York Region, including both local and GO transit trips, are expected to increase from 61,300 to 106,000 trips between 2011 and 2041.

Table 5-1: 2041 Transit Ridership in York Region

Mode	1986		2011		2041 Base Case	
	Trips	Mode Share %	Trips	Mode Share %	Trips	Mode Share %
Transit (Local, GO)	16,600	11.4%	61,300	12.5%	106,000	13.4%
Auto (Driver+Passenger)	128,300	88.6%	430,900	87.5%	685,100	86.6%
Total	144,900		492,300		791,100	



### 5.1.4 Network Recommendations

The YR-TMP documents an assessment of existing trends and anticipated future conditions in York Region. This assessment not only identifies problems and opportunities for improvements to the transportation network, but also summarizes strategies, guidelines, and recommendations to the Region's 2041 road and transit network. A summary of the YR-TMP findings is provided below:

- Transportation demand is increasing faster than road network capacity. The future road network will be congested, have major capacity constraints, and the level of service will worsen for road users, especially motorists, under existing roadway capacities
- Connectivity between modes and the ease of access to transit are major factors to transit demand. The availability of sidewalks and path connections to transit stops, as well as park-and-ride lots at major transit stations are needed to

provide mode choice options and accommodate multi-modal trips for the “first and last mile”

- The assessment of the future base and future ‘build-out’ networks indicate that continuing to widen Regional roads alone will not address the needs of York Region as demand will continue to exceed capacity. Applying alternative solutions through Transportation System Management measures that make better use of the existing infrastructure to improve flow and reduce delay could provide relief in a more cost-effective manner. Measures could include traffic signal coordination, signal priority for transit vehicles, queue jump lanes, or operational improvements at specific locations to address local capacity constraints
- The development of the proposed transit network was based on designating transit/HOV lanes where peak passenger demand, including transit, exceeds 1,000 passengers per hour in the peak direction
- The focus of the proposed road network is to make strategic road improvements that add capacity, address traffic bottlenecks, complete missing links and optimize system performance. Widening to six lanes with transit/HOV lanes was recommended where peak volume-to-capacity ratios exceeded 1.2

In accordance with the network improvement strategies and guidelines identified above, the YR-TMP recommends widening on Kennedy Road between Steeles Avenue and Major Mackenzie Drive to six lanes to accommodate a transit/HOV lane. In addition, Kennedy Road is also recommended in the YR-TMP to be part of the Region’s Frequent Transit Network. In addition to the Frequent Transit Network identified for Kennedy Road, YR-TMP identifies a section of Kennedy Road for Bus Rapid Transit, between Highway 7 and YMCA Boulevard, servicing the edge of Markham Centre.

### 5.1.5 Planned Improvements

Planned improvements to 2041 were identified in the YR-TMP including road capacity improvements, frequent transit service, and separated cycling facilities. YR-TMP recommendations for the study corridor are summarized in **Section 2.2.1**.

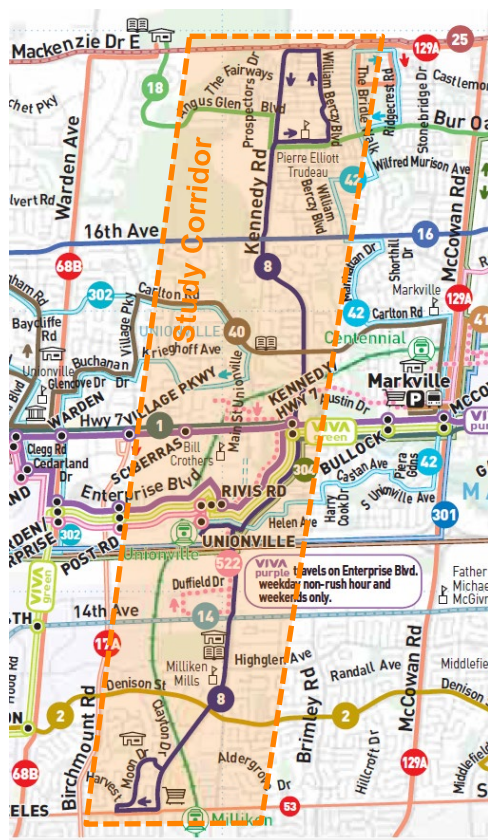
## 5.2 Transit

### 5.2.1 Existing Transit Network

Transit service on Kennedy Road provides connectivity for local residents and businesses to other routes and areas around York Region and the City of Toronto. The existing GO, Viva, YRT, and TTC services currently serve within the study area.

Existing Viva, YRT, and TTC services are illustrated in **Exhibit 5-1** and are detailed in **Appendix E**.

Unionville GO Station is located within the vicinity of the study corridor, west of Kennedy Road on YMCA Boulevard approximately 500 m from Kennedy Road. This station is part of the GO Transit Stouffville Railway Corridor and is served by fourteen southbound and seventeen northbound trains every day, from Monday to Friday effective January 4, 2020. Weekday service started in June 2019. These trains run between the Lincolnville GO Station in Whitchurch-Stouffville and Union Station in Toronto. While trains are not running, the station is served by Route 70/71, and 51/52/54 GO Buses. As of June 2019, trains run approximately every 30 minutes during the morning and afternoon peak periods and hourly during off-peak periods, and buses run every hour on weekdays when trains are not in service and on weekends.



**Exhibit 5-1: YRT/Viva/TTC/GO Service within Kennedy Road Study Area**  
\*Map effective June 2019

## 5.2.2 Future Transit Network and Opportunities

Planned improvements for York Region's transit network to 2041 are documented in the YR-TMP, designating Kennedy Road as a frequent transit network, referenced in **Section 5.1.5**.

## 5.3 Pedestrians

### 5.3.1 Pedestrian Level of Service Methodology

A multi-modal level of service (MMLOS) analysis was used to better understand the existing pedestrian conditions along the corridor.

As shown in **Exhibit 5-2**, PLOS is calculated at the intersection and mid-block segment in recognition that, unlike vehicular LOS, a pedestrian's experience is determined by the conditions both between crossings and at the crossing itself (e.g., a high quality pedestrian crossing may or may not connect to a sidewalk facility at either end). Scoring ranges as follows:

- **PLOS 'A' to 'B'** – Attractive to most pedestrians including locations where lower vehicle speeds and volumes, wider sidewalks, and larger boulevards with ample separation from moving traffic are present.
- **PLOS 'C' to 'D'** – Elements may not appeal including narrow sidewalks, lack of separation from traffic, longer crossing distances, etc.
- **PLOS 'E' to 'F'** – Facilities under this rating are not adequate, this includes locations without any facility or where no buffer is provided adjacent to high speed high volume traffic. At the intersection level, no cross-walks are provided.

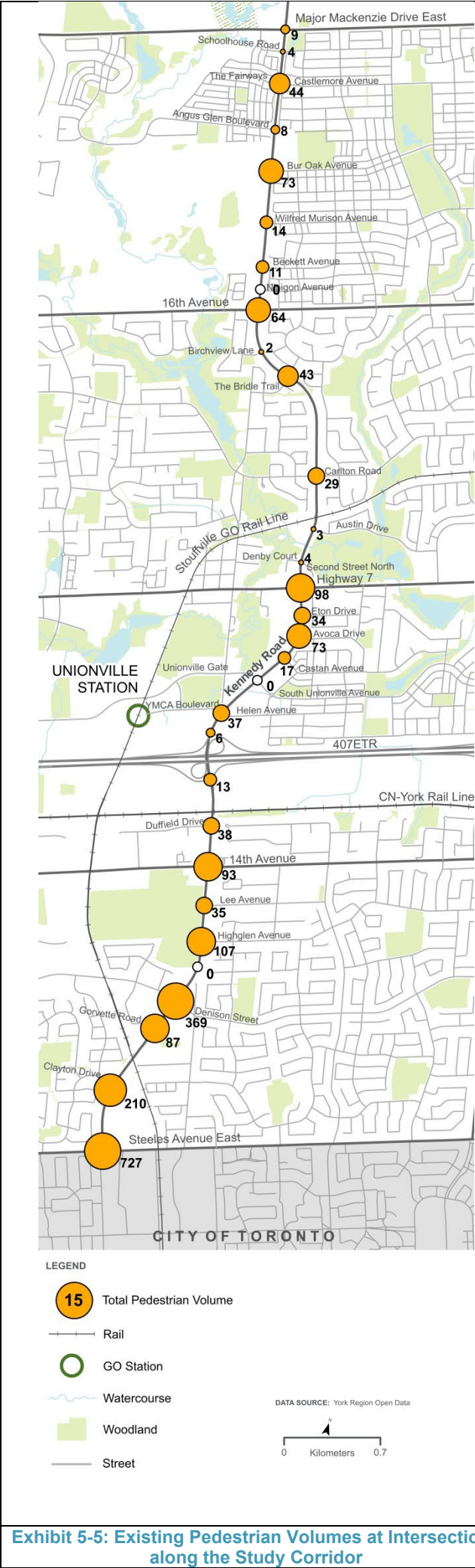
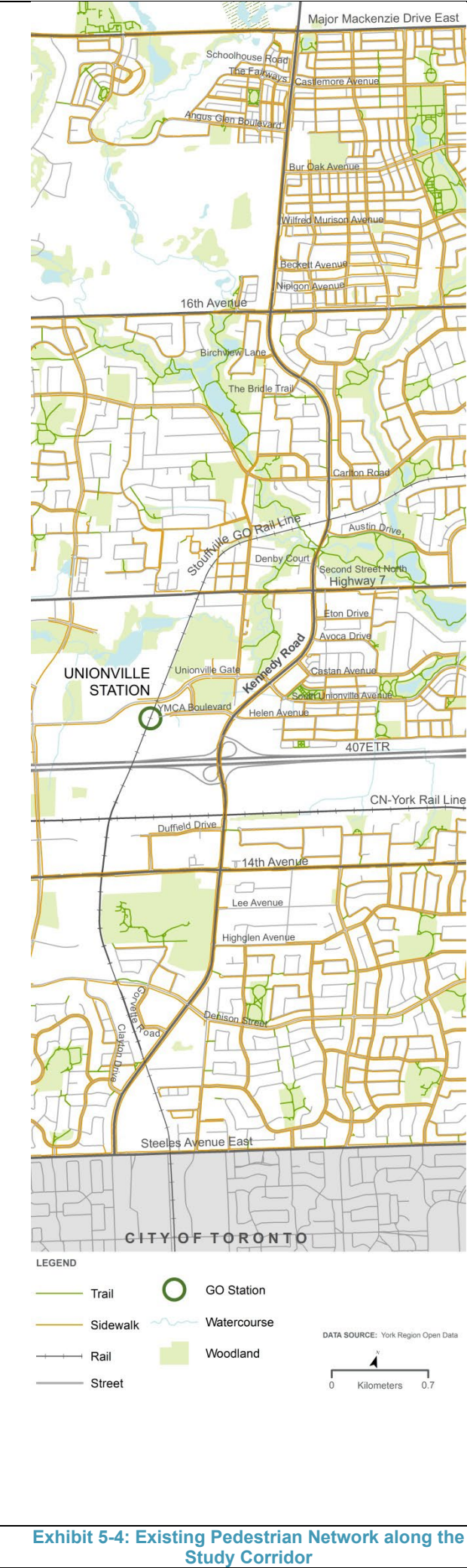
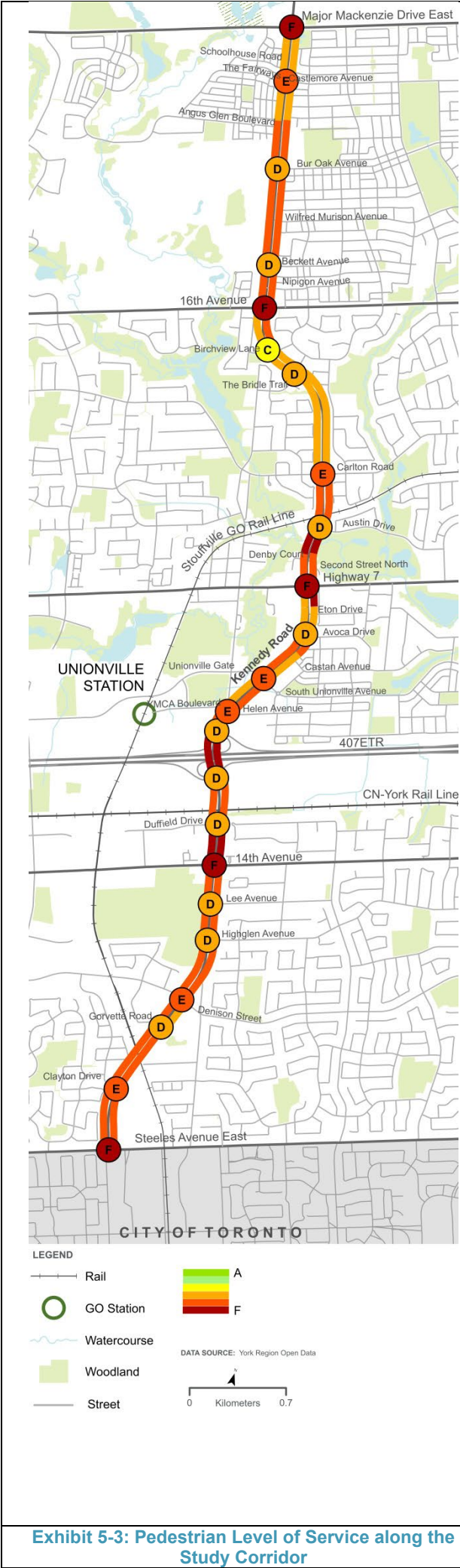
The methodology for the evaluation of segment PLOS uses a look-up table approach based on cross-section and roadway characteristics (e.g., sidewalk and boulevard width, traffic volumes, presence of on-street parking, and operating speed). Intersection PLOS uses the Pedestrian Exposure to Traffic at Signalized Intersections (PETSI) and assigns points based on a number of crossing characteristics (e.g., crossing distance, presence of a median, presence of a crossing refuge, turning restrictions, right hand turn characteristics, curb radii, etc.). This is calculated for each crossing (e.g., north, south, east, west) and their averages are computed to derive an overall intersection PLOS; however, each crossing's score should be considered individually when recommending improvements.



**Exhibit 5-2: Pedestrian Level of Service (PLOS) Rankings**

The look, feel, and function of the study corridor changes along its length as does the level of comfort experienced by pedestrians. The segment PLOS scores range between E and F for the study corridor. Similarly, intersection PLOS varies along the study corridor with the majority of intersections between PLOS 'D' and 'F'

The results of the pedestrian level of service (PLOS) evaluation are graphically summarized in **Exhibit 5-3**.



### 5.3.2 Pedestrian Quality of Service

There are continuous sidewalks on the east and west side of Kennedy Road between Steeles Avenue and Major Mackenzie Drive, shown in **Exhibit 5-4**. Sidewalks are at least 1.5 metres wide along the study corridor.

Pedestrian volumes were estimated from intersection 8-hour turning movement counts. **Exhibit 5-5** illustrates the combined AM and PM peak pedestrian volumes at all intersections along the corridor.

The segment PLOS scores range between 'C' and 'F' for the study corridor. The pedestrian level of service along the study corridor is illustrated in **Exhibit 5-3**. The low scores can be attributed to high operating speeds along Kennedy Road (i.e. greater than 60 km/hr), high traffic volumes (i.e. greater than 3000 AADT), and 1.5 metre sidewalks (minimum width to meet provincially accessible standards). The lowest scores occur where there is no buffer between the roadway and the sidewalk (i.e. segment PLOS 'F'). **Exhibit 5-6** demonstrates an example along the study corridor where segment PLOS is rated 'F' due to the 1.5 m width sidewalks, high operating speeds, and lack of lateral separation between the roadway and pedestrian facility.



**Exhibit 5-6: Kennedy Road at 407ETR Interchange (Segment PLOS 'F')**

Similarly, intersection PLOS varies along the study corridor with the majority of intersections between PLOS 'D' and 'E'. Intersection PLOS scores of 'D' are indicative of somewhat shorter crossing distances (3-4 lanes), relatively small corner radii, and zebra crosswalk treatments. The lowest scores (i.e. intersection PLOS 'F') tend to apply to intersections with longer crossing distances, standard transverse markings and large corner radii. **Exhibit 5-7** demonstrates an example intersection within the study corridor with an intersection PLOS of 'F' due to a large number of lanes (6-7), pedestrians must cross limited traverse markings and high speed turns facilitated by a large turning radii.

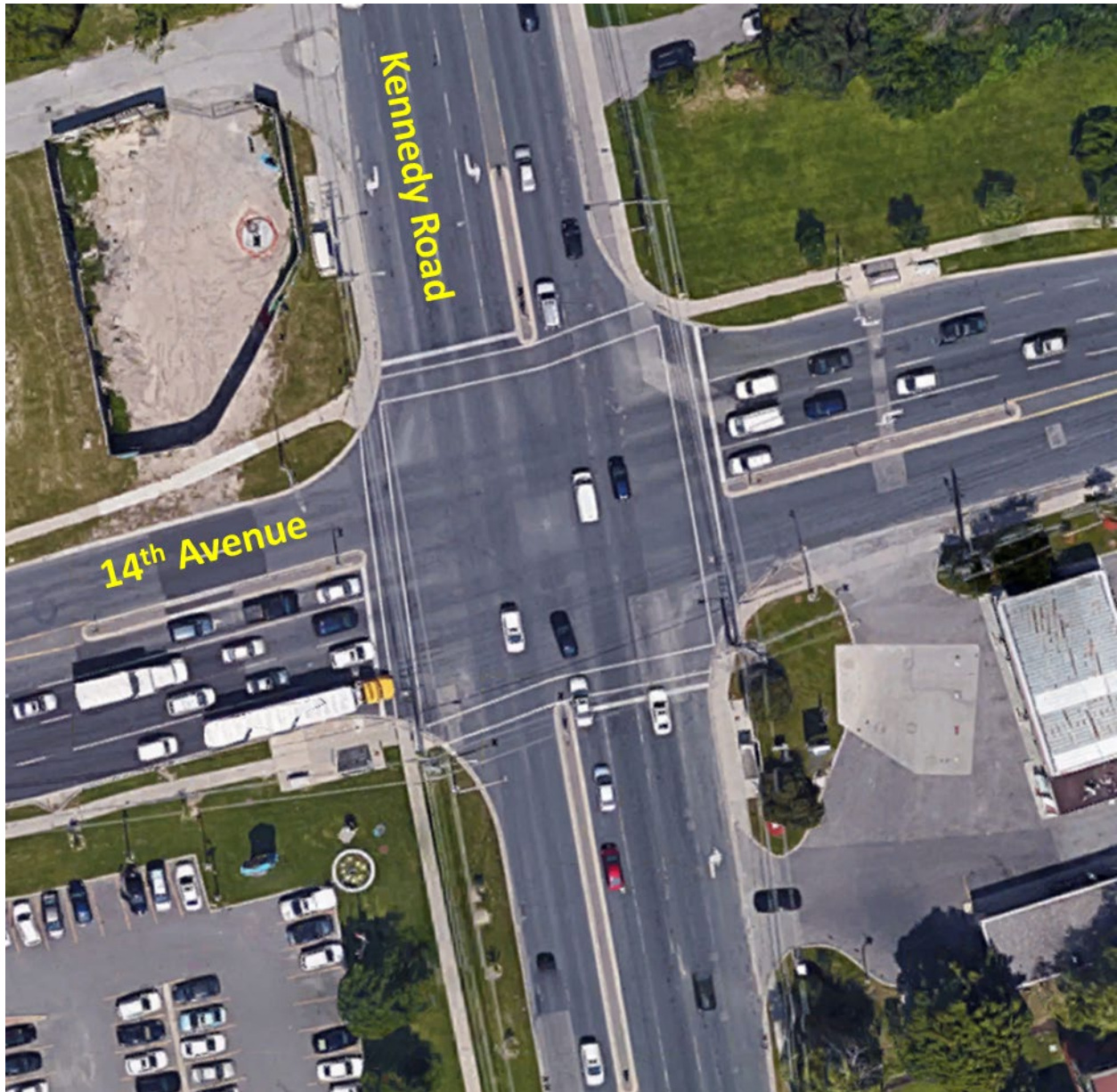


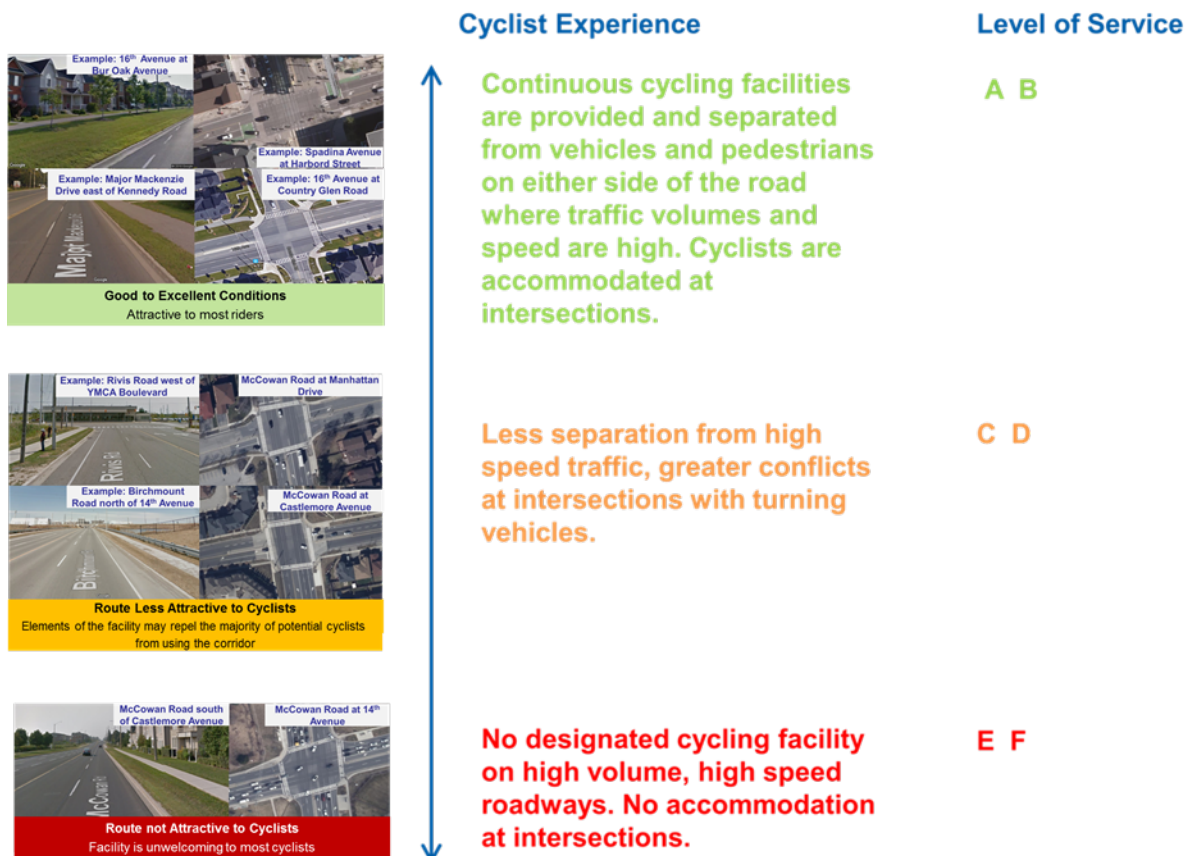
Exhibit 5-7: Kennedy Road at 14<sup>th</sup> Avenue (Intersection PLOS 'F')

## 5.4 Cycling

### 5.4.1 Cycling Level of Service Methodology

Similar to pedestrian level of service, MMLOS analysis was used to estimate the quality of the cycling environment along Kennedy Road. Bicycling level of service (BLOS) is calculated at the intersection and mid-block in recognition that, unlike vehicular LOS, a cyclist's experience is determined by the conditions both between crossings and at the crossing itself, as shown in **Exhibit 5-8**. Facility type is a key factor for segment BLOS scores as follows:

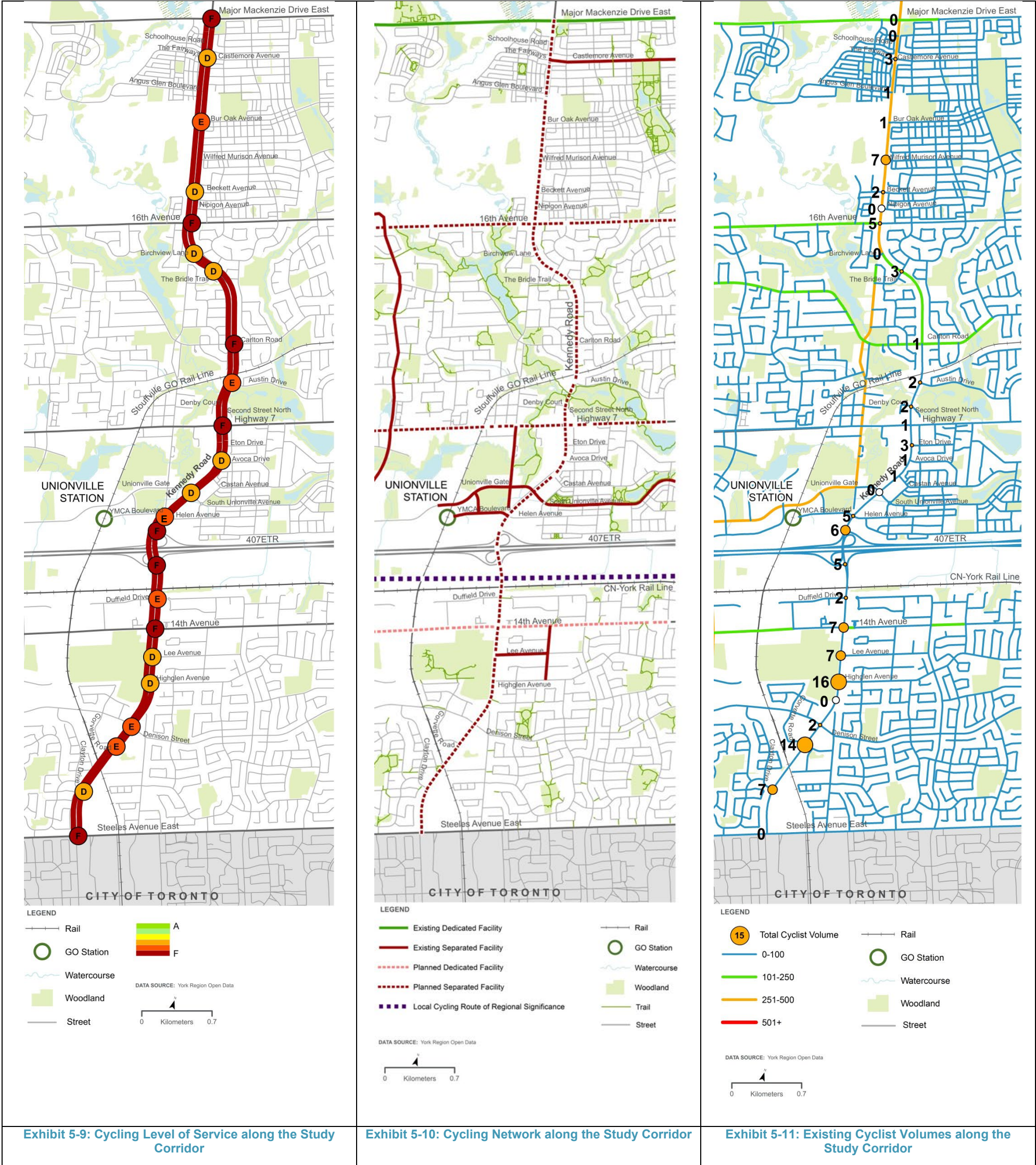
- **BLOS 'A' to 'B'** – Physically separated facilities such as cycle tracks, protected bike lanes, and multi-use paths (MUP) are attractive to most cyclists
- **BLOS 'C' to 'D'** – Designated bike lanes adjacent to high speed traffic lanes or shared facilities on low volume, low speed streets with wide curb lanes provide some comfort but the majority of cyclists typically will not cycle
- **BLOS 'E' to 'F'** – Non-separated, shared roadways with high volume traffic volume and speeds, and no accommodations at intersections



**Exhibit 5-8: Bicyclist Level of Service (BLOS) Rankings**

The BLOS methodology is similar to the PLOS method, and is based on roadway characteristics and facility type and quality. Segment BLOS is calculated using a look-up table approach and considers facility type, street width, operating speed, and parking characteristics. As with segment PLOS, segment BLOS is calculated using a weakest link approach, meaning that the lowest scored portion of a segment is used to calculate its BLOS. This is in line with the methodology's user-centric focus which evaluates a user's perceived safety from a network perspective (in this case the segment). Intersection BLOS is calculated for each approach and for both left and right turning conditions. Scores are evaluated using a look-up table approach. For a typical 4-way intersection, eight scores are calculated—a left and right for each approach. The average of all eight scores is used to determine the intersection BLOS.

The results of the BLOS evaluation are graphically summarized in **Exhibit 5-9**.



## 5.4.2 Cycling Quality of Service

In the study corridor, cyclists are required to share the roadway with vehicles. At present, there are no designated cycling facilities on Kennedy Road, resulting in a low BLOS segment score for the entire study corridor. The YR-TMP notes that separated cycling facilities are planned for Kennedy Road; however, the individual configurations will depend on the future typical cross-sections identified through the Class EA process. **Exhibit 5-10** shows the location of existing and planned bicycle network, per the Region's Pedestrian and Cycling Master Plan.

Cycling demand along the corridor was estimated using geo-referenced activity data acquired by the Region from Strava, Inc. (a free mobile application allowing members to record their physical activity and is popular with runners and cyclists in the Region). **Exhibit 5-11** represents the number of unique cycling trips per street segment giving an indication of a street's popularity amongst recreational cyclists in the area as well as the combined AM and PM peak hour cycling movements at study intersections. Cycling demand is modest and generally constant along the study corridor given that cyclists must travel in mixed traffic. Higher cycling volumes are observed (according to the Strava data) north of Highway 7 along Main Street Unionville and towards Unionville Gate, where there are separated cycling facilities.

The segment BLOS scores range between 'D' and 'F' for the study corridor. The BLOS along the study corridor is illustrated in **Exhibit 5-9**. The low scores can be attributed to high operating speeds along Kennedy Road (i.e. greater than 60 km/hr), high traffic volumes (i.e. greater than 3000 AADT), and a lack of dedicated cycling facilities. The intersection BLOS scores 'F' are seen at major intersections which may be attributed to the long crossing distances, standard transverse markings and a large corner radii.

## 5.5 Auto Traffic

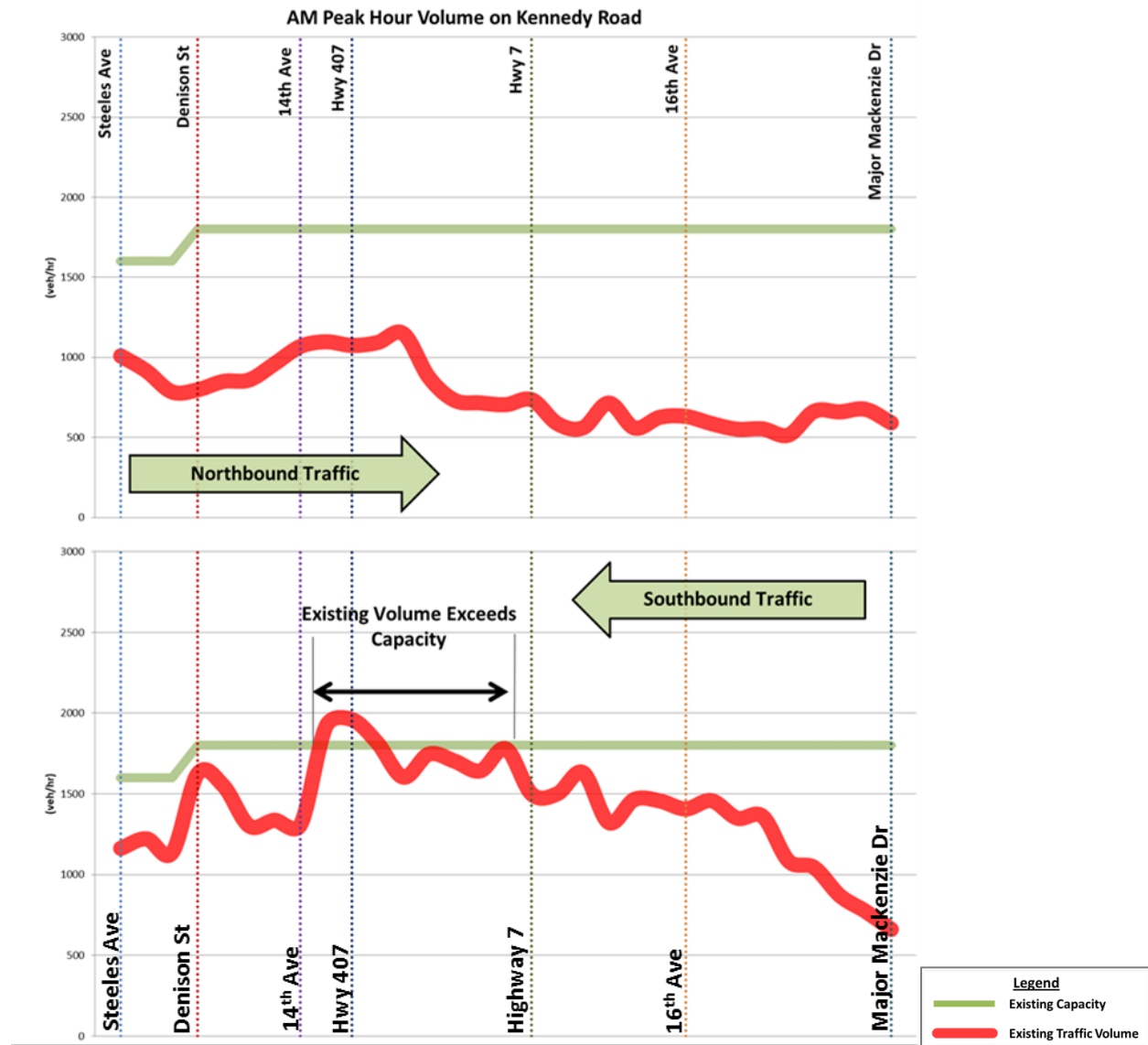
### 5.5.1 Existing Peak Hour Traffic Conditions

The peak hour volumes were compared to the theoretical road capacity to conservatively evaluate peak hour operations for existing conditions.

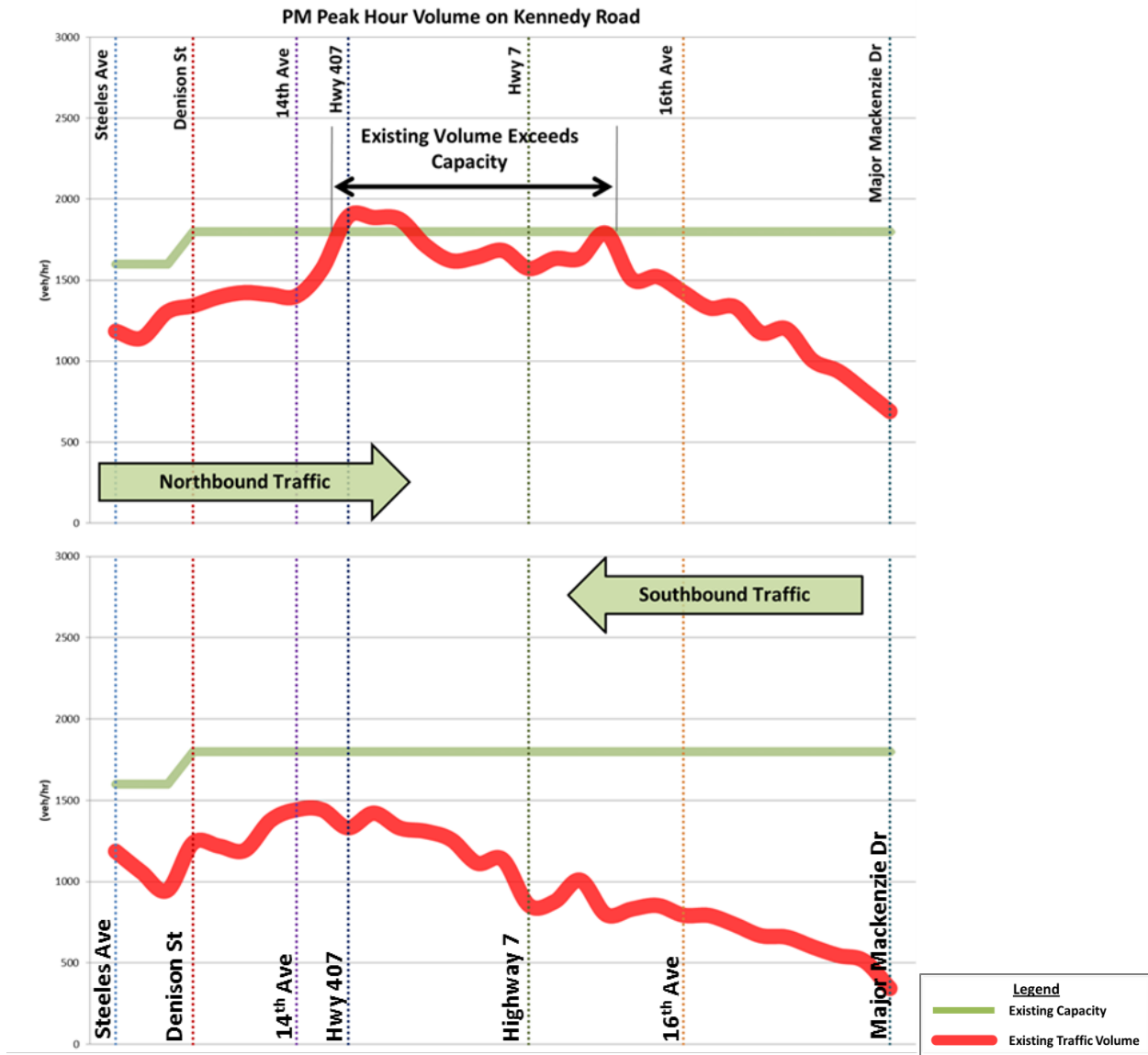
As illustrated in **Exhibit 5-12**, existing traffic on Kennedy Road between Major Mackenzie Drive and Steeles Avenue is highest in the southbound direction during the weekday AM peak hour. In the southbound direction, the traffic volumes increase continually from Major Mackenzie Drive to 16<sup>th</sup> Avenue and fluctuate within a range from 1,200 and 2,000 vehicles per hour between 16<sup>th</sup> Avenue and Steeles Avenue.

In the weekday PM peak hour, as shown in **Exhibit 5-13**, existing traffic is highest in the northbound direction. In the northbound direction, the traffic volumes fluctuated within a

range from 1,400 and 1,900 vehicles per hour between 16<sup>th</sup> Avenue and 14<sup>th</sup> Avenue, and diminish from 14<sup>th</sup> Avenue to Steeles Avenue.



**Exhibit 5-12: Existing AM Peak Hour Volumes**



**Exhibit 5-13: Existing PM Peak Hour Volumes**

### 5.5.2 Future Peak Hour Traffic Conditions

As illustrated in **Exhibit 5-14**, 2041 traffic is highest in southbound direction during the weekday AM peak hour, peaking at approximately 3,000 vehicles per hour near 407ETR. The projected volume in the southbound direction is expected to exceed existing capacity throughout almost the entire study corridor. In the northbound direction during the weekday AM peak hour, 2041 traffic exceeds existing capacity on small segment at south of Major Mackenzie Drive.

During the weekday PM peak hour, as shown in **Exhibit 5-15**, 2041 traffic is highest in northbound direction and peaking at over 3,000 vehicles per hour near 407ETR. The projected volume in the northbound direction is expected to exceed existing capacity throughout the entire study corridor. In the southbound direction during the weekday PM

peak hour, 2041 traffic is expected to exceed capacity from south of Major Mackenzie Drive to north of Denison Street. In summary, traffic is expected to exceed capacity throughout entire study corridor during both AM and PM peak hours in 2041.

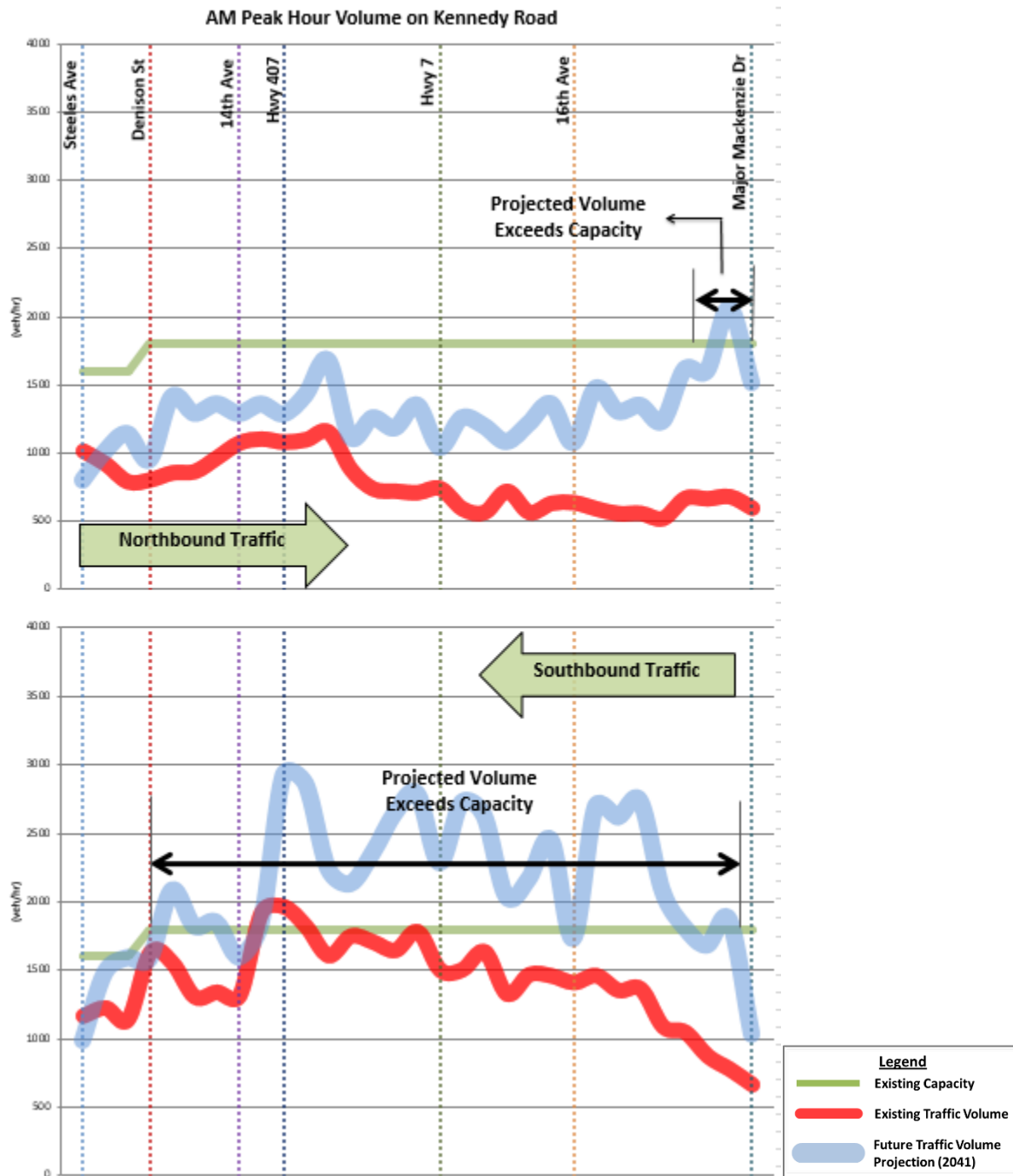


Exhibit 5-14: Future AM Peak Hour Volumes

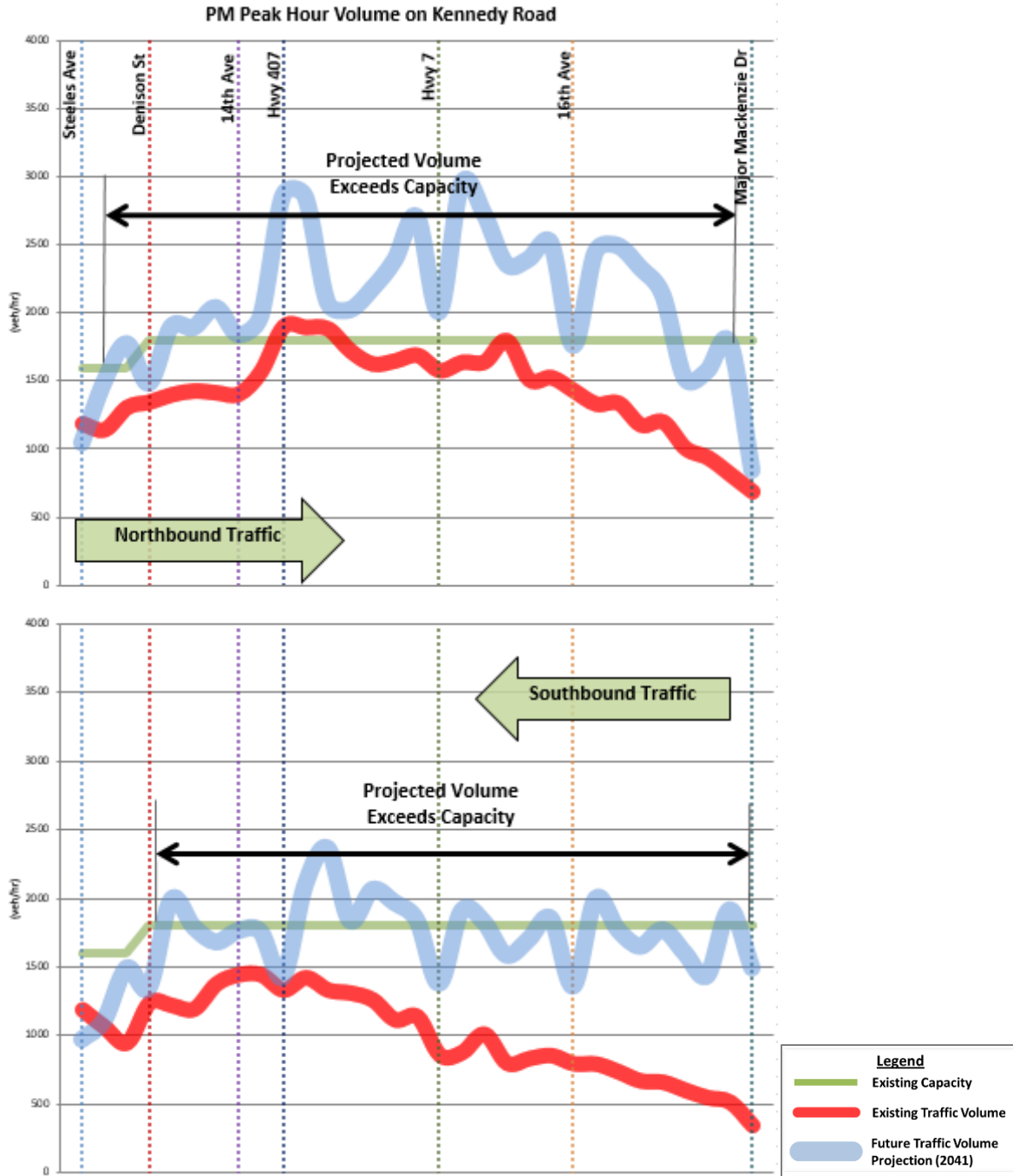


Exhibit 5-15: Future PM Peak Hour Volumes

### 5.5.3 Anticipated Vehicular Delays at the At-Grade Crossing of Go Transit Stouffville Railway Corridor north of Clayton Drive

In the existing conditions, a total of thirty-three (33) GO trains cross Kennedy Road per day at this location, with seventeen (17) in the northbound and fourteen (14) in the southbound directions, effective January 4, 2020. In 2041, under GO Expansion all-day two-way service, Metrolinx forecasts an average of one train every 15 minutes operating in the peak direction.

Existing 95<sup>th</sup> percentile queues at the Clayton Drive at-grade railway crossing reach Corvette Road in the southbound direction (AM) and approach Clayton Drive in the northbound direction (PM) during peak hours and in peak directions. Queues in either direction are expected to spillover to adjacent intersections within one kilometre of the crossing. **Exhibit 5-16** illustrates these queue conditions. Queues are expected to increase significantly in 2041 conditions, as illustrated in **Exhibit 5-17**.



**Exhibit 5-16: Existing Peak Hour 95<sup>th</sup> Percentile Queues at the Clayton Drive Go Transit Stouffville Railway Corridor Crossing**



Exhibit 5-17: 2041 Peak Hour 95<sup>th</sup> Percentile Queues at the Clayton Drive Go Transit Stouffville Railway Corridor Crossing

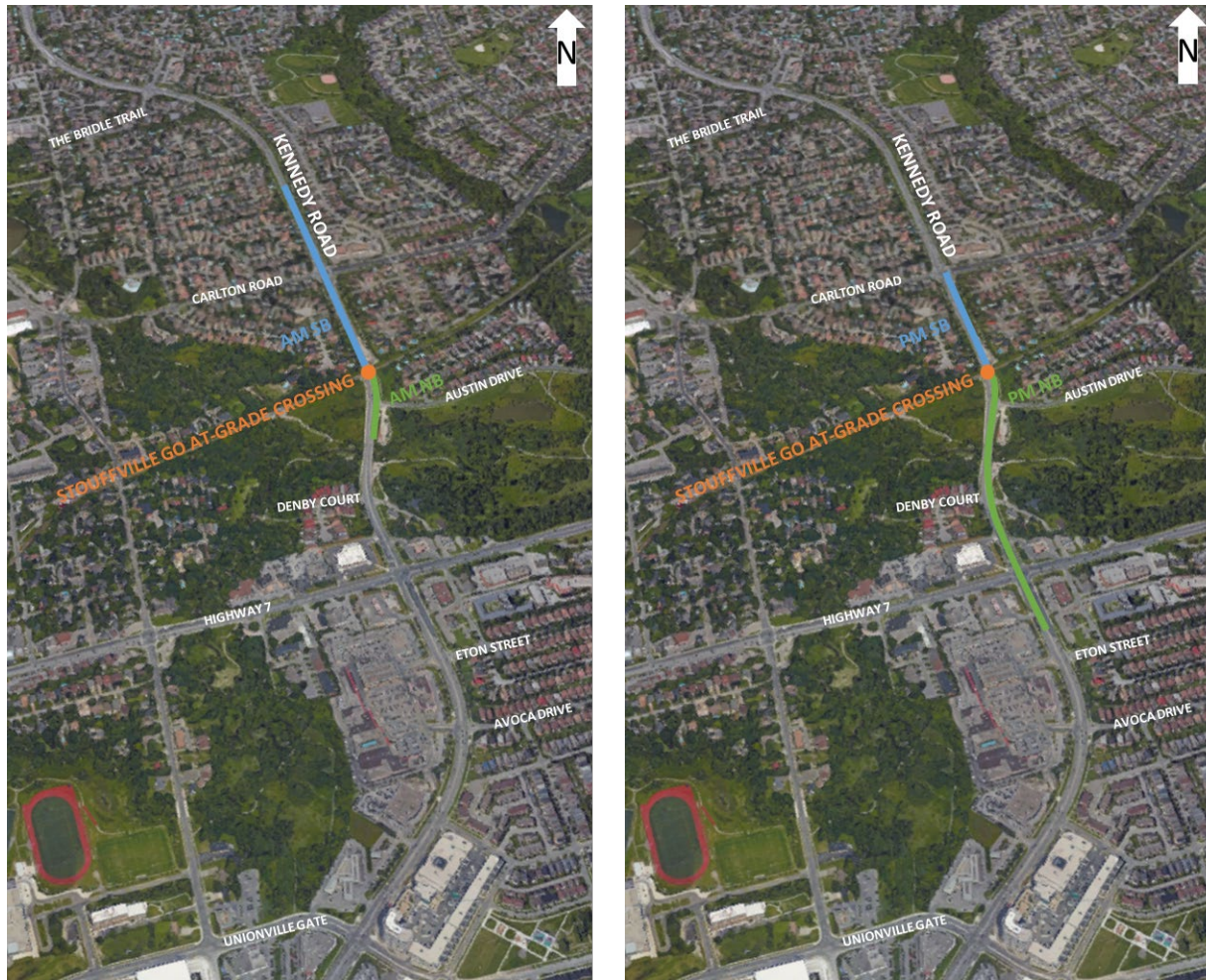
#### 5.5.4 Anticipated Vehicular Delays at the At-Grade Crossing of Go Transit Stouffville Railway Corridor north of Austin Drive

In existing conditions, according to GO Transit train schedules, a total of 33 GO trains cross Kennedy Road per day at this location, with seventeen (17) in the northbound and fourteen (14) in the southbound directions, effective January 4, 2020. In 2041, under GO Expansion all-day two-way service, Metrolinx forecasts an average of one train every 15 minutes operating in the peak direction.

During the peak hour and peak direction in the existing condition, 95<sup>th</sup> percentile queues at the at-grade railway crossing extend to Highway 7 for PM northbound direction, and past Carlton Road for AM southbound direction. Queues in either direction are expected to spillover to adjacent intersections within one kilometre of the crossing. **Exhibit 5-18** illustrates these queue conditions. Queues are expected to increase significantly in 2041 conditions, as illustrated **Exhibit 5-19**.



**Exhibit 5-18: Existing Peak Hour 95<sup>th</sup> Percentile Queues at the Austin Drive Go Transit Stouffville Railway Corridor Crossing**



**Exhibit 5-19: 2041 Peak Hour 95<sup>th</sup> Percentile Queues at the Austin Go Transit Stouffville Railway Corridor Crossing**

## 5.6 Grade Separation Assessment

### 5.6.1 Go Transit Stouffville Railway Corridor At-Grade Crossing north of Clayton Drive

A rail exposure index is used to determine whether a grade separation is warranted or not based on current and future traffic volumes, and the number of trains at the crossing each day. By 2041 the exposure index will be beyond the desirable threshold of 200,000 and grade separation should be considered. To support the rail exposure index values and traffic analysis, further investigation was completed on collision and safety, and pedestrian/cyclist conditions. The collision and safety analysis completed in the areas adjacent to the at-grade crossing noted that this section between Clayton Drive and Steeles Avenue of Kennedy Road had one of the highest collision rates among the entire study corridor, considering further investigation for mitigation and improvements. An evaluation of pedestrian and cyclist conditions was completed for adjacent areas along Kennedy Road in proximity to the at-grade crossing and noted that

there were several major trip generators near the crossing but less than desirable overall facilities. Based on the analysis conducted and the above-factors analyzed, it is recommended that a grade separation be considered at this crossing.

### 5.6.2 Go Transit Stouffville Railway Corridor At-Grade Crossing north of Austin Drive

A rail exposure index is used to determine whether a grade separation should be considered based on current and future traffic volumes, and the number of trains at the crossing each day. By 2041 the exposure index will be beyond the desirable threshold of 200,000 and grade separation should be considered at the Go Transit Stouffville Railway Corridor crossing north of Austin Drive. The future exposure index takes into account the future Metrolinx GO Expansion service, increasing the number of trains twofold. Based on the analysis conducted and the above-factors analyzed, it is recommended that a grade separation be considered at this crossing.

## 5.7 Traffic Safety

York Region provided both segment and intersection-related collision records for the most recent 5 years between January 1, 2011 and December 31, 2015 along the study corridor. Collisions reported with classification of 'Non-reportable' are assumed to be 'Property Damage Only' (PDO), as more severe collisions resulting in injury would likely be reported as such. A total of 1,430 collisions occurred in the study area during the five-year review period. Further information on safety for vulnerable users and collision data analyzed by year, weekday and month of occurrence, severity, initial impact type, environmental conditions, light conditions to identify trends and patterns in the collisions are detailed in TTR #1 under **Appendix E**.

## 6. Physical and Environmental Constraints

### 6.1 Overview of Existing Features and Constraints

#### 6.1.1 Steeles Avenue to 407ETR

As shown in **Exhibit 6-1**, key features and constraints in the vicinity of the study corridor along this segment include:

- Go Transit Stouffville Railway Corridor Crossing north of Clayton Drive
- Commercial areas including Pacific Mall, Market Village, Hollywood Square, Denison Centre, and Goldbright Plaza, lands abutting Kennedy Road between Denison Street and 14<sup>th</sup> Avenue
- Schools and community centres including Milliken Mills High School, Milliken Mills Community Centre/Library, and Kennedy Montessori School
- Religious institutions including Milliken Wesleyan Methodist Church and Fellowship Baptist Church
- Hagerman East and West Cemeteries located north of 14<sup>th</sup> Avenue, Right-of-Way constraints at these locations along the study corridor
- Wetlands near Gorvette Drive
- Utilities including the hydro corridor south of 407ETR
- CN York Subdivision Underpass south of 407ETR
- Four cultural heritage properties abutting Kennedy Road including: Smith House, 7543 Kennedy Road, Jessie Noble House, and Thomas Morley House

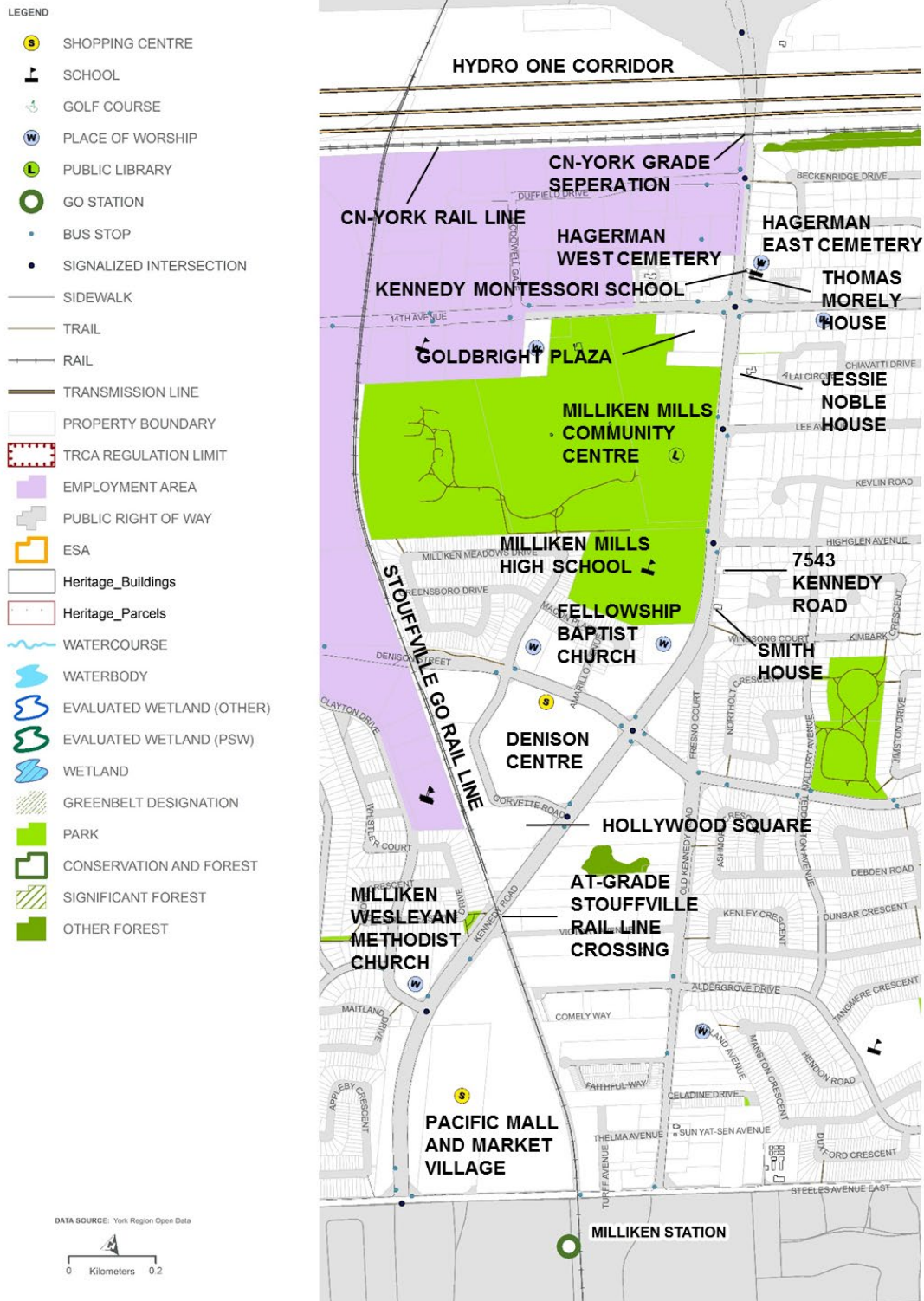


Exhibit 6-1: Key Features and Constraints (Steeles Avenue to 407ETR)

### 6.1.2 407ETR to The Bridle Trail

As shown in **Exhibit 6-2**, key features and constraints in the vicinity of the study corridor along this segment include:

- 407 Transitway lands, south of 407ETR
- One trail connection north of 407ETR adjacent to the Rouge River Tributary
- 407ETR Interchange
- Two watercourse crossings in this segment; a tributary of the Rouge River, located south of Unionville Gate crossing through a culvert, and the Rouge River bridge crossing north of Highway 7
- Land-use in this segment abutting the study corridor is predominantly commercial, with a few car dealerships south of Highway 7 and with low to mid-rise residential predominantly north of Highway 7
- Commercial areas abutting the study corridor between Highway 7 and 407ETR, and commercial plazas including Langham Square, New Kennedy Square, Peachtree Centre, Bridle Trail Plaza, and Bridle Post Shopping Centre
- One school including St. Matthews Catholic Elementary School
- Two religious institutions abutting the study corridor including Unionville Gospel Hall and Bridle Trail Baptist Church
- TRCA-regulated parklands and the Rouge River crossing north of Highway 7
- Go Transit Stouffville Railway Corridor Crossing north of Austin Drive
- Historic Main Street Unionville located immediately west of the study corridor

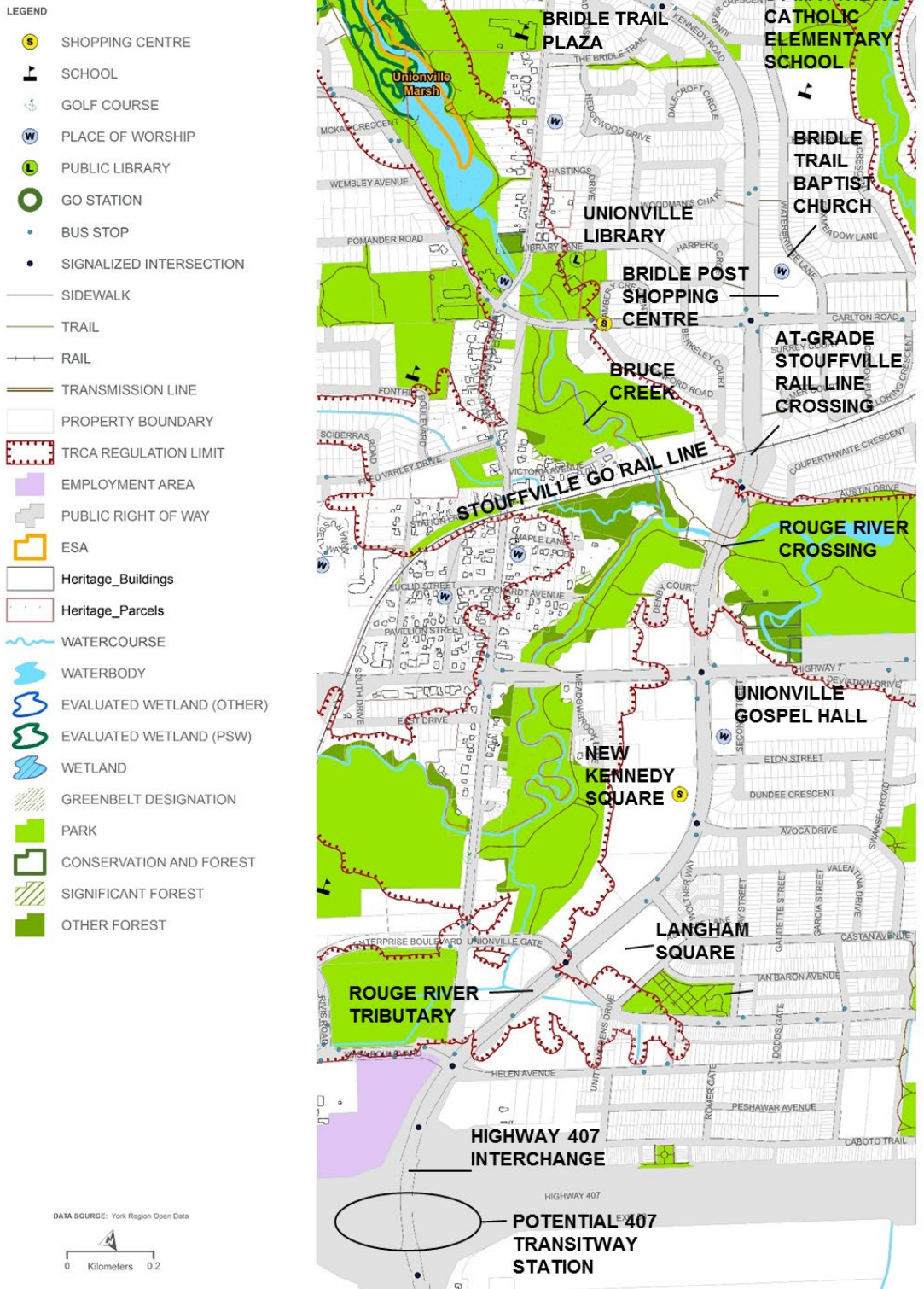


Exhibit 6-2: Key Features and Constraints (407ETR to The Bridle Trail)

### 6.1.3 The Bridle Trail to Major Mackenzie Drive

As shown in **Exhibit 6-3**, key features and constraints in the vicinity of the study corridor along this segment include:

- Markham Fire Station 95 is located in vicinity of the study corridor, south of 16<sup>th</sup> Avenue
- Land use in this segment is predominately low-rise residential with commercial plazas at major intersections including Bridle Trail Medical Centre, Berczy Village Shopping Centre, and Shoppes of Angus Glen Plaza
- Four schools within this segment including Unionville Montessori School, Beckett Farm Public School, Pierre Elliot Trudeau High School, and Angus Glen Montessori School
- York Downs Redevelopment west of Kennedy Road between 16<sup>th</sup> Avenue and Angus Glen Boulevard, this redevelopment may include future access streets onto Kennedy Road
- One religious institution abutting the study corridor including St. Philips-on-the-Hill Anglican Church
- Two cemeteries abutting Kennedy Road north of 16<sup>th</sup> Avenue resulting in Right-of-Way constraints, including St. Philips-on-the-Hill Cemetery, and Bethesda Lutheran Cemetery
- Three cultural heritage properties abutting Kennedy Road; Colty Corners School House (Angus Glen Montessori School), Thomas Lownsbrough House, and George Hunter House
- Natural heritage feature includes Mattamy Pond

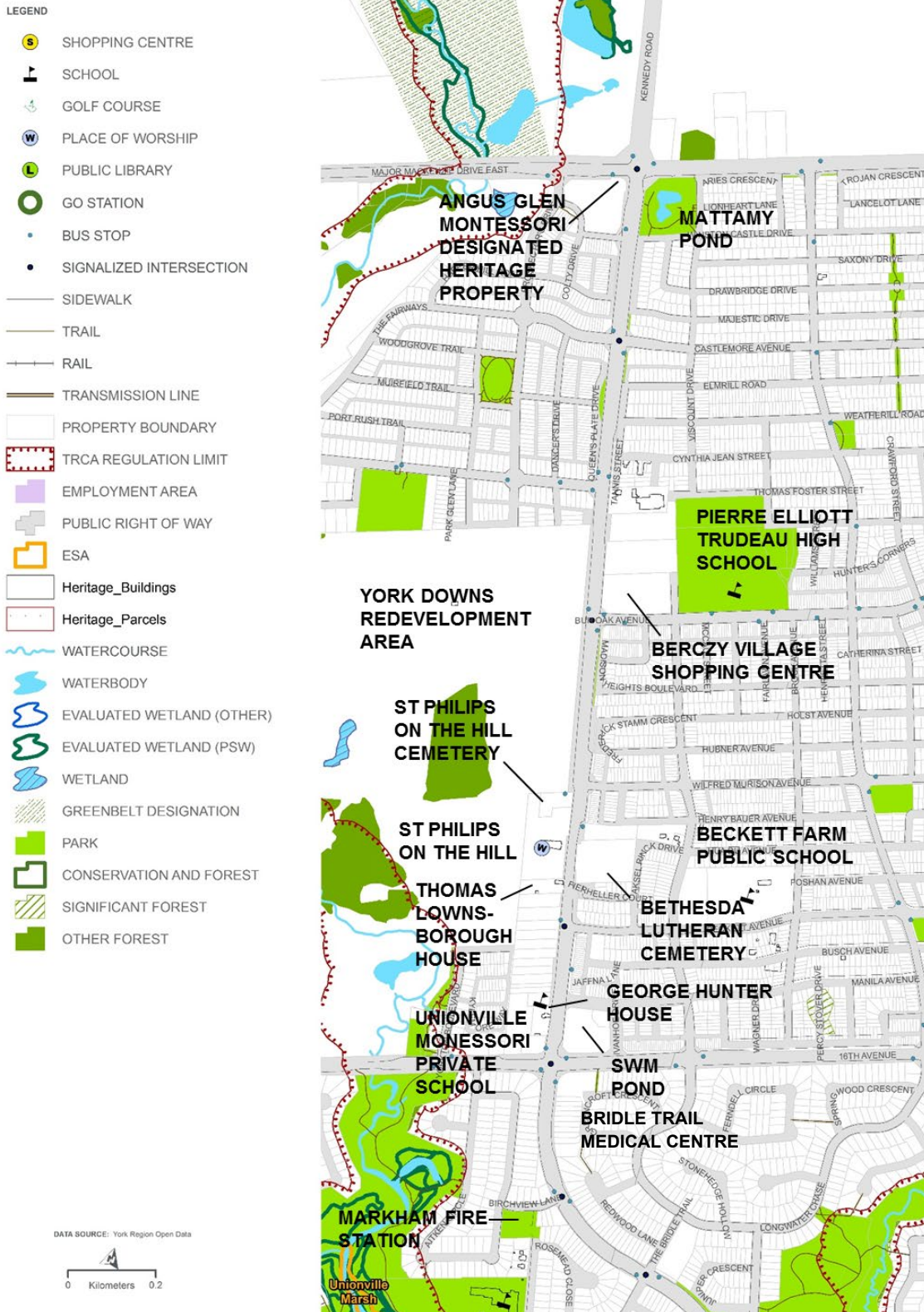


Exhibit 6-3: Key Features and Constraints (The Bridle Trail to Major Mackenzie Drive)

## 6.2 Natural Environment

A field investigation was conducted on July 4, 2017. The natural environment assessment included a review of aquatic habitat, vegetation, wildlife, and designated natural areas along the study corridor. Key findings are summarized in the following sections. A detailed Natural Heritage Report can be found in **Appendix F**.

### 6.2.1 Aquatic Habitat

The Kennedy Road study corridor between Steeles Avenue to Major Mackenzie Drive is located in the Rouge River watershed. Within the study area, there are two watercourses that cross Kennedy Road: a Tributary of the Rouge River and the Rouge River. All watercourses within the study limits are under the jurisdiction of Toronto Region Conservation Authority (TRCA), Ministry of Natural Resources and Forestry (MNR) Aurora District, and Ministry of the Environment, Conservation and Parks (MECP). Through the aquatic habitats and communities analysis, Redside Dace was identified as a species at risk. However, it was noted that within the Rouge River, Redside Dace habitat was identified as recovery or occupied habitat but is likely to be recovery or historic habitat. In the meeting with MNR on June 27, 2018, MNR confirmed that Rouge River crossing at Kennedy Road is considered a contributing habitat of Redside Dace and not historic/potential habitat. It was clarified that contributing habitat does not require Species At Risk permitting during construction. The Tributary to the Rouge River crossing at Kennedy Road is not identified as regulated habitat for Redside Dace under Fisheries and Ocean Canada (DFO) Risk Mapping.

**Table 6-1** provides a summary of watercourses within the study corridor. Watercourse locations within the corridor are illustrated in **Exhibit 6-4**.

**Table 6-1: Summary of Watercourse Crossings**

Watercourse Name	Watershed	Characteristics	Redside Dace Habitat
<b>Tributary of Rouge River</b>	Rouge River Watershed	Coolwater	Not identified as regulated habitat for Redside Dace
<b>Rouge River</b>	Rouge River Watershed	Warmwater Riverine	Identified as contributing habitat for Redside Dace



Exhibit 6-4: Watercourse Crossings

## 6.2.2 Vegetation

Much of the study area consists of an urban roadway with manicured lawns and street trees. Wetland communities were identified in an isolated natural area just south of Gorvette Road (north of Steeles Avenue), and east of Kennedy Road and are classified as Swamp Maple Mineral Deciduous Swamp (SWD3-3), Red Osier Mineral Thicket Swamp (SWT2-5), and Cattail Mineral Shallow Marsh (MAS2-1). This deciduous swamp is dominated by Freeman's maple and well established large corkscrew willow were observed at the southwest corner of the wetland community. Mineral Cultural Meadow communities were also identified within portions of the study area that are typically associated with past or current disturbance activities. These communities are dominated by disturbance tolerant, non-native plant species, including smooth brome, Canada goldenrod, bird's-foot trefoil, tufted vetch, and common plantain. The natural area associated with the Rouge River includes early to mid-successional vegetation communities, several of which are bisected by established paths that include a connection from Main Street to the west, and continues east of Kennedy Road.

A vegetation and flora community inventory was undertaken to identify any potential species at risk. The Kentucky coffee tree was identified as Threatened by the Ontario *Endangered Species Act (ESA)*, 2007. However, these trees have been planted as amenity trees in the road right-of-way; therefore, they are not treated as protected under the *Endangered Species Act*, 2007. White spruce, white oak, black walnut, and poison-ivy were all identified as rare plant species; however, all of these species have populations that are considered secure.

## 6.2.3 Wildlife

The wildlife habitat within the study area associated with the Rouge River consists of three vegetation communities, which include old field meadows, cultural woodlands, and manicured areas. It is likely that this area provides locally significant habitat for wildlife species associated with wetland/swamp, aquatic, riparian zone, and forest/forest edge habitat types. Denby Valley Park and Austin Drive Park maintain connectivity with natural areas to the north, south, east and west. These natural areas are likely to provide significant wildlife movement opportunities. Breeding communities for frogs, toads, and bird species have been identified within or in the vicinity of the deciduous swamp and shallow marsh communities located across the study area. These deciduous forested communities provide forest and forest edge habitat for a number of species and also serves as a corridor for wildlife movement.

There are two stormwater management ponds located along the study corridor – Berczy Square, located on the northeast corner of Kennedy Road and 16<sup>th</sup> Avenue, and Mattamy Pond, located on the southeast corner of Kennedy Road and Major Mackenzie

Drive. These ponds were found to provide habitat for aquatic and semi-aquatic wildlife species, and are likely to provide breeding habitat for frogs, toads, and bird species.

The following species at risk have been recorded in the study area: two threatened species, the Barn Swallow (*Hirundo rustica*) and Bobolink (*Dolichonyx orzivorus*), and three special concern species, the Monarch Butterfly, snapping turtle (*Chelydra serpentina*), and Eastern Wood-pewee (*Contopus virens*). However, the Monarch Butterfly, Snapping Turtle, and the Eastern Wood-pewee are not regulated species under the ESA and therefore do not receive protection under the ESA. There is also potential for endangered bat species, including eastern small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-coloured bat (*Perimyotis subflavus*).

The existing Rouge River single-span bridge has an openness ratio of 3.85 and accommodates wildlife passage for large mammals. At the Tributary to the Rouge River crossing the existing twin culverts have an openness ratio of 0.4 (one culvert only) to accommodate the passage of smaller wildlife species.

#### 6.2.4 Designated Natural Areas

The Rouge River valleylands are identified as part of the Regional Greenlands System per the York Region Official Plan. The Greenway System from the City of Markham Official Plan includes the Rouge River area and a small area between Denison Street and Steeles Avenue within the Study area.

There are no Provincially Significant Wetlands (PSWs) or Natural and Scientific Interest (ANSIs) within 120m of the study area. However, a portion of the study area, in the vicinity of the Rouge River, is located within the Regulation Limit under Ontario Regulation 166/06 *Toronto and Region Conservation Authority: Regulation of development, Interference with wetlands and Alterations to Shorelines and Watercourses*. A permit will be required for the improvements to Kennedy Road during detailed design.

Areas of forest include lands surrounding the Rouge River valleylands. Areas of meadows are generally between Gorvette Road and Steeles Avenue, surrounding the 407ETR / Kennedy Road interchange, meadows with the Rouge River, west side of Kennedy road near Bur Oak Avenue and a SWM pond at the southeast quadrant of Major Mackenzie Drive intersection. Wetlands are identified near Gorvette Road as Swamp Maple Mineral Deciduous Swamp, Red Oiser Mineral Thicket Swamp and Cattail Mineral Shallow Marsh.

### 6.3 Tree Inventory

An International Society of Arboriculture (ISA) Certified Arborist conducted a tree inventory on May 24, 29, and June 2, 2017, along the study corridor from Steeles Avenue to Major Mackenzie Drive. A total of 1,080 trees (including trees less than 10 cm DBH and privately owned) consisting of 48 species were inventoried during the field investigation.

One species, Kentucky Coffee Tree (*Gymnocladus dioicus*), is regulated as Threatened by the Ontario Endangered Species Act, 2007, and was observed in 50 instances, planted as amenity trees in road right-of-way. Consultation with the Ministry of Natural Resources and Forestry (MNR) Area Biologist (Mr. Bohdan Kowalyk in January 2016) confirmed that the streetscape Kentucky Coffee Trees are not treated as protected under the Endangered Species Act, 2007, due to their non-native origin.

A detailed Arborist Report can be found in **Appendix F**.

### 6.4 Built Heritage and Cultural Landscape

A Cultural Heritage Assessment Report (CHAR) was conducted as part of the Kennedy Road Environmental Assessment Study. The results of background historical research and a review of secondary source material, including historical mapping, revealed that the study area was originally located within rural landscape dating back to the late eighteenth century to early nineteenth century, with major roadways connecting various settlements in the area and several creeks and smaller tributaries throughout. The area has been subject to considerable urban and suburban development, especially in the City of Markham.

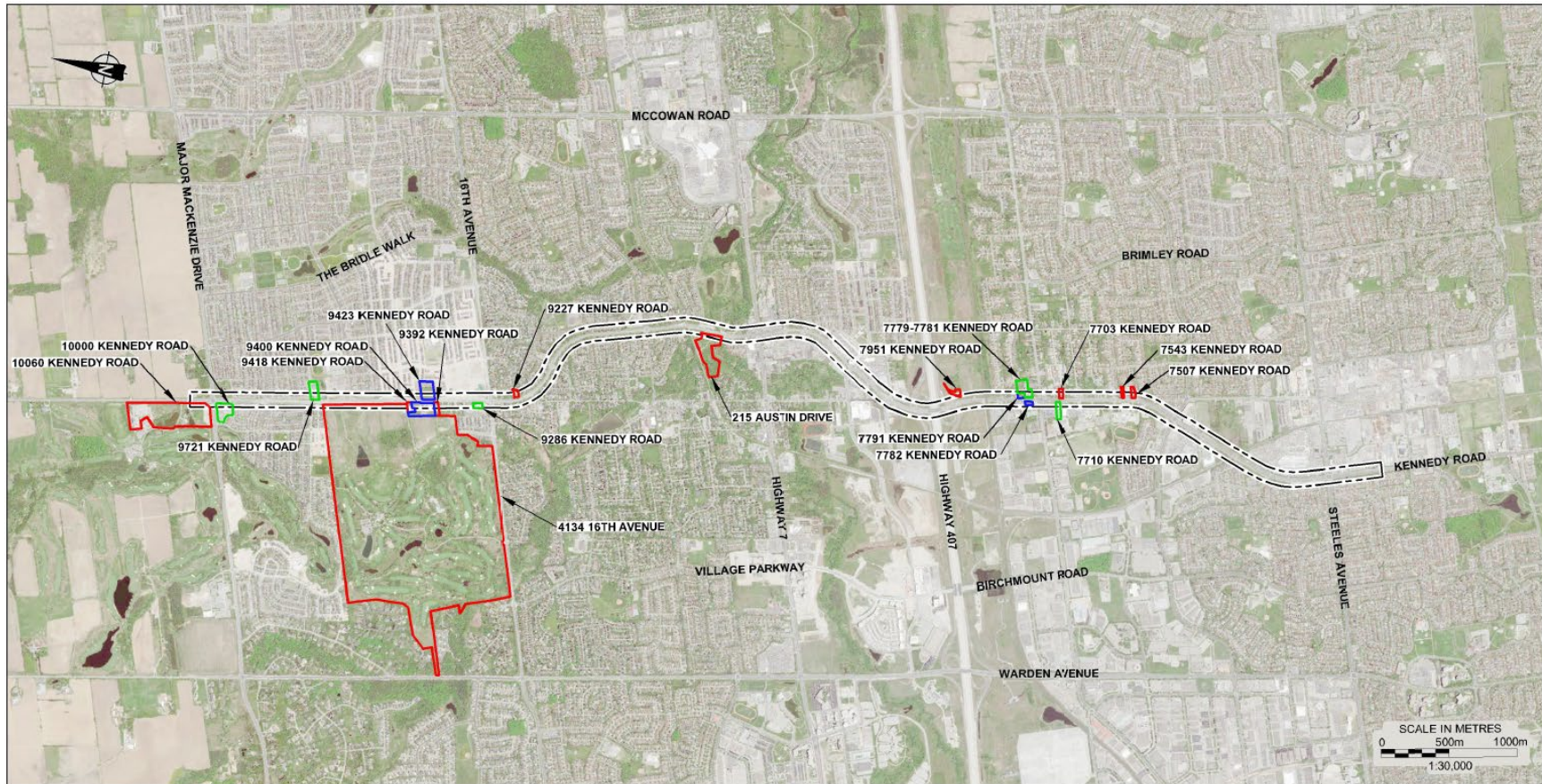
The CHAR identified eighteen (18) designated, listed, and inventoried properties of known or potential Cultural Heritage Value or Interest (CHVI), and one (1) newly identified potential cultural heritage landscape in the Project Area, as demonstrated in **Exhibit 6-5**. Of these properties, the following three (3) are predicted to be at high risk for direct impact from the study corridor improvements and are discussed in the following sections.

1. Thomas Morley House - 7779-7781 Kennedy Road
2. George Hunter House - 9286 Kennedy Road
3. Thomas Lownsbrough House - 9392 Kennedy Road

Fifteen (15) properties are predicted to be at medium to high risk for direct or indirect impact from the study corridor. The report recommends a series of actions to ensure that the heritage attributes of these properties will not be adversely A detailed Cultural Heritage Assessment Report can be found in **Appendix G**. Heritage Impact



Assessments undertaken for these three homes are provided in **Appendix H** and discussed in further detail in **Section 10.1.21**.



**Exhibit 6-5: Properties of Known and Newly Identified CHVI in the Study Area**

Source: Cultural Heritage Assessment Report, Golder Associates, October 2017

## 6.5 Archaeology

A Stage 1 Archaeological Assessment was conducted in June, 2017.

The background research determined that eighteen (18) previously registered archaeological sites are located within one kilometre of the study corridor between Steeles Avenue and Major Mackenzie Drive. Moreover, the Stage 1 archaeological assessment found the study area exhibited potential for the recovery of pre- and post-colonial Indigenous and historical Euro-Canadian archaeological deposits, based on various factors such as the study area's proximity to water, soils conducive to Indigenous agriculture, the large number of previously identified archaeological sites within one kilometre, and the proximity of the study corridor to early transportation routes and documented infrastructure. The geophysical survey identified numerous anomalies that could represent historic and recent graves in the areas of the cemeteries adjacent to Kennedy Road.

The property inspection determined that the study corridor beyond the existing ROW exhibits low archaeological potential and does not require further archaeological assessment.

However, for the four cemeteries located adjacent to the study corridor (Hagerman East and West Cemeteries, St. Philip's on-the-hill Anglican Church Cemetery, and Bethesda Lutheran Cemetery), it is recommended that, should impacts be planned beyond the disturbed ROW within 10 metres of the boundary of the cemeteries, a Stage 3 Archaeological Assessment should be conducted. This Stage 3 Archaeological Assessment should include mechanical topsoil removal within 10m of the cemetery's edge to ensure no unmarked grave shafts are impacted.

A detailed Stage 1 Archaeological Assessment Report can be found in **Appendix I**.

## 6.6 Noise

York Region's Traffic Noise Mitigation Policy for Regional Roads (March 2006) and York Region's Transportation Services, Capital Delivery – Roads Standard Operating Procedures (SOP) for Traffic Noise Mitigation on Regional Roads (July 2010) provide requirements for noise assessments and mitigation relating to the construction of new or the expansion of existing Regional Roads. They identify the requirements regarding noise control measures for various scenarios, including Capital Program Projects and were used to guide the development of the Noise Assessment undertaken for this study.

The Noise Impact Study was conducted to identify existing noise barriers and determine potential noise impacts resulting from road improvement activities. Noise Sensitive Areas (NSAs) were identified and generally include land uses for residential

developments, seasonal residential developments, hospitals, nursing / retirement homes, schools, day-care centres with associated Outdoor Living Areas (OLAs). An OLA is defined as part of an outdoor amenity area typically at ground level accommodating quiet outdoor living activities. A common example of an OLA is a backyard. Representative OLAs were assessed in the Nosie Study. A preliminary assessment was undertaken to determine locations of existing physical structures that appeared to be noise barriers or privacy fencing. As per the Region's policy for Capital Projects the Region will not implement new noise mitigation where noise barriers already exist. The noise assessment identified the following, and more details can be found in Appendix J:

- The existing Kennedy Road right-of-way consists of adjacent properties with and without property line fences. For properties with fences both noise barriers and non-acoustic barriers (i.e., privacy fencing) exist.
- A total of 104 representative OLAs were identified throughout the corridor.

## 6.7 Utilities

The following utilities are identified within the study area. A Subsurface Utility Engineering Quality Level B investigation (SUE QL-B) was undertaken during the EA study with field investigation undertaken in July 2018 and is provided in the Region's files. Utilities installed or relocated since the timing of the SUE-B would not be reflected in the SUE-B drawing. During Detailed Design the location and alignment of existing utilities and municipal services are to be confirmed.

### Telecom

There are existing conduits and/or buried lines and aerial lines within each arterial block of the study corridor both on the east and west side of Kennedy Road.

### Cable

Aerial and/ or buried cables run along the length of the Kennedy Road study area, both on the east and west sides of Kennedy Road.

### Gas

A pipeline runs in the north-south direction in the study area as follows:

- Between Steeles Avenue to 230m North of Steeles, pipeline runs along the East side of Kennedy Road
- Between 130m South of Gorvette Drive and Denison St, pipeline runs along East side of Kennedy Road

- Between 200m North of Denison Street and 14<sup>th</sup> Ave, pipeline runs on West side of Kennedy Road
- Between Unionville Gate to Hwy 7, pipeline runs along West side of Kennedy Road.
- Between 16th Avenue and Major Mackenzie Drive, pipeline runs along East side of Kennedy Road.

## **Illumination and Hydro**

Buried and aerial hydro alternate between the east side and the west side of the street.

North of the CN right-of-way is the Hydro One corridor, with 500 kV towers, as well as a cell tower located northeast of the CN rail bridge crossing of Kennedy Road. There is streetlighting/illumination on the east and west sides of Kennedy Road between Steeles Avenue and Major Mackenzie Drive.

## **Water**

There is a recently constructed 1500 mm watermain and shaft along Kennedy Road; the watermain was tunneled to provide the necessary clearance with the 2400 mm sanitary sewer.

The existing watermain facilities that run along the Kennedy Road corridor include:

- 300mm watermain along Kennedy Rd between Steeles Ave E and Clayton Dr.
- 300mm watermain along Kennedy Rd between Denison St and north of Gorvette Dr.
- 400mm watermain along Kennedy Rd between Duffield Dr and north of Windsong Crt.
- 300mm watermain along southbound Kennedy Rd between Highway 7 E and South Unionville Ave.
- 200mm watermain along northbound Kennedy Rd between Eton St and Avoca Dr.
- 400mm watermain along Kennedy Rd between Highway 407 eastbound ramp and 14<sup>th</sup> Ave.
- 400mm watermain along Kennedy Rd between north of 16<sup>th</sup> Ave and Major Mackenzie Dr E.

The existing watermain facilities that cross the Kennedy Road corridor include:

- 300 mm watermain cross Kennedy Rd at Steeles Avenue E.
- 300mm watermain cross Kennedy Rd at Clayton Dr north of Pacific Mall.

- 300mm watermain cross Kennedy Rd at Denison St.
- 400mm watermain cross Kennedy Rd from north of YMCA Blvd to Helen Ave.
- 150mm watermain cross Kennedy Rd at Denby Crt.
- 300mm watermain cross Kennedy Rd at south side of Hwy 7 E.
- 300mm watermain cross Kennedy Rd at Avoca Dr.
- 200mm watermain cross Kennedy Rd at Castan Ave and connect to the City owned 300mm watermain along southbound Kennedy Rd.
- 300mm watermain cross Kennedy Rd at South Unionville Ave connect to the City owned 300mm watermain along southbound Kennedy Rd.
- 300mm watermain cross Kennedy Rd at Duffield Dr.
- 200mm watermain cross Kennedy Rd at Beckenridge Dr via an easement.
- 400mm watermain cross Kennedy Rd at 14<sup>th</sup> Ave.
- 200mm watermain cross Kennedy Rd at north of Highglen Ave connect to the City owned 400mm watermain along northbound Kennedy Rd.
- 300mm watermain cross Kennedy Rd at Carlton Rd.
- 250mm watermain cross Kennedy Rd at The Bridle Trail.
- 300mm watermain cross Kennedy Rd at Angus Glen Blvd connect to the City owned 400mm watermain along northbound Kennedy Rd.
- 300mm watermain cross Kennedy Road at Castlemore Ave/The Fairways connect to the City owned 400mm watermain along northbound Kennedy Rd.

For fire hydrants that are located adjacent to Kennedy Road, water is provided to these hydrants through services that feed off the main water distribution pipeline.

## **Wastewater**

There is a 2400 mm sanitary sewer from west of Rouge River crossing Kennedy Road and continuing east; connects to 2100 mm sanitary sewer west of Rouge River.

The existing wastewater facilities that run along Kennedy Road corridor include:

- 300mm sanitary sewer along Kennedy Rd between Weatherill Rd and Angus Glen Blvd.
- 200mm sanitary sewer along Kennedy Rd flowing southward between south of 14<sup>th</sup> Ave and Highglen Ave.

The existing wastewater facilities that cross Kennedy Road corridor include:

- 300mm sanitary sewer cross Kennedy Rd at Castlemore Ave/The Fairways.
- 300mm sanitary sewer cross Kennedy Rd at Weatherill Rd
- 525mm sanitary sewer cross Kennedy Rd at Bur Oak Ave.
- 300mm sanitary sewer cross Kennedy Rd at The Bridle Trail.

- 250mm sanitary Sewer cross Kennedy Rd at Lismer Crt via an easement.
- 200mm sanitary sewer cross Kennedy Rd at Second St N/Denby Crt.
- 300mm sanitary sewer cross Kennedy Rd at south side of Highway 7 E.
- 300mm sanitary sewer cross Kennedy Rd at Helen Ave connect to Main St Unionville sanitary sewer.
- 375mm sanitary sewer cross Kennedy Rd from North of Highway 407 ramp connect to Main St Unionville sanitary sewer.
- 375mm sanitary sewer cross Kennedy Rd between Highway 407 and GO railway track north of Duffield Dr.
- 375mm sanitary sewer cross Kennedy Rd at Denison St.
- 675mm sanitary sewer cross Kennedy Rd at Steeles Ave E.

## Stormwater

Storm pipes run along both sides of Kennedy Road and within each arterial block of the study corridor.

## 6.8 Stormwater, Drainage, and Hydrology

The study area is located within the Rouge River subwatershed, which is under the jurisdiction of the Toronto Region Conservation Authority (TRCA) and the Ministry of Natural Resources and Forestry (MNR) Aurora District. The Rouge River subwatershed starts in the Oak Ridges Moraine and flows south to Lake Ontario; it encompasses approximately 340 km<sup>2</sup> of land area.

The portion of the Kennedy Road study area between Steeles Avenue and Major Mackenzie Drive is primarily an urban cross-section, and the roadway and boulevard surfaces are drained by a network of catchbasins and storm sewers, discharging to the two watercourse crossings and municipal storm drainage systems.

### 6.8.1 Transverse Drainage Crossings

The Tributary to the Rouge River crossing is located approximately 0.5km north of Highway 407 and water flows westerly through a crossing consisting of two twin corrugated steel pipe arch culverts each 900mm x 1430mm. The Tributary to the Rouge River is not identified as Redside Dace habitat under Fisheries and Ocean Canada (DFO) Risk Mapping.

The Rouge River Bridge crossing at Kennedy Road is a 30.5 single span concrete deck bridge, and it is located approximately 0.4km north of Highway 7. It was identified that the water course sustains warmwater fish habitat but is only considered as contributing habitat for Redside Dace, which is listed as an endangered species.

**Table 6-2** summarizes the size, type, and location of the culvert and bridge structures and **Table 6-3** summarizes the hydraulic analysis for the existing conditions. At the Rouge River Bridge under existing conditions, meets the MTO freeboard criterion but does not meet the clearance criteria of minimum 1.0 m from the design high water level. The Regional Storm event results in overtopping Kennedy Road at Rouge River with a depth of approximately 1.85m. At the Tributary to the Rouge River crossing under existing conditions, it does not meet the MTO freeboard and clearance criteria but does not overtop the road.

A Drainage and Stormwater Management Report with additional details can be found in **Appendix K**.

**Table 6-2: Summary of Watercourse Culvert/Bridge Crossings**

Watercourse Crossing	Location of Crossing	Culvert/Bridge Dimensions (Width x Height) m (Diameter) mm	Culvert/Bridge Description	Culvert /Bridge Crossing Length (m)
<b>Rouge River Tributary</b>	500m north of Highway 407	<b>2 - 1.43 x 0.90</b>	Twin CSP <sup>1</sup> Arch Culverts	47.5
<b>Rouge River</b>	350m north of Highway 7	<b>30.5</b>	Single-span	18.9

Note: CSP – Corrugated Steel Pipe

**Table 6-3: Existing Condition Hydraulic Analysis**

Water Crossing	Type	U/S Invert (m)	D/S Invert (m)	Length (m)	Road Elev. (m)	Water Surface Elev. (m) 50 Yr	Water Surface Elev. (m) 100 Yr	Reg.	Free-board (m)	Clear-ance (m)	Remarks
<b>C-1 Rouge River Tributary</b>	Culvert	173.24	173.00	47.5	175.10	174.22	174.31	174.78 (Check Flow)	0.88	1.09 (HW/D )	Does not meets MTO criteria Check Flow does not overtop road
<b>C-2 Rouge River</b>	Bridge	167.33 (Channel Invert)		18.9	172.07	170.72	170.89	173.92 (Reg.)	1.18	-0.05 (Clearance)	Meets MTO freeboard criteria but not clearance, Regional storm overtops road

## 6.9 Source Water Protection

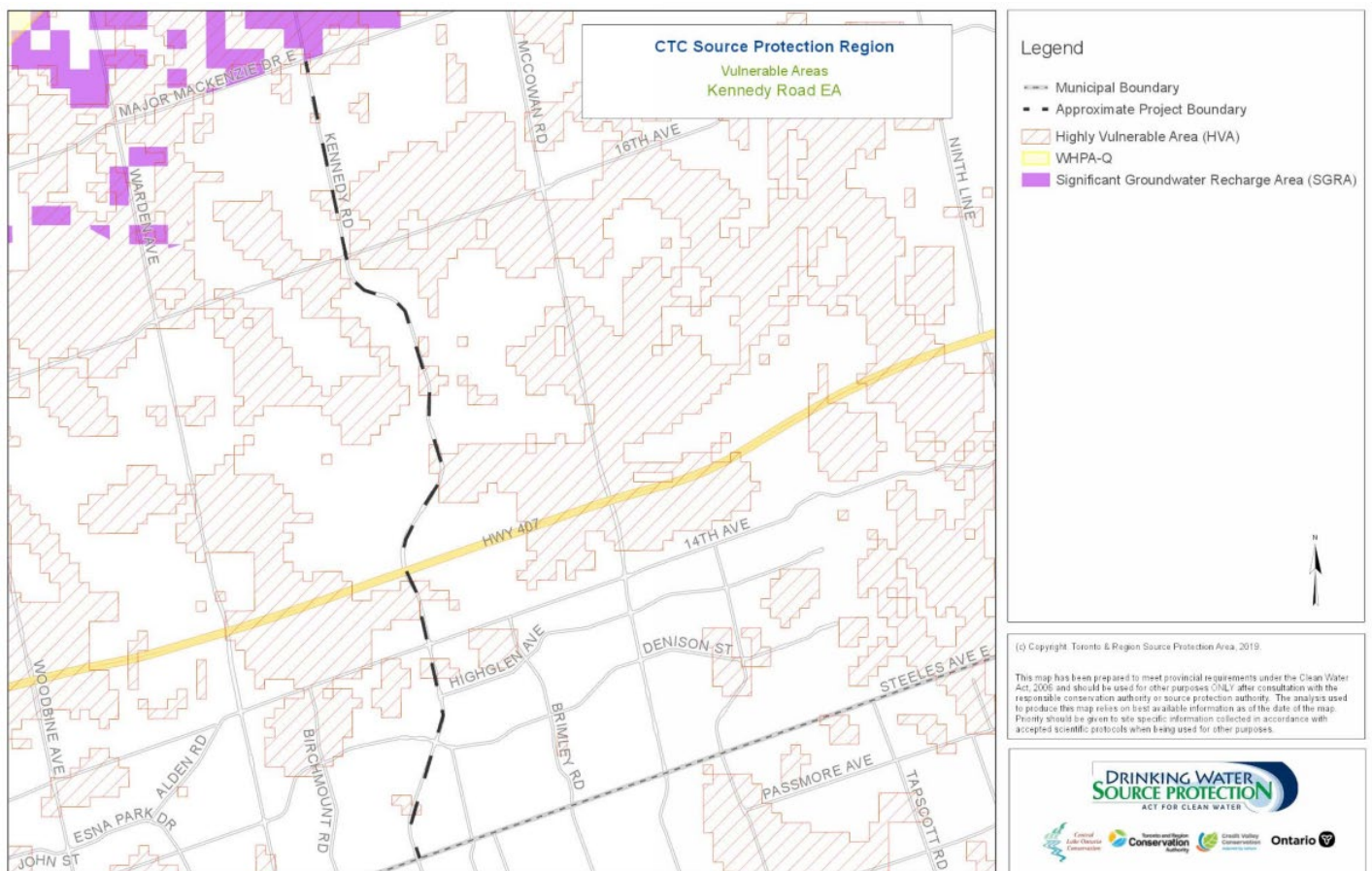
Based on correspondence from TRCA, the Kennedy Road EA corridor transects the following vulnerable areas identified under the Clean Water Act, 2006, as illustrated in **Exhibit 6-6**:

- Significant Groundwater Recharge Area (SGRA)
- Highly Vulnerable Aquifers (HVA)

Potential threats associated with the Kennedy Road roadway improvements, per the Clean Water Act, 2006, include:

- The establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage (limited to stormwater runoff)
- The application of road salt
- The storage of snow (limited to roadway clearing operations only)

Mitigation strategies to minimize impacts associated with these potential threats are described in **Section 11**.



Source: TRCA (August 2019 correspondence)

**Exhibit 6-6: Source Protection Information in the Vicinity of the Study Area**

## 6.10 Fluvial Geomorphology

There are two watercourse crossings within this segment of the Kennedy Road study corridor, which are an unnamed tributary of the Rouge River and the main stem of the Rouge River. The main stem of the Rouge River conveys flow easterly through the segment, while the tributary of the Rouge River conveys flow westerly through the segment. A fluvial geomorphic assessment was undertaken along defined sections of these two watercourses. The specific work involved in the study included background field inspections to assess bed and bank stability, meander belt width, and 100-year erosion limit to determine the long-term erosions potential of the stream.

The results of the study also suggest that the tributary is generally stable, noting the following observations:

- The drainage feature holds a discernable shape and alignment but represents an engineered feature with little or no natural channel form.
- The small intermittent watercourse or drainage feature with a moderately defined channel is a well vegetated bank and/or riparian area with limited evidence of erosion and sedimentation.

The results of the study suggest that the Rouge River is generally stable, noting the following observations:

- The channel planform is relatively straight in the vicinity of the existing bridge crossing at Kennedy Road, and meandering at the downstream end of the reach. The channel at the crossing location has shown limited evidence of lateral movement over the most recent period (1988 to 2016).
- There are instances of bank erosion, recognizing that the riparian zones and the upper portion of the banks were for the most part well protected against erosion with a dense cover of vegetation.
- A preliminary meander belt width was measured to be approximately 120m, with a 100-year erosion limit of approximately 115 m.
- The existing bridge span and adjoining abutments are located within the boundaries of the estimated belt width and 100-year erosion limit of the reach.
- A preliminary recommendation to accommodate fluvial geomorphologic functions any upgrade or replacement of the existing structure includes a width of approximately 30 m.

A detailed Fluvial Geomorphic Assessment report can be found in **Appendix L**.

## 6.11 Geotechnical Assessment

### 6.11.1 Pavement Investigations

A geotechnical/pavement field investigation was undertaken in November 2018 which consisted of seventy-nine (79) boreholes advanced to a depth of approximately 1.5 m below ground surface on the existing lanes and boulevards along Kennedy Road. Findings of the existing pavement structure from the investigation are included in **Table 6-4**.

**Table 6-4: Geotechnical Findings**

Section	Direction	Layer Thickness (mm)			Sub-Grade(s) Encountered
		Hot Mix Asphalt	Granular Base	Granular Sub-base	
Section 1: Steeles Avenue to 300m north of Denison Street	NB	100-175 (140)	260-350 (295)	320-430 (380)	Clayey Silt Silty Sand
	SB	100-170 (140)	290-500 (365)	310-530 (405)	
Section 2: 300m north of Denison Street to 14 <sup>th</sup> Avenue	*NB	340-350 (345)	420-470 (430)	-	Clayey Silt Silty Clay
	SB	90	220	290	
Section 3: 14 <sup>th</sup> Avenue to 407ETR	NB	150	190	1010	Silty Clay
	*SB	330-345 (340)	270-385 (330)	-	
Section 4: 407ETR to Highway 7	*NB	100-170 (130)	190-300 (220)	350-550 (425)	Sandy silt Silty Sand Clayey Silt Silty Clay
	SB	80-160 (130)	160-440 (270)	220-620 (395)	
Section 5: Highway 7 to 16 <sup>th</sup> Avenue	NB	100-130 (120)	150-340 (195)	150-340 (195)	Clayey Silt Silty Clay
	SB	90-130 (110)	140-585 (275)	140-585 (275)	
Section 6: 16 <sup>th</sup> Avenue to Major Mackenzie Drive	NB	160-190 (165)	150-300 (205)	150-300 (205)	Silty Sand Silty Clay
	SB	140-180 (165)	280-350 (305)	320-760 (495)	

Note: The Thicknesses shown represent the range and the (average).

\*Localized variable pavement structure was encountered.

A detailed Pavement Investigations can be found under the Pavement Design Report in **Appendix M**.

## 6.12 Hydrogeology

Hydrogeological investigations were carried out for multiple structures along Kennedy Road, between Steeles Avenue and Major Mackenzie Drive, including the CN Rail, 407ETR, Tributary Crossing, Rouge River, and GO Rail crossings at Clayton Drive and Austin Drive. The purpose of the investigation was to characterize existing groundwater conditions along Kennedy Road, assess potential impacts as part of the environmental assessment, and identify the potential need for a Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR). Findings from the investigations are summarized below:

- The ground surface at the GO Rail crossing north of Clayton Drive is at about Elevation 201.7m and the surrounding lands are generally flat. The natural ground surface at the CN Rail crossing slopes downward from south to north (about Elevations 191 to 187m), with the crossing at about Elevation 188m. The Kennedy Road grade at the 407ETR crossing varies from about Elevation 188m to 189m. The grade of Kennedy Road in the vicinity of the Tributary culvert is about Elevation 175m and the surrounding lands are generally flat. At the Rouge River crossing, the road varies from Elevation 173m to 172.4m. The grade of Kennedy Road in the vicinity of the GO Rail crossing north of Austin Drive is at about Elevation 175.6m and the surrounding lands are generally flat.
- This section of Kennedy Road, from Steeles Avenue to Major Mackenzie Drive straddles the boundary between two physiographic regions of Southern Ontario; the South Slope region and the Oak Ridges region. The South Slope physiographic region comprises a surficial till sheet, which generally follows the surface topography and is present through much of this area. The till is typically comprised of clayey silt to silty clay, with occasional silt to sand zones. The Oak Ridges region is over 160m in length and the surface is hilly, with the hills composed mostly of sandy and gravelly materials.
- The hydrostratigraphic units influencing groundwater flow in the study area include a shallow groundwater system (i.e., Halton Till and Oak Ridges Complex Aquifer) and a deeper groundwater system (i.e., Newmarket Till, Thorncliffe Aquifer, Sunnybrook Aquitard, Scarborough Aquifer and Weathered Bedrock) (TRCA, 2008).
- Based on a review of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Water Well Information System (WWIS), there are 412 water well records within a 500 m radius of the study area.
- Of the 412 water wells, 97 were listed as abandoned and 99 were listed as monitoring/test holes/observation wells. A total of 145 wells were identified as

water supply wells and are listed primarily for domestic and livestock use. Two (2) municipal and two (2) public wells were identified. These water supply wells were completed between 1950 and 2016. The majority of the area is now municipally serviced and most of these water supply wells are assumed to be no longer active and may have been decommissioned.

- Based on a review of available MECP data, there are 7 Permits to Take Water (PTTW) identified within 500 m of the Site.

The existing ground water levels taken from stand pipe piezometers at each structure location immediately following drilling and after well development and recovery are provided in **Table 6-5**. The measurements reflect the groundwater conditions on the dates they were measured and are anticipated to fluctuate with seasonal variations in precipitation and snow melt.

**Table 6-5: Measured Groundwater Levels**

Crossing Location	Borehole	Screened Stratigraphy	Ground Surface Elevation (m)	Pre-Development (13-Sept-18)		Post-Development (27-Sept-18)	
				Water Level Depth (m)	Water Elevation (m)	Water Level Depth (m)	Water Elevation (m)
GO Rail Crossing at Clayton Drive	CNR-202B	Gravelly Silty Sand	175.6	5.6	170.0	5.0	170.6
Rouge River	RR-1	Sandy Gravel	172.0	3.2	168.8	3.4*	168.6*
Rouge River	RR-2	Gravelly Silty Sand Fill	172.9	4.0	168.9	4.6	168.3
Tributary Crossing	TC-1	Sandy Silty Clay and Gravelly Silty Sand Till	174.9	5.7	169.2	4.6	170.3
407ETR	ETR-2	Till / Silty Clay	188.5	10.8	177.7	10.8	177.7
CN Rail Crossing	CNR-102	Silty Sand Till	187.1	7.7	179.4	10.6	176.5

Crossing Location	Borehole	Screened Stratigraphy	Ground Surface Elevation (m)	Pre-Development (13-Sept-18)		Post-Development (27-Sept-18)	
				Water Level Depth (m)	Water Elevation (m)	Water Level Depth (m)	Water Elevation (m)
GO Rail Crossing at Austin Drive	GO-2	Silt and Sand	201.6	1.3	200.3	1.4	200.2

\*Water level collected on January 11, 2019

The Hydrogeological Investigations Study can be found in **Appendix M**.

## 6.13 Structural Assessment

A structural assessment was completed based on a visual inspection of all structures included within the Kennedy Road study corridor. Site visits were conducted by HDR Structural staff on May 11 and 17, 2017. The preliminary structural assessment is based on review of the available materials and visual observation of these bridges and culverts, and may be modified as the study progresses.

The existing condition Structural Assessment Report can be found in **Appendix N**.

### 6.13.1 CN Rail Crossing

The CN York Subdivision Bridge over Kennedy Road is located approximately 380 m north of 14<sup>th</sup> Avenue, in the City of Markham. It currently carries two rail tracks over two northbound and two southbound lanes of traffic.

Constructed in 1963, the existing structure is a simply supported, one span, steel ballast tray deck on transverse floor beams and two steel through plate. The Ontario Structure Inspection Manual (OSIM) report carried out on October 3, 2016 indicated that the structure was in good condition, but was in need of minor repairs for the following:

- Wide, stained, and map cracks on abutments
- Minor impact damage on the Southeast girder's bottom flange
- Light to moderate corrosion of soffit

Site investigations carried out as part of the study verified that the 2016 OSIM report findings and recommendations are consistent with the current site conditions.

### 6.13.2 407ETR Interchange

The 407ETR overpass at Kennedy Road intersects 407ETR south of Highway 7 and north of 14<sup>th</sup> Avenue. The structure carries three northbound and three southbound lanes of Kennedy Road over five eastbound and five westbound lanes of 407ETR. Constructed in 1997, the overpass is a continuous, two span bridge.

Site investigations carried out as part of this study indicated that the structure was in good condition with the following defects:

- Impact damage on all guiderails
- Asphalt cracks and deterioration on newly paved transverse strip at both approach slabs
- Cracking on all sidewalks
- Cracking and spalling on all barrier walls
- Long vertical cracks on North abutment
- Concrete segregation at top of both abutments
- Concrete curb spalling by Northeast catch basin
- Northeast guiderail missing
- Partially filled pothole on Southeast road surface
- Impact damage on Southeast guiderail/barrier wall connection
- Delamination and cracks on South abutment

### 6.13.3 Rouge River Bridge

The Rouge River Bridge is located approximately 0.4km north of Highway 7, and carries two northbound and two southbound lanes of Kennedy Road over the Rouge River.

Constructed in 1981, the Rouge River is a simply supported, single span bridge. OSIM was carried out in 2016 and indicated that the bridge was in good condition but needed minor repairs for the following:

- Wide cracks and delamination on North abutment
- Spalls, stained, and wet areas on Northwest abutment
- Wide cracks, medium raveling, sealed cracks, and pot holes on asphalt road surface

- Spalls and delamination on North concrete end post
- Abrasion damage, unsecured, and missing end caps on railings
- Spalling at girder ends, exposed rebars
- Delamination on soffit, exposed rebar
- Missing blocks on abutment slope protection
- Spalls, cracks, and asphalt patches at top of expansions joints
- Cracking and spalling on sidewalks
- Local rail separation at railing post

Site investigations carried out as part of the study verified that the 2016 OSIM findings were consistent with current site condition, with the additions or exceptions of:

- Cracks on abutments and wingwalls not visible due to paint
- Paint peeling off and graffiti
- Spalling of Northwest bearing seat
- Missing cover of Northeast electrical box with spalling
- Dents on Northeast, Northwest, and Southwest guiderails
- Loss of concrete at underside of Northeast expansion joint
- Spalling of guiderail connections at Southwest, Northwest, and Northeast concrete end posts
- Exposed tie rod anchor at Southeast girder end
- Recommendation to replace existing handrails with new PL2 concrete barrier walls with railings
- Bridge found to be in moderate condition

## 6.14 Contamination Overview Study

The Contamination Overview Study (COS) consisted of a broad assessment of actual and potential sources of contamination within the study area, based on a review of readily available information regarding current and former land uses and visual site reconnaissance. Based on this information, Areas of Potential Environmental Concern

(APECs) were identified and recommendations provided with regards to the needs for further investigation. Directly within or adjacent to the Kennedy Road corridor there are 29 properties listed as areas of potential environmental concern with the following risk rankings: 20 low risk, 9 moderate risk and no properties with high risk.

Based on the findings of the COS conducted within the study area, several APECs were identified as having the potential for subsurface impacts including the following:

- Seven (7) gas stations and four (4) dry cleaners were observed within the study area;
- Several properties within the study area were identified as having former and/or current private and retail fuel tanks on site; the condition and operation period of these tanks are unknown;
- Nine (9) autobody repair and service shop was identified within the study area; and,
- Multiple environmental spills including diesel fuel, gasoline, transformer oil, and fuel oil were listed along the Kennedy Road ROW. These spills ranged in size between 38 L to 1,800 L and environmental impacts were unknown or unconfirmed in many cases.

It is anticipated that fill material and salt-related impacts as a result of roadway de-icing activities may be present in the study area. The quality and source of this suspected fill material and any salt-related soil and groundwater impacts are unknown. An assessment of the quality of the fill material and any sub-surface soils is recommended as part of the proposed construction activities prior to the reuse of any excavated and/or excess material. Similarly, the quality of water generated during any construction/dewatering activities should be assessed prior to being discharged into the environment.

A detailed COS Report can be found in **Appendix O**.

## 7. Problem and Opportunity Statement

The Kennedy Road EA study presents an opportunity to improve Kennedy Road between Steeles Avenue and Major Mackenzie Drive for all travel modes – cyclists, pedestrians, transit users, and motorists.

The transportation assessment presented in this report supplements the recommendations in the YR-TMP and confirms the need for capacity improvements between Steeles Avenue and Major Mackenzie Drive, continuous cycling and pedestrian facilities, and improved transit service along the corridor to support segments of Kennedy Road as part of the Frequent Transit Network and Bus Rapid Transit.

The needs for improvements outlined in this report are in line with the vision described in the YR-TMP, by actively supporting regional objectives such as the development of a world class transit system, the creation of a road network fit for the future, and the integration of active transportation into urban areas along the corridor. In particular, the provision of improved transit service in multi-modal strategy (i.e. the introduction of Transit/High Occupancy Vehicle (HOV) Lanes, and Bus Rapid Transit in one segment), not only supports the Region's vision for its Frequent Transit Network, but also builds on the transit supportive strategies as outlined in the Region's *Towards Great Regional Streets – a Path to Improvement* in order to help encourage ridesharing and to be supportive of regional transit initiatives.

**Table 7-1** provides a summary of the problems and opportunities identified for the study corridor. The problems and opportunities identified will consider impacts to the transportation, natural, cultural, and socio-economic environments.

**Table 7-1: Summary of Kennedy Road Problems/Opportunities**

Problem	Opportunity
<b>Existing road segments and intersections between Steeles Avenue and Major Mackenzie Drive cannot accommodate projected traffic volumes</b>	Improve Kennedy Road to accommodate projected traffic demand and provide sufficient north-south transportation capacity
<b>With regional roads at capacity, there is the potential for increased traffic on local roads</b>	Improve Kennedy Road to provide sufficient capacity to mitigate potential traffic infiltration and traffic increases on local roads
<b>Lack of continuous pedestrian and cyclist facilities for all users</b>	Provide pedestrian and cyclist facilities to accommodate existing users and growth as a result of future development, especially across the 407ETR and Rouge River bridge

Problem	Opportunity
<b>Existing infrastructure does not support enhanced transit service and results in delays to transit users</b>	Evaluate for potential addition of transit/HOV lanes to support Kennedy Road as a Frequent Transit Network Corridor
<b>Anticipated delays at the existing at-grade Stouffville GO Line crossings</b>	Evaluate for potential grade separation (underpass or overpass) or improvements to at-grade crossings
<b>Safety and operational concerns at various locations, including the Stouffville GO Line crossings</b>	Evaluate intersection-related countermeasures and treatments, particularly at major arterial intersections and the Stouffville GO crossings, to improve the safety performance and operational efficiency for all modes of transportation at critical locations along the study corridor

## 8. Alternative Solutions

The Municipal Class EA process requires documentation and examination of all reasonable alternatives, or means to address the problem, referred to as Alternative Solutions (Phase 2).

The Region's Transportation Master Plan (YR-TMP) 2016 Update followed the Municipal Class EA Master Plan Process thereby fulfilling the requirements of Phases 1 and 2 of the Municipal Class EA process for roads including identification of problems and opportunities and the selection of preferred solution. The YR-TMP followed a modified Approach #2 for undertaking Master Plans, as per Appendix 4.4 of the MEA Municipal Class EA process. Project sheets for each infrastructure project describing its impacts and the rationale for the preferred solution are included in *Background Report E* of the YR-TMP. The YR-TMP and its background technical reports are supporting documents for this Class EA.

The Municipal Class EA process recognizes that it is beneficial to begin the planning process for infrastructure by considering overall system before dealing with corridor-specific issues. Master Plans provide for this system-wide approach to infrastructure planning and, at the same time, integrate environmental assessment principles.

For the Kennedy Road corridor, the Alternative Solutions considered, evaluation methodology, evaluation of Alternative Solutions, and selection of the Preferred Solution were completed and documented in the YR-TMP. The following section highlights the overall methodology, key findings and recommendations from the YR-TMP, as it relates to Phase 2 of the Kennedy Road corridor.

For supporting documentation and details of the Kennedy Road Phase 2 assessment from the YR-TMP, refer to YR-TMP Background Report C – Future Needs Assessment Report and YR-TMP Background Report E – Project Details and Summary Sheets, Appendix A – Road Projects, Project ID: 2001, and 2002, and Appendix B – Transit Projects Project ID: 1010 . These references are also provided in **Appendix E** of this report.

### 8.1 Development of Alternative Solutions

The YR-TMP corridor-specific alternative solutions were developed, each approaching the Problems and Opportunities of Kennedy Road in a different way, and are described in **Table 8-1. Exhibit 8-1** to **Exhibit 8-4** illustrate the Alternative Solutions where modifications to the roadway cross-section are required.

Table 8-1: Alternative Solutions

Alternative Solution	Description
<b>1. “Do Nothing”</b>	This option is a benchmark to compare other alternative solutions and represents the maintenance of existing conditions with no changes implemented.
<b>2. Optimize Existing Facility with Intersection Improvements</b>	This option involves maintaining existing road widths while improving traffic flow at intersections, through the optimization of traffic signal timing and phasing, and improvements to turn-lane configurations at intersections.
<b>3. Widen to 6 Lanes for Capacity Improvements</b>	This option involves widening the road from four to six lanes with one additional continuous lane in each direction to accommodate general purpose vehicles.
<b>4. Widen to 6 Lanes for Transit/HOV</b>	This option involves widening the road from four to six lanes with one additional continuous lane in each direction for exclusive Transit/ High Occupancy Vehicle (HOV) use.
<b>5. Widen to Implement Rapid Transit</b>	This option involves widening the road with one additional continuous lane in each direction to support the addition of Rapid Transit routes along the corridor.
<b>6. Widen Parallel/Adjacent Corridor</b>	This option involves widening the corridors adjacent to the study corridor (i.e. McCowan Road, Major Mackenzie Drive, 16 <sup>th</sup> Avenue, Warden Avenue) without any improvements to the Kennedy Road corridor. The objective of this option is to divert traffic from the study corridor.

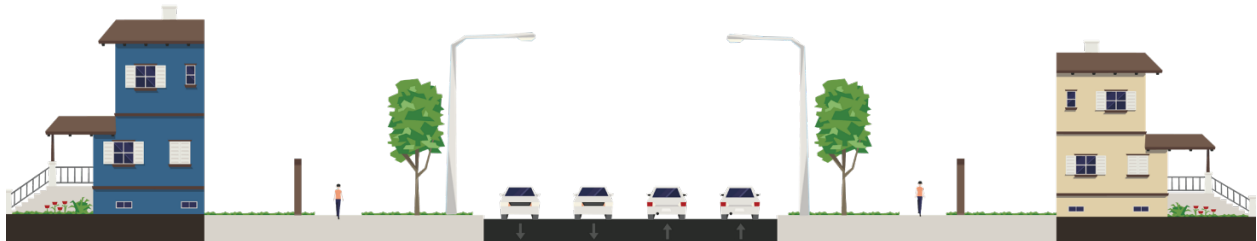


Exhibit 8-1: Alternative 1 – Do Nothing

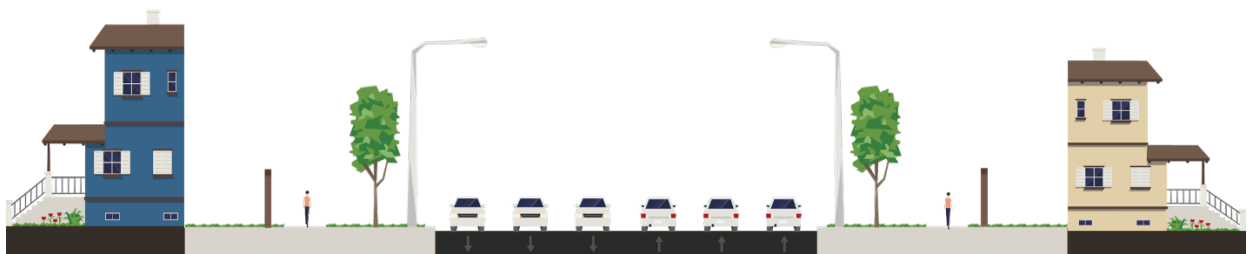


Exhibit 8-2: Alternative 3 – Widen to 6 Lanes for Capacity Improvements

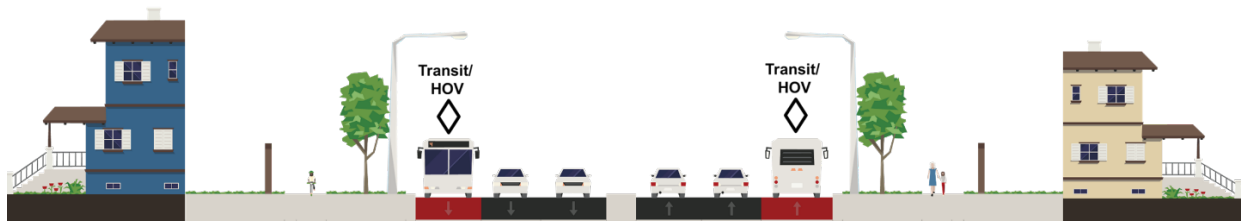


Exhibit 8-3: Alternative 4 – Widen to 6 Lanes for Transit/HOV

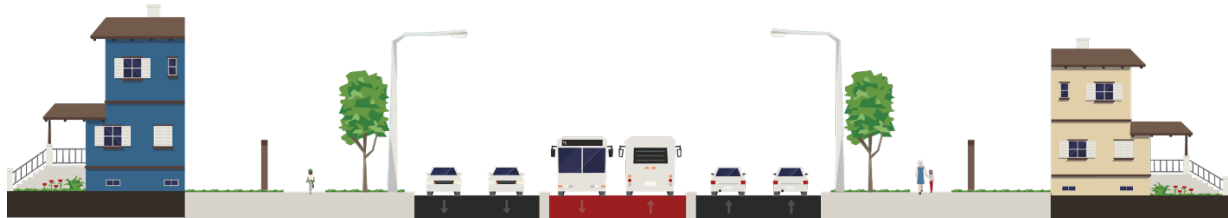


Exhibit 8-4: Alternative 5 – Widen to Implement Rapid Transit

## 8.2 Evaluation Methodology and Criteria

This Class EA adopts the system-wide approach taken by the YR-TMP to assess Alternative Solutions. The evaluation methodology used in the YR-TMP to assess the Alternative Solutions followed a Network-Level Capacity Analysis approach.

### 8.2.1 Network-Level Capacity Analysis

The Alternative Solutions for the Kennedy Road corridor were identified through a network-level capacity analysis. This system-wide analysis examined the distribution of future traffic for different scenarios of specific road and transit improvements. All scenarios assumed 40% intensification for residential growth in the urban built boundary. Additional sensitivity testing was done for other growth scenarios. The three scenarios used in the analysis were:

- **2041 Do Nothing Network Scenario:** Based on identified constraints in the network where additional transportation capacity is not provided. With the exception of the Highway 404 extension (from north of Green Lane to Woodbine Avenue), no other network improvements beyond 2011 existing conditions were assumed.
- **2041 Base Network Scenario:** Based on funded and committed transit and road improvements, including projects in the Region's (2015) 10-Year Capital Program, VivaNext, Metrolinx's First Wave projects and Regional Express Rail.

- **2041 ‘Build-out’ Network Scenario:** Based on the identified network to support the build-out of York Region to 2031 (from 2009 TMP and 2012 Development Charge program).

The following capacity thresholds help identify corridor-specific road and transit improvements to support the 2041 transportation network<sup>1</sup>:

- *Widening to four lanes (outside of the urban area) where peak volume-to-capacity ratios exceed 0.9 and/or daily truck volumes exceed 2,500 trucks per day*
- *Widening to four lanes (within the urban area) where peak volume-to-capacity ratios exceed 0.90*
- *Widening to six lanes with transit/HOV lanes where peak volume-to-capacity ratios exceed 1.2*
- *Designate transit/HOV lanes where peak passenger demand, including transit, exceeds 1,000 passengers per hour in the peak direction*
- *Construct median rapidways where peak transit demand exceeds 2,000 passengers per hour*
- *Construct Light Rail Transit (LRT) where peak transit demand exceeds 2,000-5,000 passengers per hour*

Key findings and recommendations from the YR-TMP Network-Level Capacity Analysis to support the recommendation regarding road capacity, transit capacity/service, major arterial network, rapid transit corridor, and recommendations for conversion to LRT, are documented in *Sections 4 and 5 of the YR-TMP Background Report C – Future Needs Assessment Report*<sup>2</sup> and are provided as follows:

#### **8.2.1.1 ROAD CAPACITY**

The assessment of the future base and future ‘build-out’ networks indicate that continuing to widen Regional roads alone will not address the needs of York Region as demand will continue to exceed capacity. Applying alternative solutions through Transportation System Management and Travel Demand Management measures that make better use of the existing infrastructure to improve flow and reduce delay could provide relief in a more cost-effective manner. Measures could include traffic signal

<sup>1</sup> Regional Municipality of York, *Transportation Master Plan 2016 Update, Background Report C*: 31-36

<sup>2</sup> Regional Municipality of York, *Transportation Master Plan 2016 Update, Background Report C*: 29-35

coordination, signal priority for transit vehicles, queue jump lanes, or operational improvements at specific locations to address local capacity constraints.

The current policy in York Region is to designate lanes for transit/HOV use on all 6 lane road widenings. While this results in a sizeable network of transit/HOV lanes, a strategic plan for supporting infrastructure and inter-regional connections is needed to effectively maximize the person-carrying capacity of the transit/HOV lane.

At a number of locations, the jurisdiction of a Regional road changes as it traverses through the centre of the community, i.e. Markham Main Street, sections of Yonge Street in downtown Richmond Hill and Aurora, etc. In these sections, the function of the road has changed from primarily moving people to facilitating the adjacent land uses.

#### **8.2.1.2 TRANSIT CAPACITY/SERVICE**

Planned rapid transit service improvements and expansions are primarily focused on trips to/from Toronto. This segment of the travel demand market is and will continue to be very well served by transit, and transit share will exceed 80% for trips to downtown Toronto.

Additional transit service focused on serving the growing demand of internal York Region trips is needed. The rapid transit corridors on Yonge Street and Highway 7 are within a 400 m walk of only 10% of the population.

Transit share for internal trips in the future base conditions is only 5%. A suburban/urban area with a strong grid-based transit system has the potential for a transit mode share of 25%. This is exhibited in the suburban areas of Toronto (excluding transit trips to/from downtown) today.

The vast geographic size of York Region, and the lower density development in most of it is a challenge to developing a transit system that is attractive to the user and cost-effective for the Region. Long distances which separate growth centres, employment areas and outlying urban areas make the private automobile the preferred mode of travel for many.

The grid-pattern of the arterial road network in York Region is based on 2 km by 2 km concession blocks. There is a lack of minor, or mid-block, arterials in much of York Region which limit the provision of efficient transit and active transportation networks and results in an over-reliance on the Regional road network for both short and long-distance travel.

The transit systems in York Region are provided by a number of different operators – York Region Transit/Viva, GO Transit, and TTC. While recent improvements have been

made towards fare integration, there is a need for a more coordinated and integrated system that operates seamlessly from the riders' perspective.

### 8.2.1.3 MAJOR ARTERIAL NETWORK

Maximizing person-carrying capacity on the arterial road network is essential to accommodate growth and manage congestion. In addition to providing rapid transit, approaches for maximizing person-carrying capacity include introducing transit priority measures and adding or converting existing general purpose lanes to High Occupancy Vehicle (HOV) lanes.

The proposed six-lane road network supports the proposed rapid transit network by expanding capacity in parallel corridors to provide for HOV and/or transit priority lanes.

The six-lane network is based on the Region's existing policy of expanding capacity beyond four lanes only for the addition of HOV or transit-only lanes. Additional lanes would generally begin as HOV lanes and then be converted to transit-only lanes where volumes/ridership warrants conversion.

For existing six-lane corridors, lanes could be converted to HOV or transit-only lanes if/when thresholds for combined transit and HOV volume are met. This conversion supports mode shift from single occupant vehicles to transit and HOV usage in the corridor.

### 8.2.1.4 RAPID TRANSIT CORRIDORS

Rapid transit corridors identified in the proposed 2041 Transit Network build on the original VivaNext Plan (Yonge Street, Highway 7 and Davis Drive) to include the Viva Network Expansion Plan (Jane Street, Major Mackenzie Drive and Leslie Street/Don Mills Road) and future rapid transit corridors to accommodate growth to 2041 (Major Mackenzie Drive East, Green Lane, Yonge Street north of Davis Drive and Woodbine Avenue).

**Highway 7 Rapid Transit Corridor:** In western Vaughan, a key constraint along the Highway 7 rapid transit corridor occurs near Islington Avenue. The TMP Update proposes eliminating this pinch point with construction of a median rapidway plus six traffic lanes through this area (Helen Street west to Kipling Avenue).

From Bruce Street east to Highway 400, this rapidway segment is a Metrolinx funded project which was completed in 2019. East of Highway 400 to Bowes Road, the rapidway was coordinated with the opening of the Toronto-York Spadina Subway Extension which opened in 2017. The section along Centre Street, Bathurst Street and Highway 7 to Yonge Street was also completed in 2019. With these sections completed there is now continuous rapidway from Bruce Street in the City of Vaughan to

Birchmount Road (east of Warden Avenue) in the City of Markham, with the exception of a mixed traffic segment from Yonge Street to Bayview Avenue.

The TMP Update reconfirms the recommendations of the approved environmental assessment to extend the Highway 7 rapidway from Unionville Station to Cornell Terminal in the east. The environmental assessment identifies a median rapidway plus four general purpose lanes.

### 8.2.1.5 CONVERSION TO LRT

After the 2041 horizon of the TMP, the Region expects to convert some or all Viva rapidways into higher-capacity light rail facilities. Key issues that could influence the timing of this include:

- LRT systems typically attract more riders than Bus Rapid Transit (BRT) systems but the creation of additional transfers (e.g. by replacing express bus routes with hub-and-spoke combinations of local bus and LRT routes) can dampen ridership gains.
- Conversion from BRT to LRT would require substantial capital costs and service disruptions during construction. These costs would have to be weighed against the possible operating cost savings.
- LRT systems operate on electricity and generate fewer local air emissions than diesel or hybrid buses. The pace at which bus technologies evolve toward full electrification will determine how long this advantage of LRT technology remains.

### 8.2.2 Alignment with TMP Objectives

The five objectives of the YR-TMP are: Support Transit, Support Road Network, Support Active Transportation, Support Goods Movement, and Support Last Mile. They were developed on a Region-wide scale and used to assess infrastructure improvements as it relates to transportation service, and natural and socio-economic environments. A description of each of the five YR-TMP objectives is provided<sup>3</sup>:

- **Objective 1 – Create a World Class Transit System:** York Region will have a World Class Transit System when there is a seamless interconnected system of subways, rapidways, a frequent transit network and other services that meet the needs of all York Region residents and businesses. This system will help to direct growth to Centres and Corridors and ensure a compact, mixed-use built form that minimizes the need for travel and reduces dependence on single occupant vehicles.

<sup>3</sup> Regional Municipality of York, *Transportation Master Plan 2016 Update, Main Report: i-iii*

- **Objective 2 – Develop a Road Network Fit for the Future:** A Road Network Fit for the Future will use technology and innovation to optimize the road network by leading in traffic management, urban design and providing opportunities to support all modes of travel within the Region’s right-of-way, including transit, driving, cycling and walking.
- **Objective 3 – Integrate Active Transportation in Urban Areas:** Focusing on improving the viability of active transportation in York Region’s urban areas is vital to ensuring a sustainable transportation system for the future. The Region recognizes the benefits of providing a variety of active transportation options, including improved health of residents, better air quality and reduced greenhouse gas emissions, a more connected and efficient transportation network, reduced traffic congestion and less dependence on the automobile.
- **Objective 4 – Maximize the Potential of Employment Areas:** Through technology and partnerships, the Region will identify opportunities to efficiently and safely move employees and goods around and through York Region to support ongoing economic growth.
- **Objective 5 – Make the Last Mile Work:** The “last mile” refers to the point or moment when consumer decisions are actually made. It refers to the tactics used to increase adoption of transit and active transportation while lowering the amount of single occupant vehicle use especially during peak periods.

Following the network-level capacity analysis, evaluation of each alternatives, and extensive consultation, the preferred solution was measured for its alignment with the YR-TMP objectives. The preferred solution was rated on a scale from 0 to 4, based on its ability to fulfill each YR-TMP objective. Each rating was represented through pie quarters, where 0 or an empty pie represents an inconsistency with TMP objective assessed, and 4 or a full pie represents full alignment with TMP objective. The measures used to rate the alternative(s) are outlined in **Exhibit 8-5**.

Rating Objective					
<b>Support Transit</b>	<ul style="list-style-type: none"> <li>Does not benefit transit</li> </ul>	<ul style="list-style-type: none"> <li>Improves traffic operations along a corridor with transit service</li> </ul>	<ul style="list-style-type: none"> <li>HOV Network (widen to 6 lanes)</li> <li>Provides new link across barrier (i.e. midblock crossing)</li> <li>Grade separation on frequent transit network corridor.</li> </ul>	<ul style="list-style-type: none"> <li>Supports Frequent Transit Network (FTN)</li> <li>Provides connection to GO station or other major transit hub</li> <li>Grade separation on RT corridor.</li> </ul>	<ul style="list-style-type: none"> <li>Rapid transit (RT) corridor (including interim RT projects and "rapid transit subject to further study")</li> </ul>
<b>Support Road Network</b>	<ul style="list-style-type: none"> <li>Does not impact traffic operations</li> </ul>	<ul style="list-style-type: none"> <li>Provides additional capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Grade separation on 2-lane road</li> <li>V/C ratio improves, but max v/c ratio and average v/c ratio still &gt;1.0</li> </ul>	<ul style="list-style-type: none"> <li>Grade separation on 4-lane road</li> <li>New/improved interchange connection with highway network not directly connected to employment area</li> <li>v/c ratio improves and average v/c ratio is &lt;1.00</li> </ul>	<ul style="list-style-type: none"> <li>Midblock connection</li> <li>Missing link</li> <li>Grade separation on 6-lane road or RT corridor</li> <li>New/improved interchange connection with highway network with connection to employment area</li> <li>v/c ratio improves and max v/c ratio is &lt;1.00</li> </ul>
<b>Support Active Transportation</b>	<ul style="list-style-type: none"> <li>Does not impact active transportation</li> </ul>	<ul style="list-style-type: none"> <li>Rail grade separation</li> <li>Either cycling facilities or sidewalks (both sides) already exist and are to be maintained</li> </ul>	<ul style="list-style-type: none"> <li>Provides improved AT facilities along a corridor where basic facilities already exist (Shared to dedicated cycling facilities; sidewalk on one side only to sidewalk on both sides).</li> <li>Both cycling facilities and sidewalks (both sides) exist and are to be maintained</li> <li>Midblock crossing (new link across barrier) w/ no cycling facilities</li> </ul>	<ul style="list-style-type: none"> <li>Provides dedicated cycling facility where one does not exist</li> <li>Eliminates sidewalk gap in urban area not associated with significant transit.</li> <li>Midblock crossing w/ dedicated cycling facilities</li> </ul>	<ul style="list-style-type: none"> <li>Eliminates sidewalk gap along major transit route (FTN, RT)</li> <li>Provides separated cycling facility where one does not exist</li> <li>Midblock crossing with separated cycling facilities</li> </ul>
<b>Support Goods Movement</b>	<ul style="list-style-type: none"> <li>Does not impact goods movement (truck volume not on YR-provided map)</li> </ul>	<ul style="list-style-type: none"> <li>Widening/capacity improvement not on strategic goods movement network but serves a low volume of trucks (&lt;1000/day per as YR map)</li> <li>Midblock connection (no employment areas/not on SGMN)</li> </ul>	<ul style="list-style-type: none"> <li>Widening/capacity improvement not on strategic goods movement network but serves a moderate volume of trucks (1000&gt;x&gt;3000/day as per YR map)</li> <li>Midblock connection (employment area on one sides)</li> <li>Grade separation on secondary SGMN</li> </ul>	<ul style="list-style-type: none"> <li>New/improved interchange not on strategic goods movement network</li> <li>Improvement on Secondary Strategic Goods Movement Network</li> <li>Widening/capacity improvement not on strategic goods movement network but serves a high volume of trucks (&gt;3000/day as per YR map)</li> <li>Midblock connection (employment area on both sides)</li> <li>Grade separation on primary Strategic Goods Movement Network</li> </ul>	<ul style="list-style-type: none"> <li>New/improved interchange to/from major employment area</li> <li>Improvement on Primary Strategic Goods Movement Network</li> </ul>
<b>Support Last Mile</b> (e.g. TDM, commuter parking, address active transportation gaps)	<ul style="list-style-type: none"> <li>Does not impact last mile</li> </ul>	<ul style="list-style-type: none"> <li>Urban road projects not directly adjacent to existing or proposed major transit station or commuter parking facility</li> <li>Rail grade separation</li> </ul>	<ul style="list-style-type: none"> <li>Road project adjacent to existing or proposed major transit station or commuter parking facility</li> <li>New AT facilities (not shared) not directly adjacent to FTN or major transit stops</li> <li>New midblock connection over a barrier without cycling infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>New/improved interchange at current or proposed commuter parking facility</li> <li>New/improved basic cycling facilities (dedicated lanes) and sidewalks adjacent to FTN or major transit stations</li> <li>RT corridor</li> </ul>	<ul style="list-style-type: none"> <li>New/improved full AT facilities (separated cycling infrastructure and continuous sidewalks on both sides) adjacent to FTN or major transit station</li> </ul>

Exhibit 8-5: Assessment Criteria Based on Alignment With TMP Objectives

Source: York Region Transportation Master Plan 2016 Update Background Report Project Details and Summary Sheet

## 8.3 Evaluation of Alternative Solutions

### 8.3.1 Network-Level Capacity Analysis

Based on the YR-TMP Network-Level Capacity Analysis outlined in **Section 8.3.2, Alternative 4 - Widen to 6 Lanes for Transit/HOV** was recommended to be carried forward for the Kennedy Road corridor to measure its alignment with the TMP objectives, as summarized in **Table 8-2**.

In 2005, YRRTC completed the Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements Environmental Assessment (EA), which identified the preferred solution as “**Widen to Implement Rapid Transit**”.

This EA study evaluated alignment options for the rapidway between Warden Avenue and Kennedy Road, and recommended a rapidway alignment on Kennedy Road between YMCA Boulevard and Highway 7 to service Unionville GO Station in Downtown Markham, as constraints precluded the continuation of rapidway further east along Highway 7 and other adjacent corridors.

The detailed assessment of alignment options and recommendation for this section of Kennedy Road is documented in the Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements Environmental Study Report (ESR).

The recommended Alternative Solution from the ESR will be incorporated into this study.

**Table 8-2: YR-TMP Alternative Considerations**

Alternative Solution	Recommendation
1. “Do Nothing”	<b>Not recommended</b> as the solution does not address the problem and opportunity statement.
2. Optimize Existing Facility with Intersection Improvements	<b>Not recommended</b> as the solution does not address overall traffic congestion and does not improve transit/HOV and active modes.
3. Widen to 6 Lanes for Capacity Improvements	<b>Not recommended</b> as the solution does not support shift to transit/HOV and is not consistent with Council policy to widen to 6 lanes for transit/HOV lanes only.
4. Widen to 6 Lanes for transit/HOV	<b>Recommended</b> carried forward as the solution addresses traffic capacity issues. There is opportunity to improve cycling facilities and potential to improve transit travel time and encourage shift to transit/HOV.
5. Widen to Implement Rapid Transit	<b>Recommended</b> along Kennedy Road between YMCA Boulevard and Highway 7,






Alternative Solution	Recommendation
	to support the solution to implement rapid transit (Viva) service along Highway 7.
<b>6. Widen Parallel/Adjacent Corridor</b>	<b>Not recommended</b> as the solution does not address corridor congestion and travel demand. There are no improvements to walking and cycling facilities and does not encourage shift to transit/HOV.

## 8.3.2 Alignment with TMP Objectives

### 8.3.2.1 YR-TMP ROAD PROJECTS

**Alternative 4 – Widen to Six lanes for Transit/HOV** for Kennedy Road between Steeles Avenue and Major Mackenzie Drive was carried forward from the network-level capacity analysis to review its alignment against the five objectives of the YR-TMP. Using the assessment methodology described in **Section 8.2.1.4** the evaluation was completed and a summary of the recommendation is presented in **Table 8-3**.

Table 8-3: Evaluation of Alternative Solution Considered based on the YR-TMP

Alternative	Support Transit	Support Road Network	Support Active Transportation	Support Goods Movement	Support Last Mile
<b>4. Widen to 6 Lanes for Transit/HOV</b>	Support for Frequent Transit Network (FTN) along corridor  Provision of connection to Unionville GO Station	Provision of additional capacity on corridor	Provision of separated and continuous active transportation facilities where ones currently do not exist  Provision of midblock crossings where required	Improvement on Secondary Strategic Goods Movement Network	Potential for new/improved cycling infrastructure and continuous sidewalks adjacent to FTN or major transit stations
<b>Alignment with YR-TMP Objectives</b>					

### 8.3.2.2 YR-TMP TRANSIT PROJECTS

As noted, to support the Highway 7 Rapidway, **Alternative 5 – Widen to Implement Rapid Transit** was identified as the Preferred Solution on Kennedy Road between YMCA Boulevard and Highway 7, in addition to Alternative 4. **Alternative 5** for Highway 7 from Cornell Terminal to Unionville GO Station, including the alignment along Kennedy Road between Highway 7 and YMCA Boulevard, was carried forward from the

network-level capacity analysis to review its alignment against the five objectives of the YR-TMP. Using the assessment methodology described in **Section 8.2.1.4** the evaluation was completed and a summary of the recommendation is presented in **Table 8-4**.

**Table 8-4: Evaluation of Alternative Solution Considered based on the YR-TMP**

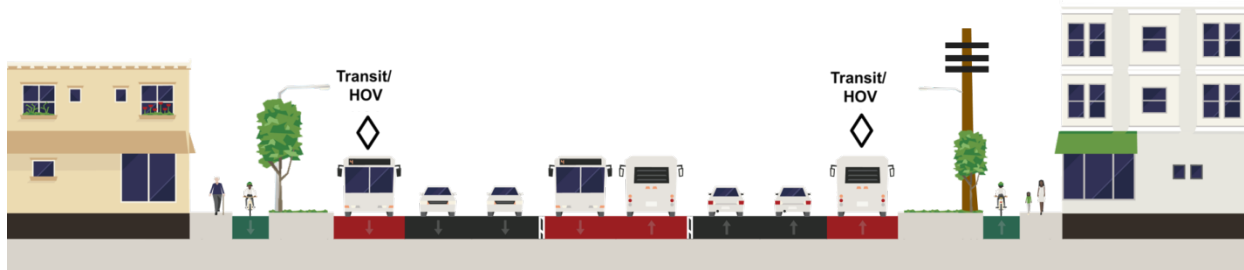
Alternative	Support Transit	Support Road Network	Support Active Transportation	Support Goods Movement	Support Last Mile
<b>5. Widen to Implement Rapid Transit</b>	Rapid Transit (RT) Corridor  Provision of connection to Unionville GO Station	Does not impact traffic operations	Provision of dedicated and continuous active transportation facilities where ones currently do not exist  Provision of midblock crossings where required	Does not impact goods movement	Potential for new/improved cycling infrastructure and continuous sidewalks adjacent to FTN and RT or major transit stations
<b>Alignment with YR-TMP Objectives</b>					

## 8.4 Selection of Preferred Solution

Based on the capacity analysis and review of alignment with the YR-TMP objectives, Alternative 4 – Widen to Six lanes for Transit/HOV as shown in **Exhibit 8-6** was identified as the YR-TMP's Preferred Solution for Kennedy Road between Steeles Avenue and Major Mackenzie Drive. Alternative 5 – Widen to Implement Rapid Transit as shown in **Exhibit 8-7** was also identified along Kennedy Road between YMCA Boulevard and Highway 7 in addition to Alternative 4 to support the Highway 7 Rapidway. This was documented in the YR-TMP project sheets for Kennedy Road (ID: 1010, 2001, and 2002), located in Appendix A of the YR-TMP, and reference in **Appendix E** of this report.



**Exhibit 8-6: Alternative 4 – Widen to Six lanes for Transit/HOV**



**Exhibit 8-7: Alternative 5 – Widen to Implement Rapid Transit**

In May 2017, the Kennedy Road EA study team reviewed the YR-TMP Preferred Solution for the study corridor against the corridor-specific Problem and Opportunity Statement. This was completed to ensure that the YR-TMP Preferred Solution aligned with the study opportunities. The YR-TMP Preferred Solution was confirmed to align with the identified opportunities for the Kennedy Road EA study as documented in **Table 8-5**.

**Table 8-5: Preferred Solution's Alignment with Study Opportunities**

Opportunity	Preferred Solution's Alignment with Study Opportunities
<b>Improve Kennedy Road capacity to accommodate projected traffic demand and maximize person-carrying capacity</b>	Maximization of person-carrying capacity through the provision of Transit/HOV lanes
<b>Facilitate York Region's Finer Grid Network Strategy including the review of York Region's access management guidelines, and removal of turning and vehicle restrictions where appropriate</b>	Where possible, the facilitation of York Region's Finer Grid Network will be applied
<b>Improvement of pedestrian and cycling facilities to encourage other modes of transportation to reduce congestion and single occupancy vehicle (SOV) use</b>	Provision of separated active transportation facilities
<b>Improve the efficiency and reliability of transit</b>	Supports Kennedy Road as a Frequent Transit Network through the provision of Transit/HOV lanes
<b>Improve the Stouffville GO Rail crossing(s) and reduce delays and congestion with the associated crossing(s)</b>	Alternative design concepts with the Preferred Solution will be assessed for the Stouffville GO Rail Crossing
<b>Improve safety, performance, and operational efficiency for all modes along the study corridor</b>	The Preferred Solution accommodates the safety, performance, and operational efficiency for all modes

Based on the supplementary evaluation presented in **Section 8.3** and the findings of the YR-TMP, the Preferred Solution consists of:

- Widening of Kennedy Road between Steeles Avenue and Major Mackenzie Drive to six lanes for Transit/HOV
- Widening of Kennedy Road between YMCA Boulevard and Highway 7 to support the Highway 7 Rapidway
- Provision of continuous and separated cycling facilities, and improvement of sidewalks and streetscaping

The Preferred Solution was presented to the public at the Kennedy Road Open House #1 and generally received public support. Additional comments regarding the project were summarized and are documented and discussed in **Section 4.2**. Comments received following the Open House regarding other alternative solutions for the Kennedy Road corridor were considered and evaluated against YR-TMP objectives as the study progressed.

## 9. Alternative Design Concepts

The Municipal Class EA process requires examination of alternative methods of implementing the Preferred Solution, referred to as Alternative Design Concepts. The advantages and disadvantages of each are assessed.

This section discusses the development of Alternative Design Concepts, the evaluation criteria, and identification of the Preferred Design Concept.

### 9.1 Development of Alternative Design Concepts

The following section discusses the development of the Alternative Design Concepts which includes typical cross-sections and alternatives at constrained locations along the corridor.

#### 9.1.1 Cross-Section Elements

Typical cross-sections developed for the corridor and at constrained locations based on the recommended element widths are documented in **Table 9-1**. These widths were referenced using established guidelines and standards.

Where applicable, the design elements were based on design speed of 60km/h with posted speed of 60km/h, which is consistent with the Region's Towards Great Regional Streets Guidelines, 2008 for six-lane roads.

Design parameters for the Viva rapidway are discussed in **Section 9.3.3.9**.

**Table 9-1: Cross-Section Design Parameters**

Element	Width / Clearance	Source/Notes
<b>Right-of-Way (existing)</b>	<36 m (14 <sup>th</sup> Avenue to CN Rail Crossing, 16 <sup>th</sup> Avenue to Wilfred Murison Avenue)	Legal Survey for Kennedy Road EA
	>36 m and < 43m (Steeles Avenue to 14 <sup>th</sup> Avenue, CN Rail Crossing to 407 ETR, Castan Avenue to Highway 7, Carlton Road to 16 <sup>th</sup> Avenue, Wilfred Murison Avenue to Castlemore Avenue)	
	>43 m (407 ETR to Castan Avenue, Highway 7 to Carlton Road, Castlemore Avenue to Major Mackenzie Drive)	
<b>Right-of-Way (designated)</b>	Up to 43 m between Steeles Avenue and YMCA Boulevard, and between	Map 12 of the Region's Official Plan, 2010

Element	Width / Clearance	Source/Notes
	Highway 7 and Major Mackenzie Drive	
	Up to 45 m between YMCA Boulevard and Highway 7	
<b>Lane Width (through lane)</b>	3.3 m	Section 5.1 of Towards Great Regional Streets, 2008
<b>Lane Width (Transit/HOV lane)</b>	3.5 m	Section 5.1 of Towards Great Regional Streets, 2008
<b>Two-Way Centre Left-Turn Lane</b>	3.3 m	Transportation Association of Canada (TAC) – Geometric Design Guide for Canadian Roads, 2017
<b>Left-Turn Lane at Intersections</b>	5.0 m (3.3m lane with 1.7 m median)	TAC – Geometric Design Guide for Canadian Roads, 2017
<b>Centre Median</b>	5.0 m (minimum 1.5 m at constrained locations)	TAC – Geometric Design Guide for Canadian Roads, 2017
<b>Sidewalk</b>	Minimum 1.5 m (additional 0.5 m if adjacent to curb)	Section 5.6 of Towards Great Regional Streets, 2008
<b>Cycle Track (off-street)</b>	2.0 m (ideal) – 1.8 m if adjacent to sidewalk	Ontario Traffic Manual – Book 18, 2013
	1.8m preferred one-way cycle track	
<b>Multi-Use Path</b>	3.0 m (ideal) – Minimum 2.4 m at constrained locations (additional 0.5 m if adjacent to curb)	Ontario Traffic Manual – Book 18, 2013
<b>Utility Line Clearance</b>	2.0 m (1.0 m from back of curb to edge of pole; 0.7 m maximum pole diameter; 0.3 m minimum buffer from edge of pole to edge of AT facility)	Discussions with York Region Internal Team
	2.0 m (1.0 m from property line to edge of pole; 0.7 m maximum pole diameter; 0.3 m minimum buffer from edge of pole to edge of AT facility)	

Element	Width / Clearance	Source/Notes
<b>Grading Buffer</b>	0.6 m from edge of AT facility to property line	Transportation Association of Canada (TAC) – Geometric Design Guide for Canadian Roads, 2017
<b>Tree Planting clearance (short and tall trees)</b>	<p>Absolute minimum 2.9 m, ideal minimum 3.5m</p> <p>[0.6 m from edge of AT Facility (ideally 1 m); 2.3 m from back of curb (2.5 m from centreline of tree to face of curb)]</p> <p>Full-form trees may be planted near streetlights if above clearances are met</p> <p>3.0 m from centreline of hydro pole to centreline of tree; 3.5 m from face of curb; 0.6 m from edge of AT Facility</p> <p>Full form trees shall be set back a minimum distance of 3.0 m from overhead hydro</p>	York Region Street Tree Preservation and Planting Design Guidelines, 2013

<sup>1</sup>Lane width for this segment will be confirmed during Phase 3 of this study

### 9.1.2 Screening of Active Transportation Facilities

Prior to generating the typical cross-section alternatives, a high-level screening of the active transportation facility type for the corridor was undertaken as presented in **Table 9-2**. Consideration was given to the Region's Transportation Master Plan recommendation which identified Separated Facilities (see Map 9 of the YR-TMP) for the Kennedy Road corridor. Separated Facilities are defined in the YR-TMP as:

*“...facilities that provide physically separate space for cyclists. Types of facilities can include cycle tracks, raised bike lanes or multi-use trails. These facilities improve the comfort for cyclists along higher-speed, busy roadways.”*

Table 9-2: High Level Screening of Active Transportation Facilities

Facility Type	Discussion	Recommendation
<b>Sidewalk, on one or both sides</b>	<ul style="list-style-type: none"> <li>Provides dedicated pedestrian facility</li> <li>Opportunities to provide new sidewalks and connect to existing sidewalks</li> </ul>	<b>Carry forward</b>
<b>Multi-use Path (two-way shared facility), on one or both sides</b>	<ul style="list-style-type: none"> <li>Provides grade separation and adequate horizontal distance from vehicular traffic</li> <li>Minimizes potential conflicts with transit</li> <li>Does not provide separation between cyclists and pedestrians</li> <li>Consistent with Transportation Master Plan recommendation</li> <li>Opportunities to provide active transportation connections in constrained locations</li> </ul>	<b>Carry forward</b>
<b>On-road facility (conventional bike lanes and separated bike lanes with marked buffers)</b>	<ul style="list-style-type: none"> <li>Does not provide grade separation from vehicular traffic</li> <li>Higher potential for conflicts with transit</li> <li>Separation from pedestrians</li> <li>Not consistent with Transportation Master Plan recommendation</li> </ul>	<b>Screened out – Do not carry forward</b>
<b>One-way off-road cycle track</b>	<ul style="list-style-type: none"> <li>Provides grade separation and adequate horizontal distance from vehicular traffic</li> <li>Minimizes potential conflicts with transit</li> <li>Separation from pedestrians</li> <li>Consistent with Transportation Master Plan recommendation</li> <li>Fewer conflict points because pedestrians and turning drivers expect one directional bicycle traffic</li> </ul>	<b>Carry forward</b>

Combinations of the AT facilities carried forward, listed from greatest separation between modes to least separation, are:

- Sidewalk and one-way off-road cycle track, in each boulevard
- Multi-Use Path, one in each boulevard
- One side sidewalk and other side Multi-Use Path



The typical cross-sections developed for the corridor and at constrained locations do not preclude the AT combinations carried forward for further assessment. The recommended AT facility type for the corridor was determined following the assessment of alternative widening design concepts and a review of constrained locations and is discussed in **Section 9.3.2**.

The alternative AT facilities are presented in **Exhibit 9-1** to **Exhibit 9-3**.

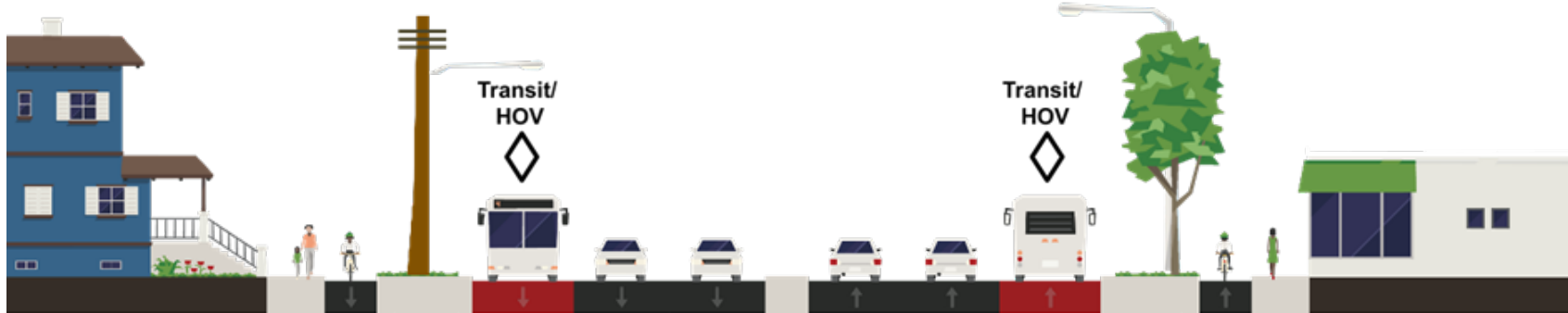


Exhibit 9-1: Alternative 1 - Sidewalk and Cycle Track in each Boulevard

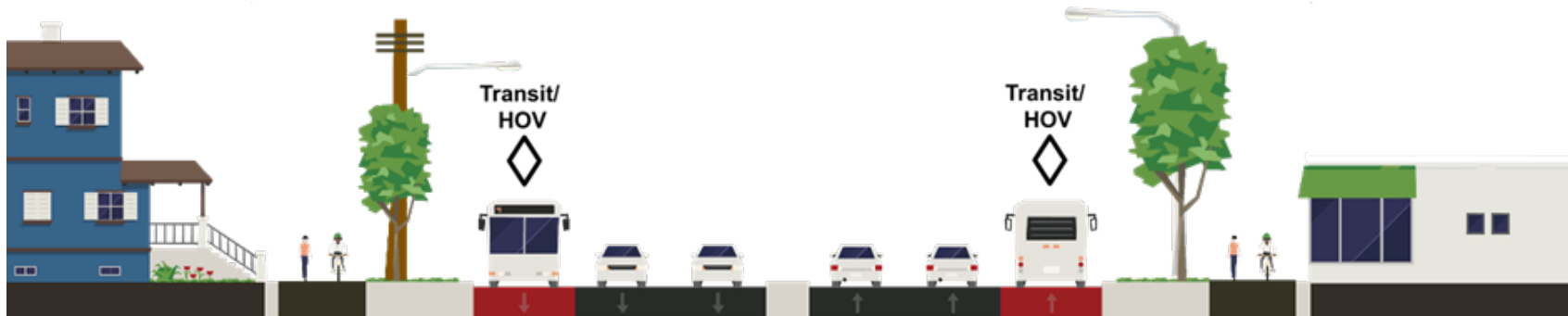


Exhibit 9-2: Alternative 2 - Multi-Use-Path in each Boulevard

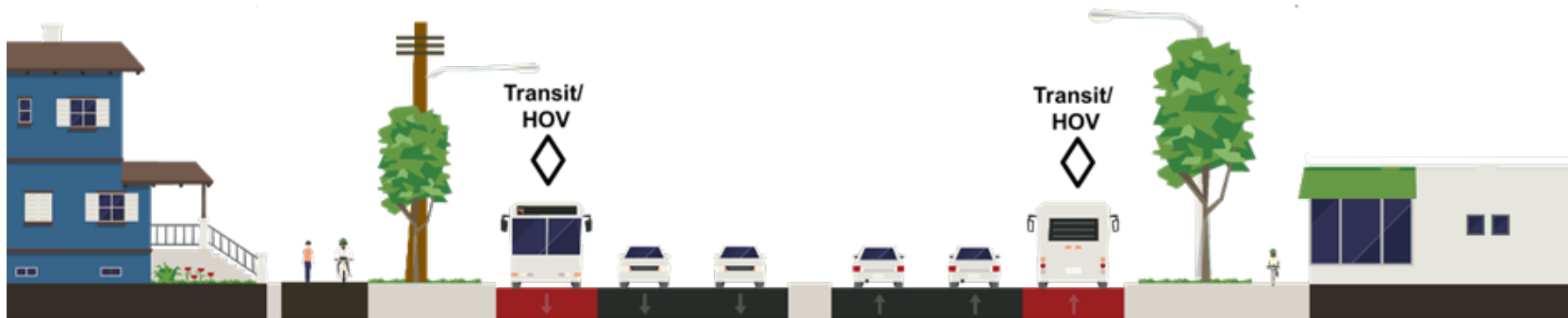


Exhibit 9-3: Alternative 3 - Multi-Use-Path on One Side, Sidewalk on One Side

### 9.1.3 Roundabout Screening Analysis

A roundabout design was considered as an alternative intersection design as roundabouts are proven to be safer than traditional intersection controls due to lower operating speeds, the elimination of the “Beating the Light” mentality, the reduction of angle collision, and one-way travel.

The following criteria were used to assess the feasibility of implementing roundabouts at intersections in the study corridor. An intersection must fulfill all three requirements in order for a roundabout design to be carried forward at the location:

- **Number of lanes required based on intersection volumes:** Roundabouts are not recommended if the candidate intersection requires more than 2 lanes in any direction;
- **Proximity to nearest intersection, access or rail crossing:** Roundabouts are not recommended if the nearest intersection is less than 215m away, as queuing can adversely affect operations; and,
- **The need for a signalized pedestrian crossing:** Roundabouts are not recommended if there is high demand for pedestrian or a need for a pedestrian crossing at the candidate intersection.

At all intersections along the study corridor, roundabouts will not be carried forward as treatment for intersection improvements due to the number of lanes recommended for the Preferred Solution (3 lanes in each direction) and the anticipation of future pedestrian demand.

### 9.1.4 Reversible Lanes Screening

Reversible lane was an alternative brought forward from public feedback. The use of reversible lane was also considered during the development of the Region’s Transportation Master Plan 2016. Based on the review, reversible lanes were not recommended for the following reasons:

- Reversible lanes are generally not as safe as a dedicated lane due to increased risk of drivers using the lane incorrectly, such as driving the wrong way in the lane
- Reversible lanes require the elimination of dedicated left-turn lanes, leading to increased delays for vehicles going straight through the intersections and a greater possibility of rear end collisions at intersections
- Reversible lanes are most effective on corridors where there are long stretches of road where intersections are widely spaced apart. Traffic signals along

Kennedy Road are closely spaced, generally every 250m to 300m. Left-turn volumes are high and result in significant queues throughout the corridor

- Reversible lanes present conflicts with centre piers bridge designs
- Reversible lanes require the installation of overhead, illuminated signage at regular intervals to indicate lane directionality. The additional signage increases operational costs and is not as visually appealing
- Reversible lanes will eliminate opportunities for streetscaping treatment in the median. Streetscaping helps create attractive and safe streets, which are the cornerstone to liveable communities with a distinct sense of place in York Region

### 9.1.5 Typical Cross-Section

#### 9.1.5.1 RIGHT-OF-WAY CHARACTERISTICS

The existing right-of-way and Region's Official Plan (YR-OP) right-of-way for the Kennedy Road corridor were used as a basis to generate typical cross-sections. The existing right-of-way generally ranges between 36m and 43m, with the most constrained location at approximately 25m at the Hagerman and St. Philips/Bethesda Cemetery segments. Along Kennedy Road, the YR-OP (Map 12) designates the ROW to be up to 43m between Steeles Avenue and YMCA Boulevard, and Highway 7 to Major Mackenzie Drive, and up to 45m between YMCA Boulevard and Highway 7. Although the YR-OP designates the maximum road right-of-way for Kennedy Road to be up to 45m, typical cross-sections were developed for 43m and 36m widths, as a majority of the study corridor falls within those parameters. The existing ROW along Kennedy Road is shown in **Exhibit 9-4**.

The existing ROW and adjacent land-uses along the Kennedy Road corridor are summarized as follows. The land-use is generally a mix of residential, commercial, industrial, or agricultural:

- Between Steeles Avenue and 14th Avenue, land-use is primarily low to mid-rise residential and commercial uses with Pacific Mall and Market Village adjacent to the study corridor. There is a crossing of the Go Transit Stouffville Railway Corridor north of Clayton Drive. The ROW in this segment is consistent, at approximately 36m.
- Between 14th Avenue and the CN Rail overpass, lands are predominately mixed-use with cemeteries on the east and west sides of the corridor. The ROW in this segment is generally less than 36m with the most critical location as low as 25.3m at the cemetery segment.

- Between the CN Rail overpass and 407ETR, lands adjacent to Kennedy Road are industrial with a hydro corridor and the 407ETR bisecting the study corridor. The ROW in this segment is approximately 36m.
- Between 407ETR and Highway 7, land-use is primarily commercial with some low-rise residential. The ROW south of Castan Avenue in this segment is 43m and north of Castan Avenue the ROW is 36m.
- Between Highway 7 and 16th Avenue, lands are predominantly low-rise residential. The Rouge River and Go Transit Stouffville Railway Corridor Crossing north of Austin Drive bisect this segment of Kennedy Road. ROW in this segment is approximately 43m south of Carlton Road and approximately 36m north of Carlton Road.
- Between 16th Avenue and Major Mackenzie Drive, land are predominately low-rise residential and agricultural with cemeteries on the east and west sides of the corridor north of Beckett Avenue. ROW in this segment varies, having one of the most constrained areas at approximately 25.3m north of 16th Avenue near the cemetery lands, and gradually increases to 36m north of Wilfred Murison Avenue, and 43m north of Castlemore Drive.

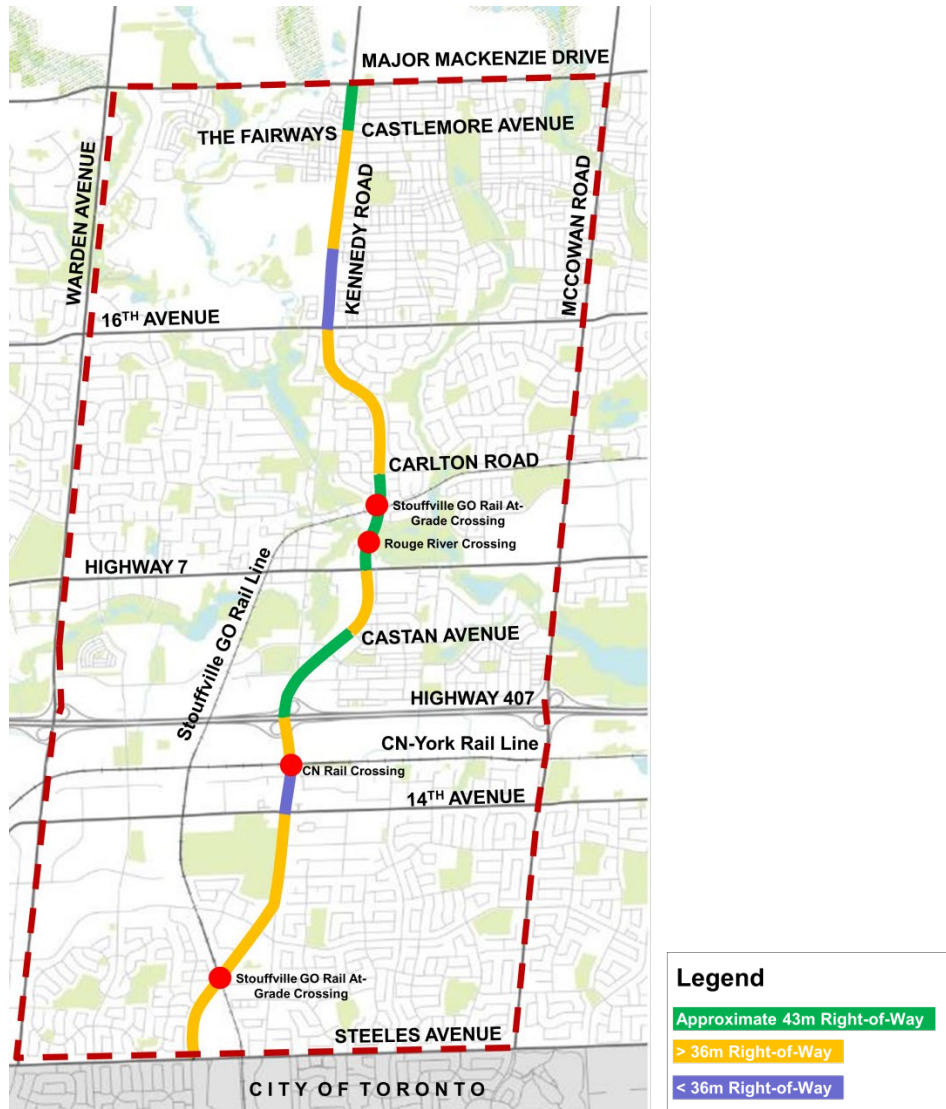


Exhibit 9-4: Existing ROW along Kennedy Road between Steeles Avenue and Major Mackenzie Drive

#### 9.1.5.2 36M AND 43M TYPICAL CROSS-SECTION

Based on the right-of-way characteristics review, two typical cross-sections were developed to accommodate the Preferred Solution for Kennedy Road, a 36m typical cross-section and a 43m typical cross-section. Both alternatives accommodate the proposed widening to 6 lanes with curb lanes designated for Transit and High Occupancy Vehicles (HOV), continuous active transportation facilities, utility zone and potential for landscaping.

To inform the Typical Cross-Sections, three minimum boulevard widths were established by combining the AT facility type and utility buffer/zone, with and without minimum landscaping opportunities. Based on the evaluation of alternative Active Transportation facilities, the best fit approach design protects for a multi-use path on both boulevards. In order to achieve the recommended alternative solution for

continuous AT facilities, transit/HOV lanes, and streetscaping within the available and protected Right-of-Way, the corridor design resulted in the following boulevard width options with the objective to minimize property takings. Each boulevard option allows for a 0.3m curb & gutter, 1.0m clearance from back to curb to face of pole, 0.7m hydro pole/light standard, multi-use path (either 3.0m ideal width, or 2.4m absolute minimum), and 0.6m grading buffer. Opportunities for streetscaping are identified considering absolute minimum 2.9m space and ideal minimum 3.5m space. The boulevard options are applied for both east and west boulevards as presented in the best fit approach plan drawing with boulevard widths of 5.3m, 6.2m, and 6.8m-7.7m illustrated in **Exhibit 9-5**. As per existing conditions, hydro poles are assumed to be accommodated in the east boulevard.

The minimum boulevard widths informed the development of the 43m and 36m Typical Cross-Sections as shown in **Exhibit 9-6** and **Exhibit 9-7**. Key differences between the two typical cross-sections are the opportunities provided with the 43m Typical Cross-Section for a centre landscaped median and greater landscaping opportunities in both boulevards.

### Minimum Boulevard Width without Landscaping (5.3m) and Minimum MUP Width (2.4m)



### Minimum Boulevard Width without Landscaping (6.2m) and Maximum MUP Width (3.0m)



### Minimum Boulevard Width with Landscaping (6.6m-7.7m)



**Exhibit 9-5: Minimum Boulevard Options, Without and With Landscaping**

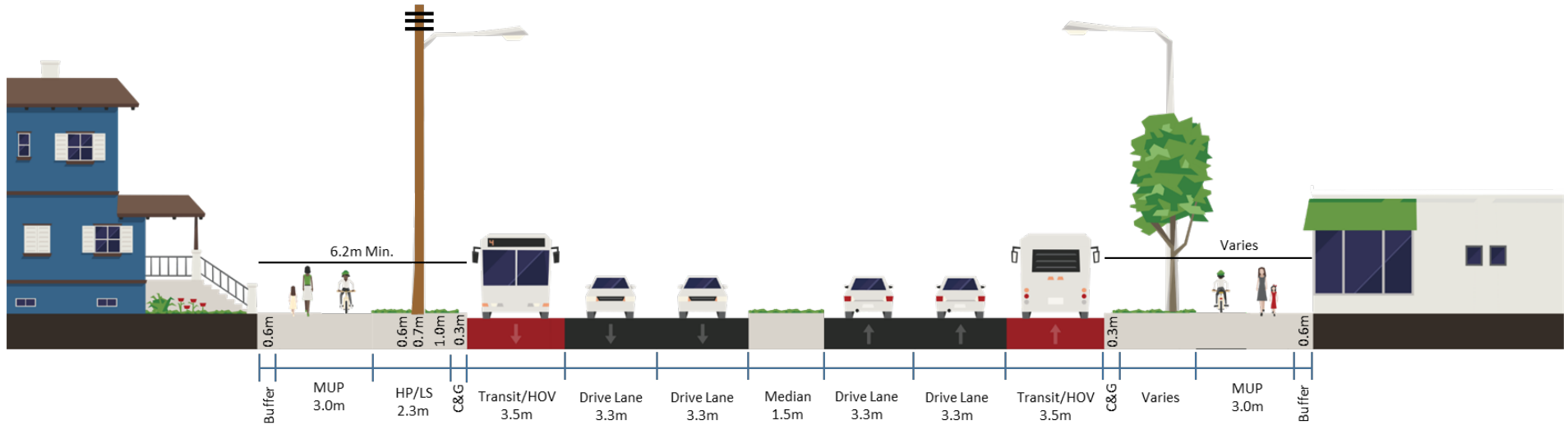


Exhibit 9-6: Typical 36m Cross-Section

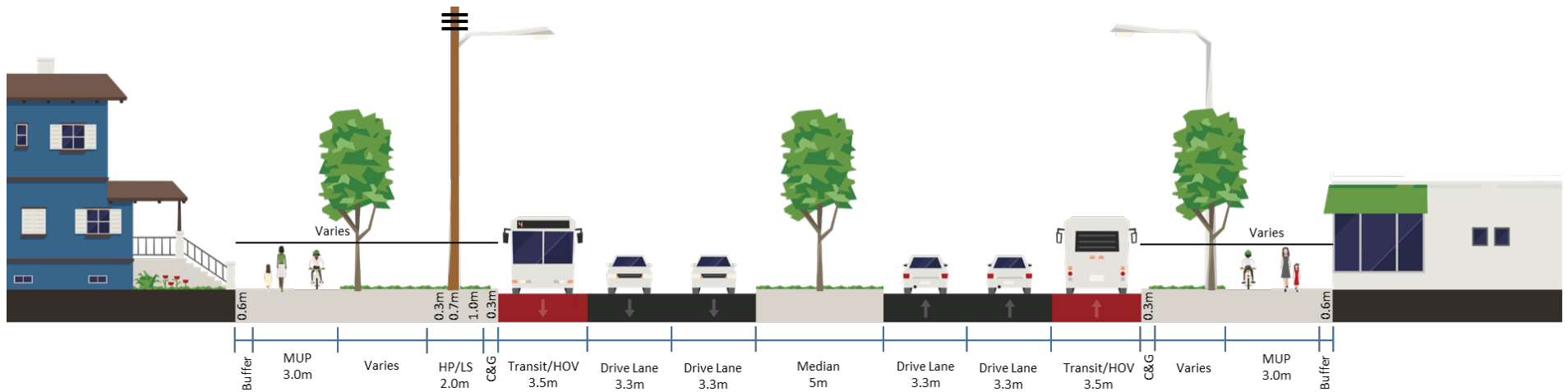
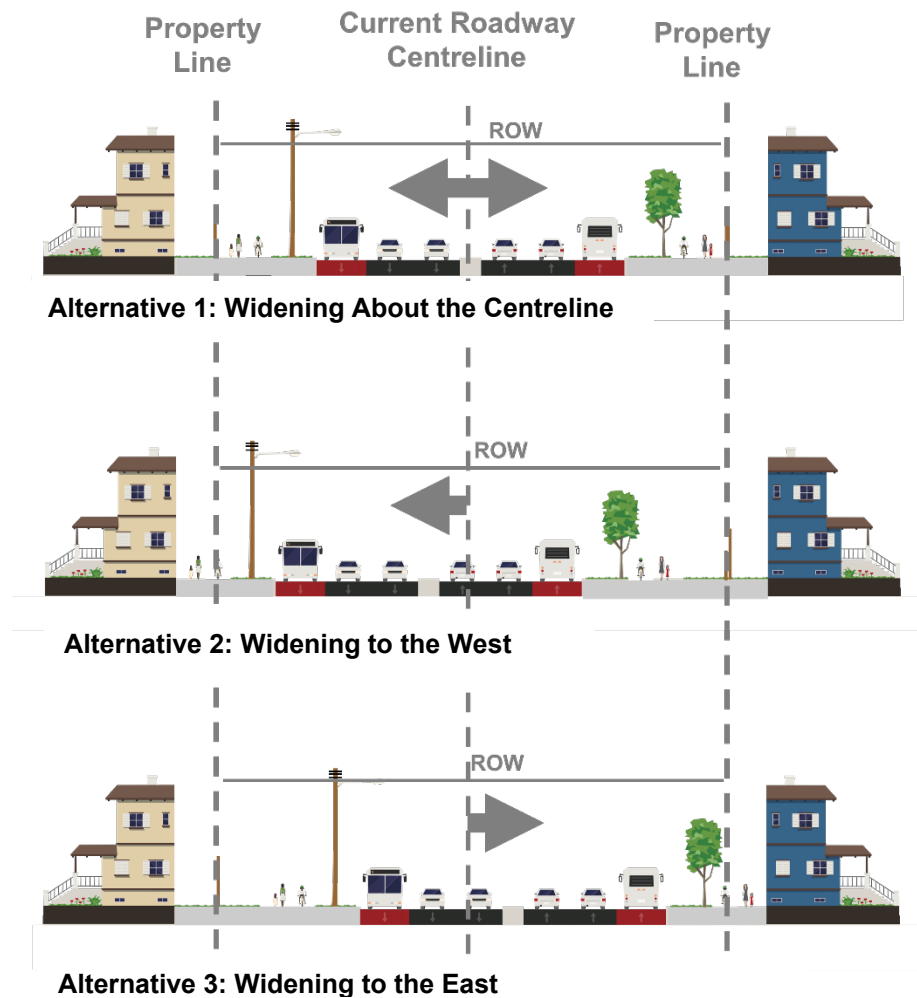


Exhibit 9-7: Typical 43m Cross-Section

### 9.1.6 Road Widening Alternatives

Three roadway widening alternatives were developed which considered applying the 36m and 43m typical cross-sections against the existing and available right-of-way throughout the overall corridor. The three alternatives are shown in **Exhibit 9-8** and are discussed as follows:

- **Alternative 1: Widening About the Centreline:** Provide additional lanes on both sides of the street to balance the impacts on both sides of Kennedy Road
- **Alternative 2: Widening to the West:** Shift road centreline so additional lanes and associated impacts occur on the west side of Kennedy Road
- **Alternative 3: Widening to the East:** Shift road centreline so additional lanes and associated impacts occur on the east side of Kennedy Road



**Exhibit 9-8: Road Widening Alternatives**

### 9.1.7 Constrained Locations

The Kennedy Road study corridor crosses over several key constrained segments that require modification to the typical cross-section. The locations of these constrained segments are shown in **Exhibit 9-9**.



**Exhibit 9-9: Constrained Segments along the Kennedy Road Study Corridor**