

ENVIRONMENTAL PROJECT REPORT

GEORGETOWN SOUTH SERVICE EXPANSION AND UNION-PEARSON RAIL LINK



July 30, 2009



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**GEORGETOWN SOUTH SERVICE EXPANSION
AND UNION-PEARSON RAIL LINK
Environmental Project Report**

July 30, 2009

PREFACE

The project's environmental impacts have been assessed in accordance with Ontario's Transit Project Assessment Process (Regulation 231/08 under Ontario's *Environmental Assessment Act*).

The Transit Project Assessment Process (TPAP) requires that an Environmental Project Report (EPR) be prepared to document:

- the purpose of the project;
- background information including finalized project description;
- description of local environment and conditions;
- an evaluation of the alternatives methods of carrying out the transit project;
- description of potential negative environmental effect and mitigation measures;
- description of monitoring program;
- description of any other required approvals and permits; and
- consultation record.

For this project the EPR was prepared in three parts.

The first part was made available for public review in April 2009 and included a description of the project site and current environmental conditions and a description of the project (preferred method). The document was updated based on comments received and recently completed investigations and was incorporated into the second part of the EPR.

The draft second part of the EPR was released on May 29, 2009. It included most of the information required under Ontario Regulation 231/08. It outlined the impacts of the preferred method on the natural and built environments, economy and society and their interrelationships, describes measures which are being proposed to mitigate negative impacts, and identifies how the effectiveness of those measures will be checked. Comments received from the public, government agencies, and First Nations were incorporated in the final EPR (this document).

The final EPR (this document) was made available for public review on July 30, 2009 and includes all of the information required under Ontario Regulation 231/08.

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Appendix J	Structural General Arrangement Drawings

LIST OF SUPPORTING DOCUMENTS

The following supporting documents are available under separate cover:

- Terrestrial Ecosystems Impact Assessment, Georgetown South Service Expansion and Union-Pearson Rail Link, Transit Environmental Assessment (Ecoplans, July 2009)
- Fish and Fish Habitat Impact Assessment, Georgetown South Service Expansion and Union-Pearson Rail Link, Transit Environmental Assessment (Ecoplans, July 2009)
- Human Health Assessment of Air Quality Impacts, Georgetown South Corridor Service Expansion and Union Pearson Rail Link Environmental Assessment (Intrinsik, July 2009)
- Air Quality Assessment, Georgetown South Service Expansion & Union Pearson Rail Link, Toronto, Ontario (RWDI, July 2009)
- Noise and Vibration Impact Assessment, GO Transit Georgetown South Service Expansion and Union-Pearson Rail Link (J. E. Coulter Associates Limited, July 2009)
- Existing Conditions and Impact Assessment Report, Transit Project Assessment Process: Georgetown South Service Expansion and Union-Pearson Rail Link, City of Toronto, City of Mississauga and City of Brampton, Ontario (Unterman McPhail Associates, July 2009)
- Stage 1 Archaeological Assessment – Georgetown South Service Expansion and Union-Pearson Rail Link (Archaeological Services Inc., July 2009)
- Hydraulics Technical Memorandum – Hydraulic Assessment of Humber River, Metrolinx – Georgetown South Link (MRC, July 2009)
- Hydraulics Technical Memorandum – Hydraulic Assessment of Black Creek Bridge, Metrolinx – Georgetown South Link (MRC, July 2009)
- Mimico Creek Crossing Hydraulic Analysis Report, Union-Pearson Rail Link Project (W.G. Clarke, July 2009)
- Preliminary Geotechnical Investigation – GO Transit Georgetown South Service Expansion (Trow Associates Inc., July 2009)

Tab 1: 1.0 Summary and Guide

→ Insert **Tab 1 → 1.0 Summary and Guide**

1.0 SUMMARY AND GUIDE TO THIS REPORT

This report has been prepared to document the Georgetown South Service Expansion – Union Pearson Rail Link (GSSE-UPRL) project in accordance with the requirements of Ontario's Transit Project Assessment Process (Regulation 231/08 under Ontario's *Environmental Assessment Act*).

The project proposes redevelopment of the corridor between Bathurst Street in Toronto and Highway 427 in Peel Region so more trains can operate to meet rising GO ridership demand over the next 25 years. It will bring fast, frequent and convenient transit options to the residents of Toronto, Mississauga, Brampton, Halton Region and beyond.

It involves:

- new tracks and signals and building/improving stations, platforms, bridges and underpasses to enhance service and to provide a safe separation between trains, motor vehicles, and pedestrians; and
- enabling a new rail service between Union Station and Pearson International Airport.

The following provides an overview of the remaining chapters of this report.

Introduction (Chapter 2)

Chapter 2 provides an overview of the project, the general purpose of the project and the background and overall planning context in which the project is being planned.

Most notably it outlines how this project relates to Metrolinx's Regional Transportation Plan for the Greater Toronto and Hamilton Area, called The Big Move (**Section 2.1.1**) and how it relates to other transit projects planned for the area (**Section 2.3.5**).

The purpose of the project is to provide the infrastructure improvements required to accommodate forecasted GO ridership growth in the corridor in the next 25 years and beyond. In addition it will facilitate a rail connection between Union Station and Pearson Airport as identified in the Big Move #2.

The recommended transit project (discussed in detail in **Chapter 5**) will provide two-way all day service along the study corridor and the Union-Pearson Rail Link will use the opportunity of the GO Transit rail expansion in the corridor to provide a new semi-express transit service between Union Station and Pearson Airport.

Additional details regarding the purpose of the project are provided in **Section 2.2** and a general description of the project is provided in **Section 2.3**.

Outline of Study and Consultation Process (Chapter 3)

An extensive consultation process was undertaken to assist in the planning and impact assessment process for this project. The consultation process was designed to address the requirements of the Transit Project Assessment Process (Regulation 231/08 under Ontario's *Environmental Assessment Act*). Those consulted include the general public, local community groups, government review agencies, local municipalities and First

Nations. **Chapter 3** outlines the consultation carried out in advance of and during the formal Transit Project Assessment Process (TPAP).

Overall, the study consisted of three main stages

Stage 1: Prior to the Notice of Commencement for the TPAP

Stage 2: Following the Notice of Commencement of the TPAP

Stage 3: During the release of the Draft Environmental Project Report

A full round of public open houses was held during each phase of the study along with many other forms of consultation.

Chapter 3 summarizes the consultation activities that occurred during those stages.

Baseline Study Area Conditions (Chapter 4)

Land use along the corridor consists of developed/redeveloped residential and industrial/commercial areas. Given the long history of urbanization in the study area, the majority of natural features have been removed. The remaining natural environmental features within the study area are almost exclusively associated with the three watercourse/valley systems: Black Creek, Humber River, and Mimico Creek.

Chapter 4 provides an overview of the existing conditions, including physical, socio-economic, cultural, transportation, utilities and navigability, within and in the vicinity of the study corridor for the Georgetown South Service Expansion and Union-Pearson Rail Link.

Recommended Transit Project (Chapter 5)

Chapter 5 describes the alternative methods considered (**Section 5.1**), the recommended transit project (**Section 5.2**) and implementation and construction staging (**Section 5.3**).

The recommended transit project includes the following improvements which will allow the provision of all day two way express and local GO train service on the GO Georgetown South corridor. The tracks required to provide this level of GO Service as well as a separate private spur line into the airport will be used to provide the Union-Pearson Rail Link service.

The following mainline tracks improvements include:

- four new GO mainline tracks between Bathurst Street and the GO Barrie (CN) line for a total of eight tracks in the corridor
- two new GO mainline tracks between GO Barrie (CN) line and the East limits of the West Toronto Diamond (Dupont Street) for a total of six tracks in the corridor
- three new GO mainline tracks between west limits of West Toronto Diamond (Dupont Street) and the existing CP Mactier line (proposed GO Bolton line) for a total of six tracks in the corridor.

- three new GO mainline tracks between the existing CP Mactier line (proposed GO Bolton line) and the project limits (Toronto / Region of Peel) boundary for a total of four tracks in the corridor

There are several GO Transit services which will be utilizing the corridor including the GO Georgetown, GO Milton, GO Barrie and the future GO Bolton service. A private sector operator will be operating the Union-Pearson Rail Link service.

Detailed Assessment of the Impacts, Proposed Mitigation and Monitoring (Chapter 6)

Chapter 6 outlines the potential impacts, proposed mitigation measures, commitments to future work and monitoring to be completed for the project.

The environmental impact assessment examines the potential impacts during the construction phase of the project as well as during operations and maintenance.

This chapter documents the results of studies (including noise, vibration, and air quality and human health impacts) on the community surrounding the project. The studies show either no impacts or impacts which can be addressed through mitigation measures.

The studies used a cautious approach, modeling impacts based on worst case scenarios to show that even under extreme weather conditions, with high train and vehicular traffic volumes, the project can operate safely and protect human health and the environment.

Sections 6.2.2 and 6.2.3 outline specific recommendations for addressing noise and vibration impacts.

Air Quality and the human health implications of increased air emissions are outlined in **Sections 6.2.4 and 6.2.5**.

Of the eleven substances assessed in the air quality and human health studies, only one requires mitigation. Specific short, medium, and long term measures are proposed in the EPR for addressing periodic nitrogen oxide spikes which are generally expected to occur on “bad air” days. Getting people out of cars and onto transit helps to improve local and regional air quality and it reduces greenhouse gas emissions, leading to a more sustainable GTHA.

The mitigation measures documented in this report have been developed with due consideration for the full range of potential adverse impacts of the project. The identified mitigation measures will be carried forward through the detailed design, construction, operation and maintenance phases of the project, as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project to ensure that this project does not result in any significant adverse environmental impacts.

Section 6.9 includes an assessment of the cumulative impacts of the project considering the potential impacts associated with the incremental effects of the project combined with other existing, and reasonably foreseeable future projects. A summary of construction mitigation measures and commitments to future work is included in **Section 6.10**. Monitoring procedures for compliance with commitments outlined in this report and communication with stakeholders during Detail Design and construction are discussed in **Section 6.11**.

Tab 2: 2.0 Introduction

→ Insert **Tab 2** → **2.0 Introduction**

2.0 INTRODUCTION

2.1 BACKGROUND

2.1.1 The Big Move

On November 28, 2008, the Metrolinx Board of Directors adopted the first Regional Transportation Plan (RTP) for the Greater Toronto and Hamilton Area (GTHA) under the Greater Toronto Transportation Authority (GTTA) Act - called The Big Move. The Big Move has undergone extensive consultation since 2006, with the Federal, Provincial, and Municipal governments and the public.

The Big Move identifies the transportation network required to support future growth and development and help resolve existing and growing transportation congestion in the region to 2031.

The intended vision of the Big Move in 25-years will be to achieve the following:

- Reduce the distance that people drive by one-third
- Accommodate 50% more people in the region with less congestion than today
- One-third of trips to work to be undertaken by transit; one in five by walking or cycling
- 60% of children will walk or cycle to school
- There will be six times more bike lanes and trails than today
- All transit vehicles will be accessible
- Single fare card will be used on all transit throughout the GTHA; and all fares will be integrated.

In order to achieve the vision, goals, and objectives, the Big Move contains a series of strategies. Each strategy contains priority actions – specific actions that are needed to implement the strategy and supporting policies – policies needed to guide the decision making in support of the strategy. All the actions and policies are important and will contribute to the transformation of transportation in the GTHA. However, nine priority actions were highlighted as Big Moves – Big Moves are those that will have the largest and most transformational impacts on the GTHA's transportation system.

Of particular interest to this project are “Big Moves # 1 and #2.

Big Move #1 is entitled “A fast and expanded regional rapid transit network” and is to “Build the regional rapid transit network identified in schedules 1 and 2 (of the Regional Transportation Plan) to bring fast frequent, all-day, two-way express rail service and expanded regional rapid transit service to every region of the GTHA and to within two kilometres of 80 per cent of GTHA residents”

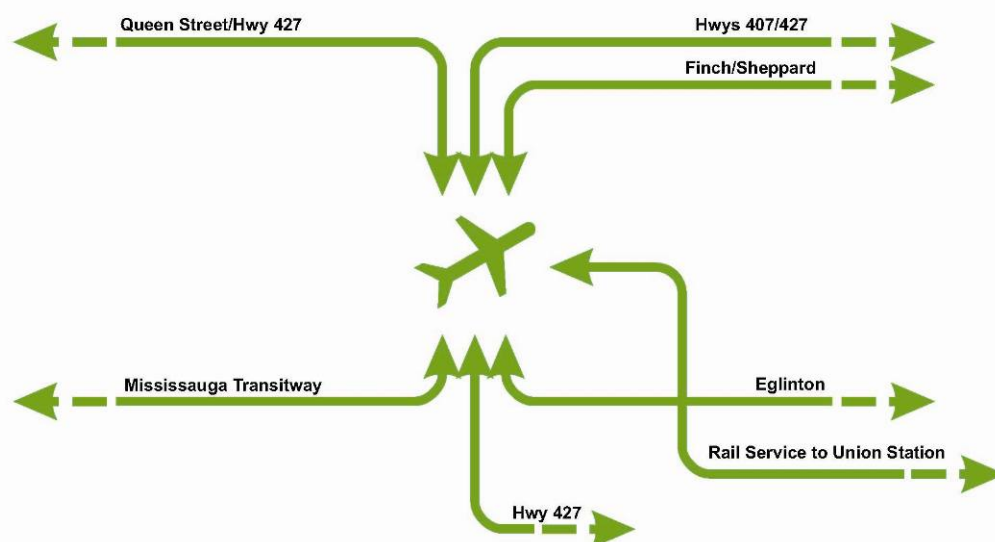
The Georgetown South GO Transit service expansion is part of Big Move #1. GO service in this corridor is presently limited by (generally) one track. Present latent ridership demand far outstrips the peak hour capacity in this corridor. Future demand, as noted in the Regional Transportation Plan, is very high and requires a major expansion of the infrastructure (track capacity) in order to accommodate both the present and the future ridership and to move more people out of their cars and into transit. This Georgetown South Environmental Project Report is focused on this required infrastructure expansion.

In addition, Big Move #2 – has a goal to establish high-order transit connectivity to the Pearson Airport district from all directions, which includes a fast transit link from downtown Toronto to Pearson Airport. **Figure 2.1.1-1** shows transit access to Pearson Airport from the east will be provided along the Eglinton corridor, from the north via the Finch transit corridor, from the west along the Highway 403 Transitway and via the Queens Street/Highway 427 corridor, and from the south via Highway 427 from Kipling Station and a rail service from Union Station.

The need for providing a multi directional access to Pearson airport in the future is greatly amplified by the fact that at present, less than one percent of all travelers at Pearson Airport arrive by public transit. Additionally, two significant mobility hubs in the GTHA, Pearson Airport and Union Station have well over half a million combined jobs within less than four kilometers of the two hubs and tens of thousands of travelers passing through them each day.

The Union-Pearson rail link service, proposed as part of this project, will be a key step towards the goal of The Big Move #2, by providing a rail service from Union Station to Pearson Airport.

Figure 2.1.1-1 High-order Transit Connectivity to Pearson Airport



2.1.2 Summary of Previous Studies

2.1.2.1 Georgetown South Corridor

CN Full Service Track Study (September 1990)

In 1990, GO Transit requested CN Rail to identify, at a conceptual level, the track requirements to allow the provision of full (two-way all day) service on all of the CN routes used by GO Transit, including the Georgetown line. These plans were to be at a greater level of detail than produced in CN's 1985 study. A set of plans was

subsequently generated by the CN Transit Expansion Program Report in September 1990, entitled "Preliminary Full Service Track Plant for GO Transit's Accelerated Planning Program". These plans provided necessary input to the Georgetown Corridor Full Service Study subsequently carried out by GO Transit.

GO Train Expansion Program Georgetown Corridor Full Service Study (January 1991)

This study was carried out by GO Transit. The Full Service Study built on the conclusions of the previous studies, in which the technical and operational feasibility of expanding GO Train service on the Georgetown line was established. The purpose of the Full Service Study was to look more closely at the physical characteristics and the potential environmental impacts of the proposal, and review in greater detail any operational constraints, which may exist. The product of the study included a report documenting a functional track work design on 1:2000 scale plans, structural plans and requirements, station plans (including potential new stations), train layover site plans, property requirements, and cost estimates associated with the proposed work.

GO Transit, upon reviewing the Full Service Study Final Report, decided that adequate technical feasibility and rationale existed to proceed to the next stage in the process – the preparation of an Environmental Study Report (ESR).

GO Transit Georgetown Corridor Full Service Study Environmental Study Report (February 1994)

This Class EA study was commenced in 1992 by GO Transit as a follow-up to the previous Full Service Study. The study progressed through the Public Consultation process, including the identification of a preferred alternative. The draft report was prepared but never filed on the public record due to funding cutbacks at the time. These cutbacks restricted GO Transit's ability to undertake the major expansion required to implement full service on the Georgetown line.

GO Transit Georgetown Corridor Planning Study Final Report (February 2002)

This assignment, carried out by GO Transit, was a technical update to the 1994 Full Service study and considered various staging options for the project.

GO Transit Georgetown South Corridor Service Expansion and Airport Transportation Link Between Lester B. Pearson Airport and Union Station Environmental Assessment Terms of Reference October (2006)

This Terms of Reference for an Individual Environmental Assessment was completed and submitted to the Ministry of Environment in October 2006.

2.1.2.2 Union-Pearson Rail Link

Airport Transportation Link – Background and Previous Studies

There has been an interest in improved transit connections to Pearson Airport since the late 1980s. This interest has been manifested in a number of studies undertaken since that time and listed below.

Transit Access to Lester B. Pearson International Airport final Report (July 1989)

This study was undertaken by the Toronto Area Coordinating Office of the Ontario Ministry of Transportation. The purpose of the study was to develop and evaluate options for better integration between regional / local public transit and the intra-airport

transit system as well as to identify options for improved transit access to LBPIA made possible by expansion of local and regional transit services and to provide input to the planning of regional gateway facilities in the general area.

The study provided a discussion of the LBPIA transportation situation as well as an overview of development plans and parking facilities. It also included a description and assessment of the existing roadway network and transit services providing access to and from the airport. The travel characteristics of daily travel generated by LBPIA were outlined. Finally the study provided a general assessment of a range of options for improved transit service to the airport and conclusions and recommendations regarding improved transit services.

Overview of a GO Transit Connection, Pearson International Airport to Downtown Toronto (February 1990)

This study was prepared for the Special Advisor to the Premier Waterfront Development; the purpose was to investigate the potential to provide access to LBPIA through a connection to the GO Georgetown corridor. The study provides a general assessment of different types of transit technology and operational strategies, the general upgrading requirements for the corridor and options for a connection from the GO Georgetown corridor to the airport terminals.

The study identified the travel time for each of these links to the airport and comments on the major concern with the services as the unreliability of travel time due to traffic conditions encountered by buses traveling in mixed traffic. The study discusses the need to upgrade the rail corridor to accommodate reasonably frequent airport service and identifies the major improvements as a rail to rail grade separation at the West Toronto Diamond, double tracking of the line to the Halwest Junction and a new station for the alternatives involving a transfer connection to the airport. Preliminary capital costs estimates are provided for this upgrading. The study provides preliminary suggestions for stations on the rail corridor and routing suggestions for the alternatives to the airport terminals.

Lester B. Pearson and Area Transportation Study, Subway Connection – Kipling Station to Lester B. Pearson Airport Review Paper (November 1991)

This is a relatively brief paper prepared for the Ontario Ministry of Transportation (MTO) as input to the *Lester B. Pearson International Airport Area Transportation Study*. The purpose of the paper was to provide a general review of two corridors that could be used for a future transit link between the Kipling Station on the TTC Bloor Subway and LBPIA. The scope was limited to this specific connection and two possible corridors, namely Highway 427 and the Richview – Manby Hydro corridor. It was intended as an assessment of a potential opportunity to provide improved public transit service to LBPIA. A comparison of the corridor alignment options and different types of transit technology was provided based on transportation service, impacts, flexibility, staging, and capital costs. The costs were intended as order of magnitude costs only as property acquisition and a number of likely construction requirement costs were not included.

2.2 PURPOSE OF THE PROJECT

The purpose of the project is to provide the infrastructure improvements required to accommodate forecasted GO ridership growth in the corridor 15 years from now and

beyond; and facilitate the rail connection between Union Station and Pearson Airport as identified in the Big Move #2. The Union-Pearson rail link would operate from Union Station with stops at Bloor GO Station, Weston GO Station and terminate at Pearson Airport.

The Georgetown South Corridor

GO Transit's Georgetown Corridor runs southeasterly from the town of Georgetown through Brampton, north of Pearson Airport, through west Toronto and continues southeast to terminate at Union Station in downtown Toronto.

This study includes the Georgetown South Corridor from Bathurst Street in Toronto to just west of Highway 427 (Region of Peel). A separate GO Transit Class EA on the expansion requirements for the Georgetown North Corridor, west of Highway 27 north of this study area has been completed. However, as the EA for the expansion of the Georgetown North Corridor was completed before the publication of Metrolinx's Big Move, additional study will be required to incorporate the priorities outlined in the Big Move into the expansion proposals of the Georgetown North Corridor.

The Georgetown South Corridor (this study) utilizes the tracks of the Weston Subdivision, which vary between one and two mainline tracks that have to accommodate the GO Transit commuter rail service, CN freight service, and VIA passenger rail service. Other GO services also utilize certain sections of the Georgetown South Corridor. These include Milton, Barrie and the future Bolton Service. CP freight service operates on a parallel corridor between the West Toronto Diamond and the CP Mactier Subdivision (Proposed GO Bolton Corridor).

Due to the track capacity and operating restrictions, commuter rail service between Union Station and Georgetown is currently limited to four peak period trains in the peak direction with some off-peak bi-directional service. Over the course of a normal weekday, ten trains travel towards Union Station and nine trains make the trip in the reverse direction. Within the limits of this study, 3 existing stations are located at Etobicoke North, Weston and Bloor.

The Big Move 15 and 25 year plans identify the following service levels for the various GO Transit routes utilizing this corridor:

- Full day 2-way express rail service between Brampton and Toronto
- Full day 2-way regional rail service between Georgetown and Toronto, making all stops
- Potential for additional services (likely peak hour service) between Kitchener/Waterloo/Guelph and Toronto
- Peak hour service between Bolton and Toronto
- Full day 2-way service between Barrie and Toronto
- Full day 2-way service between Milton and Toronto
- Full day 2-way service between Union Station and Pearson Airport, with stops at the Weston and Bloor GO stations
- Express rail service to be extended to Cooksville on the Milton Line

The total number of tracks required to support this level of service is shown in **Figure 2.2-1**. From the southern study limits at Bathurst Street, the future recommendation is for a total of **eight** GO mainline tracks of which **two** GO mainline tracks branch off to form

the GO Barrie Corridor; this leaves **six** GO mainline tracks of which **two** GO mainline tracks again branches off to form the GO Milton Corridor; leaving **four** GO mainline tracks which proceeds to the end of the study corridor.

Further details of the Georgetown South Corridor proposed mainline track requirements and service levels are contained in **Appendix A**.

Additionally in the corridor, two CP mainline tracks join the corridor at the West Toronto Diamond and split off to form the existing CP Mactier Subdivision (Proposed GO Bolton Line).

The total trackage shown will be capable of supporting the service levels proposed as part of The Big Move. The trackage shown therefore translates into the number of trains in the corridor shown in **Table 2.2-1**. For ease of comparison, the table shows existing daily number of trains in the corridor, the opening day projected daily number of trains in the corridor and long term projected number of trains in the corridor. **Figure 2.2-2** illustrates the location of the screenlines used to determine the number of trains along the corridor. Screenline A-A was used to determine the number of trains passing through the western limits of the study corridor. Screenline B-B was used to determine the number of trains passing through the eastern limits of the study corridor,

Table 2.2-1: Existing and Projected Daily Number of Trains in the Corridor

	Existing (trains/day)	Projected Opening Day (trains/day)	Projected Long Term (trains/day)*
VIA	6	12	12
GO Georgetown	19	59	112
CN	4	4	4
UPRL	-	140	140
A-A Screenline Total	29	215	268
GO Bolton	-	8	12
GO Milton	12	53	97
GO Barrie	8	47	87
B-B Screenline Total	49	323	464
CP**	21	21	21

Note:

* = 2-way all day express and local GO Transit Service

** = CP trains enter and exit the corridor at the West Toronto Diamond and the CP Mactier Subdivision (Proposed GO Bolton Line)

It should be noted that the projected figures shown in Table 2.2-1 represent the projected maximum number of trains required to serve the forecast long term (25 year) ridership demands projected in the Metrolinx RTP "The Big Move". This assumes full build-out of the RTP plan and achievement of employment and population growth forecasts. This approach establishes the ultimate design infrastructure footprint. In practice however, the growth in train service and staging of infrastructure improvements will develop at a pace that reflects the actual growth in ridership based on residential and employment expansion in the service area and the operators' ability to service that demand both financially and technically.

The Regional Transportation Plan (RTP) outlines ridership volumes and service levels required for the 2031 AM peak hour. This provides design horizon data to calculate the number of tracks required. The RTP calls for full day, 2-way express and regional rail (trains make all stops) GO train service between Union Station and Brampton. During the AM peak hour, there will be southbound express and local GO and VIA trains. In addition, there will also be northbound (counter-peak) express and local GO and VIA trains. The northbound and southbound trains cannot use the same track. In addition,

express and local trains traveling in the same direction cannot use the same track as the express trains would overtake the local trains. For these reasons, 4 separate tracks are required. There is 1 existing track serving Georgetown Corridor trains now, so 3 new tracks are required. Two existing tracks on the Milton Corridor join the Georgetown Corridor at the West Toronto Diamond (e.g. Keele/Dundas). In the future, the 4 Georgetown Corridor tracks and the 2 Milton Corridor tracks will run in parallel from the West Toronto Diamond to Parkdale (Lansdowne Avenue). In Parkdale, one existing track from the Barrie Corridor joins the Georgetown Corridor. The RTP requires expansion of GO services on the Barrie Line to full day, 2-way service with trains making all stops. This requires 1 new track to service Barrie Corridor trains. South of Parkdale, the 2 Barrie, 2 Milton and 4 Georgetown tracks run in parallel to Bathurst Street. During the AM peak, Rail Link trains operate between GO and VIA express trains. As noted above, the staging of infrastructure construction and the expansion of GO services over time will be addressed in more detail in the next phase of the project (e.g. detailed design). Please see **Appendix A** for further information about the number of tracks required.

Union-Pearson Rail Link

The Union-Pearson Rail Link as proposed will use the opportunity of the GO Rail track expansion to provide a new semi-express transit service, using smaller rail vehicles, stopping at the Weston and Bloor stations, between downtown Toronto and LBPIA. As part of The Big Move, this rail service will be one of the many high-order transit connectivity to the Pearson Airport district. This service will provide better integration between regional / local public transit and the intra-airport transit system as well as improved transit access to LBPIA.

This new air rail link service will compliment existing and proposed commuter rail service and remove even more cars (and associated green house gases) from the already congested road system. In addition, the added convenience and attraction of a direct rail service will add to the attraction of the City of Toronto as both a business and tourist destination.

2.3 GENERAL DESCRIPTION OF THE PROJECT

2.3.1 Georgetown South Service Expansion

The proposed Georgetown South Service expansion extends northwesterly from the study limits at Bathurst Street and will consist of eight GO mainline tracks of which two GO mainline tracks branch off to form the GO Barrie Line; this leaves six GO mainline tracks of which two GO mainline tracks again branches off to form the GO Milton Line; leaving four GO mainline tracks which proceeds to the end of the study corridor. All road and rail crossings within the study corridor are being eliminated and replaced with grade separations to accommodate the increased rail traffic, reduce community disruption, and avoid collisions at level crossings.

Three stations, Bloor GO Station, Weston GO Station and Etobicoke North GO Station, are located within the study corridor. Refer to **Section 5.2** for the details of profiles, alignments, structural requirements and relevant station works within the study corridor.

2.3.2 Union-Pearson Rail Link

The Union-Pearson rail link service, proposed as part of this project, will be a key step towards the goal of The Big Move #2, by providing a rail service from Union Station to Pearson Airport.

The Union-Pearson rail link would operate from Union Station with stops at Bloor GO Station, Weston GO Station and terminate at Pearson Airport. Refer to **Section 5.2.3** for further details. The Union-Pearson will operate along the GO Georgetown corridor and then utilize a spur line from Highway 427 into Terminal 1 at Pearson Airport.

2.3.2.1 Maintenance Facility

The Union-Pearson Rail Link Operations Management Centre (OMC) will be situated on the Spur Line alignment between north of Northwest Drive and Network Road. Refer to **Section 5.2.3** for further details.

2.3.3 Property Impacts

The majority of the proposed rail corridor alignment utilizes the railway lands. In certain sections of the alignment, portions of private properties and public lands will need to be acquired to accommodate the proposed tracks, and station facilities.

There are two basic types of property acquisition necessary in order to construct the proposed project:

- 1) Full Acquisition – fee simple acquisition of an entire piece of property. This is required where a surface facility or realignment of a roadway or railway will substantially occupy the affected property and/or prohibits ingress/egress to the remaining property.
- 2) Partial Acquisition – fee simple acquisition of a portion of property. This is required where a surface facility or realignment of a roadway or railway occupies only a small portion of the overall property.

Locations of the impacted properties identified to date are outlined in **Sections 2.3.3.1 and 2.3.3.2**. The property requirements identified in this study are preliminary and are subject to change as the detailed design phase of this project proceeds. Additional property along the corridor may be required for placement of signal bridges as well as signal footings and bungalows. See Appendix J for a typical signal bridge. These specific locations will be determined during detailed design and discussions with the relevant property owners will also be undertaken during detailed design. Between the West Toronto Diamond and the CP Mactier Subdivision, portions of the CP property are required in order to accommodate the additional tracks and upgraded stations.

In acquiring property, the objective is to provide fair compensation within the framework of the *Expropriations Act* for any property acquired or affected by civic projects. Should the proponent need to acquire property, compensation is based on the market value of the property or the loss in market value to the property in the case of a partial acquisition. The market value is based on what similar land might be expected to sell for if sold on the open market by a willing seller to a willing buyer.

Figures 2.3.3-1 to 2.3.3-18 illustrates the preliminary property requirements.

Additional details regarding property requirements along the Union-Pearson Rail Link spur line and Operations Maintenance Centre (OMC) are provided in **Section 2.3.3.3**.

2.3.3.1 Corridor Requirements

Since the proposed rail corridor alignment utilizes the railway lands, only partial taking of some adjacent properties will be required along the corridor. **Table 2.3.3.1-1** outlines the proposed partial takings along the corridor. **Figures 2.3.3-1 to 2.3.3-18** illustrates the preliminary property requirements.

Table 2.3.3.1-1 Preliminary Property Requirements along the corridor

Location of Preliminary Property Requirements	Partial Taking	Figure
West of Queen Street	South side of corridor	2.3.3-1
East of Dundas Street	South side of corridor	2.3.3-2
West of Lawrence Avenue West	South side of corridor	2.3.3-3
Church Street	South side of corridor	2.3.3-4
CP Mactier Sub	North side of corridor	2.3.3-5
East of Weston Road	North side of corridor	2.3.3-6
Islington Avenue	South side of corridor	2.3.3-7
Highway 401	North side of corridor	2.3.3-7 and 2.3.3-8
Kipling Avenue	North and south side of corridor	2.3.3-9
Kipling Avenue to Martin Grove Road	North and south side of corridor	2.3.3-9- to 2.3.3-11
West of Martin Grove Road	South side of corridor	2.3.3-12
Highway 27	South side of corridor	2.3.3-14
Carlingview Drive	South side of corridor	2.3.3-15 to 2.3.3-17
West of Highway 427	South side of corridor	2.3.3-18
Martin Grove Road to Goreway Drive	North side of corridor	2.3.3-12 to 2.3.3-18

2.3.3.2 Grade Separations

All level road crossings along the corridor are being eliminated resulting in five new grade separations. For the Denison Road East grade separation a number of properties will be required in order to continue to provide access along this roadway.

Denison Road East

For the Denison Road East roadway underpass, it is anticipated that a total of 17 properties will be impacted or required. 10 properties on the along the north side of Denison Road between Weston Road and the GO Georgetown corridor and one property on the southeast corner of Denison Road and Weston Road will be required

due to the realignment of Denison Road East. Two properties on the south side of Denison Road west of the GO Georgetown corridor will require partial taking due to the two-way property access road. Part of one property on Sam Frustaglio Drive will be required due to the cul-de-sac at Sam Frustaglio Drive. Accesses to two properties on the north side of Denison Road between the GO Georgetown corridor and Sam Frustaglio Drive will be impacted. However, alternative accesses will be accommodated. **Figures 2.3.3-19** illustrates the preliminary property requirements. These preliminary property requirements may change as detailed design progresses and the concepts are further developed.

Table 2.3.3.2-1 contains a full list of preliminary property requirements at Denison Road East. The property requirements identified below are preliminary and the final number will be determined as the detailed design of this project proceeds.

Table 2.3.3.2-1 Preliminary Property Impacts at Denison Road East Grade Separation

Physical Address	Full Property Required	Part of Property Required	Change to Access
4 Denison Road East	Realignment of Denison Road East		
6 Denison Road East	Realignment of Denison Road East		
10 Denison Road East	Realignment of Denison Road East		
12 Denison Road East	Realignment of Denison Road East		
14 Denison Road East	Realignment of Denison Road East		
16 Denison Road East	Realignment of Denison Road East		
18 Denison Road East	Realignment of Denison Road East		
20 Denison Road East	Realignment of Denison Road East		
22 Denison Road East	Realignment of Denison Road East		
21 Denison Road East		Cul-de-sac at the end of the existing Denison Road East (property access road)	
23 Denison Road East		Cul-de-sac at the end of the existing Denison Road East (property access road)	
1647 Weston Road	Realignment of Denison Road East		
1655 Weston Road		Realignment of Denison Road East	
1631 Weston Road	Realignment of Denison Road East		
3 Sam Frustaglio Drive		Cul-de-sac at the end of Sam Frustaglio Drive	
42 Denison Road East			Regrading of Denison Road

Physical Address	Full Property Required	Part of Property Required	Change to Access
			East. Alternative access proposed from Sam Frustaglio Drive
46 Denison Road East			Regrading of Denison Road East. Alternative access proposed further east on Denison Road East.

A meeting with property owners that had been identified as being significantly impacted was held on April 14, 2009 at the Weston Public Library. This session provided a private forum to ask questions and discuss concerns, prior to announcing the proposed project.

Hand-outs included a property impact map and Fact Sheet 1 entitled Property. Owners requesting the advance purchase of their property were advised to write to Metrolinx. The property owners at 1655 Weston Road were very concerned about the reconstruction of their newly constructed driveway/entrance onto Denison Road East. The Project Team committed to work with the owners of 1655 Weston Road throughout the design process to ensure their entrance is reconstructed in a manner that will minimize impact their operations.

All owners present were reminded that property requirements and impacts may change as the project proceeds and the design is refined. Community input will continue as the design moves from proposal to detailed design and construction.

2.3.3.3 Union-Pearson Rail Link Spur Line and OMC

Union-Pearson Rail Link Spur Line and OMC Property Requirements

In total, the Union-Pearson Rail Link spur line and OMC will require approximately 5 ha of property from twenty-two (22) different parcels, of which, twenty (97% by area) are owned or leased by five government agencies, including:

Federal

- Greater Toronto Airports Authority (67%)
- Transport Canada (18%)

Provincial

- Ministry of Transportation of Ontario (3%)

Municipal

- City of Mississauga (9%)

The subject lands are on the Mimico Creek flood plain and they have been designated by the TRCA. They are vacant, or are used principally for transportation purposes, including:

- Highway 427
- Goreway Drive
- Zahavy Way
- Northwest Drive
- Dorman Road
- Viscount Road
- Airport Road
- LBPIA Link Train (Automated People Mover) Station at Terminal 1.

The remainder (2%) is owned by a private corporation conducting business on the property immediately north of the proposed Operations Management Centre.

Just over half of the property required for the spur line would be dedicated to the Operations Management Centre.

2.3.4 Major Natural Feature Impacts

Ecoplans Limited (Ecoplans) updated natural environmental work conducted by SNC-Lavalin as part of the previous Class EA Study (2005). This included updating secondary source information from agencies (Toronto and Region Conservation Authority [TRCA], Ontario Ministry of Natural Resources [MNR]) and undertaking field assessments to generally characterize terrestrial and aquatic features within the study area.

The following findings are of particular note:

- No *Provincially Significant Wetlands* (PSWs) are present within the study area. The rail corridor is not within 120 metres of a PSW.

- No provincially or regionally significant *Areas of Natural and Scientific Interest* (ANSIs) are present within the study area.
- No *Environmentally Significant Areas* (ESAs), as designated by MNR/TRCA, are present within the study area.
- The study area is located outside of the Greenbelt Plan Area and the Oak Ridge Moraine Plan Area.
- No species at risk or provincially rare plant or animal species were recorded during field work conducted in 2004, 2008 and 2009.
- There are no current records for federally designated Species at Risk (SAR) or provincially designated Species at Risk in Ontario (SARO) in the study area
- The TRCA database identified 2 species that are not listed in the Species at Risk Act (SARA) but are designated as Threatened by the Committee On the Status of Endangered Wildlife In Canada (COSEWIC);
 - o Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population) was recorded in 2001 within the Mimico Creek valley approximately 100 m north of the existing rail corridor. Works within the Mimico Creek valley are restricted to the south side of the existing rail corridor alignment, therefore no impacts to this species are anticipated;
 - o Common Nighthawk was identified in an urban residential neighborhood east of High Park, outside of the area impacted by the proposed works.

Please refer to **Sections 4.1** (Physical Environment) for additional information regarding existing conditions.

Given the long history of urbanization in the study area, the majority of natural features have been removed. The remaining natural environmental features within the study area are almost exclusively associated with the three watercourse/valley systems: Black Creek, Humber River, and Mimico Creek. Please refer to **Sections 6.1** (Physical Environment) for additional information regarding potential natural environment impacts and mitigation measures.

2.3.5 Relationship to Other Projects and Future Undertakings

2.3.5.1 Bolton

The proposal for the GO Bolton rail service is to use the existing GO Georgetown South Corridor and then spur off to the CP Mactier Subdivision to Bolton.

The Metrolinx's 15-year and 25-year RTP proposes a regional rail (peak) type service. This is a peak period peak direction only rail service similar to the existing GO Transit Georgetown rail system.

GO Transit's 2020 Service Plan also proposes peak period peak direction rail service with frequencies every 30 minutes or better. The Georgetown South service expansion project is required to provide additional capacity along the corridor to accommodate the GO Bolton service.

A feasibility study on the rail corridor to Bolton is currently underway and is expected to report by the end of the year.

2.3.5.2 *West Toronto Diamond*

Located near the intersection of Keele Street and Dundas Street, it is part of the Union Station terminal trackage. It links the tracks of CN railway with those of CP railway. CP's west Toronto yard is located immediately to the west. The West Toronto Diamond project was approved under the Ministry of the Environment Environmental Assessment and the Canadian Environmental Assessment Agency Environmental Assessment in 2005.

The West Toronto Diamond grade separation construction is currently underway to separate CP commuter rail lines and CP railways freight trains along GO Georgetown corridor. This project is being implemented to remove conflicts with the CP Rail freight and improve GO Transit's service requirements. This grade separation project is required for both the GO Georgetown service improvements and the Union-Pearson Rail Link service to function optimally.

The tracks along the GO Georgetown corridor will be lowered to run below CP's North Toronto line; rather than cross it. The new underpass will eliminate scheduling conflicts between CP freight trains and GO trains; therefore increasing the frequency of GO service on the GO Georgetown corridor.

To enable the construction of the depressed corridor and related bridge structures, third party utilities, as well as the Dupont Street bridge, trains signals and a major water main have had to be relocated.

The project is expected to be completed in the Spring of 2012.

2.3.5.3 *Union Station*

The expansion of GO Transit services and additional rail services would require update / retrofit to be undertaken at Union Station in order for it to be able to accommodate the additional tracks required to serve the various commuter lines. These modifications would include additional platforms and track capacity.

2.3.5.4 *Georgetown North*

The section of the Georgetown Corridor between Goreway Drive and Georgetown GO Station is referred to as the Georgetown North Corridor.

A long term full service rail improvements were developed and assessed as part of the Full Service Study and the Class EA Study in 1991 and 1994. A Georgetown Corridor Planning Study in 2002 was undertaken with the long term purpose of planning and designing infrastructure necessary to allow GO Transit to expand its current peak period peak direction commuter train service in the Georgetown Corridor to full (all day two way) service. However, as the EA for the expansion of the Georgetown North Corridor was completed before the publication of Metrolinx's Big Move, additional study will be required to incorporate the priorities outlined in the Big Move into the expansion proposals of the Georgetown North Corridor.

The Metrolinx's 15-year and 25-year RTP proposes service expansion between Union and Downtown Brampton to express service – High-speed trains, typically electric, serving primarily longer-distance regional trips with two way all day service – and between Downtown Brampton to Georgetown to a regional rail service (full day two way service) – Diesel-electric or electric trains serving primarily longer-distance regional trips with approximate capacity at 10 minute headways.

2.3.5.5 Service Expansion on the Milton and Barrie Lines

The RTP proposes service expansion on the Milton and Barrie lines. The track capacity to support this service within the Georgetown South Corridor has been included in the project. In addition, the train movements have been included in the noise, vibration and air quality impact assessment.

2.3.5.6 Transit City

Transit City is an initiative by the Toronto Transit Commission (TTC) that will introduce seven new Light Rail Transit (LRT) lines to many Toronto neighbourhoods. It is designed to provide new direct high quality transit links to areas that are currently far removed from rapid transit, including north, west, and eastern areas of Toronto shown in **Figure 2.3.5.5-1**. This initiative has received endorsement from the TTC, City of Toronto and the Government of Ontario. The projects identified in Transit City were incorporated into the Metrolinx RTP.

All of the seven routes have been chosen to connect with existing TTC subway system, GO rail stations, other Transit City routes, and planned rapid transit lines in the regions of Durham, York and Peel. The Government of Ontario has recently announced funding for the construction of four of the lines: Eglinton Crosstown LRT, Etobicoke – Finch West LRT, Scarborough LRT and Sheppard East LRT.

Three of the proposed lines are likely to interact with the GO Georgetown South corridor:

- Eglinton Crosstown LRT – this is a 31 km line linking Kennedy Station in the east with the airport and Mississauga Transitway in the west.
- Etobicoke – Finch West LRT – this 18 km route will connect Finch Station with north Etobicoke; provide direct service to Humber College and could ultimately be extended to Mississauga, the Woodbine race track or Pearson International Airport.
- Jane LRT – 17 km route which will stretch from Jane Street from the Bloor-Danforth subway to the new Steeles West Station on the Spadina Subway and potentially further into York Region.

The Eglinton LRT and the Finch West LRT have recently received capital funding from the Province of Ontario and will be in operation within the next 5 to 10 years

Further information on the Transit City projects can be obtained from the TTC website (www.ttc.ca).

Figure 2.3.5.5-1 Transit City Light Rail Plan



2.3.5.7 The Big Move 15-Year and 25-Year Plan

On November 28, 2008, the Metrolinx Board of Directors approved the 25-year Regional Transportation Plan for the Greater Toronto and Hamilton Area (GTHA) called The Big Move. This Regional Transportation Plan (RTP) has undergone extensive consultation since 2006, with the Federal, Provincial, and Municipal governments and the public. The RTP was designed to address the existing and growing transportation congestion in the region. The RTP is intended to address future regional transportation demand in a sustainable and environmentally responsible manner. The recommended 15 year rapid transit plan of the RTP includes the Georgetown South Service Expansion and the Union-Pearson Rail Link. **Figure 2.3.5.6-1** shows the RTP's 15-year plan. A key objective of the RTP is to connect the 17 Urban Growth Centres of the GTHA with rapid transit. Details of the 25 year plan are shown in **Figure 2.3.5.6-2**.

Tab 3: 3.0 Consultation

→ Insert **Tab 3 → 3.0 Consultation**

3.0 OUTLINE OF STUDY AND CONSULTATION PROCESS

3.1 INTRODUCTION

An extensive consultation process was undertaken to assist in the planning and impact assessment process for this project. The consultation process was designed to address the requirements of the Transit Project Assessment Process (Regulation 231/08 under Ontario's *Environmental Assessment Act*). Those consulted include the general public, local community groups, government review agencies, local municipalities and First Nations. This section outlines the consultation carried out in advance of and during the formal Transit Project Assessment Process.

Members of the public and stakeholders were able to choose their level of involvement in the project from one or more of the following options:

- Project Website (www.metrolinx.com/gsse)
- Community Open Houses
- Metrolinx Virtual Open House – open 24/7
- Community Workshops
- Individual Meetings
- Group Meetings
- Five public review locations
- Contacting the Project Team directly via mail, email, phone or fax

The Project Team also arranged meetings with a number of provincial, federal, and broader public sector agencies to discuss the relationship between this project and their mandates. The agencies included the following:

- Ontario
 - Ministry of the Environment
 - Ministry of Transportation
 - Ministry of Natural Resources
 - Ministry of Culture
 - Ministry of Aboriginal Affairs
- Federal
 - Transport Canada
 - Canadian Environmental Assessment Agency
 - Health Canada [check this one]
- Municipal, Broader Public Sector, and Private Sector
 - City of Toronto
 - City of Mississauga

- Region of Peel
- Toronto and Region Conservation Authority
- Toronto District School Board
- Toronto District Catholic School Board
- Greater Toronto Airports Authority

Throughout the study process, three rounds of Community Open Houses and two community workshops were held (Roncesvalles-Macdonell Residents' Association Community Workshop and the John Street Crossing Design Charrette). Each covered a range of subjects including: the scope of the project, current environmental conditions, potential impacts, proposed mitigation measures and the design and implementation of the John Street crossing. In addition to these public consultation efforts, various meetings were held with local community and business groups in order to better understand local issues and concerns. The details of these events are summarized in **Section 3.3**.

To notify the general public and property owners within the study area of the Transit Project consultation dates, newspaper advertisements were placed in local and regional newspapers informing the public of the status of the study and providing notices of each round of community open house. Similar notices were also placed on the project website at www.metrolinx.com/gsse.

Letters were sent to members of the general public and interest groups by regular mail and / or by email. As the study progressed, the mailing lists were updated to include new individuals taking an interest in the project. In addition, all property owners within 40 metres of the project were advised of the Notice of Commencement and all community open houses. Notice was also given to local First Nations.

The Notice of Commencement of the Transit Project Assessment Process was completed in accordance with the requirements of Section 7(4) of the regulation. Specifically:

- Letters were sent to every assessed owner of land within 40 metres about the project, exceeding the regulatory requirement of 30 metres.
- Letters also were sent to tenants living in apartment buildings adjacent to the corridor, again exceeding the regulatory requirement which makes no provision for notifying tenants.
- All members of the public that participated in previous consultation events received notification.
- Newspaper Ads were placed in The Toronto Star on April 2 and 9, 2009 and Toronto L'express on April 7 and 14, 2009.
- Notices also were put in 8 community papers about the start of public consultation for the project.
- A notice was posted on the project website.

3.2 STUDY ORGANIZATION AND STUDY STAGES

Overall, the study consisted of three main stages:

- Stage 1: Prior to the Notice of Commencement for the Transit Project Assessment Process
- Stage 2: Following the Notice of Commencement of the Transit Project Assessment Process
- Stage 3: During the release of the Draft Environmental Project Report

The focus of Stage 1 was to generate and evaluate alternative designs, prepare draft reports and consult with stakeholders. This occurred between December 2008 and April 1, 2009. The consultation undertaken as part of this stage is outlined in **Section 3.3.1**.

The focus of Stage 2 was to consult on the project, the alternatives considered, the potential impacts and proposed mitigation measures. The Notice of Commencement of the Transit Project Assessment Process was formally issued on April 2, 2009. The consultation undertaken as part of this stage is outlined in **Section 3.3.2**.

The focus of Stage 3 was to consult with stakeholders on the Draft Environmental Project Report (Part 2), released for comment on May 29, 2009, and to review and revise the report as per stakeholder comments received. The consultation undertaken as part of this stage is outlined in **Section 3.3.3**.

Throughout the study process, various draft technical project reports were completed. The results of these reports were documented in the Draft EPR and made available for review. These included:

- Terrestrial Ecosystems Impact Assessment, Georgetown South Service Expansion and Union-Pearson Rail Link, Transit Environmental Assessment – Draft (Ecoplans, May 2009) – provided to MOE, MNR, TRCA and the Federal Review Team (FRT)
- Fish and Fish Habitat Impact Assessment, Georgetown South Service Expansion and Union-Pearson Rail Link, Transit Environmental Assessment – Draft (Ecoplans, May 2009) – provided to MOE, MNR, TRCA and the FRT
- Human Health Assessment of Air Quality Impacts, Georgetown South Corridor Service Expansion and Union Pearson Rail Link Environmental Assessment – Draft (Intrinsik, June 2009) – provided to MOE, FRT, City of Toronto Medical Officer of Health, Stakeholders listed in the Medical Officer of Health Report (including School Boards) and on the Project Website
- Air Quality Assessment, Georgetown South Service Expansion & Union Pearson Rail Link, Toronto, Ontario – Draft (RWDI, June 2009) – provided to MOE, FRT, City of Toronto Medical Officer of Health, Stakeholders listed in the Medical Officer of Health Report (including School Boards) and on the Project Website
- Noise and Vibration Impact Assessment, GO Transit Georgetown South Service Expansion and Union-Pearson Rail Link – provided to MOE, FRT, City of Toronto Medical Officer of Health, Stakeholders listed in the Medical Officer of Health Report (including School Boards) and on the Project Website
- Existing Conditions: Identified Cultural Heritage Resources, Transit Project Assessment Process: Georgetown South Service Expansion and Union-Pearson

Rail Link, City of Toronto, City of Mississauga and City of Brampton, Ontario (Unterman McPhail Associates, April 2009) – provided to Ministry of Culture and FRT

- Existing Conditions and Impact Assessment Report, Transit Project Assessment Process: Georgetown South Service Expansion and Union-Pearson Rail Link, City of Toronto, City of Mississauga and City of Brampton, Ontario – Draft (Unterman McPhail Associates, May 2009) – provided to Ministry of Culture and FRT
- Stage 1 Archaeological Assessment – Georgetown South Service Expansion and Union-Pearson Rail Link (Archaeological Services Inc., March 2009) – provided to Ministry of Culture and FRT
- Hydraulics Technical Memorandum – Hydraulic Assessment of Humber River, Metrolinx – Georgetown South Link (MRC, May 2009) – provided to MOE, MNR, TRCA and the FRT
- Hydraulics Technical Memorandum – Hydraulic Assessment of Black Creek Bridge, Metrolinx – Georgetown South Link (MRC, June 2009) – provided to MOE, MNR, TRCA and the FRT
- Mimico Creek Crossing Hydraulic Analysis Report, Union-Pearson Rail Link Project (W.G. Clarke, June 2009) – provided to MOE, MNR, TRCA and the FRT

All of the above draft technical project reports have been finalized and are available under separate cover.

3.3 CONSULTATION OVERVIEW

As noted in **Section 3.2**, consultation for this project occurred in three stages – prior to the Notice of Commencement for the Transit Project Assessment Process, following the Notice of Commencement of the Transit Project Assessment Process, and during the release of the Draft Environmental Project Report. The following sections summarize the consultation completed during each stage and are organized into discussions regarding public, government agency, municipal and First Nation consultation.

3.3.1 Pre Notice of Commencement Consultation

The following sections outline consultation completed prior to the Notice of Commencement being issued under the Transit Project Assessment Process. The Notice of Commencement was issued on April 2, 2009.

3.3.1.1 *Summary of Public Comments*

Introduction and Community Consultation Overview

Metrolinx developed a broader community relations strategy for the entire rail corridor impacted by the service expansion. The success of any major infrastructure project depends on building strong community relationships to ensure the proponent (for this project, Metrolinx) understands local issues and can respond appropriately. Building these relationships also make sure communities stay engaged and informed.

As part of this project, Metrolinx implemented a Stakeholder Engagement Strategy that included broad outreach – community open houses, online consultations through state-of-the-art software, e-mail communications, web-based information, advertising and statutory notices, one-on-one meetings with individual citizens and proactive outreach to community groups.

The following outlines the major community stakeholder events that occurred prior to the Notice of Commencement.

I – Metrolinx Announced as Project Proponent – December 2008

On December 15, 2008, Metrolinx was announced as the new proponent for the Georgetown South Service Expansion and Union-Pearson Rail Link Project. At this time, it was also announced that the project will be evaluated under the Transit Environmental Assessment (EA) Process.

Media

A news release and backgrounder were released to all Greater Toronto and Hamilton Area media in both French and English on the CNW newswire

Community Outreach

Introductory outreach calls were made to the corridor community groups who served on the Public Liaison Committee which was active during the previous EA Study. Groups contacted included:

- Liberty Village Business Improvement Area
- Friends of Fort York
- Westbend Community Association
- Roncesvalles Business Improvement Area
- Roncesvalles Macdonell Residents' Association
- West Toronto Railpath Group
- Parkdale Business Improvement Area
- Parkdale Residents' Association
- High Park Residents' Association
- Weston Community Coalition
- Rosland Ratepayers's Association
- Turnberry Residents' Association
- Silverthorn Ratepayers' Association

II – Metrolinx Announces Revised Project Proposal – January 2009

On January 21, 2009 Metrolinx announced a revised proposal to expand service for travelers on the Georgetown GO Line to Etobicoke, Bramalea, Brampton, Georgetown, and to and from Toronto Pearson International Airport.

Media

A news release and backgrounder were released to all Greater Toronto and Hamilton Area media in both French and English on the CNW newswire. At that time, it was also announced that Metrolinx would consult with the public in advance formally commencing the Transit EA Process. As part of this, Metrolinx announced plans to host a series of six pre-Notice of Commencement Open Houses. Details of the community open houses were included in the Backgrounder.

Following the announcement, Metrolinx received 22 media calls, 21 of which resulted in publications regarding the project.

The Notices for the Open Houses also appeared in the following regional and community newspapers:

- Parkdale-Liberty Villager on 01/23 and 30/09
- City Centre Mirror on 01/23 and 30/09
- Annex Guardian on 01/23 and 30/09
- Etobicoke Guardian on 01/23 and 30/09
- York Guardian on 01/23 and 30/09
- Georgetown Independent on 01/23 and 30/09
- Mississauga News on 01/23 and 30/09
- Mississauga le Metropolitan 01/28/09 and 02/02/09
- Toronto Star on January 01/21/09
- Toronto L'express on 01/27/09

Community Outreach

The public notice was also mailed to over 600 individual households who had provided their addresses to receive more information about this specific project.

E-mails were sent to parties who were known to be interested in the Open House process. On January 21, 2009 an email notice was sent announcing the project details and upcoming community open house (120 recipients).

On February 3, 2009, a follow up email blast last was sent out announcing the Metrolinx online consultation portal was open (718 recipients).

In addition to the Open Houses, Metrolinx also undertook the following channels for continued community outreach and feedback:

- GO Georgetown micro-site with project background and details: metrolinx.com/gsse
- Metrolinx Virtual Open House – online, convenient, and open 24/7, project details are available for public review and comment
- Email: public could send questions or comments to info@metrolinx.com
- Telephone: public could leave comments or questions at 1-866-658-9890 – the line was monitored daily for messages
- Fax: 416-874-5901

- Mail: GSSE-UPRL Project, Metrolinx, 20 Bay Street, Suite 901, Toronto, ON M5J 2N8

All materials, including background documents and FAQs were posted on the Metrolinx web site. Interested parties were advised that comments could be provided on-line, in writing, by telephone, and at the Open Houses. They were told comments received prior to March 16, 2009 would be reflected in the upcoming draft Environmental Project Report, but also that all comments received would form part of the public record for this project.

III Community Open Houses – February 2009 (pre-notice of Commencement)

Before issuing the formal Notice of Commencement, Metrolinx hosted a series of Open Houses. The purpose of these open houses was to provide an initial opportunity for communities to review the proposed project. Local residents were encouraged to attend, view the materials on display, and speak to the technical team.

Open House Schedule:

- Westbend Community: Lithuanian House, 1573 Bloor Street West on February 2, 2009
- Mount Dennis Community: Mount Dennis United Church, 71 Guestville on February 4, 2009
- Weston Community: Weston Park Baptist Church, 1871 Weston Road on February 6, 2009
- Liberty Village Community: Direct Energy Centre, CNE Grounds on February 9, 2009
- Malton Community: Malton Community Centre, 3540 Morning Star Drive, February 10, 2009
- Georgetown Community: Gordon Alcott Memorial Arena (Georgetown), 221 Guelph Street February 12, 2009

All of the Open Houses were held from 11:00am-8:30pm.

Listing of Display Boards:

Display Boards
Welcome Board
Project Introduction
Study Key Plan
Metrolinx and the Regional Transportation Plan
Metrolinx Vision for the Region
Metrolinx 15 Year Plan
Metrolinx 25 Year Plan
Ontario Transit Environmental Assessment Process
Study Key Plan w/ Aerial
Project Benefits 1

Project Benefits 2
Metrolinx Service to the Airport
Alternative Services to the Airport
Future Vehicles/ Corridor Demand
Transforming Transportation in the GTHA
Track Layout (Existing and Future)
Main Project Components
Introduction Plan, Profile and Road Crossing Alternatives
Corridor Plan and Profile –Plate 1
Strachan Ave Grade Separation Alternatives
Corridor Plan and Profile –Plate 2
Corridor Plan and Profile –Plate 3
Corridor Plan and Profile –Plate 4
Corridor Plan and Profile –Plate 5
Corridor Plan and Profile –Plate 6
Denison Rd Grade Separation Alternatives
Corridor Plan and Profile –Plate 7
John St. Grade Separation Alternatives
King St., and Church St. Road Crossings
Weston Tunnel Cross-section
Corridor Plan and Profile –Plate 8
Corridor Plan and Profile –Plate 9
Corridor Plan and Profile –Plate 10
Corridor Plan and Profile –Plate 11
ARL Plan and Profile – Plate 1
ARL Plan and Profile – Plate 2
Environmental Impact Assessment & Mitigation
Environmental Factor Area
What's Next

Attendance + Feedback from February Open Houses

Through the course of these Open Houses, Metrolinx:

- communicated with 700 Open House Attendees;
- received 267 comment forms;
- received an additional 116 online submissions;

	Guests (counted)	Guests (signed-in)	Comments Forms Received
Westbend	114	114	41
Mt. Dennis	107	91	24
Weston	358	287	100
Liberty Village	79	57	31
Malton	57	39	6
Georgetown	22	18	4
Online		31	116
TOTAL GUESTS COUNTED: 737			
TOTAL COMMENTS RECEIVED – Including online submissions: 322			

As part of the community outreach, members of the public could send comments, suggestions or questions to info@metrolinx.com.

As part of the pre notice of commencement consultation, 53 emails were received. Below is a break down by key themes.

General Comments	9
Electrification	4
Environmental Impacts	4
GO Stops/GO Services	8
Project Details	6
Railpath/Cycling	13
Strachan Grade Separation	1
UPRL/Private Partners	3
Weston/John Street Crossing	5
Total Emails Received	53

As similar themes began to emerge in the correspondence, members of the public were added to the email distribution list to receive regular study updates as well as the summary of key themes and Metrolinx responses. This approach ensured all members of the public with similar concerns were receiving the most up-to-date information as it become available.

In addition, members of the public could call a 1-866-658-9890 number with questions or comments. Nine calls were received as part of the pre notice of commencement consultation. All these calls were administrative in nature, largely queries for logistical

details for the Open houses, and the project's Community Relations Officer was able to directly respond to these calls.

**General Themes in Public Feedback (Feedback Forms + Online)
Community Open Houses in February 2009**

The following is a summary of the key themes from public comments (online and feedback forms) received at the February 2009 Open Houses:

Theme	Number of Comments Received	Response
Electrification/Clean Diesel	85	Service expansion to the western part of the region was needed many years ago. We need to proceed now with service improvement on this corridor. The Big Move lays out plans for possible future electrification on specific corridors, including the Georgetown Corridor. Metrolinx will work to design now so as not to preclude electrification in the future
Private Partner Operating the Union-Pearson Rail Link	83	The project is defined by GO Transit's future operating needs. It also opens up the opportunity to offer the Air-Rail Link service on GO Transit Infrastructure. Contract negotiations are currently being conducted by Infrastructure Ontario with a private sector operator in a separate process. Questions concerning that process should be directed to Infrastructure Ontario.
Environmental Impact Studies	67	Our team of professionals is working on air, noise, vibration, human health and construction impact analysis. Results and potential mitigation strategies will be shared once available.
The John Street Crossing	38	Closing John Street to vehicles requires the least amount of property acquisition and is the most cost effective. Metrolinx will continue to work with the community and local businesses in the coming months to address safety, accessibility, and community sustainability concerns around the John Street Pedestrian Bridge.

Theme	Number of Comments Received	Response
King Street/Queen Street Station	38	The TTC currently provides frequent service along King Street West and Queen Street West that connects travelers to GO Transit at both Union and Bloor Stations. GO Transit's regional trip times would also be slower if additional stops were added. There are a number of technical challenges that preclude a GO stop at either a King or Queen Street West location, including large scale disruption to the streetscape, acquisition of adjacent properties, and the challenge of fitting a platform on the curve.
Assessing Damage as a result of vibration.	15	Preliminary vibration analysis indicates that damage of adjacent buildings is highly improbable. With the cooperation of the building owners, building inspections will be done adjacent to the corridor before construction.
Incorporate the West Toronto Railpath and City of Toronto's Bike Plans	12	Metrolinx is working closely with the City of Toronto to integrate the plans for the Georgetown South Rail Corridor with the City's Bike Plan, including the West Toronto Railpath on the east side of the Georgetown Rail Corridor between Dundas and Queen Street.
Future of the Weston GO Station	9	An important component of the project is the relocation of the existing GO Weston Stop from John Street to Lawrence Avenue and the construction of a new Weston Station to accommodate GO trains and Union-Pearson rail link trains. Metrolinx and GO Transit are committed to the Weston GO Station. The status of this station will not be impacted by the proposed Eglinton Station in the future. This was further underscored in the provincial legislature by Jim Bradley, Minister of Transportation on March 2, 2009, who stated publicly that the Weston GO station would not close.

Theme	Number of Comments Received	Response
Use of the Transit Project Assessment Process instead of following up a commitment for an individual environmental assessment (EA) which looks at all service delivery alternative	n/a	The Ontario government made a policy choice to create a focused process for transit projects because it is believed that it would deliver the environmental, social and economic benefits of improvements in transit far sooner than a conventional EA process which uses too much time to looking at rationale and alternatives that are unlikely to ever be implemented.

IV) Ongoing Community Engagement

Understanding local concerns and interests is invaluable. For instance, the concerns of a seniors' centre will be distinct from those of a local BIA or a city-wide cycling group, and each group requires the appropriate level of targeted outreach – which could range from something as simple as email updates or online information, to more specific one-on-one meetings or community workshops.

Metrolinx proactively engaged, groups ranging from:

- Business Improvement Associations (Roncesvalles Village, Liberty Village, Parkdale, Weston);
- Resident Associations (Roncesvalles-Macdonald Residents Association, West Bend Residents Association, Brockton Triangle Residents Association, Weston Community Coalition, Mount Dennis Residents Association, Pelmo Swanek Community Association, Carleton Village Residents Association, Silverthorn Ratepayers Association);
- York West Seniors Centre;
- Friends of Fort York;
- West Toronto Railpath;
- Weston Historical Society; and,
- Weston Golf and Country Club.

The following is a listing of opportunities the Metrolinx team had to meet with a series of community stakeholders prior to the Notice of Commencement. The intent of these meetings was to meet with local groups to get a better sense of local issues and concerns, and to stay abreast of community issues:

Meeting with	Weston Community Coalition
Date	Monday, January 19, 2009
Attendees	Representatives from the WCC Mount Dennis Residents Association
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Weston Community Coalition
Date	Thursday, January 22, 2009
Attendees	Representatives from the WCC Mount Dennis Residents Association
Metrolinx Reps	Rob MacIsaac, Chair, Metrolinx Colleen Bell, GM Community Relations + Initiatives Brian Peltier, Project Lead, GSSE/UPRL James O'Mara, Executive Lead, Environmental Planning + Policy

Meeting with	Stakeholder Briefing with 2006 Public Liaison Committee
Date	Thursday, January 29, 2009
Attendees	Business Improvement Associations - Liberty Village BIA Resident Associations - Carleton Village Residents Association - Roncesvalles-Macdonald Residents Association - West Bend Residents Association - Silverthorn Ratepayers Association Cultural, Heritage + Others - Friends of Fort York - West Toronto Railpath
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Brian Peltier, Project Lead, GSSE/UPRL Diane Naluzny, GSSE/UPRL Robyn Connelly, Community Development Officer

Meeting with	Walking Tour with Weston Community Coalition
Date	Monday, February 2, 2009
Attendees	Representatives from the Weston Community Coalition Mount Dennis Residents Association
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Brian Peltier, Project Lead, GSSE/UPRL James O'Mara, Executive Lead, Environmental Planning + Policy Diane Naluzny, GSSE/UPRL Robyn Connelly, Community Development Officer

Meeting with	West Toronto Railpath
Date	Tuesday, February 24, 2009 4:00 pm
Attendees	Representatives from the West Toronto Railpath Representatives from City of Toronto Transportation Planning, City Planning Division and Pedestrian and Cycling Infrastructure Executive Assistant to Councillor Palacio
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Brian Peltier, Project Lead, GSSE/UPRL James O'Mara, Executive Lead, Environmental Planning + Policy Dennis Callan, MRC Diane Naluzny, GSSE/UPRL Robyn Connelly, Community Development Officer

Meeting with	Mount Dennis Residents' Association
Date	Friday, February 27, 2009 4:00 pm
Attendees	Executive of the Mount Dennis Residents' Association
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Roncesvalles-Macdonell Residents' Association
Date	Tuesday, March 3, 2009 7:30 pm
Attendees	Executive of the Roncesvalles-Macdonell Residents Association
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Project/Community Development Officer

Meeting with	Metrolinx West Toronto Railpath Association City of Toronto Transportation + Planning City of Toronto Parks + Recreation
Date	March 23, 2009
Attendees	Representatives from the West Toronto Railpath Representatives from City of Toronto Transportation Planning, City Planning Division and Pedestrian and Cycling Infrastructure Executive Assistant to Councillor Palacio Executive Assistant – Councillor Pantalone Executive Assistant – Councillor Giambrone Executive Assistant – Councillor Perks
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives, Metrolinx James O'Mara, Executive Lead, Environment Planning + Policy, Metrolinx Ryan Lanyon, Team Leader, Smart Commute Robyn Connelly, Community Relations + Initiatives, Metrolinx DennisCallan,MRC Dana Lam-Watt, MRC

Meeting with	Brockton Triangle Residents' Association
Date	Wednesday, April 1, 2009
Attendees	Executive of the Brockton Triangle Residents' Association
Metrolinx Reps	Brian Peltier, Executive Lead, GSSE/UPRL Robyn Connelly, Community Development Officer

3.3.1.2 Summary of Government Agency Comments

Prior to the notice of commencement, meetings were held with agencies to introduce and discuss the project. **Table 3.3.1.2-1** outlines those meetings and a copy of the associated meeting notes can be found in **Appendix B**.

Table 3.3.1.2-1 Summary of Agency Meetings – Pre Notice of Commencement

Date	Agencies	Purpose
Jan. 13, 2009	- Canadian Environmental Assessment Agency - Canadian Transportation Agency - GO Transit - Greater Toronto Airports Authority - Ministry of the Environment - Ministry of Transportation - Transport Canada	To introduce the project, discuss environmental assessment and consultation coordination and determine the next steps.
Feb. 17, 2009	- Canadian Environmental Assessment Agency - Canadian Transportation Agency - Greater Toronto Airports Authority - Ministry of the Environment - Ministry of Transportation - Transport Canada	To discuss progress to date, community consultation and specialist workplans.
Feb. 18, 2009	Toronto and Region Conservation Authority	To introduce the project, discuss information requirements and determine the next steps.
Feb. 25, 2009	Ministry of Culture	To introduce the project and discuss work completed to date.
Mar. 18, 2009	Ministry of Natural Resources	To introduce the project, discuss information requirements and determine the next steps.

Table 3.3.1.2-2 outlines key comments from agencies and how those comments are being addressed. It should be noted that although joint meetings were held with federal agencies and provincial agencies the purpose of those meetings was focused on coordination between the provincial and federal assessment processes.

Table 3.3.1.2-2 Summary of Agency Comments – Pre Notice of Commencement

Agency	Comment	How Comment is Being Addressed
Ministry of Culture	Interested in the potential impacts to archaeological and other cultural heritage resources.	Impacts to archaeological resources as well as built heritage and cultural landscapes have been addressed as part of this report and where appropriate mitigation measures and commitments to future work have been identified. Please refer to Section 6.3.2 (archaeological features) and Section 6.3.1 (built heritage and cultural heritage landscapes).
Ministry of the Environment	Need for appropriate assessment and documentation of the project in accordance with O.Reg. 231/08.	The Environmental Project Report has been completed to address the requirements of O.Reg. 231/08.
Ministry of Natural Resources and Toronto and Region	Interested in potential impacts to the natural environment.	Impacts to the natural environment have been addressed as part of this report and where appropriate mitigation measures and commitments to future work have been identified. Please refer to Section 6.1 and the associated subsections.

Agency	Comment	How Comment is Being Addressed
Conservation Authority	Interested in potential impacts to stormwater management and floodplains.	Impacts to drainage and stormwater management have been addressed as part of this report and where appropriate mitigation measures and commitments to future work have been identified. Please refer to Section 6.1.5 (Drainage and Stormwater Management).

3.3.1.3 Summary of First Nation Comments

Prior to the notice of commencement Metrolinx met with the Chief of the Mississauga of the New Credit First Nation on March 13, 2009 to discuss the project and request feedback regarding interest in the project and how the Mississauga of the New Credit First Nation would like to be consulted regarding this project. The Chief asked that Metrolinx keep him updated on progress of the project and inform him when key milestones are reached.

3.3.1.4 Summary of Municipal Comments

Prior to the notice of commencement, meetings were held with municipal staff and elected representatives to introduce and discuss the project. **Table 3.3.1.4-1** outlines key comments from municipal staff and elected representatives and how those comments are being addressed.

Table 3.3.1.4-1 Summary of Municipal Comments – Pre Notice of Commencement

Municipality / Department / Elected Representative	Comment	How Comment is Being Addressed
City of Toronto Council	Motion dated January 27, 2009 indicating that: - City Council opposes any road closures along the route - Addition of new stops, including a stop at Weston	- At this point, before consultation on design options have taken place, the only road closure required is at John Street and community connectivity will be maintained by providing a pedestrian/cyclist overpass. Please refer to Section 5.2.2.3 for further details. - Comment noted. A stop in Weston has been provided and the design of the corridor would enable stops at Eglinton and Woodbine should demand or other circumstances warrant it

Municipality / Department / Elected Representative	Comment	How Comment is Being Addressed
	- Metrolinx be requested to employ electric vehicles - Public transit alternatives in the Georgetown corridor and serving the airport be a component of any service improvements	- Electrification is not part of the scope for the current project. Please refer to Section 3.3.2.1.2 for further details regarding electrification of the corridor. - The proposed Union-Pearson Rail Link will provide a transit option to the airport (Terminal 1) with stops at the Weston GO Station, Bloor GO Station and Union Station. Please refer to Section 2.2 for details regarding other planned connections to the airport. Big Move #2 in the Regional Transportation Plan also addresses the need for higher order connectivity to the Airport and makes specific proposals for connections to other municipal transit services
Region of Peel	Report to Council dated February 27, 2009 noted that: - Georgetown GO service expansion is very important to the Region of Peel - The EA process should include the appropriate analysis of rail traffic operations in the Georgetown Corridor and at Union Station to ensure that the long term vision for GO service is not compromised. - Staff support the inclusion of a Woodbine Station in the current project.	- Comment noted. Once the approval of the recommended transit project is obtained, the start of the construction is anticipated in late 2009 with completion anticipated around 2014. - Traffic operations have been considered during the assessment of alternatives as outlined in the Environmental Project Report. - This project is not seeking approval for a Woodbine Station; however, it will be designed to enable the construction of a future station should demand or other circumstances warrant it. If a station at Woodbine is proposed at some point in the future it will be the subject of a future study and approval process.

3.3.2 Consultation Post Notice of Commencement

The following sections outline consultation completed following the Notice of Commencement being issued under the Transit Project Assessment Process. The Notice of Commencement was issued on April 2, 2009.

3.3.2.1 Summary of Public Comments

I – Notice of Commencement

On April 2, 2009, Metrolinx issued a Notice of Commencement under the Province of Ontario's Transit Project Assessment Process (TPAP) for the Georgetown South Service Expansion, including a Union-Pearson Rail Link (GSSE/UPRL). This marked the beginning of 120-day consultation period for the GSSE/UPRL Project, which ended with a Notice of Completion on July 30, 2009.

As part of the formal consultation period, Metrolinx:

- prepared a draft Environmental Project Report.
 - o A copy of the first draft (Part 1) was made available for public review on April 14, 2009.
 - o The second draft (Part 2) was made available for public review on May 29, 2009.
- launched a Virtual Open House on April 15. Online, convenient, and open 24/7, the revised project details will be available to review, learn more and comment.
- hosted two rounds of Open Houses.
 - o The first round occurred in April 2009
 - o The second round in June 2009.
 - o Additional details regarding the Open Houses are provided below.
- Continued to meet with community groups, residents associations and individual citizens to hear suggestions and local concerns. Metrolinx continues to meet with various stakeholders. Additional details regarding Ongoing Community Engagement are provided below.

Newspaper Advertisements

As per Ontario Regulation 231/08, a Notice of Commencement of the transit project assessment process was distributed by publishing the notice, on two separate days, in a newspaper with general circulation in the area where the site of the transit project is located.

The Notice of Commencement, which included details of the Open House schedules, was published in:

- Toronto Star on April 2 and April 9, 2009 (English)
- Toronto L'express on April 7 and April 14, 2009 (French)

The Notice of Commencement also advised that hard copies of Part I of the draft EPR were available at the following locations:

- Ministry of the Environment, Environmental Assessment and Approvals Branch, 2 St. Clair Avenue West, Floor 12A, ON M4V 1L5. Tel.: 416-314-8001
- York Civic Centre, 2700 Eglinton Avenue West, Toronto, ON M6M 1V1. Tel.: Access Toronto General Enquiry, 416-338-0338 Toronto Public Library, City Hall Branch, Nathan Phillips Square, 100 Queen Street West, Toronto, ON M5H 2N3. Tel.: 416-393-7650
- Toronto Public Library – Weston Branch, 2 King Street, Toronto, ON M9N 1K9. Tel.: 416-394-1016
- Toronto Public Library – Annette Street Branch, 145 Annette Street, Toronto, ON M6P 1P3. Tel.: 416-393-7692
- Mississauga Public Library – Malton Branch, Malton Community Centre, 3540 Morning Star Drive, Mississauga, ON L4T 1Y2. Tel.: 905-615-4640

Community Outreach

Ontario Regulation 231/08, provides that the notice of commencement must be distributed to the assessed owner of land within 30 metres of the transit project. Metrolinx contracted the Municipal Property Assessment Corporation (MPAC) to provide the following data for properties within 40 metres of the project:

- a) Residential Properties – Civic Address and Postal Code
- b) Commercial/Industrial/Vacant Land Properties – Corporate Owner Name, Civic Address, and Mailing Address.

MPAC maintains all owner and assessment information for all properties in the Province of Ontario. MPAC is the only supplier with this information. The data was provide by MPAC on an “as is” and “where available” basis and MPAC makes no guarantee as to the accuracy, completeness or usefulness of the data. This is the same risk assumed by the municipalities who similarly use MPAC data for levying taxes, etc. Each residential property address was entered into a web-based telephone number search directory to obtain the corresponding name of the resident of the property.

Over 3,500 addressed envelopes with the Metrolinx logo were sent to these assessed owners within 40 metres of the corridor. An additional 26,500 unaddressed envelopes with the Metrolinx logo were sent to apartments/condominiums based on Canada Post’s postal walks adjacent to the corridor. Metrolinx was informed that some of the Notice of Commencement letters may have been delayed. Metrolinx followed up immediately with Canada Post and Canada Post confirmed that the letters to assessed property had been delivered. Canada Post was unable to substantiate that there had been any significant delays in letters going out and/or being received.

An email notice detailing that the Notice of Commencement was also issued to the 1,143 individuals who expressed interest in the project and were on the project email list. Notice of the upcoming Community Open Houses was also sent.

II – TPAP Community Open Houses – April 2009

As part of the formal consultation process, Metrolinx committed to hosting two series of Community Open Houses. The first series took place in April 2009 and shared

information on current environmental conditions and the scope of the preferred project, as well as identified changes as a result of public input.

Open House Schedule:

- Liberty Village Community – Fort York, Blue Barracks Room, 100 Garrison Road, on April 15, 2009
- Malton Community – Courtyard by Marriot – Toronto Airport, 231 Carlingview Drive on April 16, 2009
- Brampton Community – Terry Miller Recreation Centre, 1295 Williams Parkway on April 17, 2009
- Weston Community: Weston Park Baptist Church, 1871 Weston Road on April 20, 2009
- Westbend Community: Lithuanian House, 1573 Bloor Street West on April 21, , 2009
- Mount Dennis Community: Mount Dennis United Church, 71 Guestville on April 22, 2009

All of the Open Houses were held from 3pm to 8pm

A notice for the April Open Houses appeared in the following regional and community newspapers:

- Brampton Guardian (April 3 and April 10, 2009)
- City Centre Mirror (April 3 and April 10, 2009)
- Etobicoke Guardian (April 3 and April 10, 2009)
- Mississauga News (April 3 and April 10, 2009)
- Mississauga Le Metropolitan (April 8 and April 15, 2009)
- Parkdale-Liberty Villager (April 3 and April 10, 2009)
- Annex Guardian (April 3 and April 10, 2009)
- Bloor West Villager/York Guardian (April 3 and April 10, 2009)

It should also be noted that the Notice of Commencement that was mailed to almost 30,000 property owners and tenants within 40m of the corridor included the Open House schedule.

An email notice was sent on April 14, advising that the Virtual Open House was live and the public had two opportunities to review posted materials and provide comments:

- GSSE/UPRL Draft Environmental Project Report Part I which included a project description, project map and a description of the existing environmental conditions.
- GSSE/UPRL Virtual Open House Round One – Display boards from the April 2009 Community Open Houses – online, convenient, and open 24/7, the revised project details.
- The Open House schedule was also included

Listing of Display Boards

Display Boards
Welcome Board
Introduction to Open House
Main Revisions to the Plan
Updated Study Key Plan
Corridor Plan and Profile –Plate 1
Evolution of the Strachan Avenue Road Overpass
Selected Strachan Ave Grade Separation
Corridor Plan and Profile –Plate 2
Corridor Plan and Profile –Plate 3
Corridor Plan and Profile –Plate 4
Corridor Plan and Profile –Plate 5
Corridor Plan and Profile –Plate 6
Preferred Denison Rd Grade Separation
Corridor Plan and Profile –Plate 7
John St., King St., and Church St. Road Crossings and Cross-section
Corridor Plan and Profile –Plate 8
Corridor Plan and Profile –Plate 9
Corridor Plan and Profile –Plate 10
Preferred Carlingview Drive Grade Separation
Corridor Plan and Profile –Plate 11
UPL Plan and Profile – Plate 1
UPL Plan and Profile – Plate 2
Introduction to Impact Assessment
Noise Assessment Method
Noise Impact Assessment
Vibration Assessment Method
Air Quality Assessment Method
Clean Diesel (Differences in Diesel Engines)
Construction Impacts and Mitigation Measures
Properties Which May Be Required
Provincial EA Process (w/ Federal bullet point)
Responses to Community Open House Round One
Responses to Community Open House Round One
Train Volumes
City of Toronto Bike Plan
Feasibility of King or Queen Street West Station
Lowering the rail corridor to keep John Street open to vehicles
John Street Closing Traffic Impact

Raising John Street to keep it Open to Vehicles
Proceed Now. Electrify Later.
Environmental Project Report
What's Next

Attendance + Feedback from April 2009 Open Houses

Between the April and June Open Houses, Metrolinx has:

- communicated with over 700 Open House attendees, and countless more through our 24/7 Virtual Open House
- received 218 comment forms
- received an additional 91 online submissions on the Open House Display Boards and 32 comments on Part I of the draft EPR

	Guests (counted)	Guests (signed-in)	Comments Forms Received
Westbend	260	209	98
Mt. Dennis	63	53	20
Weston	97	82	22
Liberty Village	224	224	75
Malton	20	12	3
Brampton	20	18	2
Online*	36		91
TOTAL GUESTS COUNTED: 720			
TOTAL COMMENTS RECEIVED – Including online submissions: 311			

General Themes in Public Feedback (Feedback Forms + Online) Community Open Houses in April 2009

The following is a summary of key themes from public comments (online and feedback forms) received at the April 2009 Open Houses:

Theme	Number of Comments	Response
Strachan Grade Separation	262	Upon hearing the concerns of residents in April, the Metrolinx technical team began to search for a different solution in collaboration with the City of Toronto. The recommended option now addresses neighbourhood concerns and meets GO operational requirements. The highlights of the new proposal are: ▪ A design that lowers the rail corridor at the Wellington Street West/Douro intersection to a deeper level in order

Theme	Number of Comments	Response
		to allow for a gentler grade for the road ▪ All of the streets are kept open. Douro and Wellington West are no longer impacted. Commercial trucks will not have to be rerouted onto residential streets ▪ A flatter design, more conducive to safe pedestrian and cycling traffic flows, was proposed ▪ The grade separation provides for bicycle lanes ▪ There will be opportunities for beautification in the rail corridor
Electrification	70	Metrolinx has announced an electrification study of the entire GO Transit rail system as a future alternative to diesel trains currently in service. The study could commence as early as this summer and be completed by winter 2010. While the study is being done, work will continue on the line using design elements that would accommodate both electric and diesel trains, such as designing structures (bridges and grade separations) to meet the height requirements for electrification, or ensuring track spacing is being designed to allow for foundations and columns associated with the catenaries required for electrification.

Theme	Number of Comments	Response
Liberty Village/King St. West station	53	Efficient, effective, and safe rail operations preclude stations at Liberty Village and King Street in an area that is well served by municipal transit <u>King Street</u> The corridor is very narrow at King Street. To accommodate a platform, the corridor would have to be widened outside the existing rail property lines and would require large scale property acquisition and the replacement of the entire King Street railway structure. <u>Queen Street</u> Neither Queen Street nor the new Dufferin Jog structure could accommodate the extra width required for a new platform. Also, building a platform would result in significant property requirements and road signallin. Both locations would also result in platforms on a curve which can result in unsafe rail operating conditions.
Noise, Vibration, Air Quality + Human Health Impacts	49	The purpose of this series of Open Houses is to outline the environmental impacts of the project and describe potential mitigation measures. The Metrolinx Technical Team exercised extreme due diligence in assessing the noise, vibration, air quality and human health impacts of the proposed service expansion. The maximum possible service levels (train volume, speeds) were used to predict future impacts. In addition, factors such as weather, operating conditions, as well as noise and emissions from adjacent roads, were factored in where appropriate. As a result of this approach, the projected impacts identified are likely to be greater than actual impacts.
Notification of Consultation Process	45	The Schedule for Metrolinx Open Houses were: ▪ published two consecutive weeks in newspapers along the corridor and in the

Theme	Number of Comments	Response
		Toronto Star (April 2,3 and April 9, 10) - mailed to almost 30,000 households 40m along the corridor as part of the Notice of Commencement notification - posted on the Metrolinx website - email notice sent to over 1500 stakeholder groups and individuals
Union-Pearson Rail Link	28	High-order transit connectivity to the Pearson Airport precinct from all directions is a recommendation in Metrolinx's Regional Transportation Plan <i>The Big Move</i>, including a direct rail link between the airport and downtown Toronto. This project is defined by GO Transit's future operating needs. It also opens up the opportunity to offer the Air-Rail Link service on GO Transit infrastructure.

Community Open Houses – June 2009

The second series took place in June 2009 and shared information on the refinements made as a result of consultation, scope of the preferred project, potential impacts and proposed mitigation measures.

Open House Schedule:

- Weston Community: Weston Park Baptist Church, 1871 Weston Road on June 8, 2009
- Westbend Community: Lithuanian House, 1573 Bloor Street West on June 9, 2009
- Mount Dennis Community: Mount Dennis United Church, 71 Guestville on June 10, 2009
- Liberty Village Community – Fort York, Blue Barracks Room, 100 Garrison Road, on June 16, 2009
- Brampton Community – Holiday Inn Select, 30 Peel Centre Drive on June 17, 2009
- Malton Community – Holiday Inn – Toronto Airport East – 600 Dixon Road on June 18, 2009

A third notice for the June Open Houses also appeared in the following regional and community newspapers:

- Brampton Guardian (May 29 and June 5)
- City Centre Mirror ((May 29 and June 5)
- Etobicoke Guardian((May 29 and June 5)
- Mississauga Le Metropolitan (June 3 and June 10)

- Parkdale-Liberty Villager((May 29 and June 5)
- Annex Guardian (May 29 and June 5)
- Bloor West Villager/York Guardian (May 29 and June 5)
- NOW Magazine (May 28 and June 4)
- Toronto Star (May 29)
- Toronto Sun (June 5)
- Toronto L'express (June 2)

An email notice was sent on May 29, 2009 notifying stakeholders that Part II of the draft Environmental Project Report and the schedule for the June Community Open Houses were posted to the website. This email notice was sent to over 1,500 stakeholders. A copy of the Open House public notice was mailed to the 160 previous Open House registrants who had indicated that mail was their preferred method of communication.

An additional email notice was sent on June 8 advising that the display boards from the June 2009 Community Open Houses were available posted for public review and comment. This email notice was sent to over 1500 stakeholders.

Listing of Display Boards

Display Boards
Welcome Board
Introduction to Open House
Consultation Results From Last Open Houses 1 of 2
Consultation Results From Last Open Houses 2 of 2
Updated Transit Assessment Process Board
Main Revisions to the Plan
Study Key Plan
Corridor Plan and Profile –Plate 1
Strachan Ave Grade Separation
Corridor Plan and Profile –Plate 2
Corridor Plan and Profile –Plate 3
Corridor Plan and Profile –Plate 4
Corridor Plan and Profile –Plate 5
Corridor Plan and Profile –Plate 6
Denison Rd Grade Separation
Corridor Plan and Profile –Plate 7
John St. Charette Results 1of 2
John St. Charette Results 2 of 2
King St., and Church St. Road Crossings and Cross-section
Corridor Plan and Profile –Plate 8
Corridor Plan and Profile –Plate 9

Corridor Plan and Profile –Plate 10
Carlingview Drive Grade Separation
Corridor Plan and Profile –Plate 11
UPRL Plan and Profile – Plate 1
UPRL Plan and Profile – Plate 2
Introduction to Impact Assessment
Noise Impact Assessment Findings
Noise Impacts and Mitigation Locations Zone 1 and 2 (Humber River to Jane Street)
Noise Impacts and Mitigation Locations Zone 3 and 4 (Jane Street to Rogers Road)
Noise Impacts and Mitigation Locations Zone 5 and 6 (Rogers Road to West Toronto Diamond)
Noise Impacts and Mitigation Locations Zone 7 and 8 (West Toronto Diamond to Dundas Street West)
Noise Impacts and Mitigation Locations Zone 9 and 10 (Dundas Street West to Strachan Avenue)
Typical Noise Walls
Vibration Assessment Findings
Vibration Impacts Locations Zone 2-4 (King Street to Rogers Road)
Vibration Impacts Locations Zone 5-7 (Rogers Road to Bloor Street)
Vibration Impacts Locations Zone 8 -10 (Bloor Street to Strachan Avenue)
Air Quality /Human Health Assessment 1 of 4
Air Quality/ Human Health Assessment 2 of 4
Air Quality /Human Health Assessment 3 of 4
Air Quality/ Human Health Assessment 4 of 4
Natural Environment Findings
Cultural Heritage Findings
Properties Which May Be Required
Electrification update
What's Next

Attendance + Feedback from June 2009 Open Houses

Since the June 2009 Open Houses, Metrolinx has:

- communicated with over 434 Open House attendees
- received 190 comment forms
- received an additional 410 online submissions on the Open House Display Boards

	Guests (counted)	Guests (signed-in)	Comments Forms Received
Westbend	160	138	90
Mt. Dennis	25	20	5
Weston	96	73	30
Liberty Village	127	109	56
Malton	13	10	6
Brampton	13	11	3
Online*			410
TOTAL GUESTS COUNTED: 434			
TOTAL COMMENTS RECEIVED – Including online submissions: 600			

General Themes in Public Feedback (Feedback Forms + Online) Community Open Houses in June 2009

The following is a summary of key themes from public comments received at the June 2009 Open Houses:

Theme	Number of Comments	Response
Electrification	546	Electrification is a critically important issue and Metrolinx wants to get it right. Electric trains are just one component of an efficient regional rail system. We want to make sure the choices are properly framed in the context of our broader mandate to recommend the best possible investments to improve transportation, the environment, the quality of life and the economy in the GTHA. On May 26, 2009 Metrolinx announced a study of electrification of its entire GO Transit rail system. As the first step, Metrolinx has appointed a Community Advisory Committee to assist in developing the Terms of Reference for the GO System Electrification Study. This elite group of experts will recommend the Terms of Reference to the Metrolinx Board in the fall of 2009. The final Terms of Reference will guide the Electrification Study and serve as the basis for issuing any requests for proposals to undertake the Study. The Study itself will be completed in Winter 2010. In the meantime, GO Transit continues to deploy clean diesel technology - an efficient

Theme	Number of Comments	Response
		and cost-effective way of reducing congestion and moving people to places quickly, comfortably and safely. GO Transit has also been using ultra low sulphur diesel fuel for both its rail and bus services since 2006. In addition The MP40 diesel locomotives – which will be the locomotives on the Georgetown line – use the best, cleanest technology available, meeting all US Environmental Protection Act (EPA) Tier 2 Emission standards. Canada is not the only country investing in clean diesel technology. Many nations known for their extensive transit systems and progressive environmental policies use clean diesel technology on their rail networks: ▪ In London, UK, new Bombardier diesel multiple unit (DMU) railcars will be delivered next year for use on the Gospel Oak – Barking Line, an urban railway in greater London. ▪ In Denmark, 100 new Siemens-built DMUs have been purchased for regional train service similar to the type of service GO Transit operates. ▪ In Germany, high-speed diesel train sets are used to operate 200 km/h service connecting Berlin, Hamburg and Copenhagen
Noise, Vibration, Air Quality + Human Health Impacts	98	The Environmental Project Report (EPR) documents the results of 4 studies (noise, vibration, air quality, and human health impacts of air quality) on the community surrounding the project. The studies show either no impacts or impacts which can be addressed through mitigation measures. The studies used a cautious approach, modeling impacts based on worst case scenarios to show that even under extreme weather conditions, with high traffic volumes, the project can operate safely and protect human health and the environment. Specific recommendations are made for addressing noise and vibration impacts. In

Theme	Number of Comments	Response
		some instances, people will be better off in the future as a result of the mitigation measures for this project. In all instances, any increase in sound levels greater than 5 dB will trigger a response. There are only three, confined areas which require vibration mitigation. Measures will be put in place at the time of construction. Of the eleven substances assessed in the air quality and human health studies, only one requires mitigation. Specific short, medium, and long term measures are proposed in the EPR for addressing periodic nitrogen oxide spikes which are generally expected to occur on "bad air" days. Getting people out of cars and onto transit helps to improve local and regional air quality and it reduce greenhouse gas emissions, leading to a more sustainable GTHA.
Notification of Consultation Process	50	The Public Notice for the June Open Houses was: ▪ published two consecutive weeks in 8 community newspapers along the corridor as well as in the Toronto Star and the Toronto Sun ▪ posted on the Metrolinx website ▪ email-blasted to over 1500 stakeholder groups and individuals that have expressed interest in the receiving continued notice about the project ▪ emailed to local representatives, resident associations, community groups to forward on to their membership lists, as appropriate.
Community Impacts	28	Over the past seven months, Metrolinx has been out in the communities, listening to neighbourhood groups and individual citizens all along the corridor. There has been great interest and suggestions from everyone. As a result of the huge amount of feedback, the Georgetown South Service Expansion

Theme	Number of Comments	Response
		proposal has been changed and refined to incorporate these great ideas. Some of the improvements include: ▪ Minimizing the impact of the new Strachan bridge design on the adjacent community and to identify other beautification opportunities; ▪ Preserving the iconic Farmer's Market at its current location in Weston; ▪ Designing the new pedestrian bridge in Weston to be part of a new community vision; Plans to extend the Rail Path and connecting with other cycling plans along the corridor; ▪ Community revitalization opportunities afforded by the new Weston GO station
GO Stations (Liberty Village/King St. West station)	21	The Georgetown South service expansion also needs to balance demands for increased regional service with local needs. The GO Georgetown Service and the UPRL service will stop at Union Station, Bloor GO Weston within City of Toronto limits. While there is strong local support for a GSSE/UPRL stop at either King or Queen Street, there are a number of technical challenges that preclude a GO stop at either location. King Street The corridor is very narrow at King Street. To accommodate a platform, the corridor would have to be widened outside the existing rail property lines and would require large scale property acquisition and the replacement of the entire King Street railway structure. Queen Street Neither Queen Street nor the new Dufferin Jog structure could accommodate the extra width required for a new platform. Also, building a platform would result in significant property requirements and road regrading.

Theme	Number of Comments	Response
		Both locations would also result in platforms on a curve which can result in unsafe conditions.
Union-Pearson Rail Link	28	While many comments were supportive of a rail link to Pearson Airport, there were concerns that the Union-Pearson Rail Link would not effectively serve the needs of communities along the line and of the region as a whole. In Metrolinx's regional transportation plan, Big Move # 2 calls for high-order transit connections to the Pearson Airport from all directions. Rapid transit lines on Finch Avenue West, Eglinton Avenue West, and on Highways 403, 407 and 427 will ensure connectivity for those not served by the Union-Pearson Rail Link.

As part of the community outreach, members of the public could send comments, suggestions or questions to info@metrolinx.com. Throughout the post notice of commencement consultation, 601 emails were received. Below is the break down by key themes.

Construction Impacts	2
Consultation Process	2
Electrification*	135 Clean Train Coalition Letter campaign (July 21, 2009) 49
Noise, Vibration, Air Quality + Human Health Impacts	5
General Inquires	3
GO Stops/Service	38 Liberty Village King Street/Queen Street Stop Campaign 2
Project Details	4
Property Impacts	5

Train Volume	2
UPRL/Private Partnership	1
Strachan Grade Separation	211 Liberty Village Strachan Separation Letter 142 Letters from residents at 15 Stafford
Total Post Notice of Commencement emails to info@metrolinx.com	601 emails

****Letters or correspondences addressed to parties other than Metrolinx are not included in this tally***

As similar themes began to emerge, members of the public were added to the email distribution list to receive regular project updates as well as the summary of key themes found in public and Metrolinx responses. This approach ensured all members of the public with similar concerns were receiving the most up-to-date information as it become available.

A number of the inquiries received can only be answered at the detailed design stage. Metrolinx is committed to continuing communication with interested parties as the project progresses.

Thirty calls were made to the 1-866-658-9890 numbers as part of the post notice of commencement consultation. The majority of these calls were administrative. However, six calls were made as official comments for the public record. The themes can be broken down as follows;

Support immediate electrification	5
John Street Crossing in Weston - support closure of John, King and Church Street	1

It should also be noted that, throughout the whole consultation period, Metrolinx has been listening to neighbourhood groups and individual citizens all along the corridor. There has been great interest and suggestions from everyone. As a result of the huge amount of feedback, the Georgetown South Service Expansion proposal has been changed and refined to incorporate these great ideas. Some of the improvements include:

- Minimizing the impact of the new Strachan bridge design on the adjacent community and to identify other beautification opportunities;
- Keeping streets open in the neighbourhoods of Weston and Liberty Village;
- Preserving the iconic Farmer's Market at its current location in Weston;
- Designing the new pedestrian bridge in Weston to be part of a new community vision; Plans to extend the Rail Path and connecting with other cycling plans along the corridor;

- Community revitalization opportunities afforded by the new Weston GO station

III Ongoing Community Engagement

In addition to the Open Houses, Metrolinx continued to support the following channels for intensive community outreach and feedback:

- GO Georgetown micro-site with project background and details: metrolinx.com/gsse
- Metrolinx Virtual Open House – online, convenient, and open 24/7, project details are available for public review and comment
- Email: public could send questions or comments to info@metrolinx.com
- Telephone: public could leave comments or questions at 1-866-658-9890 – the line was monitored daily for messages
- Fax: 416-874-5901
- Mail: GSSE-UPRL Project, Metrolinx, 20 Bay Street, Suite 901, Toronto, ON M5J 2N8

Three additional e-mail notices with project updates – planned bore-hole drilling, Strachan Avenue Grade Separation change, and progress on Metrolinx's plans for the electrification – were also shared with the e-mail stakeholder list in an effort to keep the communities informed and engaged at all stages of the EA process.

During the week of June 1, 2009, Metrolinx undertook an "Intercept Program." A team distributed information leaflets to interested travellers using the GO Georgetown South rail corridor and Pearson International Airport travel hubs.

The information leaflet was designed to:

- Inform residents and travellers in and around the GTHA – in particular on the Georgetown South rail corridor – of the rationale for and status of the corridor expansion project;
- Encourage travellers to participate in the consultation process by internet, phone and mail; and
- Deliver print-based information for individuals who may not have internet access. The Metrolinx-branded team greeted travellers and distributed the information leaflet during peak travel times at the following locations:

Location Date	Number of leaflets distributed
Brampton GO June 1, 2009 (am/pm rush)	450
Bramalea GO June 2, 2009 (am/pm rush)	900

Location Date	Number of leaflets distributed
Etobicoke North GO June 3, 2009 (am rush)	250
Weston GO June 4, 2009 (am rush)	120
Bloor GO June 5, 2009 (am rush)	200
Pearson International Airport June 4 & 5, 2009 (1-7pm)	600

Metrolinx continued to regularly meet with community groups, residents associations and individual citizens to hear suggestions and local concerns. Below is a listing of opportunities the Metrolinx team had to meet with a series of community stakeholders since April 2, 2009. The intent of these meetings was to continue meet with local groups to get a better sense of local issues and concerns, and to stay abreast of community issues:

Meeting with	York West Seniors Centre
Date	Friday, April 3, 2009
Attendees	Representatives from the York West Seniors Centre
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Weston Golf and Country Club
Date	Monday, April 6, 2009
Attendees	Representatives from the Weston Golf and Country Club
Outcome	Issues raised by the Golf Course include: property requirements, construction impacts (location of staging areas, access, timing, potential construction damage), access to the 5 th hole, noise and air quality.
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives James O'Mara, Executive Lead, Environmental Planning + Policy Mike Bricks, Ecoplans

Meeting with	Wabash Building Society
Date	Tuesday, May 5, 2009
Attendees	Councillor Gord Perks Representatives from Wabash Building Society Representatives from City of Toronto Parks, Forestry + Recreation,
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Roncesvalles-Macdonell Residents' Association

Date	Tuesday, May 5, 2009
Attendees	Executive of the Roncesvalles-Macdonell Residents' Association
Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Weston Business Improvement Association
Date	Thursday, July 2, 2009
Attendees	Executive of the BIA Representative from the Weston Community Coalition Councillor for Ward 11
Metrolinx Reps	Robyn Connelly, Community Development Officer, Community

Roncesvalles-Macdonell Residents' Association Community Workshop

Host	Roncesvalles-Macdonell Residents' Association
Date	Tuesday, April 28, 2009 7pm – 9pm
Objective	▪ Share details of the preferred method ▪ Review next steps and how community member can provide feedback ▪ Listen and take notes of community concerns
Approach	▪ Open House Display Boards up for review ▪ 4 Tables for work-shopping the key themes ▪ Metrolinx Facilitator at each table ▪ Note taker at each table ▪ attendees invited to sit at 1 of the 4 tables ▪ 3 key questions will be discussed ▪ each attendees will have the opportunity to join 2 of the 4 discussions
Attendees	General Public
Metrolinx Reps	Dennis Callan, McCormick Rankin Corporation Dana Lam Watt, McCormick Rankin Corporation Katie Bright, Ecoplans David Parry, URS Canada Inc Elliot Sigal, Intrinsik Environmental Sciences Inc. Sam Kulendran, JE Coulter Associates Limited James O'Mara, Executive Lead, Environmental Planning + Policy Ryan Lanyon, Smart Commute, Metrolinx, Metrolinx Colleen Bell, GM, Community Relations + Initiatives, Metrolinx Robyn Connelly, Community Development Officer, Metrolinx Jacquie Menezes, Senior Associate, Media + Public Affairs, Metrolinx

3.3.2.1.1 John Street Crossing Design Charrette

Background

As part of the 120-day formal consultation process, Metrolinx hosted two Community Open Houses in Weston to share the details of the proposed project. In addition, the team met with local Weston community groups and organizations (detailed in the

Community Outreach Sections of Part 3.3.1.1 and 3.3.2.1) to review project details and develop an understanding for the potential local impacts of the project.

Elements of the proposed project that are of particular community interest in Weston include:

- Relocating the GO Weston Stop from John Street to Lawrence
 - pedestrian access from Lawrence Avenue on both sides of the platform, from Hickory Trail Road, from Weston Road via a covered pedestrian link and potentially from John Street along a formalized pedestrian path linking with the station platform.
- A covered lowered rail corridor through Weston that maintains Church and King streets at their present grade
 - a tunneled portion of railway or cut and cover between Church Street and King Street, in order to maintain the bridge crossing and at grade location for the proposed new Weston GO Station, the slope requirements for the train prevent a grade crossing at John Street
- Keeping John Street open for pedestrians by building an accessible overpass/bridge, though it will be closed to vehicular traffic
 - the John Street crossing is proposed to be a pedestrian/ bicycle crossing above the lowered GO rail corridor with an at grade crossing with the CP tracks

Objectives

To get a better sense of the local interests and potential opportunities, Metrolinx hosted a John Street Crossing Design Charrette on May 30, 2009.

Twenty-five local residents, representing a cross section of people and groups from the Weston area, joined a team from du Toit Allsopp Hiller, a team of City of Toronto staff from a range of divisions (Urban Planning, Design, Infrastructure and Community Planning) and the elected officials from all levels of government, for a brainstorming session.

The purpose of the charrette was to discuss the practical implications of a pedestrian crossing at John Street and for Metrolinx to gain a better understanding of the community concerns.

Attendees participated in facilitated discussion groups to workshop ideas around the accessibility, safety, heritage, traffic management and community-building opportunities associated with the proposed John Street Crossing and relocation of the Weston GO Station south of Lawrence.

Priority community design principals that emerged included:

- Examining how the rail services expansion could act as a stimulus for improving the public realm and creating commercial opportunities;
- How to use this opportunity to stimulate larger joint planning exercise between the citizens of Weston and the City of Toronto;
- Using the John Street crossing as an opportunity to establish a public space/centre for the community and improve community connectivity;
- How to maximize the new GO station as an integrated multi-use transit hub.

Opportunities for Future Exploration

A key theme emanating from the charrette was the need to blend possible development proposals, community revitalization initiatives and land use policy to the John Street alternatives.

Many of these recommendations are beyond the scope of the Metrolinx mandate. However, where feasible, Metrolinx will facilitate further discussions to explore where there are opportunities for further joint cooperation with citizens of Weston, Metrolinx and the City of Toronto. Possible recommendations that can be further discussed include:

John Street Pedestrian/Bicycle Bridge

- Potential to design an iconic architectural element or landmark in Weston
- Opportunity to celebrate railway heritage
- Potential to design a bridge integrated with the existing farmers' market and a continuous pedestrian path along the railway corridor

Covered Portion of the Rail Corridor Between King and Church Street

- Explore opportunities for developing the deck surface to incorporate uses that may include recreational surfaces, pedestrian/multi-use paths and incorporation of planters
- There are two elementary schools on St. George Street that could potentially benefit from this public outdoor space over part of the railway – a green space that spans roughly 20 meters.
- Design could create an active public open space on the deck surface with links to the adjacent schools

Opportunities for Weston Farmer's Market/BIA Parking Strengthen the Existing Weston MarketPlace – a Market Bridge

- Potential to strengthen the existing Farmer's Market with a permanent market structure, year-round activity
- Potential for redeveloping a new market square and a centre for the community
- Additional BIA parking to support commercial core

GO Station and GO Parking

- Improved transit coordination with TTC
- Design to strengthen a key corner in Weston – Weston Road and Lawrence Avenue
- Redevelopment of corner to increase activity and improve safety in the neighbourhood

Conclusion

A number of proposals were identified at the Design Charrette. Based on an analysis of the community proposals from the Charrette, it was concluded that an accessible pedestrian/ bicycle bridge would move forward as the recommended option for the project. It will be the least disruptive to the community, while still providing connectivity and functionality.

During detailed design possible opportunities for continued collaboration may include addressing:

- Accessibility – ensure that the switchbacks/ramps are designed to meet accessibility standards

- Stairway – working to ensure that the pedestrian bridge is safe, navigable and wide enough to prevent entrapment area
- Lighting + fencing requirements are addressed to ensure passageway is safe and does not invite loitering
- Design – work in collaboration with the community to explore design options for the bridge that not only meets functional requirements, but can also become an iconic structure for the community.

Where opportunities for future collaboration have been identified, Metrolinx will continue to seek community input as the project moves into detailed design and construction.

Please see **Appendix C** for the complete technical review completed on the proposals suggested at the John Street Design Charrette.

3.3.2.1.2 *Electrification*

Many comments were received during this study concerning possible early electrification of the corridor. However, at this time, none of the required and substantial technical decisions have been made that would allow electrification to proceed any time in the immediate future. Additionally, since there is a long overdue and pressing need to meet existing ridership demand in this corridor, this project is proposing using GO Transit's new Tier 2 diesel locomotives in the early years of service expansion.

Although electrification of the corridor is not part of this project, and no funding has been approved for the implementation of electrification, the proposed project is being planned to not preclude electrification in the future. This includes providing required electrical vertical clearances at proposed structures along the corridor.

Prior to proceeding with electrification on any GO Transit corridor numerous fundamental questions need to be addressed, including:

- Criteria to determine the staging of electrification of GO Transit's rail lines
- Vehicle technology options and availability
- Performance improvements for riders
- Power supply and distribution
- Union Station capacity
- Rail corridor ownership
- Urban planning benefits
- Physical constraints
- Property impacts
- Operating and capital costs
- Impacts on GO capital and operating costs
- Infrastructure requirements
- Carbon footprint reduction
- Implementation staging

In this regard, on May 26th 2009, it was announced that a study of electrification of the entire GO Transit rail system as a future alternative to diesel trains would be undertaken. The study will commence in 2009 and be completed by December 2010.

3.3.2.2 Summary of Government Agency Comments

In accordance with Ontario Regulation 231/08, the following agencies were sent notification regarding the notice of commencement:

- Ministry of the Environment, Environmental Assessment and Approvals Branch
- Ministry of the Environment, Central Region
- Ministry of Natural Resources, Field Services Division, Southern Region
- Ministry of Natural Resources, Aurora District Office
- Toronto and Region Conservation Authority
- Ministry of Culture
- Ministry of Aboriginal Affairs
- Ministry of Transportation
- Canadian Environmental Assessment Agency, Ontario Region
- Transport Canada
- Canadian Transportation Agency
- Greater Toronto Airports Authority

No formal comments were received in response to the agency notification; however, input has been received as part of meetings held prior to formal project commencement as discussed in **Section 3.3.1.2** and the additional meetings discussed below. In addition, some agencies did provide comments on the draft EPR. Those comments are outlined in **Section 3.4**.

Following to the notice of commencement, meetings were held with agencies to introduce and discuss the project progress, coordination and information requirements, review technical results and discuss issues of concern. **Table 3.3.2.2-1** outlines those meetings and a copy of the associated meeting notes can be found in **Appendix B**.

Table 3.3.2.2-1 Summary of Agency Meetings – Post Notice of Commencement

Date	Agencies	Purpose
Apr. 24, 2009	▪ Canadian Environmental Assessment Agency ▪ Greater Toronto Airports Authority ▪ Ministry of the Environment ▪ Ministry of Transportation ▪ Transport Canada	To discuss progress to date, community consultation and specialist workplans.
May 13, 2009	▪ Ministry of the Environment	To discuss the scope of work being undertaken for air quality, the human health implication of increased air emissions and noise and vibration
June 29, 2009	▪ Ministry of the Environment	To discuss progress to date, review air quality, noise and vibration technical results and note issues of concern.
June 30, 2009	▪ Toronto and Region Conservation Authority	To discuss progress to date, review natural environment technical results and note issues

	▪ Ministry of Natural Resources	of concern.
July 8, 2009	▪ Ministry of the Environment	To discuss progress to date, review human health technical results and note issues of concern.

Table 3.3.2.2-2 outlines key comments from agencies and how those comments are being addressed. It should be noted that although joint meetings have been held with federal agencies and provincial agencies the purpose of those meeting was focused on coordination between the provincial and federal assessment processes.

Table 3.3.2.2-2 Summary of Agency Comments – Post Notice of Commencement

Agency	Comment	How Comment is Being Addressed
Ministry of the Environment	Need for appropriate assessment and documentation of the project in accordance with O.Reg. 231/08.	The Environmental Project Report has been completed to address the requirements of O.Reg. 231/08.
Toronto and Region Conservation Authority	Concerned about the widening of the Humber River Bridge. Would like further details to be provided regarding proposed construction access and staging.	The TRCA will be consulted during detailed design to finalize construction access and mitigation measures at the Humber River. Please refer to Section 6.1.2.1 (Potential Construction Impacts and Proposed Mitigation Measures).

At the joint meeting with MNR and TRCA on June 30, 2009, both agencies acknowledged that they had no specific concerns with the potential impacts of the project and the proposed mitigation measures and commitments to future consultation. It was acknowledged that construction access details and re-planting can be finalized during detailed design. A copy of notes of this meeting is provided in **Appendix B**.

MNR provided written confirmation via email on July 14, 2009 that they do not believe the proposed undertaking will impact the Wood Poppy located at H.J. Alexander School in Weston. If any changes to the current alignment or construction methods in the area are proposed, MNR will be contacted. A copy of the correspondence is provided in **Appendix B**. TRCA did provided formal comments on the draft EPR on July 13, 2009. Those comments are included in **Section 3.4 and Appendix B**.

3.3.2.3 Summary of First Nation Comments

In accordance with Ontario Regulation 231/08 and in response to input from federal and provincial agencies, notification regarding the notice of commencement was sent to the Chief of the Mississaugas of the New Credit First Nation. At that time it was reiterated that Metrolinx would like to meet with the Chief to discuss how the Mississaugas of the New Credit First Nation would like to be consulted regarding the project and the offer was made to set-up a “high rail” tour of the corridor to gain a better understanding of the corridor. Follow-up correspondence was sent May 7, 2009 and June 1, 2009; however, Metrolinx has not heard from the Chief. Metrolinx will continue to follow-up with the Chief and as key reports become available they will be sent to the Chief (e.g. a copy of the

draft Environmental Project Report was sent to the Chief on June 1, 2009). A copy of correspondence to the Chief can be found in **Appendix B**.

3.3.2.4 Summary of Municipal Comments

In accordance with Ontario Regulation 231/08, notification regarding the notice of commencement was sent to:

- City of Toronto, Transportation Planning
- Peel Region, Transportation Planning
- City of Mississauga, Transportation and Works

Following to the notice of commencement, meetings were held with municipal staff and elected representatives to introduce and discuss the project and coordination with other municipal project/studies and information requirements. **Table 3.3.2.4-1** outlines key comments from municipal staff and how those comments are being addressed.

Table 3.3.2.4-1 Summary of Municipal Comments – Post Notice of Commencement

Agency	Comment	How Comment is Being Addressed
Toronto Public Health	Interested in the potential impacts to air quality, human health and noise.	Impacts to air quality, human health and noise have been addressed as part of this report and where appropriate mitigation measures and commitments to future work have been identified. Please refer to Sections 6.2.2 (noise), 6.2.4 (air quality), 6.2.5 (human health).
City of Mississauga Council	Council Resolution dated May 13, 2009 resolved that: In support of “Big Move #2” in the Metrolinx Regional Transportation Plan and prior to completion of the Georgetown South Service Expansion and Union-Pearson Rail Link environmental assessment projects, Metrolinx be requested to coordinate discussions with the City of Mississauga, City of Brampton, City of Toronto, York Region, the Ontario Ministry of Transportation and the Greater Toronto Airports Authority to examine opportunities to connect the various municipal transit projects and Georgetown GO Rail initiatives at the Pearson Airport; with a view to maximizing opportunities for rapid transit access to the Airport from all directions.	The purpose of the Georgetown South Service Expansion and Union-Pearson Rail Link project is to determine the planned infrastructure improvements required to accommodate forecasted GO ridership growth in the corridor 15 years from now and beyond; and facilitate the rail connection between Union Station and Pearson Airport as identified in the Big Move #2. Metrolinx will continue to consult with municipal and agency staff as appropriate regarding “Big Move #2”.

Agency	Comment	How Comment is Being Addressed
City of Toronto Parks, Forestry & Recreation	Letter dated May 14, 2009 providing statistics on park usage for Sorauren Park	Information noted.
Region of Peel	Letter dated July 13, 2009 outlining staff report comments presented to the Region of Peel's General Committee on February 27, 2009, The letter identified 3 key issues of interest: ▪ The importance of the TPAP being completed as soon as possible. ▪ Ensure sufficient track capacity is provided to accommodate long-term service in the corridor. ▪ Providing rail access to Peel residents to Pearson Airport. Community concerns related to human health impacts and the lack of an electrification initiative were also outlined.	Information noted.

Toronto Medical Officer of Health Report to the Toronto Board of Health - Metrolinx Response

On June 8, 2009, the Medical Officer of Health for the City of Toronto published a review of the health related studies being carried out for Metrolinx. The studies in question are part of the human health and air quality impact assessment. This review was published prior to the completion of the studies undertaken by Metrolinx.

Table 3.3.2.4-2 provides a brief summary of Metrolinx comments on recommendations made by the Toronto Medical Officer of Health. These responses were provided to the Toronto Medical Officer of Health and a meeting with staff was held on June 22, 2009.

Table 3.3.2.4-2 Summary of Toronto Medical Officer of Health Comments

Medical Officer of Health for the City of Toronto Recommendation	Metrolinx Response
1. The Board of Health request Metrolinx to do the following as part of its assessment of the proposed Georgetown South Service Expansion and Union- Pearson Rail Link: a. Make the following additions to the	Recommendation 1(a)(i) The study prepared for Metrolinx considers particulate deposition onto soils around the corridor, and the potential health implications of accidental ingestion and direct skin contact with this soil. The study also considers deposition onto home gardens, and ingestion of fruit and vegetable produce from such

Medical Officer of Health for the City of Toronto Recommendation	Metrolinx Response
consultants' risk assessment studies: i. Estimate particulate deposition to soil, and evaluate skin contact and ingestion exposures to these particulates; ii. Evaluate diesel exhaust both as a whole and as a mixture of individual components; iii. Undertake an ultrafine particulate matter (PM_{0.1}) monitoring program to characterize baseline concentrations and concentration gradients;	gardens adjacent to the corridor. The results can be found in the detailed technical report in Sections 3.4 and 3.5 on pages 39 to 44. Metrolinx is not pursuing Recommendation 1(a)(ii). The analysis for the EPR used U.S. EPA recommended methodologies to consider the health effects of individual components, believing that an examination of the whole would provide little value added in that it would not make the linkage between diesel exhausts and specific health effects. Metrolinx is not pursuing Recommendation 1(a)(iii). There are no standards or methodologies for characterizing baseline concentrations in what is, to be fair, an emerging area of science.
b. Conduct a health impact assessment (HIA) study, in consultation with the Medical Officer of Health, to examine the distribution in the community of risks and benefits from the proposed Georgetown South Service Expansion and Union-Pearson Rail Link;	The studies carried out for this project form the basis of a thorough assessment of health impacts. The conclusions for the technical report which deals with acute inhalation assessment, chronic inhalation assessment, and chronic multi-pathway assessment are on pages 87 to 98 of the detailed technical report.
c. Estimate the contribution of each train line operating on the Georgetown South Corridor to total, annual diesel exhaust emissions, and thereby predict the emissions reductions achievable through electrification of GO Georgetown services and the Union-Pearson Rail Link; and,	Metrolinx is not pursuing Recommendation 11. Metrolinx looked at rail traffic on the corridor believing that an examination of total emission levels is what is needed to consider total health effects. There is little to be gained from understanding emissions from each line because it is the cumulative impact which matters. Metrolinx has launched an electrification study and its findings, in due course, will be applied to future GO operations on the Georgetown corridor
d. Make the above information available in a way that allows the public sufficient time to review and comment before Metrolinx finalizes its Environmental Project Report.	Metrolinx issued the draft Environmental Project Report, which contains an assessment of the impacts associated with the Georgetown corridor on air quality and human health on May 29, 2008. The draft Environmental Project Report and detailed technical reports were made available at metrolinx.com/gsse. In addition Metrolinx

Medical Officer of Health for the City of Toronto Recommendation	Metrolinx Response
	released the specialist reports on Noise and Vibration and Air Quality and Human Health, and held meetings with the Stakeholders listed in the Medical Officer of Health's review to discuss the results of these studies.
2. The Board of Health request the Medical Officer of Health to review the risk assessment reports, air quality impact mitigation strategy and health impact assessment when they are released by Metrolinx, and provide input to Metrolinx and the public through the Environmental Bill of Rights Registry.	The draft Environmental Project Report and detailed technical reports were made available at metrolinx.com/gsse. In addition, the Transit Project Assessment Process provides a specific period of time for public and agency review. This 30-day period begins after Metrolinx files its Environmental Project Report with MOE on July 20, 2009. The review period begins on July 31, 2009 and extends to August 31, 2009.
3. The Board of Health request Metrolinx to: a. Electrify the Georgetown South Service Expansion and the Union-Pearson Rail Link as soon as possible;	Metrolinx recently announced a comprehensive study of electrification of the entire GO Transit rail system in the Greater Toronto and Hamilton Area. The study will be started in 2009 and it will be completed by December 2010. The Georgetown Corridor will be considered in the context of that study. The infrastructure for the Georgetown corridor which is in the current assessment is designed to enable electrification to occur. It should be noted that electrification of the Georgetown Corridor is part of Metrolinx's 15 year plan.
b. Apply the following good practices for the protection of public health to the Georgetown South Service Expansion and the Union-Pearson Rail Link until such time as electrification is in place: i. Select hybrid locomotives with on-board rechargeable energy storage systems and regenerative braking; ii. Select new locomotives and remanufacture systems of the best available technology, which may be	Metrolinx is not pursuing Recommendation 3(b)(i) Recommendation 3(b)(ii) GO Transit is committed to selecting the best fit locomotive technology available on the market to meet our service requirements, including leading edge emissions reduction. GO Transit joined an industry-wide MOU with Environment Canada and Transport Canada on May 15, 2007 on environmental performance improvement. In early 2008, GO Transit introduced a new

Medical Officer of Health for the City of Toronto Recommendation	Metrolinx Response
more advanced than that required by the current US EPA emissions standards for line-haul locomotives; iii. Use ultra low-sulphur diesel (ULSD, 15 ppm); iv. Ensure that idle control systems are in place, and develop and implement idling reduction policies; and, v. Regularly assess and maintain tracks and locomotives to maintain emissions performance at or above the relevant emissions standards; vi. Develop a detailed mitigation strategy to manage the residual human health risks;	fleet of 27 MP40 locomotives. They meet U.S. EPA Tier 3 emissions standards which come into effect in 2012. Sixteen older locomotives were retired. Thirty additional MP40 are to be delivered in 2010 and 2011. By 2012, all of GO Transit's locomotives will be Tier 3 compliant. Metrolinx's Regional Transportation Plan calls for the Georgetown Corridor to be electrified. Recommendation 3(b)(iii) GO Transit has been using ultra low sulphur diesel fuel for both its rail and bus services since 2006. Recommendation 3(b)(iv) GO Transit has an anti-idling plan in operation. The idle time of trains upon full-stop is about 1 minute, depending upon the embarking and disembarking passengers. During extended mid-day or overnight layovers, locomotive engines are shutdown. Each train is plugged into wayside electrical power supply with energy management system capability. Recommendation 3(b)(v) That is already in practice. All tracks are maintained in accordance with Transport Canada's prescribed track and locomotive safety rules. All locomotives are maintained per Maintenance Schedules and procedures recommended by the original equipment manufacturer, best practices, and regulatory guidelines Recommendation 3(b)(vi) The development of mitigation strategies is part of the Ontario Transit Project Assessment Process and the federal EA process, both of which apply to the Georgetown project. Metrolinx is committed to working with both levels of government on improving the effects of its rail operations on air quality and human health.
c. Collaborate with Toronto Public Health, City Planning, and Transportation Services to ensure that the stations on the Georgetown South Corridor are developed into connected "mobility hubs" where	The development of mobility hubs is Big Move #7 in <i>The Big Move</i>, Metrolinx's Regional Transportation Plan. The partnership of municipalities is always sought and welcomed. Work on mobility

Medical Officer of Health for the City of Toronto Recommendation	Metrolinx Response
residents can live, shop, eat, work, play, and connect to active transportation and public transit.	hubs in Toronto is already underway at, for example, Kipling and Dundas West.
4. The Board of Health request Metrolinx to apply the good practices for the protection of public health requested above to all non-electrified GO transit rail services that pass through residential neighbourhoods in the City of Toronto.	Metrolinx will consider the report's other recommendations, and will discuss them with the Medical Officer of Health.
5. The Board of Health forward this report to Canadian National Railway, Canadian Pacific Railway and Via Rail Canada, and request that they apply the good practices for the protection of public health requested above to their services that pass through residential neighbourhoods in the City of Toronto.	No action from Metrolinx required.
6. The Board of Health forward this report to the: a. Clean Train Coalition, Environmental Health Association of Ontario, Mount Dennis Community Association and Weston Community Coalition; b. Toronto District Catholic School Board and Toronto District School Board; c. Medical Officers of Health for Halton and Peel Regions; d. Ontario Minister of the Environment; and, e. Federal Ministers of the Environment and Transportation.	No action from Metrolinx required. Metrolinx held two briefing sessions with these stakeholders to review and discuss the result of the studies.
7. The Board of Health forward this report and the Board of Health's decision to the Parks and Environment Committee for its June 16, 2009 meeting.	No action from Metrolinx required.

Stakeholder Briefings and Meetings with School Boards

Metrolinx hosted two technical briefings for those organizations identified in the Recommendation 6 of Medical Officer of Health report to the Toronto Board of Health. An invitation was extended for a representative from each organization. Attendees were also provided with hard copies of the full draft specialist reports. These reports were also made available on the project website.

Meeting	Human Health + Air Quality Technical Briefing
Date	Monday, June 22, 2009
Objective	Debrief on the findings and methodologies of the Air Quality and Human Health studies conducted as part of TPAP. Meeting was conducted in a question and answer format.
Attendees	Representative from the Clean Train Coalition Representative from the Weston Community Coalition Representative from the Mount Dennis Community Association Representative from the Toronto Catholic District School board Representative from the Toronto District School Board
Metrolinx Reps	Dr. Glenn Ferguson Intrinsik Environmental Sciences Inc. Mike LePage, RWDI AIR Inc. Sam Kulendran, JE Coulter Associates Limited Dennis Callan, MRC Mike Bricks, EcoPlans Brian Peltier, Executive Lead, GSSE/UPRL James O'Mara, Executive Lead, Environmental Planning + Policy Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting	Noise + Vibration Technical Briefing
Date	Tuesday, June 30, 2009
Objective	Debrief on the findings and methodologies of the Noise and Vibration studies conducted as part of TPAP. Meeting was conducted in a question and answer format.
Attendees	Representative from the Clean Train Coalition Representative from the Weston Community Coalition Representative from the Mount Dennis Community Association Representative from the Toronto Catholic District School board
Metrolinx Reps	Dr. Glenn Ferguson Intrinsik Environmental Sciences Inc. Mike LePage, RWDI AIR Inc. Sam Kulendran, JE Coulter Associates Limited Brian Peltier, Executive Lead, GSSE/UPRL James O'Mara, Executive Lead, Environmental Planning + Policy Mike Cyr, GSSE/UPRL

Meetings were also held with local school boards. The intent of these meetings was to continue to get a better sense of local issues and concerns, and to stay abreast of community issues.

Meeting with	Toronto Catholic District School Board
Date	Monday, April 6, 2009
Attendees	Representatives from Planning + Facilities, Toronto Catholic District School Board

Metrolinx Reps	Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Toronto District School Board
Date	Thursday, April 9, 2009
Attendees	Representatives from Planning + Facilities, Toronto District School Board
Metrolinx Reps	James O'Mara, Executive Lead, Environmental Planning + Policy Colleen Bell, GM, Community Relations + Initiatives Robyn Connelly, Community Development Officer

Meeting with	Toronto Catholic District School Board
Date	Thursday, June 25, 2009
Attendees	Albert Kohle Angelo Sangregorio
Metrolinx Reps	James O'Mara, Executive Lead, Environmental Planning + Policy Colleen Bell, GM, Community Relations + Initiatives

The Toronto District School Board undertook a peer review of the draft Noise, Air Quality and Human Health Impact Assessments. **Table 3.3.2.4-3** provides a brief summary of Metrolinx's response to the TDSB's comments. These responses were provided to the TDSB in a letter dated July 21, 2009.

Table 3.3.2.4-3 Summary of TDSB Peer Review Comments

TDSB Peer Review Comments	Metrolinx Response
<u>Air Quality</u> Ambient monitoring data used to characterize the baseline condition are not representative of existing air quality at nearby schools. The ambient monitoring data used to represent background should not be affected by local emission sources.	The most important comparison we have made was between the future build scenario and health benchmarks (i.e., ambient air quality criteria). For this purpose, background values were selected to be at the high end of the range of values reported for the various monitoring stations in and around the study area, as shown in Appendix C of the Air Quality Report. We intentionally selected stations that were affected by local emission sources. This helps ensure that the predicted combined concentrations for the project are conservatively high in comparison with air quality criteria. We examined ambient monitoring data from several monitoring stations in and around the area, as shown in Appendix C. The observed station-to-station variations were generally very small compared to the predicted combined concentrations shown in Tables 6 through 8 of our report. The choice of background data generally would have a relatively small effect on predicted overall concentrations in any case.
While NO₂, CO and SO₂ have improved over the past few decades; PM_{2.5} continues to be a challenge.	This comment pertains to statements we made in Section 2.2 of the Air Quality Report. We generally agree with Environ's comment. But in Section 2.2.1 of the report we note that 24-hour levels surpass the benchmark about 5% of the time and are usually associated with winds from the south-southwest and long range transmission. The worst-case for modeled emission sources remains below the benchmark.
No justification for use of the 90th percentile monitored concentration – it misses peak occurrences.	The 90th percentile has been adopted for background concentrations in numerous transportation environmental assessment projects in Ontario more than the past 15 years. The use of the 90th percentile was adopted as a result of consultations with Ministry of the Environment scientists. It recognizes that the combination of annual maximum background level with maximum modeled project contribution has a very low probability of occurrence, and combining the two would give an unrealistically high estimate of maximum project-related impacts. Therefore, rather than using the maximum annual background level, the 90th percentile level is used in combination with the maximum project contribution. This represents a reasonable worst-case level. For key contaminants that approached or exceeded applicable air quality criteria, we did not stop at using the 90th percentile background. We went on to undertake a more detailed hour-by-hour or day-by-day analysis of background plus project contribution. This is described in Section 3.1.2 of the Air

TDSB Peer Review Comments	Metrolinx Response
	Quality Report.
By averaging of all ambient monitoring data for stations within the study area, hot-spots will be missed.	We did not average ambient monitoring data for stations in the area. We generally used the maximum values from among the various stations.
Background concentration methodology appears to favour a more conservative approach, but this assumption is misleading without further analysis.	Environ appears to agree that the approach to background concentrations was suitably conservative. The statements about our approach need to be more specific and indicate what they feel are lacking.
No justification for not including industrial, institutional emissions within the study area.	Based on our review of the study area, we did not identify any sources of industrial or institutional emissions in the study area that would be sufficient in magnitude to warrant their inclusion in the modeling by comparison with the emissions from the rail corridor and from major arterial roads.
Changes in roadway traffic between the future build and no build scenarios were not considered and do not take stations into account.	Our best estimate is that most major arterial roads in the study area are already at or near capacity and, therefore, are not expected to experience any change in traffic volume or traffic speed in future. Since the project involves only two stations, only one of which will have parking associated with it, and various other measures have been taken elsewhere along the corridor to minimize project impacts to road traffic, any effect that the project will have on road traffic is expected to be localized and small.
The dispersion model, CAL3QHCR should not be used for receptors beyond 500 metres.	This statement is not supported by any technical information which our consultants have seen. We would note that almost all receptors studied were within 500 metres of the corridor in any case.
A robust ozone-limiting method is needed for estimating formation of NO ₂ .	The Air Quality Report provides results for both total NO _x and NO ₂ . The NO ₂ results were estimated from the total NO _x results using a version of the ozone-limiting method. The human health assessment study which was prepared for us used a more conservative approach, assuming that the total NO _x

TDSB Peer Review Comments	Metrolinx Response
	results consisted entirely of NO₂ and a 100% conversion of NO to NO₂. Since ground-level ozone tends to reach a maximum during summer time afternoons and early evenings and the rail corridor's maximum contribution to NO_x levels tends to occur during the morning rush hour in winter, the use of a 90th percentile 1-hour ozone concentration in combination with maximum project-related NO_x levels provides a conservatively high estimate of maximum NO₂ levels.
Over Simplified Regional Air Quality Assessment.	The calculated contribution of emissions from all rail traffic in the corridor was found to be less than 2% by comparison with other emissions in the surrounding region. This calculation was conservatively high, as it did not account for any emissions that would be displaced by virtue of the increased commuter rail service reducing commuter traffic on nearby highways. The calculation represents an even more conservative estimate of the impact of the future rail traffic on regional smog levels since, if anything, the "complexities in the formation of smog pollutants" mentioned by Environ, would lead to a lower impact than that estimated based solely on relative emissions. Given the small magnitude of the contribution, this calculation yields a precautionary, conservative estimate of potential impacts to regional smog. A more detailed study would not, in our view, produce better information.
Greenhouse gas (GHG) calculation did not follow Intergovernmental Panel on Climate Change protocols.	Environ did not elaborate on this statement. Later in the Air Quality Report recommendations are made for intensity-based estimates of the GHG emissions and comparing them to alternatives such as electric rail systems. We agree that a life cycle analysis of GHG emissions and a comparison to alternatives were not conducted. The intent of the GHG analysis was only to show the relative magnitude of the GHG emissions involved which turned out to be very small. We have done further calculations to show that the proposed increase in commuter rail traffic produces a GHG reduction in the region by displacing automobile commuter traffic. That information will be in the Environmental Project Report.
The methodologies follow generally accepted practice, but there is insufficient analysis conducted to determine whether conclusions are justified.	This comment summarizes Environ's conclusion. We believe that this study's use of generally accepted practices provides a reasonable and adequate representation of potential air quality impacts.

TDSB Peer Review Comments	Metrolinx Response
Details of the estimated of roadway emissions are lacking, and no consideration was taken of the benefits of Ontario's Drive Clean program, varying vehicle speeds and ambient temperatures, gasoline properties, etc.	We assumed no benefit from the Drive Clean program because we adopted a highly conservation approach, basing the emission estimates on reasonable worst-case ambient temperatures to ensure a high estimate of pollutant contribution from major roadways within the study area.
The assessment does not provide any details regarding input variables used to run CAL3QHCR.	The details of this comment from Environ pertain to the modeling of roadways within the study area, which was a secondary part of the study. They do not pertain to the modeling of the rail corridor. The comment suggests that modeling for automobile queuing at intersections may underestimate emissions. Even if true, the under estimation would be relatively small portion compared with the overall emissions being modeled in this study. By adopting other conservative approaches for roadway emissions, as outlined in the preceding comment, we have adequately addressed any potential uncertainties in the CAL3QHCR model.
<u>Human Health Impacts</u> The report's use of data from the NAPS stations under estimate the cumulative cancer risk and non-cancer hazard for both the no-build and future-build scenarios.	The regional NAPS stations provide an adequate set of monitoring data for baseline conditions. Our intent was to capture potential regional background within the Greater Toronto Area (GTA), in absence of significant contributions from the rail corridor. This provides a baseline on which to add predicted incremental contributions from the rail corridor to the local air shed. One could debate which metric should be used to represent the baseline concentration, but in our view the NAPS data set provides an excellent regional foundation from which to build a projected localized exposure scenario along the Georgetown South Service Corridor. With respect to the calculation of cumulative exposures, as noted by the reviewer, it would be extremely difficult to account for all the variables in play in order to accurately project future baseline concentrations for the GTA. Given the historic downward trends in ambient baseline concentrations over the past few decades, and ongoing initiatives at all levels of government to reduce air pollution within the region, it is likely that future baseline concentrations will be less than those currently monitored within the GTA. The use of current day ambient concentrations as the potential baseline concentrations present in the

TDSB Peer Review Comments	Metrolinx Response
	future when the proposed maximum rail traffic numbers may occur would over-estimate predicted exposures under the Cumulative Future Build scenario. Given the intent of the assessment process is to identify any potential adverse health outcomes arising from the proposed changes to the rail corridor, the use of a conservative approach for estimating future cumulative exposures is an appropriate methodology for predicting health risk in the current assessment.
Use of Receptor Locations to Assess Local Air Quality Impacts	The purpose of the current Human Health Assessment was to evaluate the potential implications of increased rail traffic on the most sensitive human receptors along the service corridor. As noted in the assessment, residential receptors were located all along the corridor at the closest possible point to the corridor (i.e., homes with backgrounds backing onto the corridor, some within 25 to 50 metres from the tracks). Given this approach, the assessment did not omit “important areas/receptors from analysis.” Individuals who are subject to high exposures were assessed to ensure those most sensitive individuals would be protected. The air dispersion modeling shows ambient concentrations dropping as you move away from the corridor. By protecting the closest locations along the corridor, one is inherently protecting any receptors at more remote distances. Our analysis was taken a step further with the identification of all schools, childcare facilities, and long-term care facilities within 300 to 500 metres on either side of the corridor. Potential inhalation risks were also evaluated at each of these locations as part of the assessment.
Selection of Contaminants of Concern (COC)	The purpose of the current assessment was to evaluate the potential incremental increase in health risks related to the proposed increase in rail traffic between the Future No Build and Future Build operational scenarios. The potential health implications arising from diesel emissions were the primary focus of the COC selection process for the current assessment. The potential contribution from non-rail vehicle traffic operating in the vicinity of the corridor (i.e., on major roads, within GO station parking lots, etc.) were also estimated by the air quality team. Those estimates were added to the ground level air concentrations at each receptor location for both the Future No Build and Future Build scenarios. It should be noted that the same contribution was considered for both of these scenarios. As such, these contributions would only be important for total cumulative evaluations, and not relative comparisons between the Future No Build and Future Build scenarios. While non-rail vehicle traffic (i.e., cars, trucks, buses) have been accounted for in the current

TDSB Peer Review Comments	Metrolinx Response
	assessment, it is important to note that no consideration for future improvements in emission controls on any of these vehicles were considered as part of the Future Build scenario. Given proposed regulatory changes requiring stricter emission controls on vehicles in the near future (in addition to current downward trends in emissions from the existing fleet on the road), it is expected that this conservative approach results in an over estimation of the cumulative exposures at the culmination of the Metrolinx 15 year plan.
COCs assessed only took into account a narrow range of emissions.	As noted in the Human Health Assessment Report, the intent of the COC selection was to assess those constituents of diesel emissions that pose the largest risk from both a toxicological and quantitative point-of-view. Diesel exhaust is made up of hundreds of different constituents which are either a minute portion of the emission profile, or are not as toxicologically relevant as those key components currently evaluated in the assessment. It is also extremely unlikely one would be able to locate reasonable emission factors for diesel trains for many of these minor constituents, making an accurate assessment of their contribution to potential risk difficult to estimate. Ultimately, as the current assessment demonstrates, either outright or through applied mitigation measures, the ambient concentrations of the key constituents of diesel emissions do not pose a health risk to the most sensitive individuals living along the corridor. Mitigation measures put in place to address potential risk from one of the assessed COCs would also inherently address the other minor constituents of diesel emissions.
Does not evaluate the health effects of metals	An evaluation of the available literature indicated that metals did not represent a significant constituent of diesel emissions from rail traffic, with most measurements non-detectable. If additional research shows detectable concentrations, and appropriate emissions factors could be estimated for diesel trains, these metals could be added to the multi-pathway assessment. This issue has been passed to the air quality team for follow up.
Addresses operational impacts only and should consider construction activities.	Potential health risks arising from construction activities were evaluated qualitatively within the current EA, and were beyond the scope of the current human health assessment. It is important to note that construction activities will be completed long before the estimated traffic level evaluated under the Future Build scenario could occur (in fact the construction is required to permit that level of traffic along the corridor).

3.3.3 Consultation on the Draft Environmental Project Report

The following section outlines the consultation completed during the release of the Draft Environmental Project Report (EPR) for comment. The Draft EPR was made available for comment on May 29, 2009.

As of June 20, 2009, approximately 30 comments were received from members of the public on the Draft EPR. **Table 3.3.3-1** summarizes the major comments received.

Table 3.3.3-1 Summary of Public Comments – Draft EPR, Part 2

Theme	Number of Comments	Response
Electrification	21	Metrolinx has announced an electrification study of the entire GO Transit rail system as a future alternative to diesel trains currently in service. The study will commence this summer and be completed by winter 2010. While the study is being done, work will continue on the line using design elements that would accommodate both electric and diesel trains, such as designing structures (bridges and grade separations) to meet the height requirements for electrification, or ensuring track spacing is being designed to allow for foundations and columns associated with the catenaries required for electrification.
Concerned about noise, vibration, air quality and human health impacts	19	These concerns have been examined and are documented in Sections 6.3.2 – 6.3.6.. Appropriate mitigation measures have been developed where warranted.
Concern over construction effects, specifically noise and vibration	2	Construction impacts have been examined and appropriate mitigation measures have been developed where warranted. See Sections 6.3.2 and 6.3.3.
Lawrence Avenue should be raised to street level, and the tracks lowered	1	This alternative was suggested at the John Street Charette but eliminated due to the resulting intrusive and lengthy construction of raising Lawrence Avenue and the additional cost of lowering the corridor for CP and GO.

To date, formal comments have been received from MOE, TRCA and the Ministry of Culture in response to the Draft EPR; No formal comments have been received from MNR however, input has been received as part of meetings held in May and June 2009 (as discussed in **Section 3.3.2.2**) and via informal correspondence with the project team. **Table 3.3.3-2** outlines the preliminary comments received from agencies on the Draft EPR.

Copies of the Draft EPR consultation correspondence is included in **Appendix B**.

Table 3.3.3-2 Summary of Agency Comments – Draft EPR, Part 2

Comments Received/ Concerns Identified	Response	Changes to EPR
Ministry of the Environment, EA-B - Emailed Memo Comments, dated June 29, 2009		
<u>Chapter 2 – Introduction</u> It would extremely helpful to include a glossary for many of the terms used throughout the document (e.g. screenlines, retaining wall, grade separation).	A glossary has been added to report.	To be added to Final EPR.
It is unclear what the screenlines are or represent (page 8, Figure 2.2-2). Please explain in this section.	Screenline definition will be included in the Glossary. Additional clarification as to the location of A-A and B-B will be added.	To be added to Section 2.2.
On page 6, last paragraph, clarify whether the expansion is for 8 new lines or for a total of 8 lines.	The expansion is for a total of 8 mainline tracks.	To be added to Section 2.2
On p. 11, Property Impacts: the third paragraph states that the locations of impacted properties are outlined in the following sections. Please specify which following sections, for clarity. Also, I don't see the expropriation required for Denison and Weston illustrated in these figures – it should be clear where they are located. Lastly, as discussed earlier, can you clarify the number of properties requiring full and partial expropriation?	Sections 2.3.3.1 and 2.3.3.2 outline the locations of impacted properties Denison Road number of properties has been clarified in report.	To be added to Section 2.3.3.2 Figures to be added for Denison Road property impacts
Page 32, discussion of related projects: was there an EA conducted for the West Toronto Diamond? If so, it would be useful to indicate this here.	The West Toronto Diamond project was approved under the Provincial EA and the CEAA EA process.	To be added to Section 2.3.5.2.
<u>Chapter 4 – Baseline Study Area Conditions</u> Under the Natural Environment heading (section 4.1.1), there is reference to the Natural Environmental Impact Assessment Memorandum. Has this been completed, and	Stand alone terrestrial and aquatics reports have been prepared. The information from those reports has been included in the EPR. These reports can be made available as supporting documents.	Not required

Comments Received/ Concerns Identified	Response	Changes to EPR
will this accompany the final EPR?		
If possible, it would be useful to label the three relevant watercourses in Figures 4.1.1.1-1, 2 and 3.	All three relevant watercourses will be labeled in Figures 4.1.1.1-1,2 and 3.	To be labeled in Figures 4.1.1.1-1,2, and 3
Ensure that you include any comments by MNR or the TRCA in the final EPR related to the natural environment.	Comments provided by MNR and TRCA will be included in the consultation section.	This has been added to Section 4.1.1
Page 83, Groundwater. The text indicates that details on the existing groundwater conditions will be in the next part of the EPR. As mentioned previously, ministry staff request that to the groundwater information be made available prior to the preparation of the final EPR.	Comment noted. This will be provided if available.	Not required.
Page 84, Drainage and Stormwater Management: Will you require Certificates of Approval for Stormwater Management under the <i>Ontario Water Resources Act</i> ?	No. During detailed design GO Transit will collaborate with local municipalities and conservation authorities on stormwater management issues	Not required.
Have there been any issues raised by the Weston Golf and Country Club, as there is a potential impact here?	Issues raised by the Golf Course include: property requirements, construction impacts (location of staging areas, access, timing, potential construction damage), access to the 5 th hole, noise and air quality. This will be included in the consultation section. To address construction staging issues, the Golf Course will be consulted during detailed design and construction will be staged to minimize impacts during the Spring and Summer. An underpass will be provided to allow access to the 5 th hole.	This has been added to Section 3.0

Comments Received/ Concerns Identified	Response	Changes to EPR
Section 4.3, Cultural Heritage Values or Interests. States that a full detailed history of the corridor will be included in the EPR. Please ensure that this goes into the final EPR, as it is not included here.	Comment noted. To be included in Final Draft.	This has been added to Section 4.3
In the section (Chapter 4), only Figure 4.3.2-3 indicates that there was consideration of two alternative spur locations, but there is no discussion on this consideration. This needs to be introduced here, or earlier in the introduction section.	The evaluation of alternatives is outlined in Section 5.1.6. Additional details on this alternative have been added.	Section 5.1.6 has been updated.
<u>Chapter 5 – Recommended Transit Project</u> Section 5.1.7 – Electrification. Will any details of proposed electrification study (i.e. ToR) be included in final EPR? Can you provide any further commitments/details on the timing for the electrification study? This section should provide more details on the rationale for not pursuing this option, such as the details regarding technical constraints, physical challenges, costs, and if possible a comment on potential energy requirements/energy supply issues? Specify whether electrification will be a completely separate undertaking.	Comment noted. Additional details of electrification study have been added. Details on rationale for not pursuing electrification were currently in the document, however additional details have been included. Section 5.1.7 has been moved Section 3.3.2.1.2.	Text added to Section 3.3.2.1.2.
Section 5.2.1. This section should also include details/description of the types of trains and engines to be used for both components of the project and the number of hours the trains will be running. Also indicate who will be running the UPRL service.	A table outlining the details of the services operating along the GO Georgetown corridor has been added.	Text added to Section 5.2.1.
Section 5.2.1 – This information should be included upfront in executive summary.	Comment noted. Will be included in Executive Summary.	Text added to Section 1.0.

Comments Received/ Concerns Identified	Response	Changes to EPR
Section 5.2.3 – UPRL Corridors. It states here that the UPRL spur will add approximately 4 km of track; later states that the spur line equates to 40% (1.2km) and 60% (1.8km) = 3 km – please clarify the length of the spur.	Discrepancy has been noted, and the correction to approximately 3 km has been made.	Text added to Section 5.2.3.
How many UPRL trains will be running when service starts (s. 5.2.3 station requirements states that 11 trains will be stored at start – is it anticipated that 11 will be running or will this depend on usage?).	UPRL service will have 11 vehicles at the outset. On a daily basis using 2-car trains, 4 trains will be running in the corridor , one train will be available for service recovery in the event of a failure, and a spare (single) vehicle will be available for insertion on an emergency replacement basis.	Text added to Section 5.2.3.
<u>Chapter 6 – Detailed Assessment of the Impacts, Mitigation, and Monitoring</u> Section 6.2.2 – Noise Impacts. Is there any indication in the assessment of the existing noise conditions/levels? The document speaks to increases in decibels, but will there not be an influence of the impact depending on how high the existing levels of noise are?	In accordance with the MOE/GO Noise Protocol, the focus of the noise impact assessment is on the change in sound between the “Future with out the project” and the “Future with the project”. As such, the maps in the EPR focus on summarizing those changes. Having said that, Table 6.2.2-1 summarizes the absolute sound levels with and without barriers and the stand alone noise reports provides additional noise contour mapping.	Not required.
Section 6.2.2.1 – Potential Construction Impacts, Mitigation Measures (Page 277). Mitigation measures indicate that wherever soil conditions allow, driven pile will not be used. Is there any indication of how much of the corridor has soil conditions that will require pile driving?	Specific construction methods can not be determined until detailed geotechnical information is available. This typically occurs during detailed design. Additional details on construction staging and commitments for consultation during detailed design have been	Additional details have been added to Sections 5.3 and 6.11.2

Comments Received/ Concerns Identified	Response	Changes to EPR
	added.	
Section 6.2.4 – Air Quality Impacts. Can you provide any details on the level of emissions predicted with both the proposed GO Transit and UPRL trains, in comparison to other types of trains (i.e. different tiers)? Can you provide any discussion of the change in emissions from having the project go forward with diesel trains, and taking cars off the road, versus the ‘future no build’ scenario?	The air quality impact assessment examined all trains in the corridor. It is not possible to easily separate the different trains (additional modeling would be required). In addition, we do not feel that this would add any value to the assessment as we are assessing the cumulative effect of all emission in the corridor.	N
Air impacts mitigation: Can you provide proposed mitigation measures for the predicted increase in air emissions resulting from the project? For example, can you speak to any of the recommendations detailed in the City of Toronto’s Medical Officer of Health report?	A mitigation strategy has been added. The response to the Medical Officer of Health’s report will be included in the consultation section.	This has been added to Section 6.2.4. This has been added to Section 3.0.
P. 305 – bottom of page, second last sentence has a couple extra words (‘will change the change’).	Comment noted. Change made.	Text revised
In Table 6.2.4.1-1, page 307. Make it clear that the Receptor ID column indicates the receptor with the highest predicted concentration.	Comment noted. Change made.	Text revised.
For Figures 6.2.4.1-1 to 8: Label the axes.	Comment noted. Change made	Text revised.
Section 6.3 – Cultural Heritage Values or interests. Ensure that any issues raised by the Ministry of Culture are addressed in the final EPR.	Comments provided by MCL will be included in the consultation section.	This has been added to Section 3.0.
Section 6.8.1, page 386. The last paragraph should read “Ontario Regulation 231/08 (not /05)	Comment noted. Change made.	Text revised.

Comments Received/ Concerns Identified	Response	Changes to EPR
Ministry of the Environment, Central Region - Emailed Memo Comments, dated June 26, 2009		
<u>Air Quality</u> For background concentrations, the proponent used five years worth of ambient air quality data from the AQI stations to pick out data considered representative of the most adverse conditions for the area. The EPR background data did not present 1-and 24-hour averages as appropriate, 1- and 24-hour 90th percentile values as appropriate and 1- and 24-hour maximums as appropriate (as well, 8 hour CO values are typically included). Only worst-case annual 90th percentile and annual average background levels were provided by the proponent.	This information is provided in Appendix A of the stand alone air quality report. At the meeting of June 29th, it was agreed that the summary in the EPR was sufficient. Appendix A of the report gives 90th percentile 1-hr background levels for criteria contaminants (PM, NOX, CO, SO₂). In some cases, the 90th percentile 1-hr level was used as a conservative estimate of 90th percentile 24-hr level. This was done when assessing 24-hr levels of PM and NOX, for example. In the case of VOC species, Appendix A gives 90th percentile 24-hr background concentrations, since these contaminants are monitored only on a 24-hour average basis and not on an hourly basis.	This has been included in the Air Quality Report.
The combined concentration (background and modelled) should be compared with all applicable Reg419/05 standards as noted in the MOE document <i>Summary of O.Reg. 419/05 Standards and Point of Impingement Guidelines & Ambient Air Quality Criteria (AAQCs) – Standards Development Branch</i> [December 2005]. Although the locomotive sources are exempt under O. Reg419/05, Tech Support recommends the combined concentration to be compared against O. Reg419/05 standards for comparative purposes.	The air quality study currently assesses combined concentrations against MOE AAQC's. For most of the contaminants, these values are the same as the Schedule 3 standards in O. Reg. 419/05. The exceptions are: (1) O. Reg. 419/05 has different standard for CO; and (2) O. Reg. 419/05 adopts the AAQC's for NO₂ as standards for total NOX. Item 2 is already addressed in the health implications study, which treated all NOX emissions as NO₂ in any case. Thus, the only relevant standard in Reg. 419 that is not already covered in the air quality study is that for CO (6000 ug/m³). The results presented for CO	Not required.

Comments Received/ Concerns Identified	Response	Changes to EPR
	meet this standard. Note, also, that if the exemption were not in effect, then the O. Reg. 419/05 standards would apply only to the modeled contribution of the project, without background included.	
The Environmental Project Report (EPR) does not mention what train speeds were assessed in the modeling.	This information is provided in the stand alone air quality report. At the meeting of June 29th, it was agreed that this was sufficient.	This has been included in the Air Quality Report
The EPR does not present or discuss the Cartesian grid used for receptors in the modeling. The Proponent should clarify what grid spacing was used in the modelling.	For practical reasons, a Cartesian grid was not used. It would have required an excessively large number of grid points, due to the large spatial extent of the project. Instead, a selection of 125 receptors was adopted, covering representative impact locations adjacent to right-of-way as well as representative locations at various distances away.	Not required
PAHs should be included in Table 6.2.4.1 since they have been modeled and presented in Tables 6.2.4.1-1 through 6.2.4.1-3.	PAH's are presented in these tables within the stand-alone air quality report.	This has been included in the Air Quality Report
The EPR shows that nitrogen oxides and acrolein 24-hour concentrations were above the O. Reg 419/05 standards. The proponent should discuss whether there any proposed mitigation measures to decrease these concentrations.	A mitigation strategy has been added.	This has been added to Section 6.2.4.
On page 315, the second paragraph of the Benzo(a)pyrene section begins by stating that concentrations at receptor 56 may be underestimated. The last sentence in the same paragraph states that the results reported for receptor 56 are likely to be overestimates.	As explained in detail in S. 3.1 of the stand alone air quality report, these statements are both correct. However, they may not have been fully explained in the EPR. The direct model output for BaP at Receptor 56 was thought to be an	This has been included in the Air Quality Report

Comments Received/ Concerns Identified	Response	Changes to EPR
This error should be corrected.	underestimate, so it was replaced with the worst-case result from among other receptors close to the tracks in that area (43, 44 and 52). The replaced result is considered to be a conservative overestimate.	
<i>Table 6.2.4.1-4 Maximum Observed Trace Metals Concentrations</i> lists “Measured 1-hour Concentrations” and “Current Ontario 24-hour Limit”. It is suggested that both columns be presented as 1-hour values for easier comparison.	Measured 24-hour values are not readily available from the published study. However, the measured 1-hour values provide a conservative estimate of 24-hour values for comparison to the provincial limits, which are based on a 24-hour averaging time. This is why measured 1-hr values are shown along side 24-hour limits.	Not required
The <i>Proposed Mitigation Measures</i> section in <i>Section 6.2.4.3 Potential Construction Impacts and Proposed Mitigation Measures</i> is very limited. Numerous mitigation measures can be employed on construction projects to mitigate dust. Also, TSS recommends the use of non-chloride based dust suppressant compounds to protect water quality and the planting of trees (where possible) to help offset emissions.	Current wording references Ontario Provincial Standard Specification (OPSS) 506. The standard states that water (free of contaminants), Calcium Chloride Flake (as per OPSS 2501) and Calcium Chloride Solution (as per OPSS 2501) are approved dust suppressants.	Not required
<u>Surface Water</u> Overall, significant concerns with the proposed project were not identified. However, the following comments and recommendations are offered for consideration: Section 2.3.4 (pg. 32) states that no Provincially Significant Wetlands (PSWs) are located within the GO Transit railway corridor. Please clarify if the railway corridor is within 120-metres (legislated buffer) of any PSWs as this may impose some restrictions on	“The rail corridor is not within 120 metres of a PSW” has been added to the text.	This has been clarified in Section 2.3.4.

Comments Received/ Concerns Identified	Response	Changes to EPR
development and possibly require further environmental study.		
Section 4.1.1.4 (pg. 77) states that the Western Chorus Frog was identified just north of the proposed crossing location in Mimico Creek. The report should discuss how the Western Chorus Frog will (or will not) be impacted during either the construction and/or operation of the project.	Western Chorus Frog was identified within the Mimico Creek valley approximately 100 m north of the <i>existing</i> Mimico Creek crossing. Construction activities within the Mimico Creek valley will be limited to the south side of the existing crossing, therefore no impacts to this species are anticipated. Potential impacts to the Mimico Creek valley are outlined in Chapter 6 of the report. However, text will be added to Section 4.1.1.4 to clarify that there will be no impacts.	This has been clarified in Section 4.1.1.4
Upon completion of the final design of the proposed new Black Creek crossing, a new impact assessment should be undertaken to ensure that previous assumptions accurately characterize the potential impacts to Black Creek.	This has been added to Sections 6.1.1 and 6.1.2.	Sections 6.1.1 and 6.1.2 have been refined.
The proponent should apply proper use and installation of sediment and erosion control measures and check regularly throughout the course of construction to ensure they are functioning as designed.	This is already addressed in the EPR. Most notably in Sections 6.1.1.1 and 6.1.2.1 (which commits to sediment and erosion control and the use of an environmental inspector)	This has been included in the EPR.
At sites with known contamination, contaminants should be included in the water quality monitoring program if there is a potential for them to reach the watercourse (i.e. run off/sediment transport).	The need and details of any necessary water quality monitoring program will be identified during the Permit to Take Water process undertaken during detailed design.	This has been included in the EPR.
Humber River In-water works will require approvals from relevant agencies such as the Department of Fisheries and Oceans and the Toronto Region Conservation Authority. MOE recommends completing in-water works	This has been addressed, most notably in Section 6.8 which outlines future approval requirements and Section 6.1.2.1 which outlines	This has been included in the EPR.

Comments Received/ Concerns Identified	Response	Changes to EPR
outside of both the coldwater and warmwater fisheries timing windows given the presence of migratory Rainbow Trout. If possible, in-water works should also be completed during low flow and not during any significant storm events to minimize the risk of impacting the aquatic environment. Completing works during low flows will also make it easier to divert water around the construction site.	fisheries mitigation and timing windows.	
Substrate placed around the pier for support should be appropriately sized in order to ensure it will not be easily transported with high flows. If substrate is transported downstream it could cause water damming downstream and potentially impede flow.	Comment noted. This will be considered in detailed design.	This has been included in the EPR.
The east pier structure should be constructed in a way that does not create or increase the risk of bank erosion. Banks surrounding the pier should be re-vegetated with deep rooted native shrub species to help stabilize banks adjacent to the pier.	Comment noted. This will be considered in detailed design. Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	This has been included in the EPR.
For the Mimico Creek crossing, the proponent should ensure that the installation and design of the piers on the banks of Mimico Creek does not destabilize the banks or cause the gabion baskets to fail.	This has been addressed, Most notably in Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	This has been included in the EPR.
For post-construction rehabilitation TSS recommends that erosion/bank stabilization measures (i.e. live staking, biotextiles, etc...) be implemented along with seeding to prevent erosion during the establishment of a dense vegetation community.	This has been addressed, Most notably in Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	This has been included in the EPR.
Re-vegetation should utilize a mix of grasses, herbs and	This has been addressed, Most notably in	This has been

Comments Received/ Concerns Identified	Response	Changes to EPR
shrubs. Some plantings (as opposed to just seeding) would be beneficial to ensure a timely and successful regeneration of the vegetation community. It is important to note that tree and shrub species are more successful at erosion control as their deep roots hold the soil in place better than the more shallow rooted herbs and grasses.	Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	included in the EPR.
When choosing plant species, consideration of not only their erosion control ability but their wildlife significance will help encourage/maintain the wildlife diversity within these important river valley corridors. Species that will provide food, shelter and nesting for local wildlife, increasing the value of the local habitat, are recommended.	This has been addressed, Most notably in Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	This has been included in the EPR.
The establishment and maintenance of a dense, well vegetated buffer along the banks of the Humber River, Black Creek and Mimico Creek will help to minimize potential impacts related to the use and maintenance of the expanded/new GO Transit rail corridor. A well-vegetated buffer will help reduce direct run off preventing some contaminants from entering the water.	This has been addressed, Most notably in Section 6.1.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA.	This has been included in the EPR.
During the establishment of the vegetation community fences should be placed around the rehabilitated areas to ensure minimal disturbance. This is a useful opportunity to display signage for public education on the local habitat and rehabilitation site.	This has been addressed, Most notably in the Section 6.1.1.1 (which commits to delineation and protection fencing)	This has been included in the EPR.
A monitoring program should be designed to monitor water quality and quantity, fisheries, biological indices and flora and fauna. Monitoring should capture preconstruction conditions, continue throughout the construction phase to ensure that no impacts are occurring as a result of construction Mitigation measures and contingency plans	Sections 6.1.2 and 6.1.5 outline the mitigation measures proposed for sediment and erosion control. As a result of these measures, no impacts to surface water are anticipated.	This has been included in the EPR.

Comments Received/ Concerns Identified	Response	Changes to EPR
should be designed and utilized when monitoring identifies any significant impacts to the watershed.		
Any construction dewatering taking greater than 50,000L per day will require a Permit to Take Water from the Ministry of the Environment and should be accompanied by a report supporting the feasibility of the proposed dewatering activities.	This has been addressed, Most notably in Section 6.8 which outlines future approval requirements.	This has been included in the EPR.
If stormwater management/control facilities are required for the Operations Management Centre, or any other part of the expansion, or at any time throughout construction a Certificate of Approval for Sewage Works may be required.	Comment noted. This will be considered during detailed design.	This will be considered during detailed design.
Ministry of Culture - Emailed Letter Comments, dated June 30, 2009		
<u>1.0 Introduction</u> There is an indication in this section that a full detailed history of the corridor related to railway and the associated settlement history will be included in the final report. However a short consolidated synopsis of the various community histories along the corridor may have been included in this section for early public consultation purposes. The general descriptions of the actual transit project undertaking pertaining to the Georgetown South Service Expansion and Union-Pearson Rail Link are adequate. Reference to contacting the Toronto, Mississauga and	A more detailed description has been included in the EPR and the final document presently reviewed by MCL. A more detailed description has been included in the EPR and the final document presently reviewed by MCL. Contact was made through the review of cultural	This has been included in the EPR This has been included in the EPR Not required

Comments Received/ Concerns Identified	Response	Changes to EPR
Brampton regarding heritage issues is good. Specifically, the municipal heritage committees can be mentioned and they may be interested in being involved or commenting on the heritage assessment report and proposed recommendations. Accepting comments and responding to any comments from the municipal perspective can be referenced in this section. Circulation of all heritage impact assessment reports to the municipal heritage committees is recommended.	heritage resource inventories of the named municipalities. Direct telephone contact with Kathryn Anderson of the City of Toronto Heritage Preservation Services and Jim Leonard of the City of Brampton was completed to discuss the review of the inventory properties. More information can be added.	
<u>1.1. [Legislative Overview]</u> Referencing the Ontario Heritage Act is good. There can also be a short synopsis of other relevant legislation such as the Environmental Assessment Act, the Transit regulation\Class EA, and the Planning Act Provincial Policy Statement 2.6 on cultural heritage conservation.	A more detailed description has been included in the final document presently reviewed by MCL.	This has been included in the Heritage Report
<u>1.3 Sensitivity for Change</u> In this section and to provide context for the Tables, there can be some additional description(s) and examples of what is meant by 'disruption' vs. 'displacement' of a built heritage resource or cultural heritage landscape feature. There can be further descriptions of similar terms such as 'direct' or 'indirect' impacts, as these pertain to specific resource and site types. For instance, a visual intrusion of a newly constructed station building or related transit structure to a cultural heritage landscape would be considered more of a 'displacement' or 'direct' impact, if specific views were identified as heritage attributes specified in a Part IV or V Heritage Act designation by-law.	A further explanation is provided Explanatory Notes before the Tables, therefore we do not feel additional text is required.	Not required

Comments Received/ Concerns Identified	Response	Changes to EPR
<u>1.4 Mitigation</u> This section is a good short synopsis of possible mitigative measures for built heritage and landscape resources. Table 1: Identified Cultural Heritage Landscapes and Built Heritage Resources A extra column specifying preliminary or possible 'mitigation strategies' for each of the sites identified in the study corridor can be included. We understand in the detailed design phase, more site specific heritage impact assessments and detailed mitigation strategies which would include conservation plans, will be included. [p. 9] Site #2 The Bathurst Bridge, south of Front Street is of provincial significance and listed in the Ontario Heritage Bridge List. This should be referenced in this table. Reference to any possible or forecasted impacts of this project to Union Station (which is a nationally, provincially and locally significant historic landmark) should also be mentioned in the Table. We understand that a separate Environmental Assessment is currently involved with the renovation\alterations of Union Station, but there may be some overlap or influence of this project to the Union Station undertaking. Therefore references of this Metrolinx EA being complimentary to the Union Station EA or vice versa, would be an appropriate inclusion in this Table 1.	This has been included in the EPR and the final document presently reviewed by MCL. This has been included in the EPR and the final document presently reviewed by MCL. No impacts will occur as part of this project as the study area starts at Bathurst Street.	This has been included in the EPR This has been included in the EPR Not required

Comments Received/ Concerns Identified	Response	Changes to EPR
Toronto and Region Conservation Authority – Emailed Letter Comments, dated July 13, 2009		
TRCA staff has completed its review of the draft Environmental Project Report (EPR) Part 2 and is satisfied with the findings of the draft report. Metrolinx has stated in several sections of the report to consult TRCA staff during the detailed design phase of the project for technical input on the design and construction of the Black Creek, Humber River and Mimico Creek structures. TRCA staff welcomes this opportunity to assist and provide technical input during the detailed design phase of the project.	Comment noted. TRCA will continue to be consulted as design progresses.	Not required
Staff notes that the draft EPR Part 2 does not contain or reflect previous TRCA technical comments provided in our letter dated June 2, 2009. Please ensure that TRCA's technical comments are considered and incorporated into the final EPR to the extent possible.	Comment noted. These were the comments on Part 1 of the EPR which were received after the release of Part 2. These comments have been included in Appendix B. All the technical comments have been considered in the planning and design of the project and have been incorporated into the final EPR.	This has been included in the EPR
The Humber River crossing is currently experiencing slope stability and erosion issues; it is likely that the proposed widening will exacerbate the erosion issue at this location. As such, staff suggests that Metrolinx incorporate anti-erosion protection measures into the design of the proposed bridge piers and foundations, based on the outcome of site-specific fluviogeomorphic and geotechnical studies.	Comment noted. Section 6.1.6.2 has been updated.	Section 6.1.6.2 has been updated.
Please note that the hydrology for Mimico Creek is currently being updated; as such the flow rates have not been finalized to date. Staff notes that the Regional flood lines for Mimico Creek have been updated in the EPR and	The draft/interim hydraulic analysis for the Mimico creek crossing will be revised when the results of the hydrology update are available from TRCA. This will include a graphic of the location	Not required

Comments Received/ Concerns Identified	Response	Changes to EPR
are based on an adjusted flow rate (20% increase to current flows within the HECRAS model) in lieu of the finalized flow rates. Please confirm whether the piers for the spur line will be located outside of the updated floodplain and update Figure 8 to illustrate the updated floodline. Also, note that there may be potential for scouring/erosion at the proposed piers associated with the Mimico Creek crossing during all storm events. As such, the design of the spur line should consider the potential scour/erosion at the piers and incorporate the appropriate anti-erosion/scouring measures. Staff will be available during the detailed design phase of the project to provide Metrolinx with detailed technical input once specific details of the piers are developed.	of the proposed pier locations relative to the revised floodplain limits. The comments regarding the possible need for anti-erosion and scour protection at the pier locations within the floodplain are noted. Such treatment will be considered during detailed design, as deemed necessary and practical. TRCA staff will be consulted further once specific pier details are available.	
Staff received the updated Mimico Creek HEC2 model. Please note that although the method utilized to model the proposed spur line crossing Mimico Creek resulted in minimal impact to the upstream floodplain, it will be preferable that the crossing be coded as a bridge with the skew factor. The traditional method of coding a crossing will confirm the impacts to the upstream floodplain. Once completed, please send TRCA a digital copy of the revised HECR as model. Please note that a digital copy of the HEC2 model with the piers modeled as obstructions was provided to TRCA staff via email on July 2, 2009. Please note that the north pier at cross-section 3.30 was not coded.	Comments noted. The modelling of the Mimico Creek crossing will be revisited to investigate the effect of coding of the crossing as a bridge with a skew factor, once the hydrology update is made available by TRCA. A copy of the revised HECR as model, appropriately coded, will be provided to TRCA.	Not required
As discussed in the report, Metrolinx is proposing to explore water quality enhancement opportunities at the proposed Bloor Street, Weston Road, and Etobicoke North station platforms as well as installing track side ditches along the rail corridor. TRCA staff strongly support the	Comment noted. This has been included in Section 6.1.5. TRCA will continue to be consulted as design progresses.	This has been included in the EPR

Comments Received/ Concerns Identified	Response	Changes to EPR
proposed opportunities to improve water quality within the rail corridor and will appreciate opportunities to contribute the design of site-specific water quality enhancement features/treatment during the detailed design phase of the project.		
Comment noted. This has been included in Section 6.1.5. TRCA will continue to be consulted as design progresses.	Comment noted. This has been included in Section 6.1.5. TRCA will continue to be consulted as design progresses.	This has been included in the EPR
Staff acknowledges that Metrolinx is not subject to municipal permits and approvals in line with the Conservation Authorities Act. As such, the following detailed design comments are for consideration with respect to the Fisheries Act review and the Ministry of the Environment (MOE) – Permit to Take Water application: • The report states that dewatering may be required to facilitate the structural works at the Humber River and the Black Creek in line with the MOE application for the Permit to Take Water. To the extent possible, staff recommends that Metrolinx consider the use of construction techniques that minimize dewatering requirements to avoid impacts to the watercourses and fish habitat. TRCA staff is available to provide technical assistance to Metrolinx during the detailed design stage with respect to dewatering procedures and the management of dewatering discharge. • Structural expansions at the Black Creek and Humber River as well as the construction of the new spur line across Mimico Creek will require in- and near- water works and will be subject to fisheries review under the Federal Fisheries Act.	Comment noted. This has been included in Section 6.1.2, 6.1.4 and 6.9. TRCA will continue to be consulted as design progresses and at the permitting stage.	This has been included in the EPR

Comments Received/ Concerns Identified	Response	Changes to EPR
As indicated in the Section 6.8 of the report, TRCA staff is available to provide technical assistance during the detailed design phase of the project should Metrolinx submit Fisheries Act review documentation for our review and comment.		
Please note that the in-stream and bank works associated with the Humber River crossing will likely be very extensive and will required considerable in-stream construction access and staging. As such, it will be beneficial for TRCA staff to provide technical support to Metrolinx during the detailed design phase when the details of the design and construction staging are being finalized.	Comment noted. This has been included in Section 6.1.2. TRCA will continue to be consulted as design progresses.	This has been included in the EPR
Staff notes that information on groundwater conditions as well as potential groundwater impacts will be provided in the final EPR as stated in Sections 4.1.2 and 6.1.4 of the report. Staff will provide detailed technical comments once that information becomes available.	Comment noted. Sections 4.1.2 and 6.1.4 have been updated. Sections 4.1.2 and 6.1.4 have been updated.	
As the project progresses into the detailed design stage, staff recommends a detailed vegetation assessment for construction access and staging areas, including quantifying and qualifying the amount of vegetation to be removed at each watercourse crossing. Please note that TRCA typically requests that vegetation replacement be undertaken at a 3:1 ratio, meaning that three trees or shrubs (3 times the area) be replanted for every one tree removed/impacted to ensure an ecological net gain for the project. It will also be beneficial to include restoration and or compensation of vegetation as a standard EA mitigation measure.	Comment noted. Section 6.1.1 commits to a re-vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA. The details of that will be developed during detailed design.	This has been included in the EPR
As discussed in the report, temporary and permanent	Comment noted. Section 6.1.1 commits to a re-	This has been

Comments Received/ Concerns Identified	Response	Changes to EPR
vegetation removals will be required to facilitate construction along the Humber River, Black and Mimico Creeks. It is likely that re-vegetation of the areas impacted by construction may not be possible in most cases due to maintenance access issues and the right-of-way management purposes. However, there are opportunities for incorporating the proposed post-construction and natural heritage improvement activities for the project into nearby TRCA's Terrestrial Natural Habitat Systems and restoration areas to help achieve overall ecological net gain. Staff is available to assist during the detailed design stage. Also, in addition to the sites identified in the EPR for restoration, staff recommends that Metrolinx consider other off-site restoration opportunities including the Keelestone Park on Black Creek valley and TRCA lands adjacent to the Mimico Creek crossing.	vegetation plan that will be developed for Black Creek, Humber River and Mimico Creek. This will be developed in consultation with TRCA. The details of that will be developed during detailed design.	included in the EPR
With regards to the Fish and Fish Habitat report submitted to TRCA on June 1, 2006, there appears to be some minor discrepancies with regard to bankfull and wetted width (wetted width is wider than bankfull), and the total increase in length of piers (existing 9m + 11m extension is 20m rather than 22m; the additional 2m may be the taper). The 55m2 does not account for this 2m difference (if the calculation are based on 11m extension). Please make the necessary revisions. Also, please confirm the location of existing and potential frog breeding areas, as western chorus frogs and spring peepers have been recorded within the Mimico Creek Corridor.	The minor discrepancies in the Fish and Fish Habitat Report have been corrected/revised. The Terrestrial Report and figure have been updated to reference the amphibian breeding habitat present in the Mimico Creek Valley.	Text/figures have been revised.

Notice of Completion

Ontario Regulation 231/08, provides that the notice of completion must be distributed to the assessed owner of land within 30 metres of the transit project. Using the owners list developed for the Notice of Commencement, approximately 55,000 letters informing that the Notice of Completion will be published on July 30, 2009 was sent to apartments/condominiums, houses and businesses within 40 metres of the transit project.

A notice for the Notice of Completion has been issued will also appear in the following regional and community newspapers:

- Toronto Star (July 30 and July 31, 2009)
- Toronto l'Express (August 5, 2009)
- Brampton Guardian (July 31, 2009)
- City Centre Mirror (July 31, 2009)
- Etobicoke Guardian (July 31, 2009)
- Mississauga News (July 31, 2009)
- Mississauga Le Metropolitan (August 5 2009)
- Parkdale-Liberty Villager (July 31, 2009)
- Annex Guardian (July 31, 2009)
- Bloor West Villager/York Guardian (July 31, 2009)

An e-mail notice will also be sent out on July 30 with a summary of details and next steps will be sent to the 1500 stakeholders who have asked to be kept informed of the projects. It will also include information on the next steps, including that the final Environmental Project Report (EPR) is now posted for review until August 30, 2009 , and interested persons, government agencies and First Nations will be able to review it and send their comments in writing to the Minister of the Environment. The Minister will have until October 5, 2009 to review the comments and determine whether the project can proceed as described in the EPR, proceed subject to conditions, or require further study. All comments received will become part of the public record.

Tab 4: 4.0 Baseline Conditions

→ Insert **Tab 4** → **4.0 Baseline Conditions**

4.0 BASELINE STUDY AREA CONDITIONS

GO Transit's operating needs in the Georgetown South Rail Corridor define the scope of this undertaking which is to accommodate existing and future demands for commuter rail service between downtown Toronto and Georgetown and the areas in between. By addressing GO Transit's requirements it is possible to provide for a new rail link between Union Station and Pearson Airport.

The purpose of this chapter is to provide a general overview of the existing conditions within and in the vicinity of the study corridor for the Georgetown South Service Expansion and Union-Pearson Rail Link. The study corridor is shown in **Figure 4.0-1**.

4.1 PHYSICAL ENVIRONMENT

Summary of Key Findings

The following findings are of particular note:

- No *Provincially Significant Wetlands* (PSWs) are present within the study area. The rail corridor is not within 120 metres of a PSW.
- No provincially or regionally significant *Areas of Natural and Scientific Interest* (ANSIs) are present within the study area.
- No *Environmentally Significant Areas* (ESAs), as designated by MNR/TRCA, are present within the study area.
- The study area is located outside of the Greenbelt Plan Area and the Oak Ridge Moraine Plan Area.
- No species at risk or provincially rare plant or animal species were recorded during field work conducted in 2004, 2008 and 2009.
- There are no current records for federally designated Species at Risk (SAR) or provincially designated Species at Risk in Ontario (SARO) in the study area.
- The TRCA database identified 2 species that are not listed in the Species at Risk Act (SARA) but are designated as Threatened by the Committee On the Status of Endangered Wildlife In Canada (COSEWIC);
 - o Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population) was recorded in 2001 within the Mimico Creek valley approximately 100 m north of the existing rail corridor. Works within the Mimico Creek valley are restricted to the south side of the existing rail corridor alignment, therefore no impacts to this species are anticipated;
 - o Common Nighthawk was identified in an urban residential neighborhood east of High Park, outside of the area impacted by the proposed works.

4.1.1 Natural Environment

Ecoplans Limited (Ecoplans) updated natural environmental work conducted by SNC-Lavalin as part of the previous Class EA Study (2005). This included updating secondary source information from agencies (Toronto and Region Conservation Authority [TRCA], Ontario Ministry of Natural Resources [MNR]) and undertaking field assessments to generally characterize terrestrial and aquatic features within the study area.

Secondary source information was updated through a review of relevant natural heritage databases, plans and policies and consultation with TRCA and MNR. The following provides a summary of sources that have been used:

- *GO Transit – Georgetown/Weston S/D and Union-Pearson Air Rail Link Environmental Assessment Final Status Report* (SNC-Lavalin 2005);
- *Humber River Fisheries Management Plan (HRFMP) - Draft* (MNR and TRCA November 2005);
- *Physiography of Southern Ontario* (Chapman and Putnam 1984);
- 1:50 000 NTS Map Sheets 30M/11 (Toronto) and 30M/12 (Brampton);
- *A Report Card on the Health of the Humber River Watershed* (Humber River Alliance, and TRCA 2005);
- *Greening our Watersheds: Revitalization Strategies for Etobicoke and Mimico Creeks*. (TRCA 2002);
- Fisheries and Oceans Canada Aquatic Species at Risk Mapping; and
- *Canadian Heritage River System Humber River Fact Sheet*
http://www.chrs.ca/Rivers/Humber/Humber-F_e.htm.

Toronto and Region Conservation Authority (TRCA)

TRCA GIS mapping and data for:

- Locally Significant (L-Rank) Flora and Fauna Species;
- Fish sampling stations and records: fish capture records compiled for sampling stations in the study area from a variety of recent and historic data sources from 1946-1999 and more recent Ontario Stream Assessment Protocol (OSAP) fish records from 2000-2006;
- Environmentally Significant Areas;
- Watercourses and thermal regime status;
- TRCA properties;
- TRCA Natural Heritage System Strategy (TRCA 2004); and
- Habitat Plan Areas.

Ministry of Natural Resources (MNR) Aurora District

- Natural Resource Values Information System (NRVIS) data for Woodlands and Wetlands; and
- Natural Heritage Information Centre (NHIC) database and confirmation of species at risk information through personal communication with a Species at Risk Biologist, MNR Aurora District (March 24, 2009).

City of Toronto

City of Toronto Official Plan Office Consolidation, September 2007 and associated Schedules/Maps including:

- Map 9 Natural Heritage;
- Map 10 Special Policy Areas Key Map;
- Map 11 Special Policy Areas – Area Specific Map;
- Map 12 *Environmentally Significant Areas*; and
- *Maps 13, 14, 17, 18 Land Use Plan.*

City of Mississauga

City of Mississauga Official Plan (“Mississauga Plan”) 2003 and associated Schedules/Maps including:

- Northeast District Land Use Map; and
- Schedule 3 Environmental Areas.

Site visits to assess existing natural environmental features and conditions were conducted by Ecoplans in October 2008 and April 2009. The field review generally focused on confirming and updating natural environmental information previously reviewed by SNC-Lavalin.

Vegetation communities were classified using a modified version of the Ecological Land Classification (ELC) System for Southern Ontario (Lee et. al. 1998) where appropriate. Information was collected on vegetation communities, species associations, relative age, wildlife habitat and condition/level of disturbance. Vegetation community significance was evaluated based on Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky 1996; NHIC 2008), and the significance and sensitivity of flora recorded during the field review were assessed using Newmaster et al. (1998), the NHIC website (2009), and Varga et al. (1999). SNC-Lavalin’s original studies were updated to include any new observations made by Ecoplans (**Appendix D**). Additional details (ELC sheets, additional photographs) can be found on file at Ecoplans.

Aquatic conditions were noted generally and representative site photographs were taken and are included in this report (with additional photos on file at Ecoplans). Given that the expected works at the three watercourse crossings will likely be limited to: 1) widening the existing high level bridge at Black Creek; 2) widening the existing crossing of the Humber River; and 3) crossing of Mimico Creek for the spur line, the fall 2008 field

review focused on noting any changes to aquatic conditions from SNC-Lavalin's previous work.

Additional field review will be undertaken in spring 2009 to augment and refine the understanding of existing habitat conditions, and potential sensitivities in the context of the proposed design. An assessment of the potential impacts of the proposed works on natural environmental features will be undertaken and mitigation measures developed to minimize potential impacts.

4.1.1.1 *Designated Environmental Features and Policy Areas*

Given the long history of urbanization in the study area, the majority of natural features have been removed. The remaining natural environmental features within the study area are almost exclusively associated with the three watercourse/valley systems: Black Creek, Humber River, and Mimico Creek. Natural Areas, Parks, and Other Open Space Areas are concentrated around the Humber River and to a lesser degree Black Creek. The portion of the study area that extends into the City of Mississauga is identified in the Official Plan (2003) Map 40E as Greenlands (Mimico Creek valley), Employment Area, and Industrial land uses. The Weston Golf and Country Club is located within the study area and occupies portions of the floodplain and western valley slope of the Humber River valley.

The following key points provide an overview of environmental designations within the study area:

- No Provincially Significant Wetlands (PSWs) are present within the study area. The Provincially Significant Lower Humber River Wetland Complex is located greater than 10 km downstream of the existing Humber River crossing.
- No provincially or regionally significant Areas of Natural and Scientific Interest (ANSIs) are present within the study area. The nearest ANSI is the High Park Oak Woodlands provincially significant Life Science ANSI, located approximately 1 km west of the study area and south of Bloor Street.
- No Environmentally Significant Areas (ESAs), as designated by MNR/TRCA, are present within the study area.
- The Humber River, Black Creek and Mimico Creek valleys (including the valley sections crossed by the rail corridor), all form part of the City of Toronto Natural Heritage System, as identified on Official Plan Map 9. This system corresponds to the TRCA Terrestrial Natural Heritage System discussed below.
- The Humber River was designated a Canadian Heritage River in 1999, due to its human heritage and recreational values and importance in the history and development of Canada (Canadian Heritage River System 2009).

The following key points provide an overview of environmental policy areas within the study area:

- The study area is located outside of the Greenbelt Plan Area and the Oak Ridges Moraine Plan Area.
- The City of Toronto's Rockcliffe Park: Black Creek Special Policy Area surrounds the existing rail crossing at Black Creek (City of Toronto Official Plan Map 10). Buildings and structures in this area must be protected from flooding to at least the 350-year

flood level. This policy is related to flood protection and is not related to natural heritage or natural environmental features.

Figure 4.1.1.1-1 provides an overview of the designated environmental features and policy areas within and beyond the study area.

In addition, TRCA land holdings are found within the study area at the Black Creek, Humber River and Mimico Creek valleys as indicated on **Figure 4.1.1.1-2**. The TRCA uses land acquisition as a tool to protect environmentally significant natural heritage lands; to regenerate and rehabilitate degraded areas; and to provide relief from flood and erosion hazard. Some areas are open to public access, although they do not function as fully serviced recreational Conservation Areas. Other areas are closed to public access.

Figure 4.1.1.1-3 shows the TRCA target Terrestrial Natural Heritage System (TNHS), which is comprised of Existing Natural Cover and Potential Natural Cover. Within the study area, the target Terrestrial Natural Heritage System captures two key regional landscape elements: 1) valley corridors; and 2) tableland habitat patch "islands of green". Existing natural cover is predominantly associated with the major valley systems of Black Creek, the Humber River, and Mimico Creek. The majority of potential future natural cover in the study area is identified along the Mimico Creek valley to connect existing sparse and patchy natural vegetation along this system

4.1.1.2 *Terrestrial Environment*

The study area is underlain by Ordovician shale of the Georgian Bay Formation. It includes the rock formations of Trenton, Billings, Dundas and Meaford, which are composed of limestone and/or shale (Chapman and Putnam 1984). The depth of drift is variable but is usually thick; average depth to bedrock is generally greater than 40 m below ground surface.

The study area is within two physiographic regions - the Iroquois Plain and the Peel Plain Physiographic Regions (Chapman and Putnam 1984). The Iroquois Plain covers the portion of the study area from approximately St. Clair Avenue south to Lake Ontario, while the Peel Plain covers the remaining area north of St. Clair Avenue. The Iroquois Plain is a narrow band of clay and till partly floored with sand deposits forming a smooth topography with a gentle slope towards Lake Ontario. The Peel Plain is an area of lacustrine clay deposits forming a level to slightly undulating topography with a gradual slope towards Lake Ontario.

The ecological region of the study area is the Lake Erie Lowland ecoregion of the Mixedwood Plains Ecozone. This ecoregion extends from Windsor to Toronto and south. Climax vegetation in this ecoregion is characterized by Sugar Maple (*Acer saccharum* ssp. *saccharum*), American Beech (*Fagus grandifolia*), White Oak (*Quercus alba*), Northern Red Oak (*Quercus rubra*), Shagbark Hickory (*Carya ovata* var *ovata*) and Black Walnut (*Juglans nigra*). Moist sites are characterized by American Elm (*Ulmus americana*), Eastern Cottonwood (*Populus deltoides*), Balsam Poplar (*Populus balsamifera*), Green Ash (*Fraxinus pennsylvanica*), Black Ash (*Fraxinus nigra*) and Silver Maple (*Acer saccharinum*). Carolinian species including Tulip Tree (*Liriodendron tulipifera*), Sycamore (*Platanus occidentalis*) and Bitternut Hickory (*Carya cordiformis*) also occur.

Flora

A total of 151 vascular plant species were recorded during field surveys conducted by SNC-Lavalin and Ecoplans. A working plant list combining species observed during the two studies is presented in **Appendix D**. Of the 151 species observed, 72 are ranked S5 (secure in Ontario), 5 are ranked S4 or S4S5 (apparently secure in Ontario), 1 is ranked SU (Status in Ontario uncertain) and 73 (48%) are non-native (ranked SE5, SE4, SE3, SE2, SE1 or SE?). The following points provide a summary of flora observations.

- No Species at Risk (SAR) or provincially designated Species at Risk in Ontario (SARO) plant species were recorded during field surveys (SAR and SARO species identified through secondary sources are discussed in **Section 4.1.1.4** of this report);
- No provincially rare species (S1-S3) were recorded;
- No provincially significant vegetation communities (Bakowsky 1996) were recorded within the study area; and

- Coefficient of Conservatism (CC)¹ values for the native species observed in the study area range from 0-9. The majority (96%) have CC values between 0 to 6, with an average CC of 3.3. This indicates that the majority of the native plants observed are tolerant of moderate to high disturbances according to Oldham, Bakowsky and Sutherland (1995). Only three species have a CC value greater than 6, including one species with a CC of 9 [(American Purple Vetch, (*Vicia americana*)] and two species with a CC value of 8 [Nodding Wild-rye (*Elymus canadensis*), Northern Reed Grass (*Calamagrostis stricta* ssp. *stricta*)]. None of those three species are particularly abundant within the study corridor.

Vegetation Communities

As discussed in **Section 4.2.1**, the study area is dominated by urban residential, commercial and industrial land uses. Remnant natural vegetation is predominantly associated with the major watercourse crossings of Black Creek, Humber River, and Mimico Creek. Other vegetation communities occurring within and adjacent to the railway corridor are highly disturbed and anthropogenic in origin. A description of the identified vegetation communities is provided below, and mapped on **Figures 4.1.1.2-1 - 4.1.1.1-2**. The description of the vegetation communities is grouped into the general habitat found within the majority of the right-of-way, and the more natural areas found at the watercourse crossings of Black Creek, the Humber River, and Mimico Creek.

¹ **CC Values.** Rank of 0 to 10 based on plants degree of fidelity to a range of ecological conditions: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-10) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.

Rail Right-of-Way

CUM1-1: Dry – Moist Old Field Meadow

The vegetation found within the rail corridor over the majority of the study area is highly disturbed and actively managed to prevent overhead line hazards and ensure the safe operation of trains through the corridor. As such the corridor is dominated by non-native grasses and herbaceous species tolerant of disturbance. Tree and shrub regeneration is suppressed and where present trees are young and cover is generally limited to less than 25%.

Typical tree and shrub species present include Siberian Elm (*Ulmus pumila*), Staghorn Sumac (*Rhus typhina*), Tartarian Honeysuckle (*Lonicera tatarica*), Norway Maple (*Acer platanoides*), White Ash (*Fraxinus americana*), Manitoba Maple (*Acer negundo*), Buckthorn (*Rhamnus cathartica*), Black Walnut, hawthorn species (*Crataegus* sp), Tree-of-heaven (*Ailanthus altissima*), American Elm (*Ulmus americana*), Riverbank Grape (*Vitis riparia*) and Quaking Aspen (*Populus tremuloides*).

The ground layer contains a dense mix of non-native grasses [e.g. Smooth Brome Grass (*Bromus inermis* ssp *inermis*), Timothy (*Phleum pratense*), Kentucky Bluegrass (*Poa pratensis* ssp *pratensis*)] and old field herbs including Queen Anne's Lace (*Daucus carota*), Common Milkweed (*Asclepias syriaca*), Elecampane (*Inula helenium*), Butter-and-eggs (*Linaria vulgaris*), Curly Dock (*Rumex crispus*), White Sweet Clover (*Melilotus altissima*), Common Motherwort (*Leonurus cardiaca* ssp *cardiaca*), Lesser Burdock (*Arctium minus* ssp *minus*), Asters (*Aster* sp) and Goldenrods (*Solidago* sp).



Rail right-of-way looking north from the Roger's Road Overpass showing typical vegetation found within the right-of-way.

The problematic non-native, invasive Dog-strangling Vine (*Cynanchum rossicum*) is widespread and locally abundant throughout the corridor.

Occasional wet pockets in the right-of-way include Reed-canary Grass and cattail.

One notable area of concentrated tree regeneration within the right-of-way is a narrow band of trees found on the wide median between the 2 tracks south of the Rogers Road overpass. This area includes the same species assemblage as described above, with trees up to 30 cm diameter at breast height (dbh). It is differentiated by tree/shrub cover of approximately 60 %.

Another notable area adjacent to the existing right-of-way is a series of three planted hedgerows that run parallel to the rail tracks between the rail corridor right-of-way and Entrance Road at the south end of Woodbine Race Track near the western limit of the Study Area. This series of hedgerows is identified as Wooded Area on MNR NRVIS mapping. Property may be required at this location to accommodate the proposed new tracks within an expanded right-of-way.

A single row of mature Eastern Cottonwood (*Populus deltoides ssp monilifera*) ranging in size from approximately 50-80 cm dbh and 20 m tall runs from just west of Highway 27 to Carlingview Drive and is approximately 4 m from the northern limit of the existing right-of-way. Trees are smaller and more tightly spaced at the west end of the hedgerow, and have been thinned and are larger near Carlingview Drive. Overall health of this hedgerow is relatively poor, with substantial crown dieback observed in many of the trees. A double row of Norway Spruce (*Picea abies*) and occasional White Spruce (*Picea glauca*) extends from approximately 400 m west of Highway 27 to 100 m east of Highway 427 with a 300 m gap centred around Carlingview Drive. Rows are between 7 and 12 m north of the existing right-of-way. Trees range in size from 15-30 cm dbh and 12 m tall and are generally in good health. The ground layer is mowed lawn.

Black Creek

The rail corridor crosses Black Creek just east of the intersection of Black Creek Drive and Weston Road via 2 single span bridges separated by a gap of approximately 30 meters. The surrounding area is densely populated and highly urbanized, with residential, commercial, and light industrial land uses in the immediate vicinity of the crossing. Black Creek is channelized within and downstream of the right-of-way, and the area was historically cleared and graded during construction of the bridges.

Unit BC1: Early Successional Deciduous Vegetation Patch

The vegetation community within the right-of-way is highly disturbed because of the clearing that occurred when the bridges were built and the continued pressures imposed by recreational use of the area, which includes a formal trail running under the bridges along the south east bank of the creek.

Tree and shrub regeneration is concentrated along the banks of Black Creek with occasional individual trees and tree clusters along the mid and upper valley slopes (see below for the types of vegetation). The community is young and made up of generally abundant and disturbance tolerant species, with approximate tree size ranging from 20 cm dbh up to 40 cm dbh and 15 m tall. Trimming to prevent overhead line hazards has kept most trees at or below the height of the bridge platform. Canopy cover is approximately 40%.

Canopy/Sub-canopy species include Manitoba Maple, Siberian Elm, Crack Willow (*Salix fragilis*), Quaking Aspen, Black Locust (*Robinia pseudo-acacia*), Buckthorn and Choke Cherry (*Prunus virginiana ssp virginiana*). Shrub species include Staghorn Sumac, Western Poison Ivy (*Rhus radicans ssp rydbergii*), Wild Red Raspberry (*Rubus idaeus*

ssp melanolasius) and Thicket Creeper (*Parthenocissus inserta*), with some Red-osier Dogwood (*Cornus stolonifera*) surrounding the creek channel. The ground layer is dominated by disturbance tolerant old field grasses and herbs typical of the right-of-way throughout the study corridor and described previously. Species not observed in other portions of the right-of-way include Bouncing-bet (*Saponaria officinalis*), Great Ragweed (*Ambrosia trifida*) and Heart-leaved Aster (*Aster cordifolius*).

The problematic non-native, invasive Dog Strangling Vine is present in small quantities at this location.

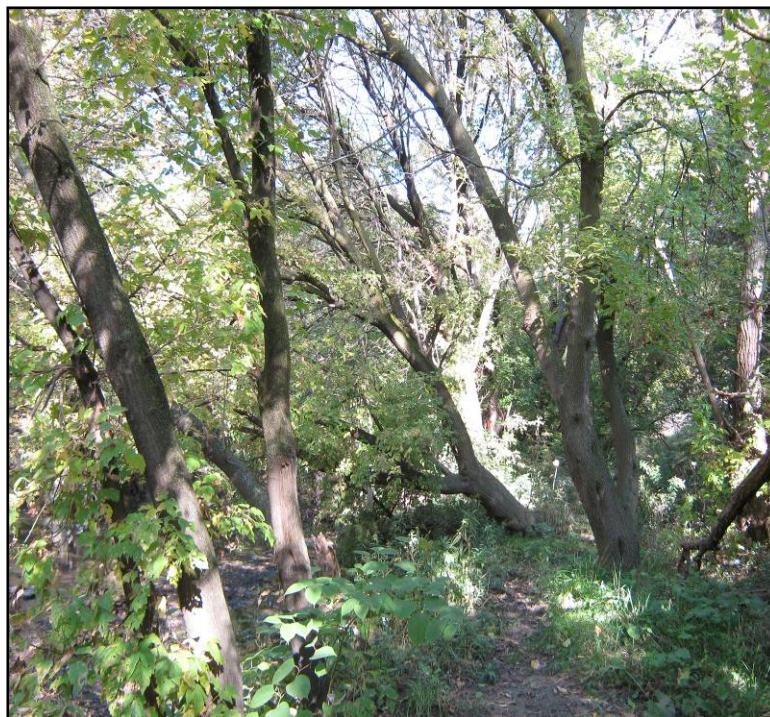


Black Creek crossing between rail bridges (Unit BC1) looking south showing early successional/regenerating vegetation.

Unit BC2: Fresh-Moist Willow Lowland Deciduous Forest Type (FOD7-3)

A narrow band of disturbed lowland deciduous forest occupies the banks of Black Creek upstream of the right-of-way along the west side of Keelesdale Park. The young to mid-aged community includes occasional snags and deadfall logs with low botanical diversity. An informal trail runs along the east bank of the creek.

The closed canopy/sub-canopy is dominated by Manitoba Maple and Crack Willow. Other species include Quaking Aspen, Green Ash, American Elm, American Basswood, Eastern Cottonwood, Siberian Elm and Norway Maple. The understory includes a mix of Buckthorn, Thicket Creeper, and Riverbank Grape. The ground layer is patchy and includes abundant Garlic Mustard (*Alliaria petiolata*) (non-native and invasive species) and avens (*Geum* sp), with Virginia Waterleaf (*Hydrophyllum virginianum*), Common Evening-primrose, Common Motherwort, Spotted Jewel-weed (*Impatiens capensis*), White Vervain (*Verbena urticifolia*) and Rough Cockle-bur (*Xanthium strumarium*).



Lowland deciduous forest within the Black Creek valley north of rail corridor right-of-way.

Humber River

The rail corridor crosses the Humber River valley just south and west of the Highway 401/Weston Road interchange via a single track 9 span bridge. The Weston Golf and Country Club property abuts the west side of the Humber River at the crossing.

The eastern valley slope is very steep to the river's edge, with a broad floodplain west of the river occupied by several holes of the golf course. The bridge spans both the river and floodplain before reaching the moderately steep western valley slope. The floodplain is dominated by the manicured landscapes of the golf course, with occasional specimen trees located outside of the right-of-way. Several distinct mid-aged to mature deciduous forest communities of moderate quality abut the right-of-way west of the Humber River valley along the Weston Golf and Country Club lands.

Hedgerows and patches of landscape/planted trees are present along the right-of-way throughout the golf course property west of the Humber River valley where natural communities are absent.

Units HR1 and HR8: Deciduous Forest (FOD)

The eastern valley slope within the right-of-way (HR1) is dominated by vigorous and healthy young tree regeneration. The east riverbank is supported by a retaining wall on the north side of the bridge, and the slope here is well vegetated to the top of the wall. The bank south of the bridge has no retaining wall structure, and the vegetation here is more disturbed with evidence of erosion, especially on the bottom third of the valley slope.

As previously noted, no SAR or SARO plant species were recorded during field surveys. Young Manitoba Maple, Sugar Maple and Norway Maple dominate the area under the bridge with larger specimens of these species (20-45 cm dbh), as well as American Elm,

Siberian Elm and American Basswood (*Tilia americana*) observed between the bridge and the limit of the right-of-way. Norway Maple is an invasive non-native species that can eventually dominate a forest stand with very dense shade that can preclude seedling and groundcover growth.

The understory is dense in spots and includes saplings of the tree species observed as well as Black Walnut, Choke Cherry, hawthorn, Carolina Rose (*Rosa Carolina*), Running Strawberry-bush (*Euonymus obovata*), and Tartarian Honeysuckle. Ground layer vegetation is sparse and includes Garlic Mustard, Heart-leaved Aster, Swamp Milkweed (*Asclepias incarnata ssp incarnata*), Prickly Lettuce (*Lactuca serriola*), Dog-strangling Vine and Broad-leaved Goldenrod (*Solidago flexicaulis*).

A second deciduous forest community (HR8) almost entirely dominated by mature Bur Oak (up to 50 cm dbh) abuts the south side of the right-of-way at the western limit of the Weston Golf and Country Club Property. Other canopy species include Norway Maple. The understory is dominated by Buckthorn and Choke Cherry, with Staghorn Sumac and European Spindle-tree (*Euonymus europaea*) also noted along the edges. The sparse understory is composed of Garlic Mustard and Dog-strangling Vine (both non-native and invasive species).



Humber River crossing looking northeast from Weston Golf and Country Club property showing deciduous forest vegetation (Unit HR1) along the eastern valley slope and the existing high level rail corridor crossing.

Unit HR2: Willow-Dominated Riparian Band

A narrow band of riparian vegetation approximately 10 m wide is present on the west bank of the river. The canopy/sub-canopy is dominated by Manitoba Maple and Crack Willow, with American Elm, Green Ash, Quaking Aspen, Black Walnut and White Mulberry (*Morus alba*) also noted.

The understory is dense with abundant Siberian Elm, Tartarian Honeysuckle and Riverbank Grape. Other understory species include Black Locust, American Basswood and Green Ash saplings, Choke Cherry, European Spindle-tree, Buckthorn and Red-osier Dogwood. The ground layer contains abundant Dog-strangling Vine (non-native and invasive species) with a mix of wetland and upland species including American

Bugleweed (*Lycopus americanus*), Purple Loosestrife (*Lythrum salicaria*) (non-native and invasive species), Lesser Burdock, Smooth Goldenrod (*Solidago gigantea*), Spotted Joe-pye Weed (*Eupatorium maculatum* ssp *maculatum*), Spotted Jewel-weed, Enchanter's Nightshade (*Circaea lutetiana* ssp *canadensis*), Bouncing-bet, Virginia Stickseed (*Hackelia virginiana*), Starflower False Solomon's Seal (*Maianthemum stellatum*), Heart-leaved Aster, Japanese Knotweed (*Polygonum cuspidatum*) (non-native and invasive species), Garlic Mustard and Dame's Rocket (*Hesperis matronalis*) (both non-native and invasive species).

The area beneath the bridge is more sparsely vegetated, with several young Manitoba Maple, American Elm, and Buckthorn saplings (less than 10 cm dbh) and patches of grasses, goldenrods, and asters colonizing the river's edge.



Humber River crossing looking south showing willow-dominated riparian vegetation (Unit HR2) along the west bank of the Humber River.

Unit HR3: Mineral Cultural Thicket (CUT1)

The western valley slope within and adjacent to the right-of-way is moderately steep with a dense cultural thicket dominated by Riverbank grape, with Staghorn Sumac, Wild Red Raspberry and Buckthorn. The ground layer is dominated by Dog-strangling Vine (non-native and invasive species) and other herbaceous vegetation typical of the right-of-way in the larger study corridor.

Unit HR5: Dry-Fresh Sugar Maple-Oak Deciduous Forest (FOD5-3) with inclusion of Fresh-Moist White Elm Lowland Deciduous Forest (FOD7-1)

A narrow extension of a larger forest community abuts the right-of-way just north of the cart path crossing. An isolated remnant portion of this community, apparently severed during construction of the golf course, is located just north of the right-of-way. The closed canopy is composed of abundant Northern Red Oak, with Sugar Maple, American Elm, White Oak, Silver Maple, and Bur Oak (*Quercus macrocarpa*), with some trees reaching approximately 50 cm dbh. The sub-canopy and understory are dominated by Sugar Maple, with frequent Choke Cherry and occasional Eastern Hop-

hornbeam (*Ostrya virginiana*) and American Basswood. The ground layer is sparse and includes Early Meadowrue (*Thalictrum dioicum*), White Rattlesnake-root (*Prenanthes alba*), and Garlic Mustard.

The FOD7-1 inclusion occupies a low lying area abutting the north side of the right-of-way. The canopy is dominated by American Elm, with occasional White Ash. The ground layer is sparse with pockets of Running Strawberry-bush and Dog-strangling Vine. This unit had evidence of ephemeral pooling including flared tree trunks and sparse ground layer vegetation. No standing water was present at the time of the field visit.



Sugar Maple-Oak Deciduous Forest (Unit HR5) on the Weston Golf and Country Club property, north of the rail corridor right-of-way (looking southeast). Unit HR6: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest (FOD5-7)

Unit HR6: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest (FOD5-7)

A small deciduous forest with relatively low levels of disturbance abuts the south side of the right-of-way just west of the western valley slope. The canopy/sub-canopy is dominated by Sugar Maple up to approximately 30 cm dbh and 15 m tall, with Black Cherry (*Prunus serotina*) and White Ash associates. A Scotch Pine (*Pinus sylvestris*) hedgerow borders the southern edge of the forest. Choke Cherry and Sugar Maple saplings dominate the understory. The ground layer is sparse and includes occasional patches of Garlic Mustard.

A swale area with water pooling to approximately 30 cm deep runs along the bottom of the railway embankment approximately 12 m south of the existing right-of-way. This feature appears to have an intermittent connection to a small tributary of the Humber River that runs through the Weston Golf and Country Club Property.



Sugar Maple-Black Cherry forest south of the rail corridor right-of-way (Unit HR6) looking east within the Weston Golf and Country Club property.

Mimico Creek

The rail corridor approaches Mimico Creek just west of Highway 427 in a portion of the Mimico Creek valley dominated by a mosaic of culturally influenced habitats. These are composed primarily of Hawthorn Cultural Savannah, Dry-Moist Old Field Meadow and Cultural Woodland.

The rails spur follows the existing Goreway Drive alignment and only involves minor encroachment into a more disturbed portion of the valley and 1 new crossing.

Unit M1: Mosaic of Dry-Moist Old Field Meadow (CUM1-1), Hawthorn Cultural Savannah (CUS1-1) and Mineral Cultural Thicket (CUT1) with inclusion of Willow Mineral Thicket Swamp (SWT2-2)

This community is separated from the Goreway Drive edge of pavement by a 15-20 m wide strip of grass. Shrub/tree cover is less than 25% in cultural meadow areas and between 25-35% in CUS1-1 areas. Shrub species observed include hawthorn, Buckthorn, Tartarian Honeysuckle, Staghorn Sumac, Wild Red Raspberry, and Riverbank Grape. Red-osier Dogwood, Sandbar Willow (*Salix exigua*), and young Manitoba Maple trees were restricted to the banks of Mimico Creek. A small patch of young American Elm and Manitoba Maple of varying size (10-20 cm DBH and 10-15 m high) is located near the centre of the field. The majority of these trees were dead, but a vigorous growth of Buckthorn was observed here.

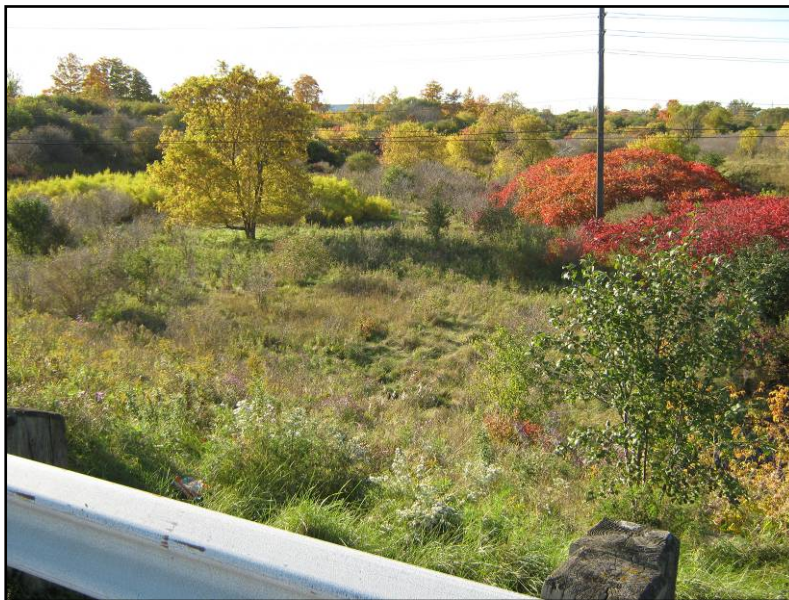
Herbaceous vegetation found throughout the valley is similar to that observed within the rail corridor right-of-way described previously and is dominated by non-native grasses. Several species not observed in other areas of the rail corridor right-of-way include Field Garlic (*Allium vineale* ssp *vineale*), sedge (*Carex* sp), Tall Meadowrue (*Thalictrum pubescens*), and White Vervain.

Occasional wet pockets with meadow marsh vegetation occur along the east valley slope and along the banks of Mimico Creek and include Reed Canary Grass, Spotted Jewel-weed, Hairy Willow-herb (*Epilobium ciliatum* ssp *ciliatum*), Purple Loosestrife

(non-native, invasive), Narrow-leaved Cattail (*Typha angustifolia*), and Water Smartweed (*Polygonum amphibium*).

A small Willow Mineral Thicket Swamp inclusion, dominated by Meadow Willow (*Salix petiolaris*) with Red-osier Dogwood, Purple Loosestrife and grasses is located just west of the creek and north of Zahavy Way.

The area south of Zahavy Way is more disturbed and is dominated by old-field grasses typical of the study corridor, with shrub and tree regeneration largely restricted to a thin strip surrounding the channelized creek. The east bank of the creek has more shrub growth than the west bank. Shrub and tree species observed include willow shrubs (*Salix* sp), Balsam Poplar (*Populus balsamifera*), Russian Olive, American Elm, hawthorn, Red-osier Dogwood, Choke Cherry, Buckthorn, White Ash, Riverbank Grape, Wild Red Raspberry and Tartarian Honeysuckle. Trees vary in size but are generally less than 10 cm dbh and 8 m tall. The banks of the creek have been stabilized with gabion baskets in the vicinity of the proposed creek crossing. Three larger Balsam Poplar (up to 40 cm dbh and 14 m tall) are located above the gabion baskets east of the creek in the vicinity of the proposed crossing.



The Mimico Creek valley looking northwest from Zahavy Way showing portions of Units M1 and M2.



Mimico Creek along the west side of Goreway Drive looking southeast from Zahavy Way showing open cultural meadow and young trees along the creek.



Mimico Creek proposed spur line crossing location, facing northwest (upstream) towards the Zahavy Way bridge.

Unit M2 Mosaic of Mineral Cultural Woodland (CUW1) and Mineral Cultural Thicket (CUT1)

This community occupies portions of the Mimico Creek valley floodplain west of the proposed Union-Pearson Rail Link Spur Line. This area is dominated by a dense cover of young Manitoba Maple, willow, Buckthorn, hawthorn and Choke Cherry, and is identified as Wooded Area on MNR NRVIS mapping. The ground layer is predominantly barren in areas of dense cover, with old-field vegetation typical of the right-of-way in canopy gaps. This community is outside the area potentially affected by the proposed works



The Mimico Creek valley facing west from the eastern valley slope, showing Unit M1 (foreground) and Unit M2 (background).

Wildlife

Incidental wildlife observations by SNC-Lavalin and Ecoplans field staff included urban adapted birds and mammals common in urban areas throughout southern Ontario. Bird species observed include Mourning Dove, Rock Dove, European Starling, House Sparrow, Song Sparrow and Black-capped Chickadee, Northern Mockingbird, Northern Cardinal, Mallard, Blue Jay, and Brown-headed Cowbird. Direct observations or signs of mammals within the study area include Eastern Cottontail, Grey Squirrel, Raccoon, Red Fox, and White-tailed Deer. The highest levels of activity were observed at the major watercourse crossings, especially at the Mimico Creek and Humber River crossings, which represent the best potential wildlife habitat within the study corridor.

In addition to the species listed in **Section 4.1.1.4**, a single Great Blue Heron was observed in the area of Mimico Creek during the field review in October 2008. Several nests belonging to other unidentified bird species were also observed here. While Great Blue Heron breeding is unlikely, this portion of the Mimico Creek valley is an active breeding site for other bird species and may be utilized as a forage and/or stopover location for birds that are uncommon in an urban setting.

The broader landscape mosaic within the study area provides habitat for a range of common, generalist wildlife species that are tolerant of urban and semi-urban conditions.

Based on a review of the background information and mapping, it is inferred that herpetofaunal habitat is potentially present in the study area along the watercourses and associated riparian areas. These areas could provide habitat for localized breeding and movement of species such as American Toad, Northern Leopard Frog and Green Frog. In particular, the main Humber River valley would support suitable habitat for a variety of amphibian and reptile species, and amphibian species have been recorded by TRCA in the Mimico Creek valley north of the existing rail corridor.

Based on the data provided by TRCA and incidental observations made during field surveys no species considered *Area Sensitive*² according to the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) were observed for the study area. This is not unexpected given the limited size and fragmentation of habitats within the study area. A complete list of fauna observed by TRCA is provided in **Appendix E**.

Wildlife habitat significance is identified by MNR using the *Significant Wildlife Habitat Technical Guide* (OMNR 2000), in which “significant wildlife habitat” is broadly categorized as:

- Seasonal concentration areas (e.g. conifer forests for deer wintering);
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and
- Animal movement corridors.

No significant wildlife habitat features are identified by MNR within the study area. NRVIS mapping identified woodlands in the vicinity of the Mimico Creek crossing (NRVIS woodlands layer data does not provide coverage for the Humber River and Black Creek within the vicinity of the study area). These woodlands correspond to Unit M2.

In addition, no significant wildlife habitat including seasonal concentration areas, rare vegetation communities or specialized habitats for wildlife, habitats of species of conservation concern, excluding habitats of endangered and threatened species was identified during field surveys completed by Ecoplans.

Wildlife movement opportunities were examined by Ecoplans visually at a landscape level by reviewing aerial photography and TRCA and MNR GIS data layers, as a supplement to field observations. The greatest opportunity for wildlife movement is provided by the Humber River, the largest valley system in the study area. This system is generally less disturbed with greater natural vegetation cover, habitat diversity and wildlife habitat elements. In addition, it is relatively wider and has fewer barriers at road crossings (i.e. bridges vs. culverts in smaller systems), affording a greater opportunity for

² *Area Sensitive* bird species require “a substantial area of suitable habitat for successful breeding and their populations decline when habitat becomes fragmented”. This includes birds of various habitats, such as grassland or forest birds. In the case of forest birds, the “minimum forest habitat for area sensitive species is at least 100 metres from any edge habitat” (OMNR 2000; pp 43).

movement by larger mammals such as deer. It should be noted, however, that major road and railway barriers / filters do exist in this setting.

Smaller valley systems such as Mimico Creek and Black Creek provide some opportunities for wildlife usage and movement. However, these systems are more limited in terms of width, natural vegetation cover, connectivity, habitat diversity and wildlife habitat elements. They would not generally fall into the category of significant 'animal movement corridor', but would function more on a local linkage scale.

4.1.1.3 Aquatic Environment

As noted above, there are three watercourses within the study area (from east to west): Black Creek, Humber River, and Mimico Creek. A general overview of the watercourses and crossing locations are provided below:

Black Creek – The existing rail corridor crosses Black Creek on two single span bridges just north and east of the intersection of Weston Road and Black Creek Drive. North of the rail corridor Black Creek retains a fairly natural form as it flows south through Keelesdale Park. Within the rail corridor crossing (between the two existing bridges) and just east of Weston Road, the Black Creek channel has been significantly modified and now consists of a concrete lined channel for flood conveyance/protection. The concrete channel continues for 3.5 km downstream to where Black Creek outlets to the Humber River at the Lambton Golf Course in Toronto, between Eglinton Avenue and St. Clair Avenue.

Humber River – The existing rail corridor crosses the main branch of the Lower Humber River on a high level multi-span bridge approximately 700 m south of Highway 401, with the nearest intersection at Weston Road and St. Phillips Road to the east. In the vicinity of the crossing location, the Humber River meanders through a large valley/floodplain. Urban land use surrounds the valley and the Weston Golf and Country Club is located in the floodplain, adjacent to the Humber River and 'below' the rail corridor.

Mimico Creek – The proposed new Spur Line crosses Mimico Creek just west of Highway 427 in the vicinity of Goreway Drive and Zahavy Way. In the vicinity of the crossing location, Mimico Creek meanders through a broad valley/floodplain. North of the rail corridor the valley forms part of the Malton Greenway. Downstream of Goreway Drive and Highway 427-409, the Mimico Creek valley forms part of the north Mimico Valley Park. Urban land use (primarily industrial land use) surrounds the valley. Upstream of the proposed rail corridor crossing, the creek retains a relatively natural form. Through the rail corridor crossing, the channel appears to have been previously modified (straightened).

These three watercourses are quite different in character, varying in their degree of anthropogenic influence, fish communities, riparian vegetation cover, flow characteristics and overall ecological sensitivity. They range from relatively undisturbed conditions with generally contiguous valley forest cover evident along much of the main Humber River to open, channelized reaches with very little associated natural vegetation and associated anthropogenic land uses (e.g. sections of Black Creek and Mimico Creek).

The descriptions of aquatic habitat and fish communities are based on: 1) the previous work undertaken by SNC Lavalin during the preparation of the *GO Georgetown/Weston Subdivision and Union-Pearson Air Rail Link Environmental Assessment* (2004); 2) the

Humber River Fisheries Management Plan (HRFMP) (2005) and the *Revitalization Strategy for Etobicoke and Mimico Creeks* (2002); 3) consultation with MNR Aurora District; 4) the comprehensive fish community database compiled and provided by TRCA; and 5) field site visits by Ecoplans (October 2008, April 2009). The information provided by the TRCA includes all of MNR's relevant historical data, as well as the more recent TRCA database.

The three watercourses as well as the TRCA fish sampling stations within and adjacent to the study area are shown on **Figure 4.1.1.3-1** and **Figure 4.1.1.3-2**. The complete fish sampling data set for stations shown, as compiled by TRCA from various sources for the years between 1946 and 2006, is summarized in **Appendix F**. The numbered series of sampling stations are the most dated (1946-1999), whereas the 'HU', 'MM', 'MIM', or 'NCD' series of sampling stations are current (2000-2006).

The characteristics of the three watercourses and their fish communities within the study area are summarized below.

Black Creek

Black Creek is a permanently flowing watercourse in the vicinity of the existing rail corridor crossing. North of the rail corridor and right-of-way, Black Creek has a fairly natural form (relative to other reaches further up and downstream) as it flows south through Keelesdale Park. Within the rail corridor crossing (between the two existing bridges) and just east of Weston Road, the Black Creek channel has been significantly modified and now consists of a concrete terrafix and concrete lined channel for flood conveyance/protection. The terrafix and concrete extends up the embankments. The concrete lined channel extends approximately 3.5 km from Weston Road to the Black Creek outlet at the Humber River.

Upstream of the right-of-way, stream morphology is dominated by riffles and runs. Substrates are predominantly sand/gravel with occasional cobble/boulders. Through the rail corridor crossing and downstream reach towards the Weston Road crossing, there is no natural channel morphology present.

The average wetted width of the channel within the rail corridor crossing and upstream reach is approximately 5 m, increasing to approximately 8 m to 10 m through the downstream reach, below the grade control structure (described further below).

The riparian vegetation through the rail corridor crossing consists of a narrow band of disturbance-tolerant herbaceous and woody vegetation (early successional growth). The closed canopy/sub-canopy is dominated by Manitoba Maple and Crack Willow. Other species include Quaking Aspen, Green Ash, American Elm, American Basswood, Eastern Cottonwood, Siberian Elm and Norway Maple. The understory includes a mix of Buckthorn, Thicket Creeper, and Riverbank Grape. The ground layer is patchy and includes abundant Garlic Mustard (*Alliaria petiolata*) (non-native and invasive species) and Avens (*Geum* sp), with Virginia Waterleaf (*Hydrophyllum virginianum*), Common Evening-primrose, Common Motherwort, Spotted Jewel-weed (*Impatiens capensis*), White Vervain (*Verbena urticifolia*) and Rough Cockle-bur (*Xanthium strumarium*). An informal trail runs along the east bank of the creek.

Riparian vegetation is absent downstream of the rail corridor crossing downstream of Weston Road.

A two-tiered concrete grade control structure just upstream of Weston Road controls flows through the rail crossing where the natural channel transitions to the concrete lined 'floodway.' The first tier is approximately 1 m and the second tier is approximately 0.60 m. This structure is a permanent barrier to fish movement through this reach. The HRFMP identifies two other barriers to fish movement along this watercourse; two other grade control structures are located approximately 1.3 km upstream (at Trethewey Drive) and 1.8 km downstream (at Jane Street) of the rail corridor crossing.

TRCA's HRFMP categorizes Black Creek as *Intermediate Riverine Warmwater*. As noted, the HRFMP also indicates that this reach (and the entire Black Creek system) is being managed for darter species and warmwater baitfish.

Based on TRCA's fish sampling records at site HU006WM, located approximately 200 m upstream of the rail corridor crossing, a warmwater baitfish community is present with Creek Chub, Blacknose Dace, White Sucker and sucker species being captured in the most recent sampling events (2001 and 2004). Older records from Station 47 (same location as HU006WM) record the capture of Creek Chub, goldfish and White Sucker (1975 and 1991). All species captured are considered common, tolerant warmwater baitfish.



Black Creek – View upstream of the existing rail corridor crossing.



Black Creek – View east (upstream) from Weston Road towards the existing rail corridor crossing (in October 2008 and March 2009)



*Black Creek – View west (downstream) from rail corridor crossing to Weston Road
(note two-tiered grade control structure).*

Humber River

The Humber River is the most prominent natural feature in the study area and the largest watercourse/valley system; meandering through the existing rail corridor crossing and right-of-way just west of Weston Road. The Humber River channel is well-defined with a natural form; flow was fast-moving and turbid at the time of the survey. The watercourse is surrounded by residential property and apartments along the east bank and the Weston Golf and Country Club along the west bank.

In general, the west bank is a two-tiered slope that has is approximately 0.5 m high at the river's edge rising another 2.5 m to the top of the slope and adjacent to the manicured lawn of the golf course grounds. The bankfull width is approximately 15 m to 18 m upstream of the bridge and 10 m downstream of the bridge.

Conversely, the east valley slope is very steep with an abrupt 30 m rise that gradually tapers to a less pronounced height approximately 70 m downstream of the rail crossing. Severe erosion and bank failure occurs along most of the east bank resulting in an estimated 25 m section of exposed shale at the water's edge approximately 45 m downstream of the rail crossing.

The steepness of the slope and erosion along the east bank results in sparse vegetation growth consisting of a mix of young and mid-aged trees and shrubs. Large boulders also line the base of the east upstream bank, which appear to have been placed as a stabilization measure. Conversely, the west bank is fairly well vegetated, especially downstream of the rail crossing. Upstream of the crossing, numerous dead trees are interspersed with the live vegetation, resulting in a lot of large woody debris along the west bank.

An average wetted width of approximately 30 m in the vicinity of the rail crossing is consistent throughout the right-of-way and downstream reach, with a short narrower section (wetted width ~ 20 m) near the northwest bend approximately 60 m upstream of the crossing.

Water depths at the time of Ecoplans' survey ranged from 0.5 m to 0.8 m along the west bank, 0.2 m to 0.4 m in the riffles near the crossing, and 1 m in one of the pools beneath the rail bridge crossing. Ecoplans estimated an average depth of 1 m or greater in the centre of the channel. Depths in the centre of the channel and beneath the bridge could not be measured due to high water levels and flows.

Substrates along the entire west bank consisted mainly of sandy soils with a mix of shale, cobble and boulder with some gravel throughout the remaining reach.

Throughout the entire reach, the morphology of the river was a mixture of runs (65%), flats (20%), riffles (10%), and pools (5%). It is worth noting that the water levels may have been elevated due to a recent storm event, resulting in the run dominant morphology of the river. Upstream of the rail crossing, the morphology of the river along the upstream and downstream reaches was dominated by runs along the outside bend of the east bank with a section of flats occurring along the inside bend of the west bank. Within the right-of-way (immediately upstream of the rail crossing), there is a gentle riffle area approximately 12 m to 15 m long, creating small rapids and extending across the width of the river. Directly beneath the existing rail crossing, runs dominate on either side of the pier, with a flat occurring directly behind the central pier. A small weir approximately 70 m downstream of the rail crossing produces a riffle/rapids area on its downstream side.

Ecoplans noted small amounts of woody debris (5%), large boulders (5%), and overhanging vegetation (10%) along the west bank, representing instream and overhanging cover and shading throughout the entire upstream and downstream reach. A small amount of cover is provided by undercut banks (5%) along the east downstream bank.

Riparian vegetation along the valley slopes includes a mixed deciduous forest of variable quality and manicured landscapes associated with the Weston Golf and Country Club property.

The estimated 0.5 m high concrete weir present 70 m downstream of the rail crossing may pose at least a seasonal barrier to movement of most fish upstream. The HRFMP identifies another barrier to fish movement; a notched concrete weir is located approximately 1 km downstream of the rail crossing. Barrier mitigation projects are currently being undertaken by TRCA including 6 weirs between Highway 401 and Bloor Street that have been notched to improve passage for migratory species and movement of resident species.



TRCA's HRFMP categorizes the Humber River as *Large Riverine*. As noted, the HRFMP also indicates that this reach (part of the main Lower Humber River) is managed for Smallmouth Bass and Rainbow Darter. There are numerous fish sampling stations located within, up and downstream of the rail corridor crossing. The reach within the rail corridor crossing supports warmwater fish habitat with a migratory function for salmonid species (Rainbow Trout).

Based on sampling records at HU007WM, located approximately 125 m downstream of the rail corridor crossing, there is a diverse warmwater fish community dominated by bait and forage fish including several darter species (Fantail, Johnny, and Rainbow), shiner species (Common, Golden, and Sand), several dace/minnow species (Blacknose and Longnose Dace, Bluntnose and Fathead Minnow), suckers (White and Northern Hog Sucker,) and chub species (Creek and River), as well as Stonecat, Central Stoneroller, Carp, Catfish, Rock Bass, Yellow Perch and American Brook Lamprey (2001 and 2004). A single Rainbow Trout was also captured at station HU007WM (2004). Similar species were captured 375 m further downstream at Station 18 (1984).

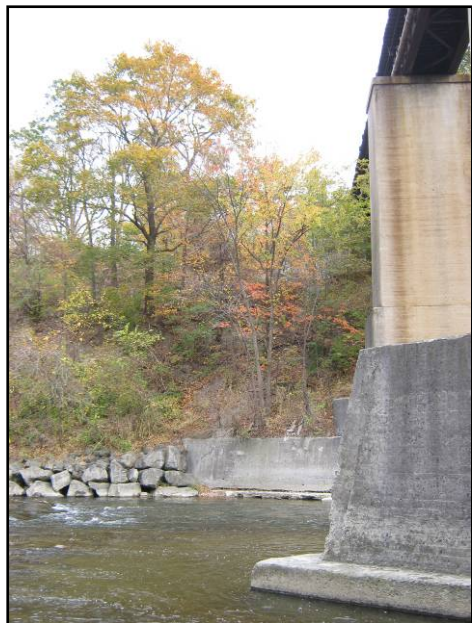
Fish Species captured at Stations 365 and HU008WM, located approximately 1.2 km and 1.75 km, respectively, upstream of the rail corridor crossing include most of the species listed above as well as Brook Stickleback, Bluegill, Emerald Shiner, Fathead Minnow and Pumpkinseed (1999, 2004).

Largemouth and Smallmouth Bass along with most of the species listed above have been captured at Station 17, located approximately 1.8 km downstream of the rail corridor crossing (1972, 1974 and 1991).

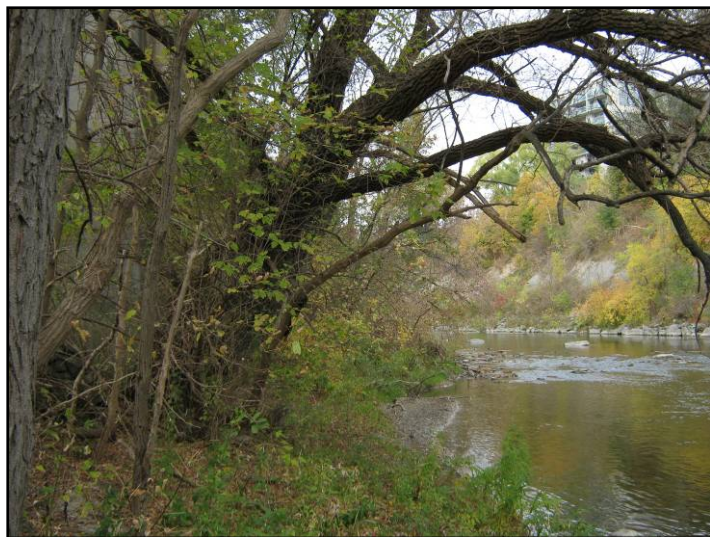
Given the diverse fish community that may include migratory coldwater species and the continuous and diverse stream corridor vegetation and habitat, the Main Humber River is considered to have the highest relative sensitivity of the watercourses within the Study Area.



Humber River – View north to existing high level rail bridge.



Humber River – View of west bank and bridge pier



Humber River – View north from rail crossing along the west bank.

Mimico Creek

Mimico Creek is a permanent, well-defined, and relatively slow-moving system surrounded by industrial land use. In the vicinity of the proposed crossing, the watercourse appears to have been historically straightened and channelized with gabion baskets lining the banks for erosion protection. Mimico Creek flows generally east through the right-of-way and through the Highway 409 structure downstream, which is a twin cell concrete box culvert (~ 6 m wide each), with main channel flow on the south side and overflow on the north side.

A large storm drain outlets on the south side of Mimico Creek approximately 100 m upstream of the Hwy 409 structure (approximately 50 m upstream of the proposed spur line crossing). Ecoplans observed an oil-like substance in the storm drain as well in Mimico Creek, downstream of the storm drain outlet.

Through the proposed spur line crossing reach, Mimico Creek has a narrow, level band of riparian vegetation (approximately 2 m wide) that lines the creek, above which a steep slope (approximately 2:1) lined with gabion baskets extends 10 m up the valley to an area of cultural meadow (15 to 20 m wide) that borders Goreway Road and the adjacent industrial development.



The wetted width of approximately 7 m to 8 m was consistent throughout the entire reach. Water depths at the time of Ecoplans' survey ranged from 0.05 m to 0.10 m along the banks, 0.05 m in one of the riffles within the right-of-way, and 0.35 m to 0.40 m in the centre of the channel. Minor undercutting of the north bank was evident within the right-of-way and the downstream reach.

Within the right-of-way substrates consisted of a mix of 70% fallen riprap from the banks, 20% gravel, 5% sand, and 5% silt. Immediately upstream of the right-of-way, substrates changed to consist of a mix of 60% gravel, 20% cobble, 15% sand and 5% silt.

Throughout the entire reach, the morphology of the channel was dominated by flats (85%), with two riffles (15%) occurring immediately upstream of the right-of-way and at the storm drain, where a small cobble island was present in the centre of the channel.

Overhanging riparian cover and shading was poor throughout the entire reach with most of the vegetation consisting of small shrubs with a few larger trees at the culvert and along the north bank. Instream cover is provided by cobble, a small amount of undercut banks and woody debris, and minor algae.

Riparian vegetation in the vicinity of the right-of-way consists of willow, Red-osier Dogwood with a few isolated patches of Manitoba Maple, Crack Willow, and Balsam Poplar lining the channelized creek.

Directly underneath the Zahavy Way bridge (approximately 0.2 km upstream of the right-of-way) an estimated 1 m concrete grade control structure is present that is a barrier to fish movement upstream. Three barriers are also present approximately 3.0 to 3.4 km upstream of the proposed crossing and one barrier is present approximately 4.2 km downstream of the proposed crossing.



TRCA categorizes Mimico Creek as Intermediate Riverine Warmwater. As noted, the HRFMP also indicates that this reach (and the entire Mimico Creek system) is being managed for darter species and warmwater baitfish.

Based on fish sampling records at Station 6, located approximately 500 m downstream of the rail crossing, Mimico Creek supports a warmwater bait and forage fish community. Species captured at this station include: Brook Stickleback, Common Shiner, Creek Chub, Fathead Minnow, and White Sucker (1985 and 1997). All species captured are considered common, tolerant warmwater forage and baitfish.



Mimico Creek – View downstream of the existing rail corridor crossing facing northwest.



Mimico Creek – View downstream of existing rail corridor crossing facing southeast.



Mimico Creek – View downstream of Zahavy Way.

4.1.1.4 *Species of Conservation Concern*

Given the predominance of urban land uses within the study area, habitat for species that are intolerant of anthropogenic disturbance is limited.

In addition to species records obtained through field work by SNC-Lavalin and Ecoplans, the NHIC database, MNR Aurora District and TRCA were consulted for information on species of conservation concern. The term *species of conservation concern*, is used to describe species that are “designated” by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Species at Risk Act; species that are “designated” by COSSARO (Committee on the Status of Species at Risk in Ontario); species that are Endangered and regulated (Endangered-Regulated) under Ontario's Endangered Species Act; and provincially rare species (S-rank of S1 to S3) and regionally recognized species (TRCA L-rank of L1 to L3).

TRCA provided Ecoplans with database records of observations of ‘species of concern’ flora and fauna, which are species that TRCA has assigned with a local rank (L-rank) for their jurisdiction. Lists of flora and fauna for the study area were generated from this ‘species of concern’ database provided by TRCA and can be found in **Appendix D**.

The flora list was then cross-referenced with *The Vascular Plant Flora of the Greater Toronto Area* (Varga et al. 1999) to determine if any of the locally recognized species were also regionally rare or uncommon.

The fauna list was cross-referenced with the *Significant Wildlife Habitat Technical Guide* (MNR 2000) to determine if any of the ‘species of concern’ observed by TRCA were also considered ‘area sensitive’ by the MNR.

Species at Risk

No species at risk were recorded during field work conducted by SNC-Lavalin and Ecoplans. During the course of public consultation, some members of the public identified a potential Wood-poppy population at H.J. Alexander School. This school is located at the southwest corner of King Street and George Street in the City of Toronto.

Wood-poppy (*Stylophorum diphyllum*) is a federally and provincially endangered species (i.e. listed on Schedule 1 of the Federal Species At Risk Act [SARA] and Schedule 1 of the Ontario Endangered Species Act, 2007 [ESA]). It also has a provincial ranking of S1 – critically imperiled in Ontario.

It is very unlikely that this observation represents a natural population of Wood-poppy, as detailed below.

In Ontario, there are only three known populations of this species and four historic records, all occurring in Middlesex County (COSEWIC 2007, Oldham and Brinker 2009), several hundred kilometres southwest of the Study Area. Naturally occurring populations of this species have never been documented in the Greater Toronto Area, and long distance seed dispersal mechanisms are not known for this species according to COSEWIC (2007).

Wood-poppy closely resembles Greater Celandine (*Chelidonium majus*), a common non-native species introduced from Europe. The observation at H.J. Alexander School may have been Greater Celandine misidentified as Wood-poppy.

Wood-poppy is also cultivated as an ornamental and is readily available from local nurseries in southern Ontario. This species performs well in shady gardens and can become weedy, forming large uniform stands by self-seeding. While the origin of commercially available plant material is unknown, it likely originated from Wood-poppy populations in the United States (COSEWIC, 2007). If the specimen observed at H.J. Alexander School is Wood-poppy, there is a very high probability that it was planted, possibly as part of a natural garden created by the school.

The Wood-poppy is typically found in rich woods, forested ravines, near woodland streams and at the base of bluffs. Based on aerial photo interpretation, there is no Wood-poppy habitat in the vicinity of H.J. Alexander School.

In summary, this particular specimen was either mis-identified or planted. If proposed works were to affect this plant (which is considered unlikely), salvage and transplanting to another suitable location on the property is an option.

Details regarding the suggested occurrence of Wood-poppy and the above-noted information documenting why it is unlikely that the observation represents a natural population of Wood-poppy have been forwarded to the Ministry of Natural Resources (MNR).

The following species at risk have been recorded by TRCA:

Common Nighthawk

The TRCA database contained a single observation record for Common Nighthawk (*Chordeiles minor*) (June 2007). The observation occurred approximately 200 m west of the rail corridor right-of-way near the intersection of Dundas Street and Roncesvalles Avenue in an urban residential neighbourhood.

Common Nighthawk is designated by COSEWIC as Threatened in Canada but is not listed in Schedule 1 of SARA. This species has a provincial ranking of S4B (Secure in Ontario) and is not tracked by MNR. The threatened status is due to long and short-term declines in population, possibly attributable to reduction of insect food sources. The Canadian population was estimated at 400,000 breeding adults in 2007, representing 10% of the global population (COSEWIC 2007). This species breeds in varied habitat including open areas where the ground is devoid of vegetation. In the agricultural portions of southern Ontario, the species has been observed nesting in grasslands, agricultural fields, gravel pits, prairies, alvars, and at airports. In city areas, the Common Nighthawk nests mostly on flat, gravelled roofs but will also occasionally nest on footpaths and railway sites (Cadman et al. 2008).

Western Chorus Frog – Great Lakes/St. Lawrence – Canadian Shield Population

The TRCA database contained a record for Western Chorus Frog (*Pseudacris triseriata*) (April 2001). This species was heard calling at a level where individual calls overlapped and the number of calling frogs could not be estimated (i.e. Call level 3 according to the Marsh Monitoring Protocol). This observation occurred within the Mimico Creek Valley just north of the existing railway crossing.

This record occurs within the range of the Great Lakes/St. Lawrence – Canadian Shield population of Western Chorus Frog. This population is designated by COSEWIC as Threatened in Canada but is not listed in Schedule 1 of SARA. The Carolinian population is considered not at risk by COSEWIC. COSSARO does not recognize the 2 distinct populations of Western Chorus Frog, and in Ontario this species is considered

distinct populations of Western Chorus Frog, and in Ontario this species is considered Not at Risk. This species has a provincial ranking of S4 (Secure in Ontario). According to COSEWIC (2008), the threatened status of this species is due to ongoing losses of habitat and breeding sites for this small frog due to suburban expansion and alteration in farming practices that have resulted in losses of population and isolation of remaining habitat patches. In Ontario, surveys of populations indicate a significant decline in abundance of 30% over the past decade (COSEWIC 2008).

This species is primarily a lowland, terrestrial species that is often found in areas that show evidence of agriculture, forestry, and other human disturbance. It requires both terrestrial and aquatic habitats in close proximity. Western Chorus Frog usually breeds in small or shallow aquatic habitats, mostly in temporary ponds and wetlands with an open canopy that become dry in the summer. Typical breeding habitats include ditches, marshes, flooded fields and pastures, ephemeral ponds and swamps. During the non-breeding season Western Chorus Frog can be found in a variety of habitats that have close proximity to breeding sites including marshes, woodlands, meadows, fallow lands and cultivated fields.

Western Chorus Frog was identified within the Mimico Creek valley approximately 100 m north of the *existing* Mimico Creek crossing. Construction activities within the Mimico Creek valley will be limited to the south side of the existing crossing, therefore no impacts to this species are anticipated.

Group 1 and 2 Candidate Species

'Candidate species' are species not yet assessed by COSEWIC but that have been identified by COSEWIC as potentially being at risk. As such, they are candidates for detailed status assessments. Species on the candidate list are ranked into three priority groups by the Species Specialist Subcommittees of COSEWIC, to reflect the relative urgency with which each species should receive a COSEWIC assessment.

Aquatic species identified by COSWEIC for a priority candidate list are: Bluegill, Rainbow Darter, Stonecat (Group 2 Intermediate Priority), and Bluntnose Minnow (Group 1 High Priority). Bluegill has been captured approximately 1.3 km north of the existing Humber River rail corridor crossing. Rainbow Darter and Bluntnose Minnow have been captured in several locations upstream, downstream and within the existing Humber River rail corridor crossing reach. Stonecat has been captured within the existing Humber River rail corridor crossing reach. Bluntnose minnow was also captured approximately 2 km upstream of the proposed spur line crossing of Mimico Creek.

No other species at risk records were reported by the TRCA.

Personal communication with a MNR Aurora District Species at Risk Biologist, (March 24, 2009) confirmed that there are no current records for federally designated Species at Risk (SAR) or provincially designated Species at Risk in Ontario (SARO) in the study area.

Aquatic Species at Risk (SAR) distribution mapping, obtained from the Conservation Ontario website in March 2009, map the Humber River, Black Creek and Mimico Creek as having the potential to support Redside Dace within the study area. This species is designated nationally as Special Concern (COSEWIC) and provincially as Threatened (MNR). However, there are no records, present or historical (fish community database compiled and provided by TRCA), of Redside Dace within the vicinity of the study area (Black Creek, Humber River, Mimico Creek). As well, the HRFMP (OMNR 2005) states

that Redside Dace is currently only managed in the upper reaches of the Humber River Watershed, approximately 10-12 km north of the study area (north of Steeles Avenue). Target species for Fisheries Management include Smallmouth Bass and Rainbow Darter for the Lower Humber River and Darter species and warmwater baitfish for Black Creek (HRFMP 2005). It is likely that Redside Dace has been extirpated from Mimico Creek (Redside Dace Recovery Team 2005). Therefore, it can reasonably be concluded that Redside Dace is not present within the study area.

Provincially Rare (S-rank) Species

No provincially rare plant or animal species were recorded during field work conducted by SNC-Lavalin and Ecoplans.

One species identified in the TRCA database within the study area is considered provincially rare. Cup-plant (*Silphium perfoliatum* var *perfoliatum*) has a provincial ranking of S2 (Imperiled). A group of 3-5 individuals was observed in May 2007 in a waterfront park at the foot of Spadina Avenue, approximately 500 m south of the rail corridor right-of-way. This population may have been planted. This species occurs in wet prairies, open forests and bottomlands. No other species identified in the TRCA database are considered provincially rare.

The NHIC database identified 8 provincially rare plant species in the vicinity of the study area. All 8 records are considered historic (1976 or earlier). Species identified are Wild Lupine (*Lupinus perrenis*, S3), Fernleaf Yellow False-foxglove (*Aureolaria pedicularia*, S2?), Sea Spurry (*Spergularia salina*, SH), Sharp-fruit Rush (*Juncus acuminatus*, S3), Stiff Gentian (*Gentianella quinquefolia*, S2), Gorgone Crescentspot (*Chlosyne gorgone*, S2), Erect Knotweed (*Polygonum erectum*, SH) and Shrubby St. John's-wort (*Hypericum prolificum*, S2).

Regionally Recognized Species

TRCA L-Ranked Species

L-ranks are assigned by TRCA to a species to describe its status within the TRCA jurisdiction. Species with L-ranks of L1 to L3 are of concern regionally, and species with L-ranks of L4 are of concern in the urban matrix.

For the purposes of this study, species with an L-rank of L1 to L4 are considered 'species of concern' and are hereafter referred to as L-ranked species. A total of 70 (51 flora and 19 fauna) L-ranked species have been recorded by TRCA within the study area. A summary of these data is provided in **Table 4.1.1.4-1**. The full list of TRCA observed flora and fauna species is provided in **Appendix D** and a map illustrating the location of species by L-rank is provided on **Figure 4.1.1.4-1**.

Table 4.1.1.4-2 Toronto and Region Conservation Authority L-Rank Species Summary

TRCA Rank	Plant		Wildlife		Total
	TRCA Database ¹	Field Observations ²	TRCA Database ¹	Field Observations ²	
L1	0	0	0	0	0
L2	7	1	4 (1 crayfish, 3 amphibian)	0	12
L3	19	4	3 (birds)	1 (bird)	27
L4	25	4	12 (10 birds, 2 mammals)	0	41
Total	51	9	19	1	80

¹ Includes all species from TRCA Database occurring within 500 m of the existing rail corridor right-of-way.

² Includes species observed by SNC-Lavalin in 2004 and Ecoplans in 2008 and 2009. Only species not identified in the TRCA Database are included.

Twenty (20) L-ranked species (19 flora and 1 fauna) were also recorded during SNC-Lavalin (2004) and Ecoplans (2008) field surveys, of which 10 were not represented in the TRCA database. A complete list of L-ranked species recorded during field surveys is summarized in **Table 4.1.1.4-2**.

Other Regionally Rare and Uncommon Species

Ten (10) of the L-ranked species listed in the TRCA database are also considered regionally rare or uncommon in the City of Toronto and 6 are considered rare in the Greater Toronto Area (Varga et al. 1999).

During field surveys completed by SNC-Lavalin in 2004 and Ecoplans in 2008 and 2009, a total of 14 species considered rare or uncommon in the City of Toronto, and 8 species considered rare in the Greater Toronto Area according to Varga et al. (1999) were recorded. A summary of these species is provided in **Table 4.1.1.4-2**.

Two (2) L-ranked bird species were recorded during Ecoplans field surveys at Mimico Creek in October 2008. One (1) Great Blue Heron (L3) and 1 Northern Mockingbird (L4) were observed at Mimico Creek by Ecoplans in 2008.

Table 4.1.1.4-2 Species of conservation concern observed during field surveys in 2004 and 2008

Common Name	Scientific Name	Srank	City of Toronto Ranking ³	Greater Toronto Area ³	Toronto and Region Conservation Authority Rank ³	Location	Source
Carolina Rose	<i>Rosa carolina</i>	S4	R	R	L2	Mimico Creek and Humber River	SNC-Lavalin ¹ (Humber and Mimico) and Ecoplans ² (Mimico)
Eastern Red Cedar	<i>Juniperus virginiana</i>	S5	R ¹	R	L5	Mimico Creek	Ecoplans ²
American Purple Vetch	<i>Vicia americana</i>	S5	R ¹	R	L3	Unknown	SNC-Lavalin ¹
Switch Grass	<i>Panicum virgatum</i>	S4	R ²	R	L3	Unknown	SNC-Lavalin ¹
Meadow Willow	<i>Salix petiolaris</i>	S5	R ²	X	L3	Mimico Creek	Ecoplans ²
Rough Goldenrod	<i>Solidago rugosa ssp rugosa</i>	S5	R ²	X	L5	Unknown	SNC-Lavalin ¹
Climbing False-buckwheat	<i>Polygonum scandens</i>	S4S5	R ⁴	R	L3	Unknown	SNC-Lavalin ¹
Running Strawberry-bush	<i>Euonymus obovata</i>	S5	R ⁵	X	L3	Humber River	SNC-Lavalin ¹ and Ecoplans ²
Water Smartweed	<i>Polygonum amphibium</i>	S5	R ⁵	X	L3	Unknown	SNC-Lavalin ¹
Nodding Wild-rye	<i>Elymus canadensis</i>	S4S5	R ⁶	R	L3	Unknown	SNC-Lavalin ¹
Common Evening-primrose	<i>Oenothera biennis</i>	S5	U	X	L5	Humber River and Black Creek	Ecoplans ²
White Oak	<i>Quercus alba</i>	S5	X	X	L2	Humber River	Ecoplans ²
Swamp Milkweed	<i>Asclepias incarnata ssp incarnata</i>	S5	X ^U	X	L4	Humber River	SNC-Lavalin ¹
Virginia Stickseed	<i>Hackelia virginiana</i>	S5	X ^U	X [?]	L5	Humber River	Ecoplans ²
Broad-leaf Cattail	<i>Typha latifolia</i>	S5	X	X	L4	Rail Corridor right-of-way and Mimico Creek	SNC-Lavalin ¹ and Ecoplans ²
Soft-stemmed Bulrush	<i>Scirpus validus</i>	S5	X	X	L4	Unknown	SNC-Lavalin ¹
Bur Oak	<i>Quercus macrocarpa</i>	S5	X	X	L4	Humber River	Ecoplans ²
Northern Red Oak	<i>Quercus rubra</i>	S5	X	X	L4	Mimico Creek and Humber River	SNC-Lavalin ¹ and Ecoplans ²
American Bugleweed	<i>Lycopus americanus</i>	S5	X	X	L4	Humber River	Ecoplans ²
Cow-parsnip	<i>Heracleum lanatum</i>	S5	X	R	L4	Black Creek	Ecoplans ²
Great-hairy Willow-herb	<i>Epilobium hirsutum</i>	SE5	X	X	L4	Unknown	SNC-Lavalin ¹
Hedge Bindweed	<i>Calystegia sepium ssp angulata</i>	S5			L4	Mimico Creek	Ecoplans ²
Great Ragweed	<i>Ambrosia trifida</i>	S5	X	R	L5	Black Creek	SNC-Lavalin ¹ and Ecoplans ²
Silver Maple	<i>Acer saccharinum</i>	S5	X	X	L4	Humber River	SNC-Lavalin ¹ and Ecoplans ²
Peach-leaved Willow	<i>Salix amygdaloides</i>	S5	X ^U	X	L4	Black Creek	Ecoplans ²
White Spruce	<i>Picea glauca</i>	S5	X ⁺	X	L3	Rail Corridor right-of-way at Woodbine race track	Ecoplans ⁴
Great Blue Heron	<i>Ardea herodias</i>	S5B, SZN	NA	NA	L3	Mimico Creek	Ecoplans ²
Northern Mockingbird	<i>Mimus polyglottos</i>	S4B, SZN			L4	Mimico Creek	Ecoplans ²

¹ Observed by SNC-Lavalin during field survey in September 2004

² Observed by Ecoplans during field visits in October 2008

³ Regional rank according to Varga et al. (1999). R = rare, U/X^U = uncommon, X = Present

⁴ Observed by Ecoplans during supplementary field visit in April 2009

4.1.2 Soil and Groundwater

A preliminary geotechnical assessment consisting of 11 boreholes to 15 m depths or to bedrock, whichever occurs first was undertaken as part of the EPR. In addition geology maps and previous geotechnical reports were consulted in order to provide a soil and groundwater a planning level assessment of the corridor. The detailed subsurface soil and groundwater conditions encountered in the boreholes are detailed in the Geotechnical Report, bound under separate cover.

4.1.2.1 Regional Geology

Based on geology maps and previous reports, the Georgetown/Western subdivision between Union Station and Malton Station can be broadly divided into six areas of surfacial geologic formations as summarized in **Table 4.1.2.3-1** below. In addition to the geologic formations, alluvial deposits of undifferentiated gravel, sand, silt and clay can be expected locally where the line crosses rivers and streams.

Table 4.1.2.3-1: Geological Deposits

Area	Approximate Extent	Formation	Geological Deposit
A	Union Station to Queen and Dufferin Streets	Sunnybrook Till	Silty clay to silt till
B	Queen and Dufferin Streets to Dundas and Dupont Streets	Lake Iroquois	Shallow water deposits: sand, silty sand
C	Dundas and Dupont to halfway between St Clair Ave and Rogers Rd	Lake Iroquois	Beach and bar deposit – gravel, sand
D	Halfway between St Clair Ave and Rogers Rd to Weston Road	Lake Iroquois	Deltaic and lacustrine deposits: gravelly sand and silty sand
E	Weston Road to Kipling Ave	Halton Till	Gritty to clayey silt till
F	Kipling Ave to Bramalea Road	Glacio-lacustrine	Massive to laminated silt and clay

4.1.2.2 Hydrogeology

Groundwater within the study corridor is not used as a potable water source as municipal water supply is available throughout the study corridor.

According to the borehole logs, the groundwater conditions vary considerably. For the 11 borehole locations, groundwater level was encountered at depths ranging from approximately 2 to 7 m. Due to the complex soil conditions and the large study area, it is not surprising that the groundwater level is not at a single level but largely depends on stratigraphic sequence and regional drainage conditions. The regional flow direction is from north to south towards Lake Ontario.

4.1.2.3 Subsurface Conditions in the Study Corridor

Subsurface conditions were also specifically investigated along the proposed grade separations and/or structure widening locations; and 11 boreholes were completed. A summary is provided below and the detailed subsurface soil and groundwater conditions encountered in the boreholes are detailed in the Geotechnical Report, bound under separate cover.

The boreholes were taken at the major excavation areas and found a variety of overburden materials.

At Strachan Avenue, the stratigraphy consists of fill overlying clayey silt to silty clay till overlying shale bedrock. Shale is at between Elevation 74 and 77 m (7 to 10 m. depth) Groundwater level in this area is at about Elevation 79 and 81 m (3 to 6 m depth).

At Dennison Road East, the boreholes found fill overlying sand and silty clay. The sand layer between 5.5 and 8.5 m depths is saturated. The underlying silty clay is very soft. Groundwater was at about 2 m depth.

Between Lawrence Avenue West and Coulter Avenue, shale bedrock is present at 2 to 5 m depth. Most of the overburden materials in this area are fill or silty clay.

At Carlingview Drive, the borehole encountered fill, underlain by clayey silt till and sandy silt till interbedded with sand strata found at 8.8 to 14.7 m depths. Groundwater was at 7.2 m depth.

4.1.3 Drainage and Stormwater Management

Throughout the majority of the study area the land is draining in a north to south direction. In most areas grassed ditches along the rail corridor convey flows to outlets; culverts across the rail corridor, ditch inlets to the municipal sewer system or directly to one of the watercourses.

There are numerous storm sewers that cross the rail corridor, usually at road crossings.

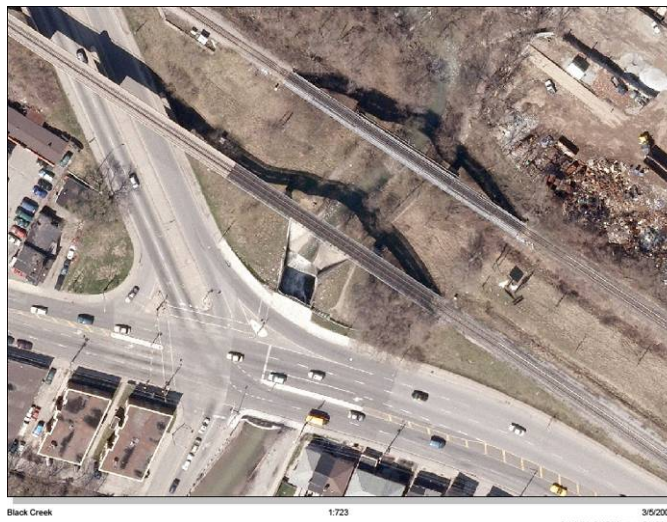
There are two major watercourse crossings within the study area (from east to west): Black Creek and Humber River. An additional crossing of Mimico Creek will be required for the spur line to Pearson Airport.

TRCA has provided floodplain mapping and existing conditions hydraulic models for each of these watercourses in the vicinity of the study area.

A general overview of the watercourses and crossing locations are provided below:

Black Creek

The existing rail corridor crosses Black Creek on two single track bridges (one GO structure and one CP structure) just north and east of the intersection of Weston Road and



Black Creek Drive. North of the rail corridor Black Creek retains a fairly natural form as it flows south through Keelesdale Park. South of the rail corridor crossing and just north of Weston Road, the Black Creek channel has been significantly modified and now consists of a concrete lined channel for flood conveyance/protection.

Regional flood mapping provided by TRCA indicates that the regional storm does not overtop the existing rail corridor at Black Creek. The regional flood elevation on the upstream side of the rail corridor at this location is 110.2m and the elevation of the rail corridor at this location is approximately 118.5m.

Humber River

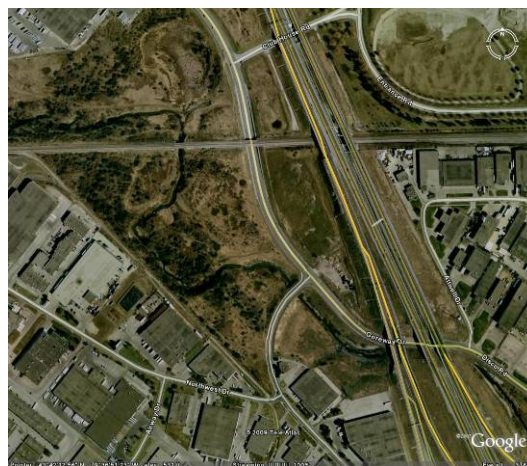
The existing rail corridor crosses the main branch of the Lower Humber River on a high level multi-span bridge approximately 700 m south of Highway 401, with the nearest intersection at Weston Road and St. Phillips Road to the east. In the vicinity of the crossing location, the Humber River meanders through a large valley/floodplain. Urban land use surrounds the valley and the West Golf and Country Club is located in the floodplain, adjacent to the Humber River and 'below' the rail corridor.



The regional storm does not overtop the existing rail corridor at Humber River. The regional flood elevation on the upstream side of the rail corridor at this location is 125.7m and the elevation of the rail corridor at this location is approximately 140.1m.

Mimico Creek

The proposed new Spur Line will also require a crossing of Mimico Creek just west of Highway 427 in the vicinity of Goreway Drive and Zahavy Way. In this area the creek has been previously straightened/ditched and is conveyed under Highway 427 by a large



structural culvert. This watercourse is considered to have relatively low sensitivity.

The regional storm would not overtop the proposed spur line at Mimico Creek. The regional flood elevation at the location where the spur line is proposed to cross the creek is 159.4m. The elevation of Goreway Drive at this location is approximately 162.3m and the proposed elevation of the spur line in this area ranges from approximately 172.5 to 164.5m.

Stormwater Management Objectives of the Agencies

The TRCA will require that the proposed works provide an “enhanced” level of protection, as defined in the Ministry of the Environment’s Stormwater Management Planning and Design Manual (March 2003) for the watercourses. They will also require that the proposed works will not increase flood elevations and in areas where works are within the flood plain it will be required to demonstrate that there are no adverse impacts with respect to erosion potential.

There are numerous policies that will be considered such as:

- Toronto Wet Weather Flow Management Guidelines.
- Ministry of the Environment’s Stormwater Management Planning and Design Manual (March 2003).
- The Canadian Highway Bridge Design Code (CHBDC).
- TRCA’s Valley and Stream Management Program (1994).

4.1.4 Contaminated Properties

Previous contaminant investigations (Phase I and Phase II Environmental Site Assessments) have been completed along the rail corridor between Strachan Avenue and Highway 427. The findings of these investigations identified a number of existing and potential site contamination issues along the corridor attributed to the nature of past and current land uses within and adjacent to the rail corridor. In addition, some actual contamination has been identified within the rail corridor. Some of these land uses/activities have included:

- Former coal storage yards;
- Former large industrial facilities;
- Former brownfield properties, i.e. former industrial properties redeveloped into residential properties;
- Existing large industrial facilities including manufacturing and chemical storage;
- Gas stations and service garages;
- Automotive wrecking yards;
- Numerous piles of railway ties within the corridor; and
- Oil storage sheds and former train stations within the corridor.

In addition to the above and typical of railway corridors, there is the potential for contaminated rail ballast, bedding and fill material attributed to the use of slag, coal cinders and ash.

Potential site contamination will be considered as part of the assessment of impacts. Any contaminated materials will be handled in accordance with applicable provincial/federal legislation and regulations as well as best management practices.

4.2 SOCIO ECONOMIC ENVIRONMENT

4.2.1 Land Use

Land use along the corridor consists of developed/redeveloped residential and industrial/commercial areas. The rail corridor is primarily within the City of Toronto; however, west of Highway 401 the corridor is within the City of Mississauga (Region of Peel). It is important to note that this is an existing rail corridor and that commencement of operations in the rail corridor preceded the majority of the surrounding developments.

The following provides a general overview of the land uses along various stretches of the study corridor.

From Strachan Avenue to Bloor Street the rail corridor is a mix of pockets of residential land use and industrial and commercial land use. Included in this area are lands and numerous buildings that have been redeveloped from industrial/commercial land use to residential land use. Please refer to **Figures 4.2.1-1 – 4.2.1-3** for aerial photographs of this section of the study area.



Industrial land use south of the Strachan Avenue at-grade crossing

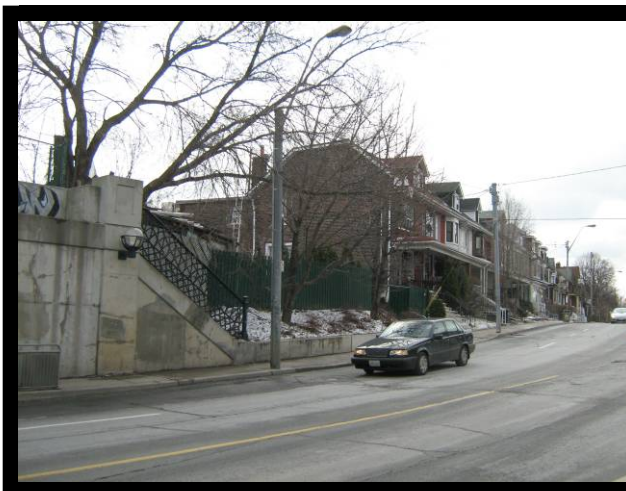
Residential land use north of the Strachan Avenue at-grade crossing



*Residential land use along King Street West at
Sudbury Street*



Mixed land use along Brock Avenue

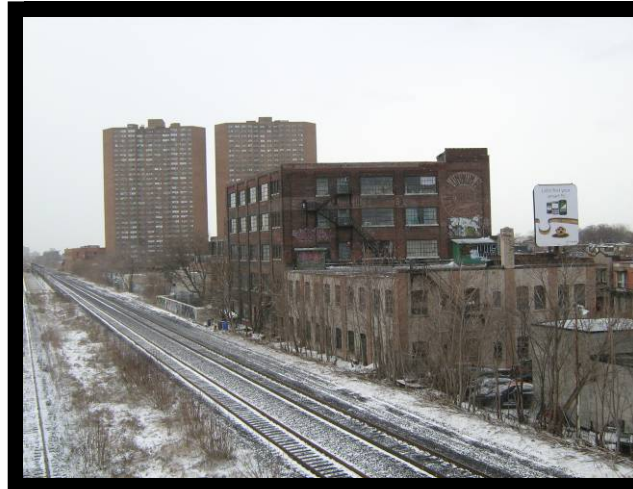


*Residential land use along
Landsdowne Avenue*



*Mixed land use (residential and commercial)
by the Bloor GO Station*

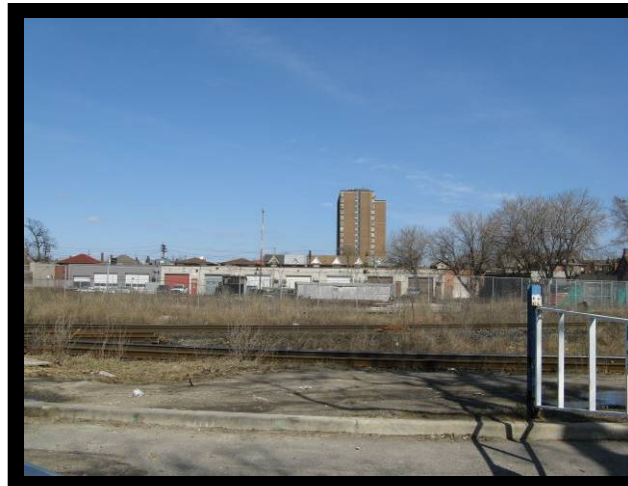
From Bloor Street to Eglinton Avenue land use is primarily a mix of residential and industrial/commercial. In this area the rail corridor serves numerous spur lines for industrial use and connects with the CP Rail Galt, North Toronto and MacTier Subdivisions, in an area known as the West Toronto Diamond. Please refer to **Figures 4.2.1-3 – 4.2.1-4** for aerial photographs of this section of the study area.



Mixed land use (including conversion) along Dundas Street West north of Bloor Street West



Mixed land use along Dundas Street West south of Kenneth Avenue



Mixed land use north of the West Toronto Diamond



Residential land use east of Weston Road north of St. Clair Avenue West

From Eglinton Avenue to the Lawrence Avenue the rail corridor passes through the Mount Dennis Community and land use is predominately residential. Please refer to **Figures 4.2.1-4 – 4.2.1-6** for aerial photographs of this section of the study area.



Mixed land use along Hollis Street



Residential land use along Craydon Avenue



*Residential land use west of the Dension Road
at-grade crossing*



Residential land use along Arthur Street

From Lawrence Avenue to the Humber River the rail corridor passes through the Weston Community and land use is predominately residential. Please refer to **Figure 4.2.1-6** for an aerial photograph of this section of the study area.



*Residential land use north of the John Street
at-grade crossing*



*GO parking lot and Farmers' Market south of the John Street
at-grade crossing*



*Residential land use north of the King Street
at-grade crossing*



*Residential land use north of the Church
Street at-grade crossing*



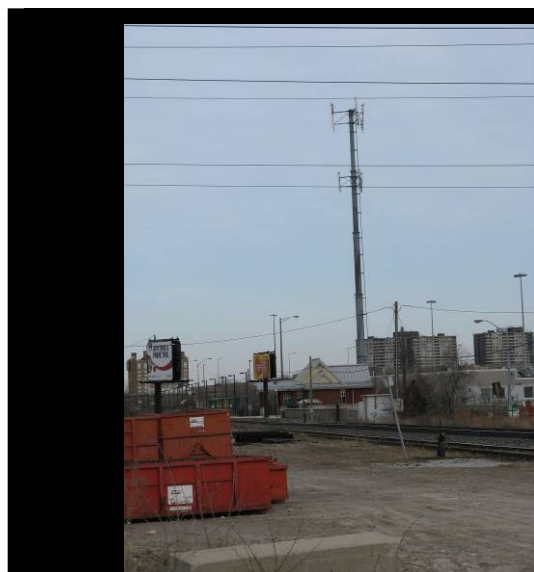
Residential land use along Rosemount Avenue



*Mixed land use along Weston Road
near John Street*

From the Humber River to Highway 401 the rail corridor passes through the Weston Golf and Country club as well as along side some commercial/industrial lands. Please refer to **Figures 4.2.1-6 – 4.2.1-7** for aerial photographs of this section of the study area.

From Highway 401 to Highway 427 the rail corridor passes through a predominately industrial/commercial area. Woodbine Race Track is included in this area. Please refer to **Figures 4.2.1-7** for an aerial photograph of this section of the study area from Highway 401 to west of Kipling Avenue.



*Mixed land use near the Etobicoke North GO
Station*



*Industrial/commercial land use west of
Kipling Avenue*

From Highway 427 to Terminal 1 of Pearson Airport the rail corridor and spur line for the Union-Pearson Rail Link will pass through the Mimico Creek flood plain and industrial/commercial lands prior to entering the Pearson Airport lands and ending at Terminal 1.

It is noteworthy that from west of Highway 401 to the end of the proposed Union-Pearson spur line the corridor passes through the Pearson Eco-Business Zone, a Partners in Green project launched by TRCA and the Greater Toronto Airports Authority (GTAA), which encompasses over 12,000 hectares of industrial and commercial land surrounding the airport. The vision of that project is to work with local businesses in transforming the lands surrounding the airport into an internationally recognized business zone (TRCA 2008).

Throughout the study area there are public parks and recreational trails. While all recreational facilities are valuable the following are of particular note:

- West Toronto Railpath – A multi-use pathway intended to provide a connection from Toronto's Junction neighbourhood to downtown Toronto (as shown on **Figure 4.2.1-8**). The north portion of the path from Caribou Avenue to Dundas Street West is currently under construction and opportunities to continue the path southwards towards Union Station are under review. Metrolinx is working closely with the City of Toronto to integrate the plans for the Georgetown South Rail Corridor with the City's Bike Plan, including the West Toronto Railpath on the east side of the rail corridor between Dundas Street and Queen Street (see Sections 3.3: Consultation Overview and 4.4.6: Bicycle Plans for additional details on the West Toronto Railpath).
- Keelesdale Park – A City of Toronto Public Park located along Black Creek east of the rail corridor.
- Cruickshank Park – A City of Toronto Public Park located along the Humber River south of the rail corridor

In addition, there are existing and planned cycling lanes and routes throughout the study corridor. A copy of the Toronto Bike Plan proposed network (City of Toronto 2009) is provided in **Figure 4.2.1-1**. As part of The Big Move, Metrolinx will work with the municipalities in the GTHA to develop a more integrated walking and cycling network that is safe and convenient.

In the vicinity of the rail corridor there are 80 schools, child care centres and long term care centres. **Table 4.2.1-1** provides a list of those facilities. The locations of these facilities are shown on **Figures 4.2.1-2 - 4.2.1-8**.

Table 4.2.1-1 Schools, Child Care Centres and Long Term Care Centres in the Vicinity of the Study Corridor

Number Reference for Figures 4.2.1-2 – 4.2.1-8	Type of Facility	Name of Facility	Address
1	Child Care Centre	City Kids Child Care Centre	34 Bathurst Street
2	Child Care Centre	Discovering Minds Montessori Preschool	74 Bathurst Street
3	School	Niagara Street Junior Public School	222 Niagara Street
4	Child Care Centre	Garrison Creek Community Day Care	222 Niagara Street
5	Child Care Centre	Downtown Kids Academy Inc.	905 King Street West
6	Child Care Centre	Queen Street Day Care Centre	1001 Queen Street West
7	Child Care Centre	Bonadventure Child Care Centre	295 Dufferin Street
8	Long Term Care Centre	Norwood Nursing Home	122 Tyndall Avenue
9	Long Term Care Centre	Fairview Nursing Home	14 Cross Street
10	School	Alexander Muir Public School	108 Gladstone Avenue
11	Child Care Centre	Alexander Muir Gladstone Junior YMCA	108 Gladstone Avenue
12	School	Gladstone Public School	114 Gladstone Avenue
13	Long Term Care Centre	Elm Grove Living Centre Inc	35 Elm Grove Avenue
14	Child Care Centre	St. Marks Child Care Centre	201 Cowan Avenue
15	School	Holy Family Elementary School	141 Close Avenue
16	School	Holy Family Catholic School	141 Close Avenue
17	Child Care Centre	Holy Family	139 Close Avenue
18	School	Parkdale Public School	78 Seaforth Avenue
19	Child Care Centre	Parkdale Public School Child Care	78 Seaforth Avenue
20	Child Care Centre	Odyssey Montessori School Inc.	136 Sorauren Avenue
21	School	Shirley Street Junior Public School	38 Shirley Street
22	Child Care Centre	Shirley Street Junior YMCA	38 Shirley Street
23	School	Fern Avenue Public School	128 Fern Avenue
24	School	St. Vincent De Paul School	116 Fermanagh Avenue
25	School	West Toronto Collegiate	330 Lansdowne Avenue
26	Child Care Centre	The Candy Factory Swallows Day Care	1411 Bloor Street West
27	School	Bishop Marrocco/ Thomas Merton School	1515 Bloor Street West
28	School	St. Luigi Catholic School	2 Ruskin Avenue

Number Reference for Figures 4.2.1-2 – 4.2.1-8	Type of Facility	Name of Facility	Address
29	School	Perth Avenue Junior Public School	14 Ruskin Avenue
30	Child Care Centre	Perth Early Learning Centre	14 Ruskin Avenue
31	Child Care Centre	Bloorview Kids Rehab - High Park	285 Indian Road Crescent
32	School	Indian Road Crescent Public School	285 Indian Road Crescent
33	Child Care Centre	High Park Junior YMCA	2665 Dundas Street West
34	School	Lucy McCormick School	2717 Dundas Street
35	School	St. Rita School	178 Edwin Avenue West
36	School	St. Josaphat Catholic School	55 Pelham Avenue
37	School	Brother Edmund Rice School	55 Pelham Avenue
38	School	Charlton Village Public School	315 Osler Street
39	Child Care Centre	Carleton Village Early Learning Centre	315 Osler Street
40	School	General Nercer Public School	30 Turnberry Avenue
41	School	St. Mathews Catholic School	18 Lavender Road
42	Child Care Centre	St. Mathews B and A School	18 Lavender Road
43	Child Care Centre	Macaulay Child Development-Regent Street	48 Regent Street
44	School	Santa Maria School	25 Avon Avenue
45	School	Archbishop Romero School	99 Humber Boulevard
46	Child Care Centre	Romero Bears Child Care Centre	99 Humber Boulevard
47	Child Care Centre	Network Child Care Services-Just Kids Child Care Centre	1695 Keele Street
48	School	George Harvey Collegiate	1700 Keele Street
49	Child Care Centre	George Harvey Child Care Centre	1700 Keele Street
50	Child Care Centre	Macaulay Satellite School Age	1700 Keele Street
51	School	Keelesdale Junior Public School	200 Bicknell Avenue
52	Child Care Centre	Keelesdale Day Care Centre	200 Bicknell Avenue
53	School	York Memorial Collegiate	2690 Eglinton Avenue West
54	Child Care Centre	Silverthorn Day Care	2700 Eglinton Avenue West
55	School	Dennis Avenue Community School	17 Dennis Avenue
56	Child Care Centre	Under the Rainbow B and A School Care	92 Lambton Avenue
57	Child Care Centre	Hollis Resource Child Care Centre	71 Guestville Avenue
58	School	Our Lady of Victory School	70 Guestville Avenue
59	Child Care Centre	Super Kids Day Care Centre	1149 Weston Road
60	Child Care Centre	Hollis Child Care Centre	1 Hollis Street

Number Reference for Figures 4.2.1-2 – 4.2.1-8	Type of Facility	Name of Facility	Address
61	Child Care Centre	Trimbee Infant Resource Centre	30 Denarda Street
62	Child Care Centre	Pine Tree Nursery School Weston Road	1234 Weston Road
63	Child Care Centre	Awashishuck Day Care	1296 Weston Road
64	Child Care Centre	Y.B.O.C. Infant and Toddler Centre	116 Industry Street
65	School	Bala Avenue School	6 Bala Avenue
66	Child Care Centre	Jubilee Day Care Centre	55 Emmett Avenue
67	School	Portage Trail Community Junior and Middle School	100 Sidney Belsey Crescent
68	Child Care Centre	Prodigy Learning Centre	1545 Jane Street
69	Child Care Centre	Royal Day Care Centre	1737 Weston Road
70	Long Term Care Centre	Leisureworld-Lawrence Caregiving Centre	2005 Lawrence Avenue West
71	Child Care Centre	Weston Village Childcare Centre	69 William Street
72	School	C.R. Marchant Middle School	1 Ralph Street
73	School	GAP Academy	4 John Street
74	Child Care Centre	H.J. Alexander B and A School Program	30 King Street
75	School	H.J. Alexander Community School	30 King Street
76	Child Care Centre	St. John the Evangelist- Lunch & After School- Plasp	23 George Street
77	School	St. John the Evangelist School	23 George Street
78	Child Care Centre	Tender Loving Care (Cross)	44 Cross Street
79	School	School of Experiential Education	40 McCarthur Street
80	School	Don Bosco Catholic Secondary School	2 St Andrews Boulevard

4.2.2 Air Quality

The project area is an urban setting with point sources (light industrial), mobile sources (roadways, railways, and air transport) as well as a spectrum of miscellaneous area sources (residential and commercial space heating, etc.). In addition to local sources, there is an influx of pollutants via long range transport from other regions. While the air dispersion modelling component of this study is aimed at quantifying air quality impacts directly related to key existing sources in the study area (existing rail and road traffic) and the project, it is prudent to establish a set of baseline pollutant loadings in the local air shed with which emissions from the project can be compared and combined. These baseline loadings are treated as the “baseline condition” and are established using ambient air quality data collected at Environment Canada (EC) and Ontario Ministry of the Environment (MOE) air monitoring stations near the project area. Locations are depicted in **Figure 4.2.2-1** and listed by exact location and station numbers in **Table 4.2.2-1**.

Table 4.2.2-1 Summary of Ambient Monitoring Station locations near the project area

Label*	City	Location	MOE ID	NAPS ID**
1	Toronto Downtown	Bay/Wellesley St.	31103	N/A
2	Toronto West	125 Resources Rd.	35125	060430
3	Toronto	Ruskin & Perth St.	N/A	060418
4	Toronto	223 College St.	N/A	060427
5	Etobicoke West	Elmcrest Rd.	35003	060413
6	Etobicoke South	185 Judson St.	35033	060429
7	Brampton	525 Main St. N	46089	060428
8	Simcoe	Experimental Farm	22071	062601
9	Windsor West	College/South St.	12016	060211

*Refer to Figure 4.2.2-1.

**The National Air Pollution Surveillance (NAPS) Network is operated by EC.

It should be noted that annual average pollutant levels tend to vary from year to year due to changes in emissions sources, changes in activity levels and variations in meteorological conditions. For this reason, five years of ambient air data were examined for each pollutant in order to capture a year representing the most adverse conditions. Baseline levels, also referred to as background levels, were estimated using the 90th percentile of monitored values for each pollutant for their respective worst-case years. The 90th percentile value (the value below which 90% of all monitored data falls) provides conservative estimates of background levels based on historical data. The 90th percentile level is considered to be the maximum background level that is likely to coincide with worst-case contributions from the modelled sources in the study area. The complete list of background values is presented in **Table 4.2.2-2**. These values were used in conjunction with modeled worst-case concentrations to assess cumulative ambient concentrations for both the ‘future’ and ‘future no build’ scenarios.

Table 4.2.2-2 Summary of Background Levels Used in the Air Quality Assessment

Pollutant	90 th Percentile Background Level (µg/m ³)	Annual Average Background Level (µg/m ³)
PM _{2.5}	25.00	10.60
PM ₁₀	41.67	17.67
CO*	1555.5	1073.2
NO ₂ *	97.07	54.66
SO ₂ *	24.83	14.90
Benzene	2.80	1.40
1,3-Butadiene	0.40	0.20
Acrolein	0.164	0.087
Acetaldehyde	2.613	1.420
Formaldehyde	4.829	2.500
Benzo(a)pyrene	0	0

Note: *Background levels converted from ppm or ppb to µg/m³ assuming 10°C

Note that, by using background concentrations based on historical data, the study does not account for possible future changes in background levels in the airshed. The relevant contaminants have generally exhibited declining trends over the past 30 years in Southern Ontario, mainly due to declining tailpipe emissions from motor vehicles and reductions in industrial emissions. Reductions in these emissions are expected to continue, and future background levels in the study area are likely to show further declines. Therefore, the use historical data to represent the background levels is a conservative approach, as it tends to overestimate future background concentrations.

Respirable Particulate Matter (PM_{2.5}) and Inhalable Particulate Matter (PM₁₀)

Particulate matter with aerodynamic diameter less than 2.5 microns (PM_{2.5}) (also referred to as respirable particulate matter) was monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were tabulated for a five year period (2002-2006). In this study the PM_{2.5} background level with which 1-hr and 24-hr model results were combined was the maximum 90th percentile value across all five stations and all five years. The PM_{2.5} background level with which annual average model results were combined was the maximum annual average across all five stations and all five years.

Currently in Ontario, 24-hour average PM_{2.5} levels are compared with the Proposed National Standard of 30µg/m³, which will be adopted as a national standard in 2010. Like many regions in Ontario, the study area currently experiences 24-hour levels that surpass this value about 5% of the time (MOE 2007). For example, the number of daily concentrations over 30µg/m³ during 2005 ranged from 12 to 20 at the stations reporting PM_{2.5} levels. Elevated levels of PM_{2.5} in the study area were often associated with winds from the south-southwest. The 90th percentile level, however, which is the maximum level likely to coincide with the worst-case contribution from the modelled emission sources, remains below the standard.

Particulate matter with aerodynamic diameter less than 10 microns (PM_{10}) is often referred to as inhalable particulate matter. The PM_{10} values presented in **Table 4.2.2-2** were calculated from $PM_{2.5}$ concentrations ($PM_{10} = PM_{2.5}/0.6$) based on known size distribution, since the monitoring stations near the study area did not monitor for PM_{10} .

Carbon Monoxide (CO)

Ambient carbon monoxide (CO) levels were monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were tabulated for a five year period (2002-2006). Carbon monoxide is produced in the incomplete combustion of fossil fuels. In Ontario, the largest contribution to CO levels is from transportation sources (56 %) (MOE 2005a) and episodes of elevated ambient CO concentrations have been attributed to vehicular traffic. On an annual average basis, carbon monoxide levels in the study area were comparable to other urban centers in Ontario. Annual average CO levels ranged from 0.72 ppm to 0.32 ppm for the last 5 year period. On a longer time frame, CO levels in general have been declining over the past 25 years (MOE 2005a).

In this study the CO background level with which 1-hr and 24-hr model results were combined was the maximum 90th percentile value across all five stations and all five years. The CO background level with which annual average model results were combined was the maximum annual average across all five stations and all five years.

Nitrogen Dioxide (NO₂)

Ambient levels of nitrogen dioxide (NO₂) were monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were examined for a five year period (2002-2006). Annual average NO₂ levels in Ontario have been steadily decreasing over the past thirty years (MOE 2005a) and annual average NO₂ levels in the study area display a similar decrease in annual levels ranging from 26 ppb to 15 ppb across all stations. The hourly NO₂ criterion of 0.2 ppm was satisfied at all stations for the five year period. Elevated ambient NO₂ concentrations reflect the significant contribution of vehicular sources at the urban stations [2].

The NO₂ background level with which 1-hr and 24-hr model results were combined was the maximum 90th percentile value across all five stations and all five years. The NO₂ background level with which annual average model results were combined was the maximum annual average across all five stations and all five years.

Sulphur Dioxide (SO₂)

Ambient levels of sulphur dioxide (SO₂) were monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were tabulated for a five year period (2002-2006). Sulphur dioxide (SO₂) is mainly a product of industrial sources such as smelting and petrochemical processes. SO₂ can oxidize to form sulphuric aerosols and in combination with precipitation contributes to acid precipitation. Since legislation has limited the sulphur content of fuel, transportation sources have had a lesser impact on SO₂ levels. Annual average SO₂ levels ranged from 1.4 ppb to 5.4 ppb in the study area.

The SO₂ background level with which 1-hr and 24-hr model results were combined was the maximum 90th percentile value across all five stations and all five years. Modeled

annual average levels were combined with the maximum annual average level from all stations across the five year period.

Benzene

Ambient levels of benzene were monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were tabulated for a five year period (2002-2006).

Province wide declines in benzene levels have occurred partially through the implementation of legislation limiting the benzene content of gasoline; however, the predominant source of benzene remains motor vehicle operation. The background benzene level ($2.8\mu\text{g}/\text{m}^3$), with which 1-hr and 24-hr model results were combined was the maximum 90th percentile value across all five stations and all five years. Maximum annual average model predictions were combined with the highest annual average value from all stations for the five year period to produce a predicted cumulative concentration.

1,3 Butadiene

Ambient levels of 1,3-butadiene were monitored at five stations near the study area. For each of these stations, 90th percentile values as well as annual average values were tabulated for a five year period (2002-2006). To assess the combined effect of background and project sources, a background 1,3-butadiene level of $0.4\mu\text{g}/\text{m}^3$ was used to combine with annual average model results. This value was the maximum annual average across all five stations and all five years. For the hourly and 24 hour maximum modeled values, the corresponding maximum 90th percentile of all stations throughout the five year period was added.

Aldehydes

While other volatile organic compounds are monitored at stations within the study area, aldehydes (acrolein, acetaldehyde and formaldehyde in particular) have been monitored at a limited number of stations and no such measurements have been taken within the study area. The only stations that monitored aldehydes for multiple years were located in Simcoe and Windsor. While these stations are not near the project area, it has been found that levels of aldehydes are spatially similar and therefore these values will be representative of aldehydes in the study area (MOE 2005b, United States Environmental Protection Agency 2003). **Table 4.2.2-3** presents a summary of five years 90th percentile concentrations for aldehydes. The levels at the Windsor Station are influenced by the Detroit airshed and this limits its relevance to the study area, and the levels at the Simcoe station are representative of rural conditions, also limiting its relevance to the study area. Therefore, the average of these two stations was taken to be representative of aldehyde levels in the project area.

Table 4.2.2-3 Summary of 90th Percentile Ambient Monitoring Data for Acrolein, Acetaldehyde, and Formaldehyde ($\mu\text{g}/\text{m}^3$)

Pollutant	Location	2000	2001	2002	2003	2004	Average
Acrolein ($\mu\text{g}/\text{m}^3$)	Simcoe	0.096	0.193	0.109	0.077	--	0.119
	Windsor	0.219	0.207	0.156	0.284	0.133	0.199
Acetaldehyde ($\mu\text{g}/\text{m}^3$)	Simcoe	4.882	2.635	2.268	1.492	1.468	2.549
	Windsor	2.685	2.620	3.040	2.738	2.298	2.676
Formaldehyde ($\mu\text{g}/\text{m}^3$)	Simcoe	8.590	5.556	5.221	4.347	2.303	5.203
	Windsor	4.157	3.569	5.044	4.957	4.548	4.455

Note: The Simcoe and Windsor monitoring stations are the only two stations for which multiple recent years of data are available for aldehydes.

Benzo(a)pyrene (b(a)p)

None of the MOE or NAPS monitoring stations near the study area or beyond collect/report ambient benzo(a)pyrene (b(a)p) data. Further, reliable data for the study area could not be found in other data sources (e.g., academic papers). Therefore, data from other jurisdictions was sought to gain understanding of possible b(a)p background levels. Data for several locations in the United Kingdom (UK) indicated that b(a)p background levels tend to fall between 0.05×10^{-9} and $1.80 \times 10^{-9} \mu\text{g}/\text{m}^3$, where the upper bound was described to be an urban location with substantial solid fuel use (Energy Institute 2008). This data supports the approach taken in this study to treat ambient b(a)p levels as negligible. Further, it was found that the project impacts in terms of b(a)p are several orders of magnitude larger than the figures given in the UK study, meaning that adding a background concentration to the project impacts would have a negligible affect on the results reported in the air quality assessment completed for this study.

4.2.3 Noise and Vibration

As outlined in **Section 4.2.1**, land use along the Georgetown South Rail Corridor consists of developed/redeveloped residential and industrial/commercial areas.

Rail traffic along the corridor is a source of noise and vibration impacts. Specialists have assessed the anticipated noise and vibration levels within the corridor to compare a future with and without the Georgetown Service Expansion and Union-Pearson Rail Link. Please refer to **Sections 6.2.2** and **6.2.3** for information regarding the noise and vibration assessments.

Figure 4.2.3-1 provides a comparison of sound energy from the various rail vehicles that currently use and are anticipated to use the corridor.

It is important to note that this is an existing rail corridor and that commencement of operations in the rail corridor preceded the majority of the surrounding developments. Historically the rail traffic along this corridor was primarily freight trains. In 1967, CN shifted its freight traffic to a bypass line. There is only 1 CN per day using the Georgetown Line. Over time the corridor has developed to include more passenger trains than freight trains. As can be seen from **Figure 4.2.3-1**, freight trains (e.g. CP freight) result in greater sound energy than passenger trains (e.g. GO Train). As a result, in the past when freight trains were the dominate rail traffic the adjacent lands and buildings were subjected to greater noise and vibration levels than currently occurring along the corridor.

4.3 CULTURAL HERITAGE VALUES OR INTERESTS

Summary of Key Findings

The following findings are of particular note:

- The project has the potential to adversely affect cultural heritage landscapes and built heritage resources by displacement and/or disruption during construction. Mitigation measures and best management practices will be implemented towards addressing potential impacts. The principal impacts in the Georgetown South Service Expansion and Union-Pearson Rail Link Project are considered indirect.
- The Stage 1 Archaeological Assessment determined that the majority of the study corridor does not retain archaeological potential due to previous disturbances or excessive slope.
- The Stage 1 Assessment did identify some lands as having archaeological potential. The identified lands are located in three areas – between Bathurst Street and Strachan Avenue; to the east of the Humber River near Weston Road; and, within the Mimico Creek valley lands west of Goreway Drive. A Stage 2 Archaeological Assessment will be conducted on these lands prior to construction if it is determined that they are required for construction staging on construction access during detailed design.

4.3.1 Built Heritage and Cultural Heritage Landscapes

The rail corridor relates historically to the construction of the Grand Trunk Railway (GTR) from Toronto west to Sarnia. The GTR bought the Toronto & Guelph Railroad (T&G), which was under construction, and changed the original route of the T&G. The Toronto to Stratford section of the line with stations in the study area at Carleton, Weston and Malton was opened in 1856. The GTR was completed later in the same year between Toronto and Montreal. The western section was extended to Sarnia by 1859. The Toronto, Grey & Bruce Railway (TG&B), built in 1871, paralleled the Grand Trunk line from Union Station northwest through Carlton Village and Weston. The Grand Trunk through the Ontario & Quebec Railway purchased controlling interest in the TG&B and leased the line to the CP in August 1883 for 999 years. The Credit Valley Railway opened in 1879 and paralleled the Grand Trunk line from Parkdale to West Toronto.

Unterman McPhail Associates undertook a windshield survey of the study area in March 2009 to identify cultural heritage resources older than 40 years of age. The survey work concentrated on the rail corridor in the study area and, in particular, on grade separation structures and at-grade crossings of city streets. The *City of Toronto Inventory of Heritage Properties* was consulted as part of this background review. The Bathurst Street Bridge, King Street Rail Subway, Queen Street Rail Subway, Wallace Avenue Footbridge, Toronto Hydro Junction Substation at No. 30 Edwin Avenue, Viceroy Factory at No. 1655 Dupont Street and Holley House at No. 6 Humberview Crescent are listed heritage properties. In addition the Weston Heritage Conservation District is designated under Part V of the *Ontario Heritage Act* (see **Figure 4.3.1-1**). To date, no designated or listed properties within the study area have been identified within the City of Mississauga and City of Brampton.

Weston

Within the study corridor is the former historical settlement of the Village, and later Town, of Weston. Weston is recognized as an extant community within the City of Toronto and its historical, architectural and contextual value is commemorated through designation as a Heritage Conservation District under Part V of the *OHA* (see **Figure 4.3.1-1**).

Weston traces its Euro-Canadian history back to Lord Simcoe who deeded himself 1200 acres in the north part of the town including prime river lots in 1794. Benjamin Davis, a Butler's Ranger was granted land in 1796 on Lot 6 and 7, Concession 8. Initially Weston developed on the west side of the Humber River with industry associated with waterpower and milling. By 1840 the village community included over fifteen residences, two stores, one tavern, a blacksmith, saddler and cooperage shops. Successive Spring floods contributed to the village locating on the east side of the river.

Weston grew progressively from the mid-1840s onwards with the development of successful subdivision plans with the Weston Plan No. 5 in 1846 being the first. This plan resulted in the designation of "Albion", soon after known as the Weston Plank Road. Now identified as Weston Road, it became the principal commercial avenue in the village of Weston. The Weston Plank Road Company was formed in 1841 to build the plank road from Dundas Street to the village of Weston. The road was believed to have followed the original Humber Trail.

Plan 182 registered in 1856 showed the Grand Trunk Railway line passing through Weston. This new form of powered transportation was one of the factors that contributed to the demise of the Weston Plank Road Company.

The railway history of Ontario is a particularly rich theme and is very much part of Weston's history and the associated commercial success of the community. The Grand Trunk Railway (GTR) line passed through the village in 1856. The Toronto Bruce and Grey Railway (TG&BR) received its charter in 1869 in Weston. Prince Arthur, son of Queen Victoria turned the first sod for the construction of the railway in the village.

The first TG&BR train went into service in 1871 on narrow gauge rail, which was converted to standard gauge by 1883. The GTR became part of Canadian National Railway (CNR) and the TG&BR became part of Canadian Pacific Railway (CPR) in 1884.

Between the 1850s and 1900 Weston emerged as an important centre of settlement within the County of York. It comprised a successful commercial and service core complimented by institutional establishments such as churches and a post office. The association of the agricultural implement and service industry was still present in the community into the 1900s.

By 1910 the population of Weston had reached 1500 persons. The community would continue to grow as new homes filled the open lots in the plans of subdivision. Today, Weston maintains many fine residences and commercial buildings built during the various eras of development.

The Ontario Heritage Act

The *Ontario Heritage Act* gives the Ontario Ministry of Culture the responsibility for the conservation, protection and preservation of Ontario's culture heritage resources.

Section 2 of the *Ontario Heritage Act* (OHA) charges the Minister with the responsibility to,

“...determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario”

The Ministry of Culture describes heritage buildings and structures, cultural heritage landscapes and archaeological resources as cultural heritage resources. Since cultural heritage resources may be impacted adversely by both public and private land development, it is incumbent upon planning and approval authorities to consider heritage resources when making planning decisions. Heritage attributes, in relation to a property, are defined in the OHA as the attributes of the property that cause it to have cultural heritage value or interest.

Individual properties may be designated of cultural heritage value under Part IV of the OHA by a municipality or the Minister of Culture. In addition municipalities may designate Heritage Conservation Districts under Part V of the legislation. As laid out in subsections 27 (1) and 39.2 (1) of the OHA, the municipal clerk is required to keep a current register of properties of cultural heritage value or interest located in the municipality. The municipal register must include all properties designated under Parts IV and V of the OHA by the municipality or under Part IV by the Minister of Culture. Designation of heritage resources publicly recognizes and promotes awareness of heritage properties, provides a process for ensuring that changes to a heritage property are appropriately managed and that these changes respect the property's heritage value. This includes protection from demolition.

The alteration process under section 33 of the OHA helps to ensure the heritage attributes of a designated property, and therefore its heritage value, are conserved. If an owner of a designated property wishes to make alterations to the property that affects the property's heritage attributes, the owner must obtain written consent from the council. This applies not only to the alteration of the buildings or structures but also to alterations of other aspects of the designated property, such as landscape features or natural features, which have been identified as heritage attributes.

The OHA subsection 27(2) also allows a property that is not designated, but considered to be of cultural heritage interest or value by the municipal council, to be placed on the register. This is commonly referred to as “listing”. In many cases, listed (non-designated properties) are candidates for protection under section 29 of the OHA. Listing of non-designated properties does not offer any specific protection under the OHA.

Provincially owned heritage property is protected under Part III of the *Ontario Heritage Act* and is not subject to designation under Parts IV or V. Conservation standards and guidelines for the identification and protection of provincially owned heritage properties are under development and will apply to all provincial ministries and prescribed public bodies.

City of Toronto Inventory of Heritage Properties

The City of Toronto Inventory was started in 1973 and includes approximately 7,000 “Listed” or “Designated” properties. “Listed” properties are those for which City Council has adopted a recommendation to be included on the inventory. The recommendations are based on criteria that relate to architecture, history and neighbourhood context. Inclusion on the Inventory indicates that the City would like to see the heritage attributes

of these properties preserved. “Designated” properties are those protected under Part IV: Conservation of Properties of Cultural Heritage Value or Interest or Part V: Heritage Conservation Districts of the *Ontario Heritage Act*. They are also included on the Inventory and are identified by the municipal by-law number relating to the designation.

Identified Cultural Heritage Resources

Identified cultural heritage resources including cultural heritage landscapes (CHL) and built heritage resources (BHR) are listed in the **Table 6.3.1.1-1**. The table includes site number, resource category, resource type, location, description, photograph, and potential impacts and proposed mitigation. The following explanatory notes provide background material on the information contained in **Table 6.3.1.1-1**.

- Resources are identified by category: Cultural Heritage Landscape (CHL) or Built Heritage Resource (BHR) and by type: rail line, roadscape, settlement, golf course, bridge, industrial building, public works, residence, etc.
- The municipal address, when applicable, and project station numbers locate the identified cultural heritage resources. In addition, the identified cultural heritage resources are mapped on figures included in **Appendix G**.
- A brief description of the cultural heritage resource is provided developed from information gained from the public roadway, for example, notable landscape features, structures on the property, construction period(s), building materials, roof shape, number of storeys, important architectural details, architectural style or influence and alterations/additions. A preliminary identification of properties of known heritage value including resources listed in a local inventory or designated under the *Ontario Heritage Act* is provided.
- Digital photographs with caption taken from the public roadway are supplied for each resource.

4.3.2 Archaeological Features

Archaeological Services Inc. completed a Stage 1 Archaeological Assessment of the study corridor. The Stage 1 Archaeological Assessment was carried out in order to identify known and potential archaeological resources within the vicinity of the study corridor. The assessment was conducted in accordance with the Ontario Heritage Act and the Ontario Ministry of Culture's draft Standards and Guidelines for Consultant Archaeologists (Ministry of Culture 2006). A report documenting the findings of the assessment (Archaeological Services Inc. 2009) has been filed with the Ministry of Culture.

The Stage 1 Archaeological Assessment determined that the majority of the study corridor does not retain archaeological potential due to previous disturbances or excessive slope. As a result, additional archaeological assessment is not warranted on those lands and those portions of the corridor can be considered cleared of further archaeological concern.

The assessment did identify some lands as having archaeological potential. Those lands are identified in plans included in **Figures 4.3.2-1 to 4.3.2-3**. The identified lands are located in three areas - lands within the rail corridor adjacent to Fort York, the land around the Weston Golf and Country Club adjacent to the Humber River, and the Mimico Creek valley lands.

A Stage 2 Archaeological Assessment will be conducted on any of the lands identified as having archaeological potential that may be impacted by the project (please refer to **Section 6.3.2**) for additional details. If required, Stage 2 Archaeological Assessment work will be conducted as early as possible prior to construction. Timing for the completion of any Stage 2 Archaeological Assessment work will be subject to field conditions and property access. The proposed project will not impact Fort York, however, should the proposed project encroach upon undisturbed land with archaeological potential into the Fort York archaeologically sensitive area (ASA), a Stage 2 Archaeological Assessment will be conducted.

The Stage 1 Archaeological Assessment also identified the need to complete archaeological monitoring during any construction excavations along the rail corridor adjacent to Fort York (see **Figure 4.3.2-1**).

4.4 TRANSPORTATION

4.4.1 The Big Move

On November 28, 2008, the Metrolinx Board of Directors adopted the Regional Transportation Plan for the Greater Toronto and Hamilton Area (GTHA) called The Big Move. This Regional Transportation Plan (RTP) underwent extensive consultation since 2006, with the Federal, Provincial, and Municipal governments and the public, the RTP was designed to help resolve the existing and growing transportation congestion in the region. The RTP is intended to address future regional transportation demand in a sustainable and environmentally responsible manner. The 15 year rapid transit network of the RTP includes the Georgetown South Service Expansion and the Union-Pearson Rail Link. **Figure 4.4.1-1** shows the RTP's 15-year plan. A key objective of the RTP is to connect every urban growth centre in the GTHA with the regional rapid transit network.

Details of the 25 year plan are shown in **Figure 4.4.1-2**

4.4.2 Rail Infrastructure and Operations

The GO Georgetown South rail corridor is composed of 4 GO mainline tracks between Bathurst Street and the West Toronto Diamond, 1 GO and 2 CP mainline tracks between the West Toronto Diamond and the existing CP Mactier Sub spur (the proposed GO Bolton Line) and 1 GO mainline track between the CP Mactier Sub spur and the project limits (Toronto / Region of Peel) boundary.

Based on the existing Georgetown GO train schedule, considering train departures from Georgetown GO station, there are four trains arriving at Union station in the morning peak between 7:20 AM and 8:45 AM. In the outbound direction, there are four trains departing Union station destined to Georgetown GO station between 4:15 PM and 5:45 PM. The off peak services in the corridor are restricted to approximately one train every hour and a half between Union station and Bramalea GO station.

4.4.3 Road Infrastructure

The GO Georgetown South corridor extends from just west of Bathurst Street north westerly through the City of Toronto to the Peel/Toronto border just north of Highway 427 crossing a number of roadways.

The separate Union-Pearson Rail Link spur connects from the GO Transit corridor just south of Highway 427 into at Pearson Airport in the City of Mississauga

The rail corridor is crossed by freeways, arterial roads and local collector roads as listed in **Table 4.4.3-1**.

Figure 4.0-1 shows the study corridor in relation to the road network.

Table 4.4.3-1 Road Crossing the Rail Corridor

Road	Classification	Jurisdiction
Strachan Avenue	Collector – At grade Crossing	City of Toronto
King Street	Arterial	City of Toronto
Queen Street	Arterial	City of Toronto
Dufferin Street	Arterial	City of Toronto
Brock Street	Collector	City of Toronto
Lansdowne Avenue	Arterial	City of Toronto
Dundas Street West	Arterial	City of Toronto
Bloor Street	Arterial	City of Toronto
Wallace Avenue	Local collector – Pedestrian Bridge	City of Toronto
Rogers Road	Arterial	City of Toronto
Black Creek Drive	Arterial	City of Toronto
Eglinton Avenue	Arterial	City of Toronto
Ray Avenue	Local collector	City of Toronto
Jane Street	Arterial	City of Toronto
Denison Road	Local collector – At grade crossing	City of Toronto
Lawrence Avenue	Arterial	City of Toronto
John Street	Local collector – At grade crossing	City of Toronto
King Street	Local collector – At grade crossing	City of Toronto
Church Street	Local collector – At grade crossing	City of Toronto
Weston Road	Arterial	City of Toronto
Islington Avenue	Arterial	City of Toronto
Highway 401	Freeway	MTO
Kipling Avenue	Arterial	City of Toronto
Martin Grove Road	Arterial	City of Toronto
Highway 27	Arterial	City of Toronto
Carlingview Drive	Local collector – At grade crossing	City of Toronto
Highway 427	Freeway	MTO
Goreway Drive	Arterial	City of Mississauga

4.4.4 Existing Transit Services

Bus transit services are provided to all the GO stations in the corridor by the TTC. **Table 4.4.4-1** provides a summary of TTC (transit and streetcar) services at Etobicoke North GO station, Weston GO station and Bloor GO station. In addition, Dundas West subway station on the Bloor-Danforth Subway line is adjacent to Bloor GO station.

Table 4.4.4-1 Summary of TTC Services at GO Stations in the Corridor

Station	Route No.	Route Name	Number of Buses Operating During the AM Peak Hour (7:00 – 8:00)	Number of Buses Operating During the PM Peak Hour (4:00 – 5:00)
Etobicoke North GO Station	37A	Islington	2	4
	45	Kipling	3	6
	45E	Kipling	13	6
Weston GO Station	52	Lawrence West	11	8
	58A	Malton	6	5
	58B	Malton	2	3
	59B	Maple Leaf	3	1
	79	Scarlett Road	6	5
	79B	Scarlett Road	6	4
	89	Weston	10	7
Bloor GO Station	40	Junction	7	8
	168	Symington	10	8
	504	King (Streetcar)	25	18
	505	Dundas (Streetcar)	11	11

Mississauga Transit also provides services to Pearson Airport. Additionally at Pearson Airport, Airport Express Services, Greyhound Bus services, Coach Canada Bus services and other private bus operators also provide services to the airport.

GO Transit bus service provides services at, Etobicoke North GO station and Pearson Airport. For the most part, bus schedules are integrated with the rail schedules to reduce wait time.

The extent of services provided to Pearson Airport by GO Transit, Mississauga Transit and TTC are relatively modest and focused on employee demand rather than passenger and well wisher demand. Services by Pacific Western (Airport Express) are targeted to the Pearson Airport passenger demand between the Airport and the central area of Toronto. **Table 4.4.4-2** summarizes the existing transit services to the airport.

Table 4.4.4-2 Summary of Existing Transit Services to the Airport

Operator	Route No.	Route Name	Number of Buses Operating During the AM Peak Hour (7:00 – 8:00)	Number of Buses Operating During the PM Peak Hour (4:00 – 5:00)
TTC	58A	Malton	6	5
TTC	192	Airport Rocket	4	5
TTC	112C	West Mall	4	4
Mississauga Transit	7	Airport	3	3
Mississauga Transit	18	Northwest Explorer	3	3
Mississauga Transit	57	Courtney Park	2	2
GO Transit	34	Brampton Local	1	2
GO Transit	40	Square One – Pearson Airport	2	2
Pacific Western	n/a	Airport Express	2	2

An integrated transit map showing services by the TTC, GO Transit and Mississauga Transit is shown in **Figure 4.4.4-1**. It should be noted that Coach Canada, Greyhound and other private operators providing service to the airport are not shown in the plan.

4.4.5 Park and Ride

Existing Park and Ride lots at the following stations will be incorporated into the design:

- Weston GO Station – existing parking provision is 110 parking spaces.
- Etobicoke North GO Station (improvements to existing park and ride facilities and the shifting of the proposed new station nearer to the parking provision) – existing parking provision is 530 parking spaces.

The new Weston GO Station location will provide space for approximately 400 parking spaces. The current parking spaces leased from a City of Toronto Parking Lot will no longer be required and will become available for local business uses.

4.4.6 Bicycle Plans

As part of The Big Move, Metrolinx will work with municipalities in the GTHA to develop a more integrated walking and cycle network that is safe and convenient. **Figure 4.2.1-8** shows the City of Toronto's Toronto Bike Plan which shows the existing and proposed bike network in relation to the Georgetown South rail corridor. The Bike Plan also includes the West Toronto Railpath – this is a multi-use pathway intended to provide a connection from Toronto's Junction neighbourhood to downtown Toronto. The north portion of the path from Caribou Avenue to Dundas Street West is currently under construction and opportunities to continue the path southwards towards Union Station are under review subject to property availability in the southern portion of the corridor.

4.4.7 Other Transit Initiatives

Transit City

Transit City is an initiative by the Toronto Transit Commission (TTC) that will introduce seven new Light Rail Transit (LRT) lines to many Toronto neighborhoods. It is designed to provide new direct high quality transit links to areas that are currently far removed from rapid transit, including north, west, and eastern areas of Toronto. This initiative has received endorsement from the TTC, City of Toronto and the Government of Ontario. The projects identified in Transit City were incorporated into the Metrolinx RTP.

All of the seven routes have been chosen to connect with existing TTC subway system, GO rail stations, other Transit City routes, and planned rapid transit lines in the regions of Durham, York and Peel. The Government of Ontario has recently announced funding for the construction of four of the lines: Eglinton Crosstown LRT, Etobicoke – Finch West LRT, Scarborough LRT and Sheppard East LRT.

Three of the proposed lines are likely to interact with the GO Georgetown South corridor:

- Eglinton Crosstown LRT – this is a 31 km line linking Kennedy Station in the east with the airport and Mississauga Transitway in the west.
- Etobicoke – Finch West LRT – this 18 km route will connect Finch Station with north Etobicoke; provide direct service to Humber College and could be extended to Mississauga, the Woodbine race track or Pearson International Airport.
- Jane LRT – 17 km route which will stretch from Jane Street from the Bloor-Danforth subway to the new Steeles West Station on the Spadina Subway and potentially further into York Region.

The Eglinton LRT and the Finch West LRT have recently received capital funding from the Province of Ontario and will be in operation within the next 5 to 10 years

Further information on the Transit City projects can be obtained from the TTC website (www.ttc.ca).

Mississauga BRT

The Mississauga Bus Rapid Transit (BRT) project is a rapid transit corridor running east-west across Mississauga and will connect into the Airport Area and with the proposed Eglinton LRT in the vicinity of a possible Renforth gateway. The BRT will support all-station stop and extensive express bus service for thousands of riders per day, making it faster and easier to travel to, from and through Mississauga and the GTA.

Figure 4.4.7-1 Mississauga BRT



The following are key components of the Mississauga BRT project.

- A fully grade-separated, two-lane bus-only roadway between Rathburn Road and Renforth Drive in the City of Mississauga;
- On-line BRT stations at major north-south crossing roads as shown above,;
- Construction of Park and Ride lots (approximately 200-spaces each) at the proposed Cawthra, Tomken and Dixie BRT stations;
- Grade separations at all road and water crossings by the busway link between Rathburn Road and Renforth Drive.
- Coordination with existing bicycle and pedestrian provisions in the arterial corridors.

Renforth Station Development

Metrolinx, the Ontario Ministry of Transportation,(MTO), the Greater Toronto Airport Authority (GTAA), GO Transit, Toronto, and Mississauga have all been involved in developing various plans for both interim and long-term transit plans for the entire Renforth / 427 / 401 / Airport area. The currently proposed site and layout of the Renforth station will continue to evolve as the Highway 427 / 401 interchange reconfiguration; Eglinton Avenue LRT; Pearson International Airport transit access study; and adjacent office development proposals progress Metrolinx will be involved in coordinating various aspects of those studies. The key to the Renforth Station effectiveness will be its accessibility to and from all roads, transit, LRT, and HOV facilities in all directions.

At the present time, the location and design details of the Renforth Station facility is subject to consultation with all the stakeholders and a final decision awaits the results of these discussions and consultations.

4.5 UTILITIES

As part of the Environmental Assessment (EA) study for the GO Georgetown South Expansion and Union-Pearson Rail Link an inventory of existing utilities located along the corridor was compiled. Each utility company with known plant in the area provided drawings showing approximate locations of their plant along the corridor. It should be noted that utilities in the area of the West Toronto Diamond and Dufferin Street are not being reviewed as relocations in this area are being done under a separate project.

There are numerous utilities located along the rail corridor. The majority of these utilities are local distribution utilities which cross the existing corridor providing services to residential neighborhoods and commercial and industrial areas on both sides of the rail right-of-way. These utilities typically traverse the corridor at the existing road crossings; however, there are some utilities located in between the crossing roads. There are also longer distance transmission pipelines and hydro lines which cross the existing rail corridor.

The following is a brief description of the existing utilities located within the study area. Storm sewers are described separately in Section 4.1.3.

4.5.1 Pipelines

There are six existing pipelines (with four owners) crossing the existing rail right-of-way in the existing hydro corridor at approximately Mile 11.2, just west of Kipling Avenue. These pipelines are:

- Sun-Canadian Pipe Line Company Ltd.: 300mm & 200mm diameter oil pipelines.
- Imperial Oil – Sarnia Products Pipeline: 300mm & 200mm diameter high pressure oil pipelines.
- Trans-Northern Pipelines: 273mm diameter high pressure petroleum products pipeline.
- Enbridge Pipelines: 763mm diameter high pressure crude oil pipeline.

Table 4.5.1-1 summarizes National Energy Board (NEB) applicability and requirements related to any relocation work which may be necessary as part of the proposed additional tracks.

Table 4.5.1-1: Summary of Agreement Requirements

Pipeline	Pipeline Category/ NEB Regulation	Agreement Requirements	
		Crossing	Relocation (with mutually acceptable design and cost sharing solution)
Sun-Canadian Pipe Line Company Ltd.	Provincial: OEB regulated	All crossings and relocations would only require an agreement from Sun-Canadian Pipe Line Company Limited.	
Imperial Oil – Sarnia Products Pipeline	Provincial: OEB regulated	All crossings and relocations would only require an agreement from Imperial Oil.	
Trans-Northern	Interprovincial:	Crossing agreement	NEB approvals may be

Pipeline	Pipeline Category/ NEB Regulation	Agreement Requirements	
		Crossing	Relocation (with mutually acceptable design and cost sharing solution)
Pipelines	NEB regulated	would be required from Trans-Northern Pipelines for any new facilities.	required for relocations, lowering or extension of existing protection. ¹
Enbridge Pipelines	Interprovincial: NEB regulated	Crossing agreement would be required from Enbridge Pipelines for any new facilities.	NEB approvals may be required for relocations, lowering or extension of existing protection. ¹

¹ Note: relocation, lowering and extension of the existing protection will not be required for the proposed work. As a result, NEB approval is not required.

4.5.2 Watermains

The City of Toronto and Region of Peel both have watermains located within the study area. City of Toronto watermains vary from 150mm to 1500mm in diameter and most intersect the rail corridor at existing road crossings. City of Toronto watermains also traverse the rail corridor away from existing road crossings at the hydro corridor west of Kipling Avenue (1500mm dia.), south of Eglinton Avenue (1050mm dia.), Nashville Avenue (300mm dia.), Humberside Avenue (1350mm dia.), Wyndham Street (900mm dia.) and Earnbridge Street (500mm dia.). The Region of Peel maintains a 400mm diameter watermain along Goreway Drive.

4.5.3 Sanitary Sewers

The City of Toronto and Region of Peel both have sanitary sewers located within the study area. The City of Toronto also maintains numerous combined sewers within the study area. City of Toronto sanitary sewers vary from 200mm to 2100mm in diameter and most intersect the rail corridor at existing road crossings. Combined sewers vary from 450mm to 2700mm in diameter and include the 3000mm x 3000mm sewer which runs south along Strachan Avenue from north of King Street to south of the Oakville Subdivision rail corridor. City of Toronto sanitary and combined sewers also traverse the rail corridor away from existing road crossings at the Humber River (750mm & 1650mm dia. Sanitary), south of Lawrence Avenue (1200mm dia. Combined), Wright Avenue (450mm dia. Combined), Black Creek (450mm & 1350mm dia. Sanitary), Lavender Road (1950mm dia. Combined), Jerome Street/Ruskin Avenue (1200mm dia. Combined), Wallace Avenue (2700mm dia. Combined) and just east of Brock Avenue (450mm dia. Combined). The Region of Peel maintains a 1220mm diameter sanitary sewer which crosses the rail corridor just west of the Mimico Creek structure.

4.5.4 Hydro One Transmission Corridors

Hydro One high voltage transmission corridors cross the Weston Subdivision at four separate locations. There is a 115 Kva underground pipe type plant crossing the existing rail corridor just east of Strachan Avenue at Tecumseth Street. High tension powerlines cross the Weston Subdivision between St. Clair Avenue and Rogers Road (approximately Mile 5.6), at Kipling Avenue (approximately Mile 11.2) and between Martin Grove Road and Highway 27 (approximately Mile 12.2).

4.5.5 Hydro Distribution Lines

Toronto Hydro is the main hydro supplier within the City of Toronto and has significant aerial and buried plant located within the study area. Most of the Toronto Hydro plant intersects the rail corridor at existing road crossings. Toronto Hydro also maintains a pole line along the west side of Carlingview Drive which continues along the rail corridor west of Carlingview Avenue and connects to Enersource plant at Highway 427.

Enersource (Hydro Mississauga) is the main hydro supplier within the City of Mississauga. Enersource has an existing pole line along the west side of Goreway Drive. Enersource also maintains a connection to Toronto Hydro along the north side of the rail corridor within the study area, west of Highway 427.

4.5.6 Gas Mains

Enbridge Gas maintains numerous gas mains located within the study area. The gas mains vary from 50mm to 750mm in diameter and most intersect the rail corridor at existing road crossings. Enbridge gas mains also traverse the rail corridor away from existing road crossings at Lavender Road (750mm dia.), Jerome Street/Ruskin Avenue (300mm dia.), St. Clarens Avenue (150mm dia.), and Lisgar Street/Jefferson Avenue (300mm dia.).

4.5.7 Bell Canada

Bell Canada maintains aerial cable, buried cable and duct structures within the study area. Aerial cables exist on Northwest Drive. All existing Bell plant intersects the rail corridor at existing road crossings.

4.5.8 Rogers Cable

Rogers Cable maintains aerial and buried fibre optic TV plant and aerial and buried coaxial TV plant within the study area. With the exception of Wallace Avenue (buried fibre), all existing Rogers Cable plant intersects the rail corridor at existing road crossings. At the rail crossings all plant is buried.

4.5.9 MTS Allstream

MTS Allstream maintains aerial and underground fibre optic plant within the study area. There is existing buried conduit crossing the rail corridor at Goreway Drive, Highway 401, Ray Avenue and between Strachan Avenue and Tecumseth Street. MTS Allstream

also maintains aerial plant along the north side of the rail corridor west of Highway 427 and buried plant along the north side of the rail corridor from just west of Strachan Avenue to Bathurst Street.

4.5.10 Public Service Network

Public Service Network (PSN) maintains an aerial plant at Goreway Drive and Northwest Drive.

4.5.11 Utilities Parallel to the Rail Corridor

Utilities are also located within the existing rail corridor running parallel to the existing track alignment. These utilities include CN/CP signals and communications cable and fibre optic cable maintained by various communications companies including 360 Networks, Leducor Communications and Rogers Communications (formerly Sprint Canada). The signals and communications cables provide power, signal control, wayside communications and telecommunications for railway operations. The fibre optic cable is utilized by a variety of services such as cable, banking, national defence, air-traffic control and emergency communications.

4.6 NAVIGABILITY

Transport Canada's Navigable Water Protection Office has indicated that for the purposes of the *Navigable Waters Protection Act* the Humber River is the only navigable waterway crossed by the project (Transport Canada, 2009). As a result, for the purposes of this study, allowances for navigation under the proposed crossings at the Black Creek and Mimico Creek are not necessary and approvals under the *Navigable Waters Protection Act* are not required for those crossings.

Tab 5: 5.0 Recommended Transit Project

→ Insert **Tab 5 → 5.0 Recommended Transit Project**

5.0 RECOMMENDED TRANSIT PROJECT

5.1 ALTERNATIVE METHODS CONSIDERED

5.1.1 Evaluation Process

Alternative methods are typically defined as 'different ways of doing the same activity'. These tend to be design alternatives.

For the purpose of this project the design alternatives focused at road crossing as the project is designed within an existing rail corridor and there are few opportunities for alignment alternatives. Typically the approach taken to the project was to site the required tracks within the existing rail corridor to minimize property requirements.

There are a number of existing at-grade road crossings in the corridor. Because of the increase in the number of train movements projected for the corridor in the future, these existing crossings either have to be closed or grade-separated for both safety reasons and traffic delay impacts on the crossing roads.

Specific design alternatives to the vertical profile were considered for the crossing streets at-grade crossings at:

- Strachan Avenue – **Section 5.1.2**
- Denison Road East - **Section 5.1.3**
- Weston (including John Street, King Street and Church Street) – **Section 5.1.4**
- Carlingview Drive – **Section 5.1.5**

In addition to the vertical profile alternatives for the main GO corridor:

- Alignment alternatives into the airport for the Union–Pearson rail service were examined- **Section 5.1.6**.

5.1.2 Strachan Avenue

Strachan Avenue is a north-south City of Toronto collector road running from Lake Shore Blvd W in the south and Queen Street West to the north.

The Strachan Avenue intersections with King Street and Fleet Street each have traffic signal control. Currently there is no traffic control between King Street and Fleet Street; however there are a number of intersections with stop control on the crossing roads. A traffic signal is planned for the East Liberty Street intersection. There are two properties with driveway access onto Strachan Avenue, one on the east side just north of the rail corridor and one on the west side just south of East Liberty Street. The remaining properties in this area have driveway access from the east-west intersecting roads. It should be noted that there is also a proposed development along the west side of Strachan Avenue, south of the rail corridor. Locations of access points for these developments should be coordinated with developers and the City of Toronto as detailed design of the preferred option progresses. There are existing sidewalks and bike lanes along Strachan Avenue within the project limits.

Several alternatives were developed for the grade separation at Strachan Avenue.

The closure of Strachan Avenue between Wellington Street and East Liberty Street was also briefly considered. Due to the lack of north/south access routes across the GO Georgetown Corridor, Strachan Avenue is considered an important connection serving the western portion of downtown Toronto. Average traffic volumes on Strachan Avenue at Wellington Street are approximately 15,500 vehicles per day. Closure of Strachan Avenue would result in this traffic diverting to Bathurst Street and Dufferin Street. These alternative routes are not only very busy but are also a significant distance away from Strachan Avenue resulting in significant out-of-way travel for the diverted traffic over already congested routes such as King Street. This closure alternative was eliminated from further consideration.

With the elimination of at-grade and closure based alternatives for Strachan Avenue, several alternatives were developed to provide a grade separated crossing for Strachan Avenue.

Alternative A – Raise Strachan Avenue 3 metres and cross over the rail corridor which is lowered by approximately 7 metres. (similar to the original City of Toronto proposal)

This alternative (**Figure 5.1.2-1**) minimizes the height of the Strachan Avenue structure, maintains access to all crossing roads from Strachan Avenue but maximizes the depth of the rail excavation

Corridor Requirements

The rail corridor would be lowered to go under a new Strachan Avenue structure. However, to minimize visual impacts of Strachan Avenue structure, the rail corridor would be lowered to a depth of approximately 7 metres at the Strachan Avenue. The track bed would continue below grade to the east at a grade of 0.2% to tie back into the existing corridor just west of Bathurst Street. For this alternative a single span structure is assumed resulting in the center pier being eliminated. As a result additional property along the rail corridor is no longer required. The Strachan Avenue structure is deeper requiring additional excavation and retaining walls.

To achieve the 7.4 metre clearance to not preclude future electrification, the alternative raises Strachan Avenue on a 3.5% grade from just south of East Liberty Street/Ordinance Street to cross over the Weston Subdivision rail corridor approximately 3 metres above existing grade. The roadway would then descend at a 4.4% grade to just north of Wellington Street/Douro Street. Retaining walls will be used to raise Strachan Avenue and minimize property impacts. Connections to all crossing roads will be maintained.

This alternative is also likely to have the following impacts:

- The design speed of Strachan Avenue would be 60 km/h.
- The intersection of Strachan Avenue with Wellington Street/Douro Street will be raised by approximately 0.7 metre. This will require minor re-grading of the driveway on the north side of Douro Street just east of Strachan Avenue.
- The intersection of Strachan Avenue with East Liberty Street/Ordinance Street will be raised by approximately 1.8 metres. This results in the intersection of East Liberty Street and Western Battery Road being raised by approximately 0.8 metre. Access

to the western driveway at the City of Toronto building at the southeast corner of the intersection with Ordinance Street would also be closed as a result of the profile raise on Ordinance Street.

- Parking at the front 45 Strachan Avenue would be eliminated; however, access would still be available to the main parking lot at the rear of the building.
- Driveway access from Strachan Avenue to the property at the southeast corner of the intersection with Wellington Street could not be maintained. Alternative access is provided from Wellington Street at the east end of the property.
- There would be some visual impacts as a result of raising Strachan Avenue at the rail corridor.
- Construction of the lowered rail corridor may require closure of Strachan Avenue at the rail corridor during construction.
- Cost of the excavation and retaining walls for the below-grade rail corridor is likely to be high.
- Lowering of the rail corridor would have significant impacts on existing utilities especially the existing 3.0 x 3.0 metre sewer.

Structure Requirements

As a result of this alternative, a structure will be required for the roadway overpass at Strachan Avenue.

Alternative B – Raise Strachan Avenue 8 metres and cross over the rail corridor lowered by approximately 2 metres.

This alternative (**Figure 5.1.2-2**) minimizes the excavation and piling required for the below-grade portion of the rail corridor.

Corridor Requirements

This alternative lowers the existing track bed profile from east of the King Street overpass at a maximum 2% grade to a depth of approximately 2 metres at a new Strachan Avenue structure. Retaining walls will be used lower the rail corridor below grade and minimize property impacts. The track bed will continue below grade to the east at a grade of 0.6% to tie back into the existing corridor just west of Bathurst Street. A single span structure is assumed as in Alternative B.

To achieve the 7.4 metre clearance to not preclude future electrification, the alternative proposes raising Strachan Avenue on a 6.0% grade from just north of the Oakville Subdivision rail corridor to cross over the Weston Subdivision rail corridor approximately 11 metres above existing grade. The roadway would then descend at a 6.0% grade, crossing over Wellington Street/Douro Street approximately 6.2 metres above existing grade, and tie into the existing roadway just north of Cannif Street. Retaining walls will be used to raise Strachan Avenue and minimize property impacts. The roadway connection between Strachan Avenue and Wellington Street/Douro Street would be eliminated. A new structure would be constructed to maintain the connection between Wellington Street and Douro Street.

This alternative is likely to have the following impacts:

- The design speed of Strachan Avenue would be 50 km/h.

- Significant traffic impact due to the elimination of the connections between Strachan Avenue and Wellington Douro Street. Traffic would divert to Canniff Street to connect to Wellington Street and Douro Street. Trucks going to Quality Meats would have to use King Street and local streets, rather than using Wellington Street as an alternate access. Canniff Street is a local residential street and not designed for large semi-trailers.
- The intersection of Strachan Avenue with Canniff Street will be raised by approximately 0.5 metre. This will require re-grading of the driveways on the north side of Douro Street just east and west of Strachan Avenue.
- To maintain the minimum 4.85 metre clearance (post tension structure assumed) Wellington Street and Douro Street would be lowered by approximately 0.5 metres at the Strachan Avenue overpass. This will require minor re-grading of the driveway on the north side of Douro Street just east of Strachan Avenue.
- The intersection of Strachan Avenue with East Liberty Street/Ordinance Street will be raised by approximately 2.8 metres. This results in the intersection of East Liberty Street and Western Battery Road being raised by approximately 1.6 metres. Access to the two western driveways at the City of Toronto building at the southeast corner of the intersection with Ordinance Street would also be closed as a result of the profile raise on Ordinance Street.
- Parking at the front 45 Strachan Avenue would be eliminated; however, access would still be available to the main parking lot at the rear of the building. Minor re-grading of the driveway to the parking lot at the rear of the building would be required.
- Driveway access from Strachan Avenue to the property at the southeast corner of the intersection with Wellington Street could not be maintained. Alternative access is provided from Wellington Street at the east end of the property.
- There would be visual impacts as a result of raising Strachan Avenue at the rail corridor would be very noticeable.
- Placement of the retaining wall in close proximity to the townhouses on the west side of Strachan Avenue may result in legal action.
- Construction of the lowered rail corridor may require closure of Strachan Avenue at the rail corridor during construction.
- Cost of the excavation and retaining walls for the below-grade rail corridor would be significantly less.
- Lowering of the rail corridor would have significant impacts on existing utilities; however preliminary investigations show that existing 3.0 x 3.0 metre sewer would not require relocation. This would require the new structure to be designed around the existing sewer possibly complicating construction and increasing costs.

Structure Requirements

In addition to the structure required for the roadway overpass at Strachan Avenue, a second structure will be required to cross Strachan Avenue over Wellington Street/Douro Street.

Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor

This alternatives **Figure 5.1.3-3** eliminates grade changes along the rail corridor by having Strachan Avenue cross under the rail corridor.

Corridor Requirements

This alternative realigns Strachan Avenue to the east to cross below to existing rail corridor to meet Wellington Street at Stanley Terrace. To achieve the 7.4 metre clearance to not preclude future electrification, the alternative proposes lowering Strachan Avenue on a 6.0% grade from just north of the Oakville Subdivision rail corridor to cross over the Weston Subdivision rail corridor approximately 8.6 metres below existing grade. The roadway would then climb at a 6.0% grade to Wellington Street. Retaining walls will be used to lower Strachan Avenue and minimize property impacts. All existing road connections would be maintained. This alternative has no impacts on rail operations.

This alternative is likely to have the following impacts:

- The design speed of Strachan Avenue would be 50 km/h.
- Property will be required on both sides of the rail corridor.
- Wellington Street would have to be lowered by 4.0 metres at the new intersection with Strachan Avenue. The intersection of Wellington Street and Stafford Street would be lowered by approximately 2.5 metres. This would require the closure of the driveway at 21 Canniff Street as the connection to Wellington Avenue could not be maintained.
- The intersection of Strachan Avenue with East Liberty Street/Ordinance Street will be lowered by approximately 1.8 metres. In order to connect with Strachan Avenue, the grade on East Liberty Street would have to be increased to 7.0%.
- The intersection of East Liberty Street and Western Battery Road would be lowered by approximately 1.4 metres. However, due to the existing grade on Western Battery Road of 6%, it would not be possible to maintain the connection to East Liberty Street without eliminating access to driveways on Western Battery Road.
- Access to the two western driveways at the City of Toronto building at the southeast corner of the intersection with Ordinance Street would be closed as a result of the profile lowering on Ordinance Street.
- Driveway access from Wellington Street to the property at the southeast corner of the intersection with existing Strachan Avenue could not be maintained. Alternative access is provided from Strachan Avenue at the west end of the property.
- Visual impacts as a result of raising Strachan Avenue at the rail corridor would be eliminated.
- Strachan Avenue could be kept open during construction.
- Cost of the excavation and retaining walls for the below-grade roadway would be less.
- There would be no impact to the existing 3.0 x 3.0 metre sewer.

The option of lowering Strachan Avenue to cross under the rail corridor within the existing right-of-way was reviewed. This option would have similar impacts as noted above but would also eliminate the connection between Strachan Avenue and Wellington Street/Douro Street and Canniff Street. As a result this option was not developed beyond a conceptual level.

Alternative D – Raise Strachan Avenue 4 metres and cross over the rail corridor lowered by approximately 5 metres

This alternative raises Strachan Avenue and lowers the track bed profile, shown in **Figure 5.1.2-4**. This alternative minimizes the depth of excavation for the lowered rail corridor Avenue while still maintaining access to all crossing roads from Strachan Avenue.

Corridor Requirements

The alternative lowers the existing track bed profile from east of the King Street overpass at a maximum 2% grade to a depth of approximately 5 metres at a new Strachan Avenue structure. Retaining walls will be used to lower the rail corridor below grade and minimize property impacts. The track bed will continue below grade to the east at a grade of 0.1% to tie back into the existing corridor just west of Bathurst Street. The additional length of the corridor below-grade is required to maintain the required interlocking between the tracks on approach to and leaving Union Station. In order to bring the rail corridor back to grade sooner would require additional vertical curves. Because rail switches cannot be located on a vertical curve there would not be sufficient space for the required switch gear. To minimize the Strachan overpass structure depth, a pier is required within the rail corridor.

To achieve the 7.4 metre clearance to not preclude electrification, this alternative proposes raising Strachan Avenue on a 4% grade from just north of the Oakville Subdivision rail corridor to cross over the Weston Subdivision rail corridor approximately 4 metres above existing grade. The roadway would then descend at a 6% grade to just north of Wellington Street/Douro Street. Retaining walls will be used to raise Strachan Avenue and minimize property impacts. Connections to all crossing roads will be maintained.

This alternative is also likely to have the following impacts:

- The design speed of Strachan Avenue would be 50 km/h to minimize impacts to the intersections along Strachan Avenue while maximizing the elevation of the roadway at the rail corridor. It is City of Toronto policy to post speeds on roads with bike lanes no higher than 40 km/h; therefore, the reduced design speed should not be an issue.
- The intersection of Strachan Avenue with Wellington Street/Douro Street will be raised by approximately 1.0 metre. This will require re-grading of the driveway on the north side of Douro Street just east of Strachan Avenue.
- The intersection of Strachan Avenue with East Liberty Street/Ordinance Street will be raised by approximately 2.0 metres. This results in the intersection of East Liberty Street and Western Battery Road being raised by approximately 1.0 metre. Access to the western driveway at the City of Toronto building at the southeast corner of the intersection with Ordinance Street would also be closed as a result of the profile raise on Ordinance Street.

- Parking at the front of 45 Strachan Avenue would be eliminated; however, access would still be available to the main parking lot at the rear of the building.
- Driveway access from Strachan Avenue to the property at the southeast corner of the intersection with Wellington Street could not be maintained. Alternative access is provided from Wellington Street at the east end of the property.
- Visual impacts as a result of raising Strachan Avenue at the rail corridor would be similar to Alternative A and overall much better than Alternative B.
- Construction of the lowered rail corridor may require closure of Strachan Avenue at the rail corridor during construction.
- Cost of the excavation and retaining walls for the below-grade rail corridor is likely to be high.
- Lowering of the rail corridor will have significant impacts on existing utilities especially the existing 3.0 x 3.0 metre sewer.

Structure Requirements

As a result of this alternative, structural undertaking will be required for the roadway overpass at Strachan Avenue.

Impact Assessment of Alternatives

Alternatives were assessed against a set of qualitative criteria to identify a preferred. Factors, and associated criteria, included natural environment, social environment, land use, transportation and economic environment. The results of this analysis and evaluation are summarized in the following tables.

Table 5.1.2-1 Analysis of Corridor Alternatives – Strachan Avenue Alternatives

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor.	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
Transportation				
Effect on surrounding land use on accessibility	Driveway on Ordnance Street and driveway on Strachan Avenue will be closed. Will require re- grading on Wellington Street/Douro Street, East Liberty Street/Ordnance Street and Western Battery Road with impacts on access to building fronts/sidewalks and one driveway on Douro Street. Grade on Strachan Avenue improved for bikers and pedestrians.	Driveways on Ordnance Street and driveway on Strachan Avenue will be closed. Will require re- grading on Canniff Street, Wellington Street/Douro Street, East Liberty Street/Ordnance Street and Western Battery Road with impacts on access to building fronts/sidewalks and driveways on Canniff Street, Douro Street and Ordnance Street. Extended steep grades on Strachan Avenue not favorable for bikers and pedestrians.	Driveways on Ordnance Street and Western Battery Road and driveway on Wellington Street will be closed. Will require re- grading on Wellington Street, East Liberty Street/Ordnance Street and Western Battery Road with impacts on access to building fronts/sidewalks and driveways on Ordnance Street. Extended steep grades on Strachan Avenue not favorable for bikers and pedestrians.	Driveway on Ordnance Street and driveway on Strachan Avenue will be closed. Will require re- grading on Wellington Street/Douro Street, East Liberty Street/Ordnanc e Street and Western Battery Road with impacts on access to building fronts/sidewalks and one driveway on Douro Street. Grade on Strachan Avenue slightly steeper for bikers and pedestrians.
Effect on traffic/transit/rail	Design speed on Strachan Avenue	Design speed on Strachan Avenue	Design speed on Strachan Avenue	Design speed on Strachan

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor.	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
operations	would be 60 km/h. Potential impacts to GO operations resulting from the vertical curves required to lower the rail corridor. Traffic impacts resulting from the potential closure of Strachan Avenue during construction.	would be 50 km/h. Significant traffic impacts as a result of eliminating the intersection between Strachan Avenue and Wellington Street/Douro Street. Potential impacts to GO operations resulting from the vertical curves required to lower the rail corridor. Traffic impacts resulting from the potential closure of Strachan Avenue during construction.	would be 50 km/h. Significant traffic impacts as a result of interrupting the continuity of Strachan Avenue. No impacts to GO operations.	Avenue would be 50 km/h. Potential impacts to GO operations resulting from the vertical curves required to lower the rail corridor. Traffic impacts resulting from the potential closure of Strachan Avenue during construction.
Summary	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres; has the least transportation benefits due to the elimination of Strachan Avenue and Wellington Street/Douro Street intersections.			
Cultural Environment				
Effect on heritage resource	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Effect on archaeological resource	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Effect on landscape composition/visual intrusion	Strachan Avenue will be raised approximately 3.2 metres. Less of a “rollercoaster” effect produced from the crossings over the Weston Subdivision and the	Strachan Avenue will be raised approximately 7.4 metres – giving a substantial visual intrusion. Exaggerated “rollercoaster” effect produced from the crossings over the	Wellington Street will be lowered by approximately 4.0 metres – giving a substantial visual intrusion. Exaggerated “rollercoaster” effect produced from the	Strachan Avenue will be raised approximately 3.8 metres. Less of a “rollercoaster” effect produced from the crossings over

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor.	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
	Oakville Subdivision.	Weston Subdivision and the Oakville Subdivision.	crossings at the Weston Subdivision and the Oakville Subdivision.	the Weston Subdivision and the Oakville Subdivision.
Summary	Alternative B – has the largest impact on the Cultural Environment due to the substantial visual intrusion it proposes. Proposals for Alternatives A and D would result in the least visual intrusions.			
Economic Environment				
Effect on commercial/ industrial operations	No significant issue.	Significant impacts to trucking operations at Quality Meats as a result of eliminating the intersection between Strachan Avenue and Wellington Street/Douro Street.	No significant issue.	No significant issue.
Effect on capital, operation and maintenance costs	Highest potential costs resulting from lowering of the rail corridor and required utility relocations. Increased maintenance costs resulting from the potential pumping station required to relocate the existing sewer.	Lowest potential costs resulting from minimized lowering of the rail corridor.	Reduced potential costs resulting from lowering of the roadway and reduced required utility relocations.	Reduced potential costs resulting from lowering of the rail corridor and required utility relocations. Increased maintenance costs resulting from the potential pumping station required to relocate the existing sewer.
Summary	Alternative C –provides better capital and operation/maintenance cost returns with the least impacts on commercial/industrial operations. Alternative B results in the lowest capital cost but the greatest impact on the operation of Quality Meats			

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor.	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
Social Environment				
Effect on noise and vibration	Construction noise and vibration due to below-grade work.	Less construction noise and vibration.	Construction noise and vibration due to below-grade work.	Construction noise and vibration due to below-grade work.
Effect on communities	No significant issues.	Significant impact to the surrounding community based on the elimination of the intersection of Strachan Avenue and Wellington Street/Douro Street as well as the height of the structure crossing the rail corridor.	Significant impact to the surrounding community based on the elimination of the continuity of Strachan Avenue.	Significant impacts as a result of the closure of western driveway at the City of Toronto building at southeast corner of the intersection with Ordnance Street. Impacts due to the elimination of parking at 45 Strachan Avenue
Effect on land use plans	No significant issues.	Elimination of the intersection of Strachan Avenue and Wellington Street/Douro Street would limit future development in the surrounding area.	Acquisition of the properties on Ordnance Street would limit future development in this area.	No significant issues.
Effects on property	No property required. Some driveway closures will be required, however alternative access can be provided.	No property required. Some driveway closures will be required, however alternative access can be provided.	Realigning Strachan Avenue to the east will result in property acquisitions. Additional property	Will require property along the rail corridor as a result of the bridge pier. Some driveway closures will be

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor.	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
			acquisitions may be required as a result of driveway closures on Wellington Street and Western Battery Road.	required, however alternative access can be provided.
Summary	Alternatives A or D–provide the best Social Environment with the least related impacts (or mitigated impacts).			
Natural Environment				
Effect on designated natural areas	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Effect on wildlife and wildlife habitat	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Effect on species at risk	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Effect on local air quality	No significant difference.	No significant difference.	No significant difference.	No significant difference.
Summary	No significant difference			

Table 5.1.2-2 Evaluation of Corridor Alternatives

	Alternative A – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 7 metres.	Alternative B – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 2 metres.	Alternative C – Realign Strachan Avenue to the east and cross under the rail corridor	Alternative D – Raise Strachan Avenue and cross over the rail corridor lowered by approximately 5 metres
Transportation	●	○	◐	◐
Cultural Environment	●	○	◐	●
Economic Environment	○	●	◐	◐
Social Environment	●	◐	○	●
Natural Environment	●	●	●	●
Overall Ranking	◐	◐	○	●

Legend:

- Best alternative
- Worst alternative

Preferred Alternative

Following the analysis of the alternatives, the following was concluded:

- Eliminating the intersection Strachan Avenue and Wellington Street/Douro Street (Alternative B) or interrupting the continuity of Strachan Avenue would be the most disruptive alternatives to traffic and the surrounding community.
- Alternative A would cost an additional \$25 million more than Alternative D, The top of the roadway in Alternative D is only 0.6m higher than in Alternative A and still lower than the existing structure of the Oakville Subdivision.
- Although Alternative D has property requirements, the possibility of this property being provided by the City of Toronto is currently being investigated to eliminate additional property acquisition costs.
- Although the design speed is reduced for Alternative D, Strachan Avenue has existing bike lanes which will be maintained. City of Toronto policy is to post 40 km/h speed limits on city streets with bike lanes. As a result lowering the design speed of Strachan Avenue will have no impact on traffic on Strachan Avenue.
- Alternative B would have too significant of an impact to properties on the west side of Strachan Avenue, north of the rail corridor, including access to Quality Meats.
- Alternative C would have too significant of an impact to properties on Wellington Street and Western Battery Road as a result of profile changes required in this alternative.

Based on the noted outcome of the analysis, *Alternative D* was carried forward as the preferred alternative.

5.1.3 Denison Road East

Denison Road is a City of Toronto local collector road which runs east-west across the Georgetown rail corridor between; Weston Road and Jane Street.

The Denison Road intersections with Weston Road and Jane Street each have traffic signal control. There is no traffic control between Weston Road and Jane Street. There is a one-way (to the north) public lane along the west side of the rail corridor between Denison Road and Arthur Street. Sam Frustaglio Drive, a local residential street, terminates at the north side of Denison Road, east of the rail corridor. A number of residential and commercial driveways are located along both sides of Denison Road between Weston Road and Jane Street.

Closing Denison Road was briefly considered. If Denison Road was closed, alternative access routes across the rail corridor would be limited to Lawrence Avenue to the north and Jane Street to the east. These alternative accesses are a significant distance away from Denison Road which results in out-of-way travel for the diverted traffic. The diverted traffic would also have traffic impacts at the intersections along Weston Road and Jane Street. This alternative was eliminated from further consideration due to the significant out-of-way travel for diverted traffic and impacts on the local road network and community.

A number of alternatives involving the raising or lowering of the Denison Road profile were developed.

Alternative A– Maintain Denison Road in the current alignment and lower the roadway under the rail corridor.

This alternative (**Figure 5.1.3-1**) was developed to assess the impacts of lowering Denison to cross under the rail corridor.

Corridor Requirements

This alternative maintains Denison Road in its current alignment and lower the roadway on a 6% grade from Weston Road east to cross under the rail corridor with the required 5.0 metre minimum clearance. The roadway would then climb up on a 6% grade to just east of Sam Frustaglio Drive. Access to the properties on both sides of Denison Road would be maintained via new one-way access lanes at existing ground level on both side of the new below-grade Denison Road. The implication of this is that partial property taking will be required along both sides of Denison Road, west of the rail corridor. Retaining walls will be used along the below grade portion of Denison Road to reduce property requirements. An additional structure would be required to connect both sides of the one-way access lane to allow access and egress.

This alternative would have the following impacts:

- Although the existing properties might be maintained, most of the front yards of these properties would be required for the access lanes.
- The City of Toronto requirements for lane widths and sidewalks along Denison Road could not be met. This would minimize the possibility of bike lanes in the future and limit snow storage in the winter.
- The intersections between the access lanes and Denison Road would be very tight limiting turning movements onto and from Denison Road to the east. Additional properties would be required to improve turning movements at these intersections.

- An additional structure is required increasing costs and future maintenance.
- Acquisition of the property at the southeast corner of the Denison Road/Weston Road intersection would still be required as driveway access to this property will be cut off as a result of the lowering of Denison Road.
- Vehicles leaving the properties on Denison Road would experience longer travel times as vehicles traveling to Jane Street or Weston Road would have to use Arthur Street. The intersection of Weston Road and Arthur Street is not signalized.
- Driveway access to 42 Denison Road would be cut off requiring acquisition of the property or relocation of the driveway. See Sam Frustaglio Drive options below.
- Modifications to the driveways at 46 Denison Road including closure of the western driveway and re-grading of the eastern driveway.
- Re-grading of the driveway to the commercial property on the south side of Denison Road, east of the rail corridor.
- Both options at Sam Frustaglio Drive are unaffected by this alternative.

Structure Requirements

In addition to the structural undertaking required for the railway overpass at Denison Road, a second structure will be required for the one-way road to cross over the below-grade Denison Road.

Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.

This alternative (**Figure 5.1.3-2**) was developed to assess the impacts of raising Denison to cross over the rail corridor.

Corridor Requirements

This alternative maintains Denison Road in its current alignment and raises it on a 6% grade from Weston Road east to cross over the rail corridor with the 7.4 metre rail clearance to not preclude future electrification. The roadway would then descend on a 6% grade to the east of Sam Frustaglio Drive. Access to the properties on both sides of Denison Road would be maintained as in Alternative A.

The impacts of this alternative include the impacts of Alternative A as well as the following additional impacts:

- The high retaining walls required would have serious visual impacts not only for the existing properties on Denison Road but for the surrounding community as well.
- Access to the driveway on Denison Road from 1655 Weston Road could no longer be maintained.
- Access to both driveways at 46 Denison Road could no longer be maintained requiring acquisition of the property.
- Significant re-grading of the driveway to the commercial property along the south side of Denison Road between the rail corridor and Jane Street would be required.

- Sam Frustaglio Drive could not remain open in this Alternative without additional impacts to properties further north on Sam Frustaglio Drive and along John Best Avenue.

Structure Requirements

Additional structural length is required for the roadway to overpass the one way public lane to the south as well as the rail corridor.

Alternative C – Realign Denison Road to the north, maintain existing Denison Road as a two-way property access road with a cul-de-sac

This alternative (**Figure 5.1.3-3**) was developed to try to minimize the property impacts on both side of the road inherent in the previous scheme. This alterbnative maintains the southerly part of the existing Denison Road as a two-way property access roadway with a cul-de-sac on existing grade. Realigning Denison Road to the south was also considered; however, the skew of the roadway at the rail corridor would require a longer structure and a longer reconstruction length to the east along Denison Road, impacting additional driveways. In addition the skew at the intersection of Weston Road and Denison Road would be too great.

Corridor Requirements

This alternative lowers Denison Road on a 6% grade from Weston Road east to cross under the rail corridor with the required 5.0 metre minimum clearance. The roadway would then climb up on a 6% grade to just east of Sam Frustaglio Drive. The implication of this is that properties along the north side of Denison Road, west of the rail corridor will be displaced. Retaining walls will be used along the below grade portion of Denison Road to reduce further property requirements. The existing portion of Denison Road between Weston Road and the rail corridor will remain as a two-way roadway with reduced lane widths (3.0m-3.5m) to maintain access to the properties on the south side of Denison Road. A new stop controlled intersection with the realigned Denison Road will be constructed. A cul-de-sac is proposed at the rail corridor requiring partial property takings. The options of either closing Sam Frustaglio Drive at Denison Road or maintaining the connection are still being reviewed and are presented below.

This alternative will have the following impacts:

- New traffic signals will be required at the intersection of Denison Road and Weston Road.
- A portion of the driveway to the property at 1655 Weston Road will be required. The remaining portion of the driveway will be re-graded as a result of the lowered roadway.
- Closure of the public lane between Denison Road and Arthur Street. Access to the existing driveway off the public lane will be maintained.
- Acquisition of the property at the southeast corner of the Denison Road/Weston Road intersection. The new intersection between the realigned Denison Road and the old portion of the roadway will be lower than the existing roadway profile. This will result in the driveway access to this property (currently from Denison Road) being cut off. Providing new access from Weston Road was reviewed but rejected due to the proximity to a signalized intersection.

- Pedestrian access between the eastern end of the old portion of Denison Road and the realigned portion should be maintained via a stairway.
- Driveway access to 42 Denison Road would be cut off requiring acquisition of the property or relocation of the driveway. See Sam Frustaglio Drive options below.
- Modifications to the driveways at 46 Denison Road including closure of the western driveway and re-grading of the eastern driveway.
- Re-grading of the driveway to the commercial property on the south side of Denison Road, east of the rail corridor.
- There are no negative impacts to vehicles accessing or leaving the properties on the south side of Denison Road.

Structure Requirements

As a result of this alternative, a new structure will be required for the railway overpass at Denison Road.

Impacts of Keeping Sam Frustaglio Drive Open

Opportunities that would allow Sam Frustaglio Drive to remain open to vehicular access with this alternative were explored as shown in **Figure 5.1.3-4**. Sam Frustaglio Drive would require lowering of approximately 4 metres at Denison Road. This would be accomplished by lowering the roadway at a grade of 6% from just north of John Best Avenue to the realigned Denison Road. The construction related impacts on adjacent properties would be as follows:

- There would be a requirement for property acquisition along Sam Frustaglio Drive, south of John Best Avenue (both sides of the road) as driveways would be closed due to the lowered roadway.
- Property acquisition would be required for 42 Denison Road. Access to this property could not be maintained as a result of the lowering of Denison Road and Sam Frustaglio Drive and the need to maintain proper sight distances.
- Re-grading of John Best Avenue at Sam Frustaglio Drive. There would be no additional property impacts on John Best Avenue as a result of the re-grading.
- All access points to the subdivision north of Denison Road and west of Jane Street would be maintained.

Impacts of Closing Sam Frustaglio Drive

The possible closure of Sam Frustaglio Drive to vehicular access at Denison Road with this alternative was also explored as shown in **Figure 5.1.3-5**. Sam Frustaglio Drive would remain at its existing elevation. A new cul-de-sac would be constructed just north of the below-grade Denison Road. Pedestrian access would be maintained via a new stairway between the cul-de-sac and Denison Road. The construction related impacts on adjacent properties would be as follows:

- No property acquisitions would be required on the west side of Sam Frustaglio Drive.
- A partial property taking would be required from the property on the east side of Sam Frustaglio Drive to construct the cul-de-sac.

- Driveway access to 42 Denison Road would still be unavailable from Denison Road; however, a new driveway could be constructed from the cul-de-sac on Sam Frustaglio Drive.
- Access to the subdivision north of Denison Road and west of Jane Street would be reduced to existing intersections at Jane Street and Lawrence Avenue possible resulting in longer travel times

Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane

This alternative (**Figure 5.1.3-6**) was developed in order to maintain as much of the existing roadway network as possible.

Corridor Requirements

This alternative realigns Denison Road in the same manner as Alternative C. Instead of maintaining the existing portion of Denison Road between Weston Road and the rail corridor as a two-way roadway with a cul-de-sac, this alternative proposes Denison Road be a one-way road to the east with a connection to Arthur Street via the public lane. An additional structure would be required to cross the one-way public lane over the below-grade Denison Road.

This alternative is likely to have the following impacts:

- An additional structure is required increasing costs and future maintenance.
- The property needed for the cul-de-sac in Alternative C would not longer be required.
- There would be no additional impacts to vehicles accessing the properties on the south side of Denison Road. However, vehicles leaving the properties would experience longer travel times as vehicles traveling to Jane Street or Weston Road would have to use Arthur Street. The intersection of Weston Road and Arthur Street is not signalized.
- All other property impacts would be as noted in Alternative C.
- Both options at Sam Frustaglio Drive are unaffected by this alternative.

Structure Requirements

In addition to the structural undertaking required for the railway overpass at Denison Road, a second structure will be required for the one-way road to cross over the below-grade Denison Road.

Impact Assessment of Alternatives

The alternatives were assessed against a set of qualitative criteria to identify a preferred. Factors, and associated criteria, included natural environment, social environment, land use, transportation and economic environment. The results of this analysis and evaluation are summarized in the following tables. The possible closure of Sam Frustaglio Drive has not been included in this assessment as the same options exist for all alternatives presented with additional property impacts required to maintain the connection to Denison Road in Alternative D.

Table 5.1.3-1 Analysis of Corridor Alternatives – Denison Road Alternatives

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
Transportation				
Effects on surrounding land use on accessibility	Access to Arthur Street from Denison Road maintained via the access lanes. Access to the access lane from Denison Road to the east will be affected due to the tight turning radius required. Possible travel delays to traffic leaving properties on the south side of Weston Road.	Access to Arthur Street from Denison Road maintained via the access lanes. Access to the access lane from Denison Road to the east will be affected due to the tight turning radius required. Possible travel delays to traffic leaving properties on the south side of Weston Road. Access cannot be maintained to 46 Denison Road.	Access to Arthur Street from Denison Road via the public lane will be closed. Access to properties on the south side on Denison Road provided in a convenient manner with no additional travel time.	Access to Arthur Street from Denison Road maintained via the one-way road in the old Denison road alignment. Possible travel delays to traffic leaving properties on the south side of Weston Road.

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
Effects on traffic/transit/rail operations	No significant issues	No significant issues	Possible improved traffic operations at the intersection of Weston Road and Denison Road due to the improved intersection geometry.	Possible improved traffic operations at the intersection of Weston Road and Denison Road due to the improved intersection geometry.
Summary	Alternative C –provides better transportation potential with similar or fewer impacts.			
Cultural Environment				
Effect on heritage resource	No significant difference	No significant difference	No significant difference	No significant difference
Effect on archaeological resource	No significant difference	No significant difference	No significant difference	No significant difference
Effect on landscape composition/visual intrusion	No significant issues	Denison Road will be raised by 9-10 metres.	No significant issues	No significant issues
Summary	Alternative B –will result in significant visual intrusion due to the raising of Denison Road and therefore presents the least benefit to the Cultural Environment.			
Economic Environment				
Effect on commercial/ industrial operations	No significant difference	No significant difference	No significant difference	No significant difference
Effect on capital, operation and maintenance costs	Higher costs due to the below-grade roadway and property	Lower costs resulting for the raised roadway instead of a below-grade	Higher costs due to the below-grade roadway and property	Higher costs due to the below-grade roadway and property

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
	requirements. Impacts on winter maintenance as reduced lane and sidewalk widths may not provide sufficient snow storage. Pumping station may be required for storm water.	road may be offset by additional property required. Impacts on winter maintenance as reduced lane and sidewalk widths may not provide sufficient snow storage. No pumping station required.	requirements. Improved winter maintenance as appropriate lane and sidewalk widths can be provided for snow storage. Pumping station may be required for storm water.	requirements. Improved winter maintenance as appropriate lane and sidewalk widths can be provided for snow storage. Pumping station may be required for storm water.
Summary	Alternative A –will result in additional maintenance cost resulting from both snow storage issues and the possible need for a pumping station therefore resulting in the least Economic Environment benefit.			
Social Environment				
Effect on noise and vibration	Construction noise due to below-grade work.	Construction noise due to above-grade work.	Construction noise due to below-grade work.	Construction noise due to below-grade work.
Effect on communities	No significant issues	Construction of a large retaining wall immediately in front of existing properties would significantly affect the community.	No significant issues	No significant issues
Effect on land use plans	Reduced lane widths do not allow for the	Reduced lane widths do not allow for the	No significant issues	No significant issues

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
	possibility of a future bike route.	possibility of a future bike route		
Effects on property	Maintaining Denison Road in it’s currently alignment does not require any complete property takings; however, significant partial takings will be required. Lowering of Denison Road requires property.	Maintaining Denison Road in it’s currently alignment does not require any complete property takings; however, significant partial takings will be required. Raising Denison Road results in additional property required beyond that required to lower Denison Road.	The realignment of Denison Road to the north results in significant property impacts. Lowering of Denison Road requires property. The proposed cul-de-sac at results in partial property taking required.	The realignment of Denison Road to the north results in significant property impacts. Lowering of Denison Road requires property.
Summary	Alternative B –results in the most significant impacts to the social environment.			
Natural Environment				
Effect on designated natural areas	No significant difference	No significant difference	No significant difference	No significant difference
Effect on wildlife and wildlife habitat	No significant difference	No significant difference	No significant difference	No significant difference
Effect on species at risk	No significant difference	No significant difference	No significant difference	No significant difference
Effect on local air quality	No significant difference	No significant difference	No significant difference	No significant difference

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
Summary	No significant difference			

Table 5.1.3-2 Evaluation of Corridor Alternatives

	Alternative A – Maintain Denison Road in the current alignment and lower to go under the rail corridor.	Alternative B – Maintain Denison Road in the current alignment and raise to go over the rail corridor.	Alternative C – Realign Denison Road to the north, existing Denison Road as a two-way road with a cul-de-sac	Alternative D – Realign Denison Road to the north, existing Denison Road as a one-way road connecting to the public lane
Transportation				
Cultural Environment				
Economic Environment				
Social Environment				
Natural Environment				
Overall Ranking				

Legend:

 Best alternative

 Worst alternative

Preferred Alternative

Following the analysis of the alternatives, the following was concluded:

- Lowering Denison Road to cross under the rail corridor is preferred as it has the least visual impacts on the surrounding community.

- Realigning Denison Road to the north, while requiring property acquisitions along the north side of Denison Road, maintains adequate access to properties on the south side of Denison Road.
- Maintaining the existing portion of Denison Road as a two-way road with a cul-de-sac would not significantly impact access and egress from the properties on the south side of Denison Road.
- Closure of the public lane between Denison Road and Arthur Street would result in limited traffic impacts and would eliminate the capital cost and maintenance costs of an additional structure.
- Maintaining Denison Road in its existing alignment, crossing either over or under the rail corridor, would have too significant of an impact to properties on Denison Road.

Based on the noted outcome of the analysis, *Alternative C* with the closure of Sam Frustaglio Drive to vehicular access at Denison Road was carried forward as the preferred alternative.

5.1.4 Weston Corridor Alternatives

Several alternatives were developed for the corridor through the community of Weston (i.e. between Lawrence Avenue and Weston Road).

Maintaining the rail corridor at its existing grade involved considering a number of alternatives for the crossing roads of Church, King and John Streets.

Closing Church, King and John Street was briefly considered but quickly eliminated because of the overall impact on traffic and connectivity within the Weston community.

Other preliminary alternatives were reviewed to determine whether it was feasible to maintaining the rail profile at grade and take Church, King and John Streets either over or under the rail corridor.

Additionally, a design charrette for the John Street crossing (workshop organized by Metrolinx) was conducted to create an opportunity to engage the community on possible design options for the John Street crossing as well as discuss the potential for the GO Georgetown expansion as a stimulus for a larger neighbourhood revitalization initiative. See **Section 3.3.2.1.1 and Appendix C** for additional details on the results and analysis of the John Street Design Charrette.

The following briefly outline the character and function of these roads and the rationale for why alternatives associated with maintaining the rail profile at grade were quickly eliminated.

Church Street

Church Street is a City of Toronto local collector road that runs east to west and connects Weston Road to Jane Street; major north to south arterials in the corridor.

The Church Street intersections with Weston Road and Jane Street each have traffic signal control. A protected/permissive leading left-turn phase is provided for eastbound traffic approaching Jane Street.

TTC surface transit Route 59 operates along Church Street between Weston Road and Jane Street as well as along Oak Street/Gary Drive via Pelmo Crescent and Uphill

Avenue. The Humber Memorial Hospital is situated on the north side of Church Street between Uphill Avenue and Pine Street, just west of Jane Street.

On site conditions make it extremely challenging for Church Street to go up and over the rail corridor, in time for the roadway to come back to grade at Rosemount Avenue. The related impacts to the surrounding community (accessibility and direct displacements) as a result of this undertaking would be unacceptable. Therefore this grade separation alternative eliminated from consideration.

With the elimination of at-grade and roadway overpass based alternatives for Church Street, alternatives that lowered the rail corridor profile were developed.

King Street

King Street is a City of Toronto local collector road that runs east to west and connects Weston Road to Jane Street; major north to south arterials in the corridor.

King Street is stop sign controlled at both Weston Road and Jane Street. This limits the capacity at these intersections. In addition to a number of all-way stop-controlled intersections along its length, King Street is also designated for local traffic only between Rosemount Avenue and Jane Street.

There are no transit routes on King Street.

Similar to Church Street, alternatives were developed that showed grade separation at King Street. On site conditions (similar to the arguments for Church Street) makes it impossible for King Street to go up and over the rail corridor, in time for the roadway to come back to grade at Rosemount Avenue. The related impacts to the surrounding community (accessibility and direct property displacements) as a result of this would be unacceptable. The grade separation alternatives for King Street were therefore not taken forward.

John Street

John Street is a City of Toronto local collector road that runs east to west and connects Weston Road to Jane Street; major north to south arterials in the corridor. Lawrence Avenue West, a major east to west arterial, is also in the vicinity of John Street.

The John Street intersections with Weston Road and Jane Street each have traffic signal control. However, left-turn movements from John Street onto Weston Road are prohibited at all times. Although there are a number of all-way stop-controlled intersections along John Street between Weston Road and Jane Street, most of the intersections throughout the neighbourhood, including those along King Street and Church Street are also configured with all-way stop control.

John Street is currently designated for local traffic only east of Rosemount Avenue. A sign post identifies this designation for eastbound traffic approaching Rosemount, but there is no posting for westbound traffic entering from Jane Street. There are no transit routes along John Street.

Similar to Church Street and King Street, conceptual alternatives were developed that showed grade separations for John Street either over or under the rail corridor. On site conditions (similar to the arguments for Church Street and King Street) makes it extremely challenging for John Street to go up and over the rail corridor, in time for the roadway to come back to grade at Rosemount Avenue. The related impacts to the

surrounding community (accessibility and direct property displacements) as a result of this would be unacceptable. The grade separation alternatives for John Street either over or under the at-grade railway were therefore eliminated.

With the elimination of options for maintaining the railway at grade, alternatives that lowered the rail corridor profile were developed.

Alternatives that lowered the Rail Corridor

The following outline the three alternatives that were considered in more detail. These all involved lowering the rail corridor.

Alternative A – John Street converted to pedestrian/bicycle access only

Alternative A shown in **Figure 5.1.4-1** maintains the existing accessibility to Church Street and King Street but John Street would be converted to a pedestrian/bicycle access only.

Corridor Requirements

This alternative lowers the corridor as much as possible while maintaining its crossing configuration at Weston Road and Lawrence Avenue. To do this the track descends at the maximum 2% grade from east of Weston Road bridge structure to just west of Lawrence Avenue West. This allows Church Street and King Street to cross the rail corridor in a grade separated crossing at their existing elevation. At John Street, the rail corridor will not be low enough to facilitate a traffic crossing and will therefore be converted to a pedestrian/bicycle overpass. Pedestrians will cross the existing CP tracks at grade and then use the pedestrian bridge to cross the GO Georgetown corridor. A covered portion of the rail corridor will be provided between King Street and Church Street.

This alternative has the following impacts:

- Access to John Street is restricted to pedestrians and bicycles only
- Weston GO Station relocated to begin approximately 50 metres west of Lawrence Avenue West
- Cost of the tunneling likely to be high

Structure Requirements

As a result of this alternative, new structures will be required for the John Street pedestrian/bicycle overpass over the GO Georgetown corridor, and roadway overpasses at King Street and Church Street.

Station Requirements

This alternative requires shifting of the existing Weston GO Station platform to the east beginning at approximately 50m west of Lawrence Avenue West; A the new at-grade station and parking lot is proposed just east of Lawrence Ave on the old Chrysler dealership property now owned by GO Transit..

Alternative B – Keeping John Street Open by Raising John Street

Opportunities that would allow John Street to remain open to vehicular access based on the GO Transit rail corridor profile shown in *Alternative A* were explored (**Figure 5.1.4-2**). This alternative maintains King and Church Streets as in *Alternative A* but raises John Street by approximately 3 metres above its existing grade at the railway crossing;

Therefore to maintain vehicular access to John Street, the roadway profile of John Street has to be raised by approx. 3 metres shown in **Figure 5.1.4-3**.

This would also require Rosemount Avenue and Weston Road to be raised by one to two metres and the CP mainline tracks to be raised by up to two metres. Additionally, the need for earth fills of up to 6 metres and a width of up to 15 metres would be required on the south-west side of the corridor.

The construction related impacts on adjacent properties would be as follows:

- There would be a requirement for property acquisition along John Street (east and west of the railway) as driveways would be closed and fill would be placed on these properties to raise John Street over the railway. This would result in the elimination of the City Parking facility, the farmers market and other commercial and residential properties.
- South Station Street would be closed at John Street creating significant property impacts
- Regrading Rosemount Avenue and Weston Road would impact access to properties along both roads
- Raising the CP tracks would result in major property impacts.

Based on technical considerations and the related negative impacts to adjacent properties, the option of keeping John Street open with this alternative was considered not a viable option.

Impacts of Closing John Street

With this alternative, detailed analysis of traffic redistribution as a result of the closure of John Street was undertaken. The following is a summary output of the traffic analysis:

- The closure of John Street would result in the diversion of 40 to 90 vehicles in the peak hour in each direction to King Street between Rosemont Avenue and Weston Road
- The total traffic volumes would grow to approximately 255 vehicles per hour in the peak hour
- Traffic diversion from John Street is not expected to noticeably impact Church Street traffic volumes as King Street is the nearest logical alternative for access to Weston Road
- Peak hour traffic diversion to Lawrence Avenue between Ralph Street and Weston Road is 40 to 135 vehicles in each direction
- Traffic impacts at all intersections along Weston Road (as a result of the closure of John Street) can be accommodated with adequate peak hour levels of service

Therefore, closure of John Street is unlikely to significantly impact traffic operations in the surrounding community. See **Appendix H** for additional details on the results and analysis of the John Street Closure Traffic Analysis.

Alternative C – Maintaining John Street as a road crossing by extending the lowered rail corridor farther to the south-east

Another alternative (**Figure 5.1.4-4**) was developed to consider keeping John Street open to traffic.

Corridor Requirements

As in Alternative A this alternative lowers the existing track bed profile easterly from east of the Weston Road bridge structure but instead of coming back to grade at Lawrence Avenue this profile does not come back to grade until Jane Street. The track bed profile descends at a maximum of 2% from east of Weston Road bridge structure and emerges at grade rate of 2% just west of Jane Street. The alternative will see the Weston GO Station at Lawrence Avenue relocated below ground level. This alternative allows Church Street, King Street and John Street to cross the rail corridor as grade separated crossings at their existing elevation. This alternative will have the following impacts:

- The platforms at Weston GO Station would be 15 metres (50') below ground; requiring stairs, escalators, elevators and additional property for pedestrian access.
- The required connections between CN, CP and GO tracks are not possible with this design. This would impact the viability of the Proposed GO Bolton service.
- There would be major construction impacts including the construction of the proposed lowered Lawrence Avenue West – likely to require the closure of Lawrence Avenue West and temporary detours during construction. Possible property acquisition would be required to accommodate the temporary detours.
- The extent of the depth of the proposed depressed corridor is likely to require special construction methods that would impact adjacent properties.

Structure Requirements

As a result of this alternative, a major structural undertaking would be required to construct a new Lawrence Avenue West structure over the new GO Georgetown corridor shown in **Figure 5.1.4-5**.

Station Requirements

The alternative proposes the relocation of Weston GO Station to 15 metres below ground. Additional requirements such as stairs, escalators, elevators and additional property for pedestrian access will be required as result of this relocation.

Impact Assessment

The alternatives were assessed against a set of qualitative criteria to identify a preferred alternative. Factors, and associated criteria, included natural environment, social environment, land use, transportation and economic environment. The results of this analysis and evaluation are summarized in the following tables.

Table 5.1.4-1: Analysis of Corridor Alternatives – Weston Alternatives

	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle	Alternative B – Lowering through Weston: John Street open to vehicles	Alternative C – Extended lowering through Weston: John Street open to vehicles
Transportation			
Impacts on surrounding land use on accessibility	Access to John Street will be restricted to pedestrian/bicycles only	Access to Church, King and John Streets will be unaffected Will require regrading on Weston Road and Rosemount Avenue therefore impact on access to store fronts at Weston and driveways/sidewalks on Rosemount No access to South Station Street No access on John Street between Weston Road and Rosemount Avenue	Access to Church, King and John Streets will be unaffected Elevators/escalators/ stairs will be required to access the relocated Weston station
Impacts on traffic/transit/rail operations	Traffic diversion due to the closure of John Street. However, the diverted traffic can be accommodated on the existing road	With John Street raised between Weston Road and Rosemount Avenue, significant diverted traffic to find alternative routes for	Closure of Lawrence Avenue in order to construct the new Lawrence Avenue structure would affect transit routes 52 and 58, 58A, 58B

	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle	Alternative B – Lowering through Weston: John Street open to vehicles	Alternative C – Extended lowering through Weston: John Street open to vehicles
	network No impact on transit routes	access Will require raising the CP mainline tracks	& 58D. The required connections among CP and GO tracks will not be possible.
Summary	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle overall provides better potential with minimum impacts		
Cultural Environment			
Effect on heritage resource	No significant difference	No significant difference	No significant difference
Effect on archaeological resource	No significant difference	No significant difference	No significant difference
Effect on landscape composition/visual intrusion	No significant issue	John Street will be raised by approx. 3m.	No significant issue
Summary	Alternative B – Lowering through Weston: John Street open to vehicles will result in significant visual intrusion due to the raising of John Street. Therefore presents the least benefit to the Cultural Environment		
Economic Environment			
Effect on commercial/industrial operations	No significant issue	Closure of the City Parking Facility, the farmers market and other commercial properties as John Street is raised by approx. 3m	No significant issue
Effect on capital, operation and maintenance	Lowest potential cost	Higher costs for regrading to raise John Street by	Significant additional costs due to the construction of the

	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle	Alternative B – Lowering through Weston: John Street open to vehicles	Alternative C – Extended lowering through Weston: John Street open to vehicles
costs		approx. 3m; also raising the CP tracks.	extended tunnel and operations/maintenance of the facility
Summary	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle provides better capital and operation/maintenance cost returns.		
Social Environment			
Effect on noise and vibration	Construction noise due to tunnelling	Construction noise due to tunnelling	Significant construction noise due to extended tunnelling
Effect on communities	Community impacts due to restriction on vehicular access on John Street resulting in disjointing of the community. However, pedestrian / bicycle access will be allowed on John Street.	Closure of the City Parking Facility, the farmers market and other commercial properties as John Street is raised by approx. 3m will significantly affect the community	Closure of Lawrence Avenue in order to construct the new Lawrence Avenue structure will impact community access on Lawrence Avenue
Effect on land use plans	No significant difference	No significant difference	No significant difference
Impacts on property	No significant issue	Raising of John Street by approx. 3m will result in additional property acquisitions	The depth and extent of the depressed corridor will require additional property acquisitions in preparation of the construction
Summary	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle provides the least impact on the social environment despite the fact that it results in disjointing the community by the restriction on vehicular access on John Street.		

	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle	Alternative B – Lowering through Weston: John Street open to vehicles	Alternative C – Extended lowering through Weston: John Street open to vehicles
Natural Environment			
Effect on designated natural areas	No significant difference	No significant difference	No significant difference
Effect on wildlife and wildlife habitat	No significant difference	No significant difference	No significant difference
Effect on species at risk	No significant difference	No significant difference	No significant difference
Effect on local air quality	No significant difference	No significant difference	No significant difference
Summary	No significant difference		

Table 5.1.4-2: Evaluation of Corridor Alternatives

	Alternative A – Lowering through Weston: John Street Pedestrian/Bicycle	Alternative B – Lowering through Weston: John Street open to vehicles	Alternative C – Extended lowering through Weston: John Street open to vehicles
Transportation			
Cultural Environment			
Economic Environment			
Social Environment			
Natural Environment	n/a	n/a	n/a
Overall Ranking			

Legend:

 Best alternative

 Worst alternative

Preferred Alternative

Following the analysis of the alternatives, the following was concluded:

- Alternative C would cost an additional \$400 million or more than Alternative A
- Closure of John Street (or converting it to a pedestrian bridge), as proposed with Alternative A (**Figure 5.1.4-6**), would result in limited traffic impacts; based on the existing and forecasted traffic volumes. The traffic analysis has shown that the diverted traffic can be accommodated within the existing road network without compromising the affected roadway Level of Service.
- Church Street and King Street would maintain existing accessibility, shown in **Figures 5.1.4-7** and **5.1.4-8**, respectively.
- The proposal of keeping John Street open with Alternative A would result in significant accessibility, construction related and property impacts.
- With Alternative B, GO, CN, VIA and Union–Pearson tracks would be relocated underground with CP tracks remaining at grade therefore, the required connections among the tracks becomes impossible.

Based on the noted outcome of the analysis, *Alternative A* was carried forward as the preferred alternative.

5.1.5 Carlingview Drive

Carlingview Drive is a City of Toronto arterial/collector roadway that runs north from the vicinity of Highway 401, east of and parallel to Highway 427. It terminates as a City of Toronto road at the south property line of the rail corridor and then becomes a private ancillary entrance into the Woodbine Race Track complex.

The following alternatives were developed for Carlingview Drive.

Alternative A, Carlingview Drive Overpass – This proposal would have Carlingview Drive over the rail corridor. It should be noted that a 7.4 metres vertical clearance is required for road over rail crossing. A major drawback with this alternative is that there is insufficient space for the roadway to go up and over the mainline tracks and down again in order to maintain (a) the east west service road around the Woodbine Race Track and (b) the access from the service road to Woodbine Race Track stables. For this reason, this alternative was set aside.

Alternative B, Carlingview Drive Underpass – This alternative has Carlingview Drive go under the proposed rail corridor (**Figure 5.1.5-1**). The minimum vertical clearance for an underpass is 5m. The alternative would have Carlingview Drive lowered under the mainline tracks at a maximum of 8% - giving a 5m minimum vertical clearance under the tracks – and emerge also at a maximum of 8% on the existing service road round the Woodbine Race Track. It should be noted that at the emergence point on the service road round the race track, Carlingview Drive will be at a lower grade than the existing; which leads to the following implications:

- The service road around the race track will be lowered (reggraded) where it forms a T-junction with the private entrance from Carlingview Drive.
- The access to the stables via the access road will be closed due to grade difference. An alternative (improved) access will be provided approximately 10 metres east of the existing access point.

- Access to the industrial establishment – immediately east of Carlingview Drive on the south approach to the Georgetown Corridor tracks – will be relocated. Alternative access is currently provided.

Impact Assessment

The alternatives were assessed against a set of qualitative criteria to identify a preferred. Factors, and associated criteria, included natural environment, social environment, land use, transportation and economic environment. The results of this analysis and evaluation are summarized in the following tables.

Table 5.1.5-1: Analysis of Corridor Alternatives – Carlingview Alternatives

	Alternative A – Carlingview Drive Overpass	Alternative B – Carlingview Drive underpass
Transportation		
Impacts on surrounding land use on accessibility	Results in the closure of the access from the service road to Woodbine Race Track stables due to grade difference Require raising of the grade of the service road where the private access road from Carlingview Drive meets the service road Access to the Industrial establishments on the south approach to the Georgetown Corridor from Carlingview Drive will be closed	Access to the Woodbine Race Track stables will be relocated Service road round the race track will be regraded where it forms a T-junction with Carlingview Drive Access to the Industrial establishment immediately east of Carlingview Drive on approach to Georgetown Corridor tracks will be relocated
Impacts on traffic/transit/rail operations	Traffic access to the Woodbine Race Track stables from the service road around the race track will be closed Traffic access to the Industrial establishments on Carlingview Drive on approach to the Georgetown corridor is closed	Alternative access to Woodbine Race Track stables from the service road round the race track is provided Alternative access to the Industrial establishments on Carlingview Drive is provided
Summary	Alternative B – Carlingview Drive underpass provides better transportation potential with the least impact	
Cultural Environment		
Effect on heritage resource	No significant difference	No significant difference
Effect on archaeological resource	No significant difference	No significant difference
Effect on landscape composition/visual intrusion	No significant difference	No significant difference
Summary	No significant difference	

	Alternative A – Carlingview Drive Overpass	Alternative B – Carlingview Drive underpass
Economic Environment		
Effect on commercial/industrial operations	Access to the Industrial establishment on Carlingview Drive on approach to the Georgetown Corridor will be affected	Alternative access to the Industrial establishments on Carlingview Drive is provided
Effect on capital, operation and maintenance costs	Higher cost due to property impacts / purchase of property	Low potential costs – however, utility relocation could be an issue.
Summary	Alternative B – Carlingview Drive underpass provides better economic returns.	
Social Environment		
Effect on noise and vibration	No significant difference	No significant difference
Effect on communities	No significant difference	No significant difference
Effect on land use plans	Potential to interfere with future development plans at Woodbine Race Track	No significant issue
Impacts on property	Property impacts in order to accommodate the overpass	No significant issue
Summary	Alternative B – Carlingview Drive underpass provides no significant impact to Social Environment	
Natural Environment		
Effect on designated natural areas	No significant difference	No significant difference
Effect on wildlife and wildlife habitat	No significant difference	No significant difference
Effect on species at risk	No significant difference	No significant difference
Effect on local air quality	No significant difference	No significant difference
Summary	No significant difference	

Table 5.1.5-2 Evaluation of Corridor Alternatives

	Alternative A – Carlingview Drive Overpass	Alternative B – Carlingview Drive underpass
Transportation	○	●
Cultural Environment	n/a	n/a
Economic Environment	○	●
Social Environment	○	●
Natural Environment	n/a	n/a
Overall Ranking	○	●

Legend:

● Best alternative

○ Worst alternative

The Preferred Alternative

Following the analysis and evaluation shown in Tables 5.1.5-1 and 5.1.5-2, *Alternative B* was selected as the preferred alternative because of the follow:

- Although the proposal recommends regrading of the service road round the race track where it forms a T-junction with the private access road from Carlingview Drive, this can be accommodated.
- Although the existing access to the stables via the private access road from Carlingview Drive is proposed to be closed with this alternative due to grade difference, an alternative access is provided nearby.
- Although the access to the industrial establishment – immediately east of Carlingview Drive on the south approach to the Georgetown Corridor tracks – will be closed, an alternative access is currently available.

Based on the noted outcome of the analysis, *Alternative B* was carried forward as the preferred alternative.

The privately owned extension of Carlingview Drive into the Woodbine Raceway grounds will be grade separated with a new structure built under the existing rail corridor.

5.1.6 Alignment into the Airport

The Union-Pearson Rail Link will connect Union Station to Pearson International Airport using GO Transit tracks on GO Georgetown corridor from Union Station to Highway 427, combined with a new 3km spur line to the airport. The portion of track located on the GO Georgetown corridor is defined however; the 3 km spur will be the subject of alternative evaluation.

The alternatives were developed to minimize impacts to flood plains, reduce the number of watercourse crossings and utilities conflicts, and reduce the cost of construction.

An earlier developed alignment (Alternative 1) consisted of a larger curve farther north and involved three crossings of the Mimico Creek. This alignment was eliminated early in the process due to the major impacts on the watercourse and flood plains.

The following two alignment alternatives were developed and assessed in more detail (refer to **Figure 5.1.6-1**):

1. Alternative 2 – along the median of Goreway Drive; and
2. Alternative 3 – on the west shoulder of Goreway Drive.

These alternatives are in close proximity to each other and both can meet three of the five criteria used by TRCA in assessing development and infrastructure alternatives:

- Prevent risk associated with flooding, erosion or slope stability;
- Protect and rehabilitate existing landforms and features and functions; and
- Provide for aquatic, terrestrial and human access.

These alternatives would also eliminate any permanent encroachment on TRCA lands in the project area.

Impact Assessment

The alternatives were assessed against a set of qualitative criteria to identify a preferred option. Factors, and associated criteria, included natural environment, social environment, land use, transportation and economic environment. The results of this analysis and evaluation are summarized in the following tables.

Table 5.1.6-1: Analysis of Corridor Alternatives – Alignment to the Airport

	Alternative 2 – Median of Goreway Drive	Alternative 3 – West shoulder of Goreway Drive
Transportation		
Impacts on surrounding land use on accessibility	No significant difference	No significant difference
Impacts on traffic/transit/rail operations	Possible impact on traffic operations on Goreway Drive Possible safety/liability issues with the rail link operating over Goreay Drive Possible restrictions on commercial vehicle turning movements from Zahavy Way to Goreway Drive	Reduced impacts on Goreway Drive traffic operations Reduced safety/liability issues with the rail link operating over Goreway Drive Possible to implement the crossing at Zahavy Way without encroaching on sight distance
Summary	Alternative 3 – West shoulder of Goreway Drive provides the least impact to traffic operation on Goreway Drive	
Cultural Environment		
Effect on heritage resource	No significant difference	No significant difference
Effect on archaeological resource	No significant difference	No significant difference
Effect on landscape composition/visual intrusion	No significant difference	No significant difference
Summary	No significant difference	

	Alternative 2 – Median of Goreway Drive	Alternative 3 – West shoulder of Goreway Drive
Economic Environment		
Effect on commercial/industrial operations	If there are restrictions on commercial vehicle turning movements from Zahavy Way to Goreway Drive, this will affect business in the community	No significant issue
Effect on capital, operation and maintenance costs	No significant difference	No significant difference
Summary	Alternative 3 – West shoulder of Goreway Drive provides the least impact to the economic environment	
Social Environment		
Effect on noise and vibration	No significant difference	No significant difference
Effect on communities	No significant difference	No significant difference
Effect on land use plans	No significant difference	No significant difference
Impacts on property	No significant difference	No significant difference
Summary	No significant difference	
Natural Environment		
Effect on designated natural areas	No significant difference	No significant difference
Effect on wildlife and wildlife habitat	No significant difference	No significant difference
Effect on species at risk	No significant difference	No significant difference
Effect on local air quality	No significant difference	No significant difference
Summary	No significant difference	

Table 5.1.6-2: Evaluation of Corridor Alternatives

	Alternative 2 – Median of Goreway Drive	Alternative 3 – West shoulder of Goreway Drive
Transportation	○	●
Cultural Environment	n/a	n/a
Economic Environment	○	●
Social Environment	n/a	n/a
Natural Environment	n/a	n/a
Overall Ranking	○	●

Legend:

● Best alternative

○ Worst alternative

The Preferred Alternative

Alternative 3, the alignment along the west shoulder of Goreway Drive, was selected as the technically preferred alternative. The advantages of the west shoulder alignment over the median alignment include:

- an improvement to the track speed through the curve coming off the GO Transit corridor;
- reduced impacts to Goreway Drive road traffic operations;
- no (high cost) bent structures across Goreway Drive;
- reduced height of piers beyond Zahavy Way;

This alignment also addresses concerns expressed by City of Mississauga Planning and Works staff related to safety/liability issues (UPRL traffic operating over Goreway Drive traffic) and traffic operations on Goreway Drive (possible restrictions on heavy commercial vehicle turning movements from Zahavy Way to Goreway Drive), including the fact that the proposed crossing of Zahavy Way can be implemented without encroaching on the sight distance triangles at the Goreway Drive intersection.

5.2 DESCRIPTION OF THE RECOMMENDED TRANSIT PROJECT

5.2.1 Recommended Transit Project Overview

The recommended transit project includes the following improvements which will allow the provision of an all day two way express and local GO train service on the GO Georgetown South corridor. The tracks required to provide this level of GO Service as well as a separate private spur line into the airport will be used to provide the Union-Pearson Rail Link service with operations every 15 to 20 minutes throughout the day. The improvements are summarized below and outlined in greater detail in **Section 5.2.1** and **Section 5.3**:

The following mainline tracks improvements include:

- Four new GO mainline tracks between Bathurst Street and the GO Barrie (CN) line for a total of eight tracks in the corridor.
- Two new GO mainline tracks between GO Barrie (CN) line and the East limits of the West Toronto Diamond (Dupont Street) for a total of six tracks in the corridor.
- Three new GO mainline tracks between west limits of West Toronto Diamond (Dupont Street) and the existing CP Mactier line (proposed GO Bolton line) for a total of six tracks in the corridor. Two of the three existing tracks are the existing CP tracks.
- Three new GO mainline tracks between the existing CP Mactier line (proposed GO Bolton line) and the project limits (Toronto / Region of Peel) boundary for a total of four tracks in the corridor.

Details of the number of existing mainline tracks and proposed future mainline tracks can be seen in **Figure 5.2.1-1**.

An outline of all services operating along the GO Georgetown corridor is provided in Table 5.2.1-1. There are several GO Transit services which will be utilizing the corridor including the GO Georgetown, GO Milton, GO Barrie and the future GO Bolton service. A private sector operator will be operating the Union-Pearson Rail Link service.

Table 5.2.1-1: Projected Types of Trains and Hours of Operation in the Corridor

Type of Service	Type of Train	Engine	Hours of Operation
GO Transit	MP40 locomotive, plus 10 GO Transit Bi-Level cars, seating capacity 1,500.	Tier 2	6:00am-2:00am
UPRL	Self propelled Diesel Rail Cars, Two cars per train with provision for a third car. Each car equipped with two engines. Approximately 68 seats per car.	Tier 3	6:00am-2:00am
VIA	F40 PH locomotive or P42DC locomotive, plus up to eight VIA Rail passenger cars. Seating capacity approximately 450.	Tier 0 or higher	7:00am-2:00am
CN and CP	Locomotives, Horsepower 2,500 – 3,000	Tier 0	All day (Based on 4 trains/day)
	Newer locomotives, Horsepower 4,000 – 4,400	Tier 2	All day (Based on 21 trains/day)

In order to accommodate the additional tracks, one existing bridge structure at Weston Road will be replaced and widened, seventeen other bridge structures will require widening and/or structure modifications and grade separation between crossing roads and the railway will be required at seven locations. A new pedestrian crossing will be constructed at John Street in Weston. Additionally, signal bridges will be required at various locations along the corridor. The specific location of the bridges will be determined during detailed design. See Appendix J for a typical signal bridge.

The rail corridor will be lowered in two locations. The first, from Lawrence north to approximately 250m east of Weston Road, will accommodate new structures for the roadway overpasses at King Street and Church Street in Weston. A structural cover will also be included on the lowered rail corridor from King Street to Church Street. The second lowered track section will be from Bathurst Street to approximately 300m east of King Street West will allow for the Strachan Avenue roadway overpass.

GO Transit stations along the line will be at Bloor, Weston and Etobicoke North with protection for a future Station at Eglinton to connect with the proposed Eglinton LRT. The track alignment will also be designed so as not to preclude a future Woodbine Station. However this project is not seeking approval for a Woodbine Station.

Union-Pearson Rail Link will stop at Bloor and Weston Stations and at Pearson Airport Terminal 1. In order to allow for future flexibility for GO Transit to use 12 car GO trains and/or to accommodate Union-Pearson Rail Link trains, relocation, and/or extension of existing platforms will be required at Bloor GO Station, Weston GO station, and Etobicoke North GO station.

The current project does not include electrification, however it has been planned to not preclude possible electrification in the future.

The recommended engineering plans and alignment are shown in **Appendix I** on Figures 1 to 34.

5.2.2 GO Georgetown Corridor

This section describes the design and operating speeds of the trains, track requirements, structural requirements and any modifications to stations.

The construction of new mainline tracks will be based on Transport Canada Regulations, GO's Engineering Design Standards and generally in accordance with CN's Standard Practice Circulars and Recommended Methods. Continuously welded rail will be used for new mainline tracks.

Throughout the design of the new mainline tracks, the horizontal alignments have been designed to follow closely the alignment of the existing tracks. Overall the vertical profile of the tracks in the corridor have been maintained, with the exception of two sections; Bathurst Street to approximately 300m east of King Street West and Lawrence Avenue West to just east of Weston Road where the tracks have been lowered. The maximum allowable vertical slope for these tracks is 2% for both up and down grades.

The project will include the addition of mainline tracks throughout the study limits and the provision of freight service tracks as required by CN. Where possible, the mainline tracks separation has been maintained at the standard 14ft (4.3m). However in certain locations where the width of the corridor is limited track separation has been reduced to the minimum Transport Canada standard of 13ft (3.96m). The maximum operating speeds for the new and upgraded tracks are given in **Table 5.2.2-1**.

Table 5.2.2-1 Summary of Maximum Operating Speeds

Section	Controlling Factor	Maximum Operating Speeds
Union Station to Strachan Avenue	Switches and signaling; and Vertical Curvature	45 mph (72 km/h)
Strachan Avenue to Weston Road	Transport Canada Track classification 4	80 mph (128 km/h)
Weston Road to north of Highway 427	Transport Canada Track Classification 5	95 mph (153 km/h)
Between Strachan Avenue and Queen Street	Curvature	75 mph (120 km/h)
West Toronto Diamond Underpass	Vertical curvature	70 mph (112 km/h)
Weston Station	Vertical curvature	75 mph (120 km/h)

The allowed maximum operating speeds are typically higher than the day to day operating speeds for the corridor. The details of the recommended engineering plan are discussed in the sections that follow:

5.2.2.1 Bathurst Street to the GO Barrie Line

Corridor Requirements

This section will require four new GO mainline tracks; in addition to the existing four GO Transit mainline tracks, for a total of eight tracks in the corridor.

The proposed alternative for the required Strachan Avenue grade separation raises Strachan Avenue and lowers the track bed profile. This alternative minimizes the depth of excavation for the lowered rail corridor Avenue while still maintaining access to all

crossing roads from Strachan Avenue. However, access to the western driveway at the City of Toronto building at the southeast corner of the intersection with Ordinance Street would also be closed as a result of the profile raise at Ordinance Street. Additionally, parking at the front of 45 Strachan Avenue would also be eliminated.

The alternative lowers the existing track bed profile from east of the King Street overpass at a maximum 2% grade to a depth of approximately 5 metres at a new Strachan Avenue structure. Retaining walls will be used to lower the rail corridor below grade and minimize property impacts. The track bed will continue below grade to the east at a grade of 0.1% to tie back into the existing corridor just west of Bathurst Street. The additional length of the corridor below-grade is required to maintain the required rail switches between the tracks on approach to and leaving Union Station. In order to bring the rail corridor back to grade sooner would require additional vertical curves. Because rail switches cannot be located on a vertical curve there would not be sufficient space for the required switch gear. To minimize the Strachan overpass structure depth, a pier is required within the rail corridor.

To achieve 7.4 metre clearance to not preclude future electrification, this alternative proposes raising Strachan Avenue on a 4% grade from just north of the Oakville Subdivision rail corridor to cross over the Weston Subdivision rail corridor approximately 4 metres above existing grade. The roadway would then descend at a 6% grade to just north of Wellington Street/Douro Street. Retaining walls will be used to raise Strachan Avenue and minimize property impacts. Connections to all crossing roads will be maintained.

The selected Strachan Avenue grade separation is shown in **Figure 5.2.2.1-1**.

The details of the recommended plan for this section are shown in Figures 25 to 29 in **Appendix I**.

Structure Requirements

The following proposed structure requirements are subject to change and will be reviewed during detailed design.

Strachan Avenue

The existing rail crossing is an at-grade crossing. Future proposals are for grade separation, with Strachan Avenue going over the tracks and the rail corridor being lowered. The new bridge consists of a two-span structure. Concrete Box Girders will be used to reduce the structure depth as a vertical clearance of 7.4m is required. The superstructure is proposed to consist of a cast in place concrete slab on Concrete Box Girders. The 18m deck width is proposed to consist of two 4.0 m lanes, two 2.0m bike lanes, and two 3.0 m sidewalk. It is proposed that semi-integral abutment, each founded on a H-Pile be used. Due to high level of water, contiguous wall is proposed to be used in front of the abutments.

King Street

The existing King Street structure carries seven railway tracks. Preliminary review of the structure has shown that the structure can accommodate eight tracks; however the substructure may need to be reinforced in order for it to accommodate the eight tracks.

Queen Street

Existing Queen Street structure consists of four steel plate girders accommodating four tracks. Currently the City of Toronto is widening the bridge at Queen Street as part of Dufferin Jog construction to accommodate seven tracks. Preliminary surveys have indicated that it is wide enough to accommodate six railway tracks. Two additional spans will be required to accommodate the additional two tracks. Substructure is adequate for all eight tracks. No strengthening is required, as abutments are solid.

Dufferin Street

Currently there is no through structure at Dufferin Street; however the City of Toronto is constructing a bridge at the intersection to allow the southern section of Dufferin Street to be connected to the northern section. The current design plan for Dufferin Street shows the structure accommodating seven railway tracks. However, discussions are currently on going with the City of Toronto in order to add an additional track so that the new structure can accommodate eight tracks.

Brock Avenue

The existing Brock Avenue structure is a Steel Slab Plate Girder type structure carrying seven railway tracks. Preliminary review shows that the current structure needs to be widened to the north in order to accommodate the required one additional track. A centre pier will be required in the roadway to accommodate the additional track.

Lansdowne Avenue

The existing Lansdowne structure consists of six Steel Plate Girders and it accommodates six tracks. Preliminary review shows that the current structure needs to be widened to the north in order to accommodate the required two additional tracks.

The details of the preliminary recommended structures for this section are shown in **Appendix J**.

5.2.2.2 GO Barrie Line to the East Limits of West Toronto Diamond

Corridor Requirements

This section will require two new GO mainline tracks – this is in addition to the existing four GO Transit mainline tracks, for a total of six tracks.

Throughout this section, the existing track bed profile is maintained. It should be noted that the West Toronto Diamond grade separation has been approved and is under construction at present.

Structure Requirements

The following proposed structure requirements are subject to change and will be reviewed during detailed design.

Dundas Street West Underpass

The existing Dundas Street West bridge carries four lanes and two sidewalks on Dundas Street over four railway tracks. The structure consists of an eight-span, concrete slab on steel plate girder superstructure supported on concrete abutments and piers.

There is sufficient room between the existing piers to accommodate two additional tracks. It may be necessary to lower the grade of the new track in order to provide the required vertical clearance to not preclude future electrification.

Bloor Street Overpass

The existing Bloor Street bridge carries four railway tracks over four lanes and two sidewalks on Bloor Street. The bridge consists of five separate, two-span, through plate girder superstructures supported on continuous concrete abutments and a steel pier bent. Although the abutments are continuous, the superstructures are separated by gaps of about 7 m and 8.6 m, which provide space for in-filling with new bridge spans. Three of the five superstructures currently support the existing four track, while the remaining two superstructures are not in use.

Construction of a new two-span, single track, steel beam superstructure within the east gap (8.6 m wide) is proposed. The new bridge configuration will increase the track capacity to six tracks. Additionally, the eastern span will be available for future conversion to a pedestrian bridge.

Wallace Avenue Pedestrian Bridge

The existing Wallace Ave Bridge is a pedestrian bridge carrying pedestrian traffic from Wallace Ave at its east end to Dundas Street at its west end. The bridge passes over four existing tracks and consists of a three-span steel truss supported on steel and concrete pier bents.

The bridge significantly over spans the existing tracks and can readily accommodate additional tracks. Accordingly changes are proposed for this structure.

The details of the preliminary recommended structures for this section are shown in **Appendix J**.

Station Requirements

The platforms of the Bloor GO station will be extended from the existing 270m to 398m. The platform extension is to allow for future flexibility for GO Transit to use 12 car GO Transit trains as well as Union-Pearson Rail Link trains. An access will be accommodated at the station platforms to accommodate a future connection between the TTC Dundas Street West Station and the Bloor GO Station.

Other Requirements

In the section, between Dundas Street West and the West Toronto diamond, the City of Toronto took ownership of the former CP rail line. The rail line has been decommissioned and the City of Toronto is using the property to build an multi-use path (West Toronto Railpath) from Caribou Street to Dundas Street West. As part of this project some of this property will be required from the City of Toronto, between Wallace Avenue and just east of Bloor Street. However, the bicycle path will remain viable after the property acquisition.

The details of the recommended plan for this section are shown in Figures 22 to 25 in **Appendix I**.

5.2.2.3 West Limits of West Toronto Diamond to Existing CP Mactier Subdivision

Corridor Requirements

This section will require three new GO mainline tracks; in addition to the existing one GO mainline track and two existing CP mainline tracks, for a total of six tracks in the corridor.

The two existing CP mainline tracks will be maintained from the West Toronto Diamond to the CP Mactier Subdivision. However, beyond King Street to the subdivision, the existing CP mainline will be relocated to the northeast of the corridor but will continue to operate along the existing track profile.

Through this section, for the most part, the existing track bed profile is maintained. Several options were explored that would accommodate the required additional three tracks while maintaining connections at John Street, King Street and Church Street. The preferred alternative that would have the least impacts on the character of the neighbourhood would be to lower the track bed profile between Lawrence Avenue West northerly to Weston Road and provide a covered portion of the rail corridor between King Street and Church Street. By lowering the rail corridor King Street and Church Street will be maintained as roadways and John Street will provide pedestrian access. The preferred grade separations at John Street, King Street and Church Street are shown in **Figures 5.2.2.3-1 – 5.2.2.3-3**. The layout of the John Street pedestrian bridge will be determined during the detailed design phase with the opportunity for the community to provide input. Additional community input was provided during the John Street Crossing Design Charrette, for additional information please refer to **Section 3.3.2.1.1**.

At Denison Road, in order that the existing operation of Denison Road is maintained, a grade separation will be provided. A roadway underpass has been selected as the preferred alternative. The horizontal alignment of the roadway has been shifted to the north which will require properties along the north side of Denison Road between Weston Road and the rail corridor. The access road between Denison Road and Arthur Street will be closed. The existing Denison Road alignment will maintain access to the properties on the south side of Denison Road which will impact 21 and 23 Denison Road East, and 1631 Weston Road driveways. Due to the raised profile of Denison Road accesses to 42 and 46 Denison Road East will be affected. The preferred Denison Road grade separation is shown in **Figure 5.2.2.3-4**. As part of this option it is recommended that the connection from Sam Frustaglio to Denison Road be closed. This option would require signalling driveways along Denison Road and Sam Frustaglio Drive and will impact three properties.

Structure Requirements

The following proposed structure requirements are subject to change and will be reviewed during detailed design.

Rogers Road

The existing Rogers Road bridge carries four lanes and two sidewalks on Rogers Road over two railway tracks (one GO track, and one CPR track). The structure is a five-span, concrete T-beamsuperstructure supported on concrete piers and abutments.

The existing bridge can accommodate three additional track between the existing piers. Accordingly, no changes are proposed for this structure.

Black Creek/Black Creek Drive Crossings

There are three existing bridges carrying two railway tracks over Black Creek and Black Creek Drive. The two bridges on the northeast side carry one CPR track over the creek and road, respectively. These bridges will not be impacted by this project. On the southwest side, a single, seven span bridge carries one GO track over both the creek and road. This bridge consists of a steel plate girder superstructure supported on concrete piers and abutments. The piers in the vicinity of Black Creek Drive are overbuilt to accommodate expansion by a single addition track.

The proposed modification to the southwest bridge includes:

- Widening of selected piers and the abutments;
- Removal of the third and fourth existing spans from the east end of the bridge, including removal of the centre pier between these spans and conversion of the outer piers to abutments;
- Construction of a fill embankment between the converted abutments to finalize the separation of the original single bridge into two separate structures
- Erection of three new steel plate girder superstructures on the widened piers and abutments to increase the number of tracks to four.

The work would be staged in order to minimize the impact of construction on existing GO/ CNR/VIA rail service.

Eglinton Avenue

The existing Eglinton Avenue subway consists of two separate bridges carrying one railway track each (one GO track and one CPR track) over six lanes and two sidewalks on Eglinton Ave. The two bridges are separated by a 26.4 m wide gap and are connected by concrete retaining walls. The north structure consists of a concrete slab on steel girders. The south superstructure consists of steel through plate girders. Each superstructure can currently accommodate one additional track.

The proposed changes to the structure includes the modification of the existing retaining walls in between the two bridges to accommodate the support of two new track platforms and two additional track. The platforms will be supported on separate, slab on steel plate girder superstructures. The new tracks will be supported on a steel decking system supported on steel plate girders. An additional platform will be provided on the outside of the south bridge (i.e. on the south side of the bridge). This platform will be supported on a similar superstructure to the other platforms. Modification of the abutments and/or retaining walls will be required to support this exterior platform.

Ray Avenue

The existing Ray Ave structure carries three railway tracks (one GO track and two CPR tracks) over two lanes and two sidewalks on Ray Ave. The bridge consists of two separate, two-span, reinforced concrete superstructures supported on continuous concrete abutments. The concrete piers are not continuous between the separate decks. The decks are separated by a 26.4 m wide gap, which provides space for in-filling with new bridge spans. The north deck carries two tracks and the south deck carries a single track. The south track can accommodate one additional track.

The proposed changes to the structure include the modification of the existing abutments between the two bridges to accommodate three new tracks. Each new track will be supported on precast concrete girders. The existing pier supporting the south bridge will be extended to support the new girders in the median on Ray Ave. The finished structure will still support the addition of one future track on the south side of the bridge.

Jane Street

The existing Jane Street structure carries four vehicle lanes and two sidewalks on Jane Street over three railway tracks (one GO track and two CPR tracks). The structure is a fourteen-span, concrete slab on steel plate girder bridge supported on concrete piers and abutments.

The existing bridge can accommodate three additional track between the existing piers. Accordingly, no changes are proposed for this structure.

Denison Road

The existing railway crossing is an at-grade crossing of three railway tracks (one GO track and two CPR tracks) and Denison Road. It is proposed to grade separate the crossing by depressing Denison Road below the tracks by constructing two bridges to carry the tracks over the road. Each bridge will consist of a two-span, post-tensioned concrete deck slab supported on concrete piers and abutments. Additionally, concrete retaining walls will be required along Denison Road to facilitate the grade separation of the crossing. A minimum vertical clearance of 5m will be required under the new bridges. A Preliminary geotechnical investigation indicated the presence of bedrock at approximately 5 metres below the original ground. The preliminary foundation recommendation is for piled foundations.

Construction would be staged to ensure that existing train operations can be maintained at all times. As a result, it is anticipated that all rail service would be maintained on the CPR tracks during the construction of the south bridge. Service would then be switched to the south bridge, for the construction of the north bridge. This staging is subject to change and will be confirmed during detailed design.

A cycle lane is not proposed at Denison Road, however to provide a safe environment for bicyclist, roadway width would be implemented at 4.3 m. A 3m wide sidewalk would also be proposed on either side.

Lawrence Avenue

The existing Lawrence Ave structure utilizes two bridges to carry three railway tracks (one GO track and two CPR tracks) over four lanes and two sidewalks on Lawrence Ave. Each structure consists of a two-span reinforced concrete bridge supported on concrete abutments and pier. The north bridge will not be impacted by the project.

The proposed changes to the south bridge include the addition of two new tracks on the north side of the bridge, and three new platforms. The new tracks and platforms will be supported on new steel plate girder decks supported on the modified retaining walls between the existing bridges.

John Street Pedestrian Bridge

The existing railway crossing is an at-grade crossing. The preferred alternative for John Street is to close the street at the rail tracks. A pedestrian / bicycle bridge is proposed to be constructed. The pedestrian bridge ramp is proposed to have a grade of 5% in conformation with Ontario Bikeways Planning and Design Guideline (clause 5.1.2.3) and to ensure wheelchair accessibility. The final layout of the pedestrian bridge will be determined during the detailed design phase with the opportunity for the community to provide input. Additional community input was provided during the John Street Crossing Design Charrette, for additional information please refer to **Section 3.3.2.1.1**.

King Street

The existing railway crossing is an at-grade crossing. The future proposal for King Street is to provide grade separation by lowering the rail corridor below the level of the road. A bridge is proposed to carry two lanes on King Street over four mainline tracks - the CPR tracks would stay at existing grade. The proposed bridge would be a single-span (21 m) structure. The superstructure would consist of a 175mm concrete slab on B700 precast concrete box girders. It is proposed that the 14.7m deck width would consist of two 4m lanes and 3m sidewalks.

A preliminary geotechnical investigation indicated that the elevation of the bedrock is approximately 5 metres below original ground. The lowered rail corridor will be enclosed by a covered top between King Street and Church Street.

Church Street

The existing railway crossing is an at-grade crossing. The future proposal for this location is to provide grade separation by lowering the rail corridor below the level of the road. A bridge is proposed to carry two lanes on Church Street over four mainline tracks - the CPR tracks would stay at existing grade. The proposed bridge would be a single-span (21 m) structure. The superstructure of the bridge would consist of a 175mm concrete slab on B700 precast concrete box girders. It is proposed that a 13.0m deck width would consist of two 3.5 lanes and 3m sidewalks.

A preliminary geotechnical investigation indicated that the elevation of the bedrock is approximately 5 metres below original ground. A vertical clearance of 7.4 meter is provided to not preclude future electrification.

The details of the preliminary recommended structures for this section are shown in **Appendix J**.

Station Requirements

The existing Weston GO Station at John Street needs to be shifted easterly from about Lawrence Avenue West structure to 330m east of Lawrence Avenue West. With the proposed lowered rail corridor between Lawrence Avenue West and Weston Road, the profiles of the new track bed could not be aligned to the track bed at the existing station, therefore necessitating the need to shift the station to where the profiles of the new track bed can align to the existing track bed profile. The new station is designed to be 398m long to allow for the future flexibility for GO Transit to use 12 car GO trains and the Union-Pearson Rail Link trains. A pedestrian access to the new station will be provided for in the new station design.

The Metrolinx Regional Transportation Plan proposes a future Gateway Hub at Eglinton Avenue to provide a transfer with the proposed Eglinton LRT. This project will be designed to allow a future GO Station to be linked to a future Eglinton LRT station. The GO Station location will be determined through discussions during the ongoing Eglinton LRT EA. The future Gateway Hub will be the subject of a future study and approval process.

The details of the recommended plan for this section are shown in Figures 11 to 19 in **Appendix I**.

5.2.2.4 Existing CP Mactier Subdivision to Project Limits

Corridor Requirements

This section will require three new GO mainline tracks; in addition to the existing one GO mainline track, for a total of four tracks in the corridor.

Throughout this section, the existing track bed profile is maintained.

Structure Requirements

The following proposed structure requirements are subject to change and will be reviewed during detailed design.

Weston Road

The existing Weston Road structure carries two railway tracks over four lanes and two sidewalks on Weston Road. The structure is proposed to be widened to the north in order to accommodate three additional tracks. The new structure is proposed to be a concrete box girder bridge. Widening and/or replacement of the existing piers and abutments would be required.

Humber River

The existing Humber River structure is a nine-span bridge carrying one railway track. The structure is proposed to be widened to the north in order to accommodate three additional tracks. The new structure is proposed to be a slab on steel plate girder. Widening of the existing piers would be required.

Weston Golf Tunnel

The existing Weston Golf Tunnel is currently an at grade crossing. The culvert is proposed to be extended to the north to accommodate two additional tracks and to the south to accommodate one more additional track. The new structure is proposed to be precast.

Islington Avenue

The existing Islington Avenue structure is a three-span bridge carrying six lanes and two sidewalks on Islington Ave over two railway tracks. The existing tracks will be realigned to fit one additional track between the piers. A retaining wall will be constructed in the south end span to create room for an additional track in this span.

Highway 401

The existing Highway 401 structure consists of a concrete rigid frame bridge, carrying 20 lanes of Hwy 401 traffic over two railway tracks. The bridge can accommodate an additional tracks without modification. A new tunnel under Hwy 401 running parallel to the rigid frame bridge is proposed in order to provide for a fourth track. Top down construction methods would minimize the impact of construction of the tunnel on Hwy 401 traffic.

Kipling Avenue

The existing Kipling Avenue structure is a two-span bridge carrying two railway tracks over six lanes and two sidewalks on Kipling Ave. Widening of both the north and south sides of the bridge is proposed in order to accommodate two additional tracks and two platforms.

Martin Grove Road

The existing Martin Grove Road structure is a two-span bridge carrying three railway tracks over four lanes and two sidewalks on Martin Grove Road. Widening of both the north and south sides of the bridge is proposed in order to accommodate three additional tracks.

Highway 27

The existing Highway 27 structure is a four-span bridge carrying three railway tracks over 5 lanes and two sidewalks on Highway 427. Widening of both the north and south sides of the bridge is proposed in order to accommodate two additional tracks.

Carlingview Drive

The existing railway crossing is an at-grade crossing. The future proposal for Carlingview Drive is to provide a grade separation with Carlingview Drive passing under the railway tracks. The new bridge is proposed to consist of three, single-span underpass structures with span of 16.8m. A minimum vertical clearance of 5 m would be required under each bridge. Each bridge would consist of a reinforced concrete slab supported on piled, concrete abutments. The south bridge would accommodate two air rail link tracks and the other two bridges would accommodate six railway tracks between them. Additionally, the bridges would accommodate two railway platforms.

Highway 427

The existing structure at Highway 427 is a three-span bridge carrying Hwy 427 over three existing railway tracks. Realignment of the existing tracks is proposed to accommodate a fourth track between the piers. An additional two tracks are proposed for the south span and a single additional track is proposed for the north end span. Construction of retaining walls in the end spans would be required to create room for the tracks in the end spans.

The details of the preliminary recommended structures for this section are shown in **Appendix J**.

Station Requirements

As part of the proposals plan, the existing Etobicoke North GO station is proposed to be shifted westerly so that it is closer to the existing GO Station parking. The recommended plan also proposes to add an additional platform to the existing single platform. As the Union-Pearson Rail Link is not proposed to stop at Etobicoke North GO Station, the new platform length will be only 315m to allow for future flexibility for 12 car GO trains.

This project is not seeking approval for a Woodbine Station; however, it will be designed so as not to preclude a future station. If a station at Woodbine is proposed at some point in the future it will be the subject of a future study and approval process.

The details of the recommended plan for this section are shown in Figures 1 to 11 in **Appendix I**.

5.2.3 Union-Pearson Rail Link

The GO Georgetown South service expansion presents an opportunity to provide a greatly improved rail service to Canada's largest airport (Pearson International Airport) from Canada's busiest service transportation hub (Union Station).

It is proposed that the Union-Pearson Rail Link will operate on the GO Georgetown South corridor from Union Station to Highway 427 and then spur off west of the Highway 427 structure on an elevated structure up to the proposed new terminus station at Terminal One – adding approximately 3 km of track. UPRL passengers destined to Terminal Three will have the opportunity to interchange with the existing Airport People Mover, which currently terminates at Terminal 1 immediately adjacent to the proposed UPRL station.

In terms of service operations, the Union-Pearson Rail Link services is planned to operate every 15 to 20 minutes throughout the day. The details of the recommended plan for the Union-Pearson Rail Link is shown in Figures 30 to 34 in **Appendix I**.

Corridor

Approximately 40% (1.2 km) of the Spur Line is at or beneath existing grade and the remaining 60% (1.8 km) is elevated. The elevated structure features average span lengths of 33 m and an average guideway height of approximately 12m, with a maximum height of 24 m. At-grade portions of the guideway will be built using slab-on-grade construction. Depressed portions will require adjacent retaining walls but will generally remain open to daylight above.

Trains on the Spur Line enter and leave the GO Georgetown South corridor near its intersection with Highway 427. A double track spur line starts to climb at 2.2% in order to elevate and cross Goreway Drive. It remains elevated until it crosses Mimco Creek and immediately beyond the creek it returns to grade. The double track spur line then travels through the Operations Management Centre (OMC). Immediately beyond the OMC, the guideway becomes a single track line and is depressed below grade in order to traverse beneath Network Road. Just beyond Network Road, the guideway begins its steepest grade, a 4% climb that extends 250 m in length and transitions to an elevated structure at the 300 m point.

The grade then reduces to 3% for approximately 750 m and crests at a vertical curve just before the station after crossing numerous roads and dual levels of freeway.

From the crest of the vertical curve, the train descends towards the T1 New Station at the Airport where it terminates.

It is proposed that the UPRL service will have 11 vehicles at the outset. On a daily basis using 2-car trains, 4 trains will be running in the corridor, one train will be available for service recovery in the event of a failure, and a spare (single) vehicle will be available for insertion on an emergency replacement basis.

Structure Requirements

The guideway will be of concrete construction with short side walls and will have a metal 600 mm wide walkway, with open handrail, along one side.

In addition, the spur line is proposed to cross the following municipal roadways:

Table 5.2.3-1 Road Crossing the Rail Corridor

Roadway	Crossing Type	Road Authority
Goreway Drive	Grade separation (over)	City of Mississauga
Zahavy Way	Grade separation (over)	City of Mississauga
Network Road	Grade separation (under)	GTAA
Viscount Road	Grade separation (over)	City of Mississauga
Airport Road	Grade separation (over)	Region of Peel
Highway 409 Ramps	Grade separation (over)	GTAA
Silver Dart Drive	Grade separation (over)	GTAA
T1 and T3 Access Roads	Grade separation (over)	GTAA

The spur line design has been designed to not preclude future electrification.

Stations Requirements

The Union-Pearson Rail Link trains are planned to depart Union Station and stop at Bloor GO Station, Weston GO Station and then terminate at Terminal One of Pearson Airport.

Union, Bloor and Weston stations are existing stations – as part of the Union-Pearson Rail Link, a new station will be constructed at Terminal One, Pearson Airport, to cater for the rail link.

Operations Management Centre (OMC)

The Union-Pearson Rail Link Operations Management Centre (OMC) will be situated on the Spur Line alignment between north of Northwest Drive and Network Road (refer to

Figure 32 in **Appendix I**). There are four primary functions that will be carried out at the OMC:

1. Management of the Rail Link operations:
 - Use of typical office space, meeting rooms and clerical support activity
2. Vehicle storage
 - up to 18 rail vehicles ultimately – 11 to start service;
 - vehicles will be in single-, double- or triple-vehicle consists (trains);
 - enough linear exterior trackage will exist to hold all vehicles at a single time, including the ability to access (switch) any desired vehicle;
 - this maximum storage will occur daily (0100h until 0530h; 7 days per week);
 - between 0530h and 0100h (next day), a limited number of vehicles will be stored. Initially, this will include a 2-vehicle consist, crewed and ready for immediate insertion into the operating cycle to prevent or provide service recovery in the event of a failure. Ultimately, it is expected that this will be a 3-vehicle consist.
 - one vehicle will be held for detailed servicing on a daily basis. Once 18 vehicles are in service, 3 cars will be held daily;
 - Vehicles will be stored in train sets ready for service. Train heating/cooling – diesel start capability will be monitored and maintained by trackside/wayside monitoring stations;
 - storage for regular service, initially:
 - 5 X 2-vehicle consist
 - 4 trains in cycle
 - 1 train hot standby
3. Operation Maintenance (day-to-day) – Unless otherwise stated, these activities will occur on the inspection tracks located on the interior of the OMC, one train at a time.
 - performance of applicable regulatory train brake tests;
 - examination and testing of engines, air brakes, disk brakes, emergency brakes, emergency response systems, radios, lights, safety devices and customer comforts;
 - review of any difficulties or failures on each vehicle from the previous 24 hour operation;
 - full clean of interior of each vehicle:
 - full clean of exterior of each vehicle on a 3 day cycle. Exterior cleaning will occur in a cleaning shed (open at each end) with a serial cleaner: water application, soap (acid based) application, scrub brushing and rinsing with full fluid recovery. The washing bays will include a grey water collection system (no discharge to surface runoff system);
 - fuelling of each vehicle (one tank per vehicle, with sufficient fuel to operate the vehicle for 24 hours – fuel tank size dependent upon final vehicle selection). No fuel will be stored on the OMC site. Fuelling by trucks from off-site supply depots

will occur at a designated OMC location (at the maintenance facility) outfitted with an apron larger than individual UPRL vehicles (or train consists, as final design permits), and an associated catch basin system for recovery of any fuel spillage. This location would be close to the entrance where fuelling can occur in an area isolated from buildings and the main ladder track (vehicle storage) area of the yard, which will provide enhanced safety/security (fuel trucks do not have to travel very far into the operational area of the yard) and minimize access road space dedicated to the refuelling operation. The catch basins or drip trays will be constructed for capture/retention, retrieval (self-recovery system) and recycling of residual petroleum hydrocarbon products.

4. Long term/heavy maintenance (monthly, quarterly and annual) - Unless otherwise stated, these activities will occur on the inspection tracks located on the interior of the OMC, one train at a time, focused on the applicable regulatory equipment tests.
 - includes a series of inspections and tests of equipment prescribed by Transport Canada, including testing of the Air Brake System, Emergency Brake System, Warning Devices (horn, bells, lights, flashing lights, step lights, door activation lights, interior escape lighting, door activation), and replacement of First Response Equipment;
 - change out of various oils, filters and other consumables, preparation of oil samples for laboratory analysis. Catch basins or drip trays will be constructed for capture, retention and retrieval (self-recovery system for recycling residual petroleum products);
 - at specified intervals, includes the removal and replacement of vital air brake equipment (e.g., air brake valve at specified year);
 - heavy maintenance will be performed for two specific recoveries:
 - Incident Recovery - If the equipment is involved in an incident where damage occurs to the vehicle, the vehicle will be repaired on the OMC site, unless it is in a state that cannot be handled at the OMC. Work would typically involve repair of exterior skin, including welding, patching, drilling, reforming stainless steel exterior, glass replacement; and repair or replacement of all rolling stock elements (coupler, yoke, bogie (truck) reconstruction, power source, transmission, wheels and interior repairs). Includes self-recovery and recycling of usable material.
 - Life Cycle Recovery - when the equipment reaches a specific age (estimated at 15-year intervals), the vehicle will receive a retrofit and upgrade, unless it is in a state that can not be handled at the OMC. Work would typically involve replacement of vital operating elements, including air brake systems, trucks, couplers, engines, compressors, electrical equipment, interior outfitting; critical elements, including skin/body replacement; wheel-axle pressing (outsourced to a specialist); painting (outsourced to a specialist); and metal testing (outsourced to a specialist). Includes self-recovery and recycling of usable material.

5.3 IMPLEMENTATION AND CONSTRUCTION STAGING

5.3.1 Implementation

Assuming that the provincial and federal environmental approval for the transit project is obtained, the start of the construction of this project is anticipated for late 2009 with completion anticipated by 2015.

Currently the service in the GO Georgetown South Corridor operates on between one and four mainline tracks within the study corridor and an additional three to four tracks will be added to the corridor. In corridor excavation areas (Weston and Strachan), will require one side of the corridor to be lowered and new tracks installed, existing service will shift to new lowered track while other portions of the excavation are completed. GO service will be maintained at all times and any shifting of service from existing to new tracks will only be carried out during short duration service stoppages.

Temporary fencing will be used at all times to separate construction work zones from active rail service. Extensive flagging will be required throughout the work. All work will be carried out in accordance with current CNR, CPR and GO Transit practices and procedures.

5.3.2 Construction Staging Overview

General

The project is approximately 20 km long with an additional 3 km long spur into the Airport for the Union-Pearson service. In order to accommodate the additional tracks in the Georgetown South corridor, one existing bridge structure will be replaced and widened; seventeen other bridge structures will require widening and/or other structure modifications; and, seven new grade separations at existing at-grade crossings will be required. Additionally, a new pedestrian crossing will be constructed at John Street in Weston. Construction will be taking place at various locations in the corridor at the same time but the actually staging sequence along the line will be determined during the next phase (detailed design) of the project. During construction there is a potential for temporary road closures at the specific bridge location.

The proposed construction staging and detailed methods of construction within the four most complex construction zones (Highway 401, Weston, Dennison Road, and Strachan Avenue) along the corridor will be developed during the detailed design phase for this project. The work within these four zones is summarized below:

- New, Single Track Tunnel Under Highway 401.
 - o One additional track will be added in the existing railway underpass under Highway 401, for a total of three mainline tracks.
 - o Construction of a new single track tunnel under Hwy 401, immediately west of the existing track tunnel under Hwy 401
- Lowering of Rail Corridor in Weston
 - o Staged lowering of the rail corridor into a walled trench from Lawrence Avenue West to Weston Road (CPR track to remain at grade);
 - o Expansion of the rail service from 1 tracks to 4 tracks

- o Grade separation of the existing at-grade crossings at King Road and Church Street
 - o Closure of the existing at-grade crossing at John Street to vehicular traffic and construction of a pedestrian bridge over the lowered rail corridor.
 - o Enclosure of the lowered rail corridor with a cover between King Street and Church Street.
- Lowering of Denison Road Under the Rail Corridor
 - o Properties will be purchased for the diversion of the Denison Road alignment
 - o Denison Road will be reconstructed on a revised alignment in a walled trench under the railway corridor
- Lowering of Rail Corridor at Strachan Avenue
 - o Staged lowering of the rail corridor into a walled trench from west of Bathurst Street under Strachan Avenue to east of King Street
 - o Expansion of the rail infrastructure from four tracks to eight tracks
 - o Construction of a new Strachan Avenue overpass over the lowered railway corridor.

Construction of the proposed new tracks and infrastructure may be constructed in stages and not all part of the initial construction.

Tab 6: 6.0 Impacts, Mitigation and Monitoring

→ Insert **Tab 6 → 6.0 Impacts, Mitigation and Monitoring**

6.0 DETAILED ASSESSMENT OF THE IMPACTS, PROPOSED MITIGATION AND MONITORING OF THE GEORGETOWN SOUTH SERVICE EXPANSION AND UNION-PERSON RAIL LINK PROJECT

6.1 PHYSICAL ENVIRONMENT

6.1.1 Terrestrial Environment (vegetation, wildlife, habitat, breeding birds and wetlands)

6.1.1.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

Vegetation clearing (and associated habitat removal) required to accommodate the rail expansion and all associated facilities is the primary direct effect related to construction. This includes vegetation removals to accommodate grading, drainage design, temporary road access, watercourse crossings and general construction activities. In some cases the direct removal of forest vegetation often has the secondary effect of creating new forest edges that expose the retained vegetation to the impacts of increased light, noise, wind and sun.

In addition to the impacts described above, the construction of the rail expansion may result in the following adverse impacts:

- Vegetation clearing/damage beyond the working area.
- Release of construction-generated sediment to adjacent vegetation areas.
- Spills of contaminants, fuels and other materials that may reach natural areas.

While these are noted as possible adverse impacts that may occur during construction, they can largely be avoided and/or mitigated through the standard mitigation measures outlined below.

Rail construction can have a number of direct impacts on wildlife. Direct construction impacts are generally associated with:

- **Habitat Loss or Modification** - Loss of wildlife habitat or reduction of wildlife habitat quality by removal of vegetation or features used for shelter, feeding and/or breeding and/or physical destruction and/or severing of habitat areas. The specific implications of the habitat removal are reviewed below.
- **Wildlife Mortality** - construction typically involves the clearing of existing vegetation, and the removal of overburden (grubbing). All activities require the operation of heavy machinery. These activities have some potential for wildlife injury or mortality within the construction zone. Wildlife species vary in their vulnerability to construction-related mortality. Three factors largely determine the potential for wildlife to be affected: 1) wildlife sensitivity to human

disturbance; 2) wildlife vagility (i.e., an individual's inherent power of movement; and 3) the timing of construction activities.

Species that are sensitive to disturbance and are capable of departing areas of increased human activity (i.e., most mammals and birds) are less likely to be affected by rail construction. Species that avoid humans through mechanisms other than flight (e.g., crypsis) and/or move too slowly to flee disturbance (such as small mammals and some herpetofauna) are at some risk from construction activity.

Timing also determines the vulnerability of wildlife to construction-related mortality. The greatest potential for adverse impacts is during the spring and summer, when migratory birds are present in the Study Area, when most species (particularly mammals and birds) are rearing young in nests, burrows or dens, and when all species are most active, thus increasing their potential to enter into the construction zone.

Wildlife vulnerability to construction is reduced during the fall and winter because migratory birds have left the Study Area, young-of-the-year have dispersed from nests, burrows and dens, and remaining species are generally less active and thus less likely to move into the construction zone.

- Impacts on Animal Movement - Terrestrial wildlife species will vary in their response to crossing the construction zone. Most tolerant species will continue to cross, but will likely adapt their movements to non-construction periods. Less mobile species may be deterred at some locations, and may seek other routes. Adjustments and changes can be anticipated during the construction period.
- Other potential impacts, including indirect or temporary disturbances to vegetation, habitat and wildlife generally as a result of construction activities include:
 - Potential disturbance to adjacent vegetation outside the construction footprint during clearing, or as a result of temporary construction storage activities.
 - Potential disturbance or accidental harm to wildlife or nesting birds encountered during construction. Although most wildlife will move away from the area during construction, smaller, less mobile animals could be affected, as well as nesting birds and their eggs or young. The *Migratory Birds Convention Act* (MBCA) prohibits harm to migratory birds and their nests, eggs and young.
 - Possible spread of invasive species with the movement of topsoil, live plants and other seed sources across the project limits.
 - Possible spills (fuel, oil, other construction products) that could reach natural vegetation areas.
 - Changes in drainage patterns (groundwater and/or surface runoff flow) that can affect dependant vegetation/wetland areas located either upgradient or downgradient of the ROW.
 - Increased light, noise, wind and sun exposure within the newly created edges of adjacent forest communities. These impacts can lead to vegetation dieback,

changes in the ground flora composition, windthrow, and/or spread of invasive species.

These potential impacts can be managed using standard construction-related mitigation measures and are summarized further in the section.

Vegetation removals will be required from disturbed cultural meadow vegetation found throughout the ROW. Tree and shrub cover is generally less than 25%. Dominant species include Siberian Elm, Staghorn Sumac, Tartarian Honeysuckle, Norway Maple, Manitoba Maple, Buckthorn, hawthorn, Riverbank Grape, Wild Red Raspberry, non-native grasses (e.g. Smooth Brome Grass, Timothy, Kentucky Bluegrass) and old field herbs including Queen Anne's Lace, Common Milkweed, Elecampane, Butter-and-eggs, Curly Dock, White Sweet Clover, Common Motherwort, Lesser Burdock, asters and goldenrods.

Wet areas within the ROW are typically dominated by cattail, Reed Canary Grass, Purple Loosestrife and Common Reed. An area of concentrated tree and shrub regeneration located within the ROW south of the Roger's Road overpass will be affected by removals. It is dominated by species typical of the ROW as listed above. Vegetation removals may be required from a series of planted hedgerows that run parallel to the ROW along the south side of the Woodbine Race Track. Dominant species are Eastern Cottonwood and Norway Spruce, with occasional White Spruce also noted. Ground layer vegetation in this area is maintained as mowed lawn.

Additional impacts to wildlife during construction and operation will be limited, since urban adapted wildlife present will likely be tolerant of noise and light associated with operation of the existing rail facility.

No area specialized or sensitive wildlife habitat features have been identified within or directly adjacent to the rail corridor (such as forest interior habitat, deer wintering habitat).

No SAR wildlife or habitats were recorded within or adjacent to the Mimico Creek Spur Line crossing.

Implementation of standard mitigation measures, in accordance with the Migratory Birds Convention Act (MBCA), will protect nesting migratory birds from direct construction impacts.

Black Creek

Permanent vegetation removals will be required within the footprint of the new piers. Additional temporary vegetation removals may be required within the existing ROW to accommodate construction access and staging. Vegetation removals will be restricted to vegetation unit BC1. This vegetation community is culturally influenced, heavily disturbed and dominated by non-native species. Dominant species include Manitoba Maple, Siberian Elm, Crack Willow, Buckthorn, Staghorn Sumac, willow shrubs, Western Poison Ivy, Wild Red Raspberry, Thicket Creeper, grass and Bouncing-bet. A small patch of Great Ragweed, a species considered rare in the Greater Toronto Area (Varga et al. 1999) was observed near the top of slope on the southeast bank of the creek and may be removed during construction. This species is commonly encountered in the City of Toronto by Ecoplans ecologists in similar environments.

Two species considered uncommon in the City of Toronto (Varga et al. 1999) (Common Evening-primrose and Peach-leaved Willow) were observed near the creek banks and may be removed during construction. Peach-leaved Willow also has a TRCA L-rank of L4 (of concern in the urban matrix but able to withstand some disturbance). Both species are commonly encountered in the Greater Toronto Area. No impacts to any other locally or regionally rare species observed at Black Creek are anticipated.

The habitat affected is generally low quality and is common and abundant in this type of urban landscape, throughout the Greater Toronto Area. The portion of the Black Creek valley vegetation being removed has been previously altered by rail corridor construction, operation and maintenance and can easily be created elsewhere (e.g. through enhancement in Keelesdale Park).

No area specialized or sensitive wildlife habitat features have been identified within or directly adjacent to the rail corridor (such as forest interior habitat, deer wintering habitat).

No SAR wildlife or habitats were recorded within or adjacent to the Black Creek rail crossing.

The expanded rail corridor does not remove or encroach into any known active amphibian breeding sites.

Linkages to surrounding habitat nodes and corridors (large forested patches or valley systems) are weak due to the urban landscape although the Black Creek valley provides opportunities for local wildlife movement within and to/from Keelesdale Park. The current design of the Black Creek crossing is large enough to maintain suitable passage for all species potentially using the valley, including potential deer use. It is worth noting that downstream portions of Black Creek are channelized with concrete banks resulting in long sections with minimal riparian vegetation and therefore poor quality habitat. While the new Black Creek structure will continue to provide passage opportunities, habitat downstream remains very limited.

Migratory birds that may nest in and adjacent to the proposed construction zone can be impacted if construction occurs during the breeding season. Implementation of standard mitigation measures, in accordance with the Migratory Birds Convention Act (MBCA), will protect nesting migratory birds from direct construction impacts.

Birds are highly mobile and species that may nest in vegetation to be removed will lose habitat. However, any affected habitat types are well represented within the Study Area and beyond.

Additional impacts to wildlife during construction and operation will be limited, since the urban-adapted wildlife present will likely be tolerant of noise and light associated with operation of the existing rail facility.

Humber River

Minor and localized vegetation removals will be required on the east bank of the Humber River (Vegetation Unit HR1) north of the existing bridge existing abutment. Dominant species in this area include Manitoba Maple, Sugar Maple, Norway Maple, American Elm, Siberian Elm, Black Walnut, Choke Cherry, Tartarian Honeysuckle, Garlic Mustard, Heart-leaved Aster, Prickly Lettuce, Dog-strangling Vine and Broad-leaved Goldenrod.

Three species considered rare or uncommon in the City of Toronto or the Greater Toronto Area (Varga et al. 1999) may be directly affected by vegetation removals at this location. Running Strawberry-bush is considered rare in the City of Toronto and has a TRCA L-rank of L3, (of concern regionally; generally secure in natural matrix; able to withstand minor disturbance). This species is commonly encountered in the Greater Toronto Area and is present in other communities on the Weston Golf and Country Club property outside the project limits. Carolina Rose is considered Rare in the City of Toronto and the Greater Toronto Area and has a TRCA L-rank of L3. Swamp Milkweed is considered uncommon in the City of Toronto and has a TRCA L-rank of L4.

Minor and localized vegetation removals will be required from the highly disturbed riparian forest band on the west bank of the Humber River (Vegetation Unit HR2). Removals occur north of the existing bridge in an area with abundant standing snags, deadfall logs, invasive species colonization, and generally poor health of the vegetation community. Dominant species include Siberian Elm, Crack Willow, Manitoba Maple, Buckthorn, Riverbank Grape, Choke Cherry, Dog-strangling Vine and grass. Two species considered uncommon in the City of Toronto may be removed. Common Evening-primrose and Virginia Stickseed were both observed in small quantities and are both commonly encountered in the Greater Toronto Area. One species with a TRCA L-rank of L4 (American Bugleweed, of concern in the urban matrix but able to withstand some disturbance) will be removed. American Bugleweed also occurs outside of removal areas along the river banks. This species is commonly encountered in the City of Toronto and the Greater Toronto Area.

Vegetation removals will be required on the west valley slope (HR 3). The vegetation on the west valley slope is highly disturbed and dominated by invasive species. Dominant species include Riverbank Grape, Staghorn Sumac, Wild Red Raspberry, Manitoba Maple and Dog Strangling Vine. One species, Virginia Stickseed, is considered uncommon in the City of Toronto and may be removed. Virginia Stickseed is commonly encountered in the Greater Toronto Area. Several Black Walnut reaching approximately 30 cm DBH are located near the bottom of the existing railway berm. Depending on the extent of grading and filling required for the rail corridor expansion, these trees may be impacted by direct removals and/or branch trimming, or indirect impacts associated with grading and filling within the root zone which could impact long term health of the trees. Potential impacts to this unit will be assessed during later design phases as information on the extent of grading limits in this area becomes available.

Vegetation removals may be required from the edge of a disturbed young White Elm lowland deciduous forest inclusion (HR5 inclusion) that is contained within the ROW north of the railway tracks and west of the Humber River valley. Dominant species are American Elm and White Ash with sparse pockets of Running Strawberry-bush and Dog-strangling Vine. This unit is contiguous with a small remnant Sugar Maple – Oak deciduous forest patch to the north (HR5). Depending on the extent of grading and filling required north of the existing track, some trees near the edge of vegetation unit HR5 may be impacted by direct removals and/or branch trimming, or indirect impacts associated with grading and filling within the root zone. Potential impacts to this unit will be assessed during later design phases as information on the extent of grading limits in this area becomes available.

The habitat affected is generally low to moderate quality and is common and abundant along the Humber River and along most major watercourse systems throughout the

Greater Toronto Area. The portion of the Humber River valley vegetation being removed has been altered by previous rail corridor construction, operation and maintenance as well as by the golf course construction and operation and can easily be reinstated or created elsewhere along the Humber River (e.g. through enhancement).

No area specialized or sensitive wildlife habitat features have been identified within or directly adjacent to the rail corridor (e.g., forest interior habitat, deer wintering habitat).

No SAR wildlife or habitats were recorded within or adjacent to the Humber River rail crossing.

The expanded rail corridor does not remove or encroach into any known active amphibian breeding sites.

The important wildlife linkage function that the Humber River valley currently provides will not be impacted by the rail corridor expansion. The proposed expansion of the existing high level bridge will provide the same degree of 'valley openness' and will continue to provide opportunities for wildlife movement.

Migratory birds that may nest in and adjacent to the proposed construction zone can be affected if construction occurs during the breeding season. Implementation of standard mitigation measures, in accordance with the Migratory Birds Convention Act (MBCA), will protect nesting migratory birds from direct construction impacts.

Birds are highly mobile and species that may nest in vegetation to be removed will lose habitat. However, any affected habitat types are well represented within the Study Area and beyond.

Potential impacts to fisheries are discussed in **Section 6.1.2**.

Mimico Creek

Vegetation removals within the Mimico Creek valley will be minimal due to the alignment of the spur-line along the southwest side of Goreway Drive. Vegetation removals will be required from cultural meadow vegetation along the roadside and within the valley, and from woody riparian vegetation at the proposed creek crossing.

Affected cultural meadow vegetation is dominated by non-native grasses and disturbance tolerant herbs with sparse shrub cover. Dominant species include Smooth Brome Grass, Kentucky Bluegrass, Queen Anne's Lace, asters, goldenrods, Russian Olive, hawthorn, and Tartarian Honeysuckle.

Several young Eastern Red Cedar, considered rare in the City of Toronto and the Greater Toronto Area, are located along the eastern valley slope adjacent to Goreway Drive and will be removed. This species has a TRCA L-rank of L5, (generally secure throughout jurisdiction, including urban matrix) and is able to withstand high levels of disturbance. Eastern Red Cedar specimens observed along the roadside may have been planted.

Vegetation removals will be required from the band of woody riparian vegetation at the proposed crossing location. Dominant species include willow shrubs (*Salix* sp), Balsam Poplar, Russian Olive, Red-osier Dogwood, Riverbank Grape and Wild Red Raspberry. Trees vary in size but are generally less than 10 cm dbh and 8 m tall. Three tree-sized Balsam Poplar (up to 40 cm dbh and 14 m tall) are located above the gabion baskets east of the creek in the vicinity of the proposed crossing and may be removed.

Additional impacts to wildlife during construction and operation will be limited, since encroachment into the Mimico Creek valley will be minimal. The habitat affected is generally low quality and is common and abundant along the Mimico Creek valley generally. The vegetation being removed has been altered by previous road construction works as well as flood protection works within the valley and can be reinstated or created elsewhere along the Humber River (e.g. through enhancement).

No area specialized or sensitive wildlife habitat features have been identified within or directly adjacent to the rail corridor (such as forest interior habitat, deer wintering habitat).

No SAR wildlife or habitats were recorded within or adjacent to the Mimico Creek spur line crossing.

The spur line does not remove or encroach into any known active amphibian breeding sites.

Wildlife movement through the Mimico Creek valley should not be hindered since the spur line will be on an elevated structure that will maintain 'permeability' through the valley.

Migratory birds that may nest in and adjacent to the proposed construction zone can be affected if construction occurs during the breeding season. Implementation of standard mitigation measures, in accordance with the *Migratory Birds Convention Act* (MBCA), will protect nesting migratory birds from direct construction impacts.

Birds are highly mobile and species that may nest in vegetation to be removed will lose habitat. However, any affected habitat types are well represented within the study area and beyond.

Additional impacts to wildlife during construction and operation will be limited, since the urban adapted wildlife present will likely be tolerant of noise and light associated with the major transportation facilities in the surrounding area (e.g., Highway 427, Pearson Airport).

Proposed Mitigation Measures

To minimize direct impacts to vegetation and associated habitat features, especially at the major valley crossings, and to protect adjacent vegetation/habitat features from indirect impacts during construction, the following mitigation measures will be implemented:

- The Humber River, and Mimico Creek valleys will be identified as a 'sensitive area' on Contract Drawings to restrict contractor activities in the valley. Black Creek is considered less sensitive given that the valley portion within the rail crossing consists of terrafix lined channel and valley slopes however, the valley upstream (within Keelesdale Park) will be identified as a 'sensitive area' on Contract Drawings to restrict contractor activities outside of the existing rail corridor.
- A re-vegetation plan will be developed for the portions of the Black Creek, Humber River, and Mimico Creek valleys disturbed by the proposed works.
- The bridge structure design will maintain existing wildlife movement opportunities.

- Vegetation clearing zones and vegetation retention zones will be clearly delineated in both the Contract documents and in the field to minimize the risk of unnecessary or inadvertent vegetation impacts and avoid incidental impacts as a result of temporary stockpiling, debris disposal and access. Works zones will be delineated in the field using construction fencing to minimize the area of disturbance and prevent disturbance of adjacent areas.
- Temporary vegetation protection fencing will be installed to protect valley and riparian vegetation adjacent to work areas, specifically woody vegetation located at vegetation unit BC1 at Black Creek, vegetation units HR1, HR2, HR3 and HR5 at the Humber River valley, and riparian vegetation along the northeast bank of Mimico Creek south of Zahavy Way. The fencing should be sturdy and may require attachment of silt fencing for erosion control depending on site conditions. Paige wire fencing with attached silt fencing is commonly used for this purpose.
- Appropriate vegetation clearing techniques (e.g., trees to be felled away from the retained natural areas) will be used to remove vegetation required for the proposed works.
- Erosion and sediment control measures will be designed, implemented and maintained throughout construction. This includes installing sediment and erosion control fencing along the edge of the required working area to protect the edges of all retained natural areas, as well as proper containment and filtering of all construction-generated sediment (whether from dewatering or soil exposure from clearing and grubbing).
- All exposed surfaces will be re-stabilized and re-vegetated as soon as possible following construction, using an appropriate native seed mix.
- All construction-related debris will be appropriately contained during construction and cleaned-up and properly disposed of following construction.
- All activity will be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to natural areas and particularly the Black Creek, Humber River, and Mimico Creek valleys. No petroleum products storage, maintenance or refuelling of equipment will be conducted within these valleys. A Spills Prevention and Response Plan will be developed by the Contractor and spills cleanup materials will be kept on site at all times.
- An environmental inspector will be responsible for ensuring that all environmental mitigation and design measures are properly installed/constructed, implemented and maintained, and appropriate contingency, response plans and remedial measures are in place and implemented if required.

- The Contractor shall not destroy the active nests (nests with eggs or young birds), or wound or kill birds, of species protected under the *Migratory Birds Convention Act* and/or Regulations under that Act. All works will be complete in compliance with the *Migratory Birds Convention Act*.
- Where feasible, timing constraints will be applied to schedule vegetation clearing and structure works (where birds may nest on a structure) outside of the breeding bird season (May 1st to July 31st).
- If vegetation clearing cannot be scheduled outside the breeding bird season timing noted above, then an Avian Biologist will be employed to conduct a nest survey in the area to be cleared. The Avian Biologist shall have completed a university or college education in a pertinent environmental discipline and shall have experience and/or training in the identification of birds and their nests and eggs as well as the assessment and development of appropriate mitigation measures to address the presence of migratory birds during construction. If active nests of migratory birds are located, then clearing must discontinue until after the breeding bird season (i.e. clearing is allowed August 1st to April 30th). This may involve delays to allow for fledging.
- If structure works cannot be scheduled outside the identified nesting season, ensure that bird nesting preventative measures (such as wire screens or tarps) are implemented to prevent new nesting prior to May 1 and are maintained until July 31st of the calendar year in which they were installed. At a minimum, the preventative measures will be installed at structures where evidence of past nesting was observed. These measures will be periodically checked, and maintained as required, so as not to entrap birds, and removed following construction when no longer needed.
- Remove “inactive” nests (previous season, adult birds are not seen flying in and out of) prior to construction, or prior to undertaking the preventative measures outlined above.
- Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed. As required, the environmental inspector will capture and release any small wildlife (e.g. turtles, amphibians) stranded within the construction zone.

6.1.1.3 *Significance of the Potential Impacts*

No significant adverse impacts to vegetation are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The vegetation and habitat associates are common, tolerant and cultural in character, and the spatial extent of the project and associated vegetation and habitat removals is limited. The implementation of identified mitigation measures will manage potential for impacts to an appropriate level.

Similarly, no significant adverse impacts to wildlife are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The wildlife in the area will be tolerant of development and transportation infrastructure generally given the decades of exposure, the amount of habitat removal is relatively small and no significant or unique habitat features are removed and no new habitat fragmentation will result.

With the implementation of the above noted mitigation measures and commitments to future work, potential for adverse impacts can be minimized and no significant residual impacts will occur.

No significant adverse impacts to vegetation, wildlife or migratory birds are anticipated during operation and maintenance, with proper implementation of the identified mitigation measures as well as the implementation and maintenance of standard stormwater management measures.

With the implementation of the above noted mitigation measures and commitments to future work potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.1.2 Aquatic Environment

6.1.2.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

Black Creek

Potential impacts to fish and fish habitat that may result from construction of a new crossing generally include:

- localized permanent removal of the valley and associated culturally influenced and disturbance tolerant early successional riparian vegetation within the crossing location (within the existing rail corridor);
- localized temporary disturbance to culturally influenced and disturbance tolerant early successional riparian vegetation associated with construction access;
- debris entry to the stream during construction and in particular fill placement, which can be avoided with the implementation of standard mitigation measures; and

6.1.1.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

Potential impacts to vegetation and associated habitat and wildlife as a result of operational and maintenance activities include:

- Generation of runoff contaminants.
- Temporary disturbance during structure and facility maintenance or future rehabilitation.
- General wildlife disturbance and noise; as noted, the environs are already subject to noise associated with the existing rail corridor and surrounding urban land use.
- Lighting disturbance to wildlife; again this effect is already present throughout the project limits and vicinity.
- Right-of-way management (fertilizer etc).

General rehabilitation activities in the long-term may involve repair or replacement structures over Black Creek, Humber River and Mimico Creek, or general rehabilitation activities to other components of the rail line and associated facilities. The activities may involve limited temporary disturbance of vegetation and wildlife. These impacts are generally predictable, temporary and limited in extent, and can be managed with the implementation of standard construction-related mitigation measures.

Noise implications of transportation facilities (specifically highways) have been gaining increasing interest in the research community, although definitive studies are still limited and conclusions about the nature and extent of impacts are variable (see recent review by the Federal Highway Administration [FHWA] 2004). There is a paucity of information on the response of many wildlife groups to noise. While birds have been more heavily studied, the nature and extent of noise impacts is still not clear particularly as they relate to rail facilities. Some species appear to be negatively affected by the presence of roads, others appear to be neutral, and a number of species directly benefit from the creation of roadside habitat (FHWA 2004). Noise impacts and sensitivity to noise appear to vary considerably among bird species. Having said that, any potential negative impacts are likely to be relatively minor as there is no critical habitat or SAR species adjacent to the corridor, these species tend to be highly mobile, and there is similar quality habitat in the surrounding area.

Wildlife mortality and reduced connectivity at key areas in the landscape can be addressed by maintaining permeability for wildlife through the new and existing crossings.. Other impacts to vegetation and habitat features resulting from the operation and maintenance of the rail line can be managed through implementation of standard mitigation measures which are outlined below.

Proposed Mitigation Measures

Similar construction-related mitigation measures and commitments to future work as outlined in **Section 6.1.1.2** will be employed for any maintenance or rehabilitation activities.

- indirect construction related impacts (e.g. erosion and sediment migration to the streams, construction debris) that can be managed with the implementation of standard mitigation measures.

Black Creek supports a warmwater baitfish community within the rail corridor crossing reaches. The potentially affected habitat at the new crossing location has been previously modified and does not provide any unique or particularly sensitive habitat features. Through the rail crossing, the Black Creek channel and valley slopes are lined with terrafix and solid concrete with no natural channel morphology present. Fish and fish habitat at the crossing is considered to have relatively low sensitivity. Therefore, potential impacts should be limited to temporary disturbance-related impacts that can be addressed using standard mitigation measures.

Humber River

Anticipated impacts to fish and fish habitat as a result of the works described are anticipated to include:

- permanent removal of a relatively small amount of stream bed:
 - one pier is completely within the river and will occupy an additional 55 m² (approximate and assuming 5 m width) of stream bed (not including any associated rock protection);
 - two piers along the east and west banks will also be extended however, the west pier is beyond the wetted edge but within the bankfull width and the east pier is at the wetted edge and will encroach only slightly into the stream channel.
- temporary disturbance and potential dewatering of the in and near water work zones within the coffer dams during the installation of the pier extensions. Potential for downstream silt transport can be managed using the coffer dams and standard mitigation measures;
- potential for trapping of fish within the coffer dams/work zones, particularly at the central pier, which can be managed with the implementation of standard mitigation measures and in-water works timing;
- potential for localized temporary disturbance or removal of riparian vegetation associated with construction access;
- potential for debris entry to the streams during construction, which can be avoided with the implementation of standard mitigation measures; and



- potential for indirect construction related impacts (e.g. erosion and sediment migration to the streams, construction debris) that can be managed with the implementation of standard mitigation measures.

The area within the pier extension footprint consists of riffle/rapid habitat. The riffle habitat extends 12 m to 15 m upstream of the existing pier and spans across the width of the river. This type of morphology is not limiting in the watercourse and is present in the reach adjacent to and up and downstream of the proposed pier extensions.

Access for most bridge construction activities will be accommodated on the west side via the golf course. Construction access to Pier 2, in the river, as well as the Pier 1, at the edge of the east valley slope, pose the greatest challenge from a natural environmental perspective. The following outlines possible access options that will be reviewed in more detail with the agencies during detailed design.

Access options to Pier 2 include installation of an in-water concrete block platform that would extend across the a portion of the river to Pier 2, or use of a temporary bridge (Bailey Bridge) that would not obstruct the river flow while providing a means for construction vehicles to reach the pier. Of these options, the use of a Bailey Bridge is the preferred from a natural environment perspective as it minimizes temporary in-water impacts and involves minimal disturbance to install and remove. A concrete block platform would partially obstruct flow and would likely only be permitted for a limited time, however the blocks can be set on the bed and removed relatively easily. Some limited disturbance of the bed would be required to install and remove the blocks, particularly on the edge areas where the substrates include a higher silt component; otherwise the substrates are coarse and stable on the riffles and less susceptible to disturbance.

These two options exist to access Pier 1. Similarly the use of a Bailey Bridge is the preferred from a natural environment perspective. In addition, there is a third option. This option includes constructing a temporary access down the east valley slope. This option would involve minimal disturbance of vegetation (since the slope is largely unvegetated), however given the steepness of the slope, there are risks in relation to slope stability and potential for erosion and transfer of sediment to the river.

As noted previously all of these options will be examined in more detail with the agencies during detailed design.

There may be some incremental impacts associated with additional design and construction details to be developed during detailed design. However, in general, these impacts are anticipated to be localized and/or temporary and manageable with the implementation of appropriate mitigation and restoration measures.

The incremental impacts associated with any additional disturbance to or removal of riparian vegetation to enable construction will also be identified (and addressed) at detailed design. Riparian vegetation potentially impacted includes much of the vegetation along the west upstream bank. Dominant species include Ash, Locust species, Elm, Silver Maple, Basswood, Red-osier Dogwood, Weeping Willow, and Wild Grape. However, the majority of the vegetation in the immediate vicinity of the ROW consists of dead trees.

The reach within the rail corridor crossing supports warmwater fish habitat with a migratory function for salmonid species (Rainbow Trout). Migratory functions should be

maintained by isolating the work zone(s) using the coffer dams and maintaining fish passage around/through these zones. However, the potential impacts of the concrete block bridge option require further assessment if this option is pursued.

Mimico Creek

Anticipated impacts to fish and fish habitat as a result of the proposed works at Mimico Creek should be limited to:

- localized permanent removal of the valley and associated riparian vegetation within the piers and structure (minimal vegetation growing on gabion embankments);
- localized temporary disturbance to culturally influenced and disturbance tolerant riparian vegetation associated with construction access; and
- potential for indirect construction related impacts (e.g. erosion and sediment migration to the streams, construction debris) that can be managed with the implementation of standard mitigation measures.

It is anticipated that no in-water works will be required for construction of the new structure. The new structure will clear span the stream channel with piers located on the gabion basket embankments. No permanent impacts to the watercourse (loss of habitat) will occur.

Riparian vegetation potentially impacted where the spur line parallels the creek along the east edge of the valley is limited to cultural meadow with scattered patches of early successional and disturbance tolerant shrub and tree growth including willow, Red-osier Dogwood and a few isolated patches of Manitoba Maple, Crack Willow, and Balsam Poplar.

Within the creek crossing, riparian vegetation removal is limited to a narrow band of cultural meadow with scattered tree and shrub growth. Several large Balsam Poplar located in the narrow riparian buffer area on the north bank may be impacted. For the most part, this area is dominated by gabion basket lined embankments that limit vegetation growth in the valley.

Proposed Mitigation Measures

There are no highly sensitive or specialized aquatic habitats or aquatic Species at Risk identified in the immediate vicinity of the Black Creek, Humber River, and Mimico Creek crossings. Based on the preliminary design available at the time of preparation of this report, the Humber River is the only crossing that requires in-water works and will result in a permanent removal of a small area of fish habitat (associated with the pier extensions).

The associated impacts to the Humber River will be minor, with the implementation of appropriate mitigation measures. The TRCA will be consulted during detailed design in order to finalize construction access and mitigation measures. In-water construction timing restrictions will be implemented during the widening of the existing pier and abutments, to protect the warmwater fishery including COSEWIC candidate species. No in-water work will be permitted from March 31 to July 1. Fish passage must be maintained for migratory Rainbow Trout. Other related mitigation measures are outlined below.

The proposed structure at Black Creek fully spans the watercourse and therefore, the implementation of standard mitigation measures will address potential impacts to the stream and its associated fish and fish habitat. Additional construction details regarding the footing installation and potential impacts to Black Creek (e.g. potential need for in-water works or dewatering) will be confirmed in subsequent design phases.

The structure at Mimico Creek fully spans the watercourse and therefore, the implementation of standard mitigation measures will address potential impacts to the stream and its associated fish and fish habitat. Additional construction details regarding the caisson installation and potential impacts to Mimico Creek (e.g. potential need for in-water works or dewatering) will be confirmed in subsequent design phases.

The following standard mitigation measures are also recommended in order to minimize impacts to fish and fish habitat within and adjacent to the ROW during and following construction. Additional measures will be identified during subsequent design phases once additional design details are complete and construction access and staging plans are developed. Preliminary mitigation measures include:

- Implementation of comprehensive sediment and erosion control measures to prevent migration of sediment laden runoff (or other contaminants) from the adjacent construction zones to the bay, including inspection and maintenance. This plan must meet the requirements, guidelines and design standards provided in TRCA's 2006 *Erosion and Sediment Control Guidelines for Urban Construction*. These measures will include, but not be limited to the following elements:
 - Isolation of the near-water construction zones using standard perimeter silt fencing of areas of the general construction zone that drain directly to the water. The silt fencing will be heavy duty/re-enforced fencing for disturbed areas that are sloping (e.g. embankments, depending on design of widening and direct encroachment; see below re silt curtain) or will collect drainage from relatively large areas.
 - Temporary isolation of the near-shore embankment fill zones in the Humber River using a 'containment' system that will prevent migration of any fine substrate disturbed during the work.
 - Proper stabilization and re-vegetation of all disturbed surfaces that drain to the water, prior to removal of sediment and erosion control measures. The erosion and sediment control measures will be left in place and maintained until vegetative cover is established.
- Any temporary dewatering discharge from the work zones will be appropriately managed using properly designed, sited and operated temporary settling facilities to filter all discharge water prior to release to river.
- Any fish stranded within the temporary work zones in the Humber River will be removed using appropriate techniques by qualified individuals and released downstream of the temporary work zones.
- Cofferdams will be used to construct the piers in or near the Humber River to isolate the temporary in and near water construction zones and contain temporary in-water disturbance.

- The details on construction access at the Humber River will be finalized during detailed design in consultation with TRCA. Most access will be provided via the Golf Course. The use of a temporary Bailey Bridge is recommended from an environmental perspective in preference to the concrete block bridge to access the in-water piers for access to the pier in the water and the pier of the east bank; the Bailey avoids interference with flow and incremental disturbance of the bed to install and remove the blocks. Construction of a temporary access down the east slope to access the east pier is acceptable provided that the risks of erosion/partial slope failure and sediment transfer to the river can be managed and appropriate restoration undertaken to re-instate a stable slope. Recognizing that there are other construction related considerations, the various options will be reviewed further in detailed design to develop the preferred access plan in consultation with TRCA. This process will involve:
 - o Geotechnical assessment of the feasibility of the east access and development of an appropriate slope and bank rehabilitation plan.
 - o Further assessment of the bed conditions to verify stability and content of materials susceptible to downstream migration if the block bridge remains under consideration.
 - o Design of the plan to minimize obstruction of flow to levels particularly during the fall migratory window.
 - o Adherence to the *Navigable Waters Protection Act (NWP)* requirements.
 - o Design of a bank rehabilitation plan to re-instate and re-vegetate a stable bank configuration.
 - o Further detailing and addressing of any other potential impacts during detailed design once the preferred plan is developed.
- Rehabilitation and construction works on the bridges above the water will be isolated/contained using a temporary protection/containment system (e.g. platforms and /or nets) to prevent release of concrete, particles and construction debris into the water. The containment system will be regularly monitored and material removed. All material will be disposed of off-site.
- Incremental impacts potentially associated with finalization of additional design and construction details will be assessed and addressed during detailed design.
- The disturbance and removal impacts to riparian vegetation based on the final construction and access details will be quantified during detailed design, and an appropriate replacement plan developed in consultation with TRCA. Options for replacement of riparian vegetation (given potential constraints on active bank and slope areas at the Humber River and hardened surfaces at the other crossings) include the open floodplain area at Mimico Creek west of the alignment and immediately south of Zahavy way. This land is owned by the TRCA.
- Only clean materials free of fine particulate matter will be placed in the water for any temporary construction containment measures (e.g. coffer dams will be constructed of sheet piling, 'pea gravel' bags, or other clean material that will be removed following construction) or permanent works (e.g. rock protection if required).

- No equipment shall ford or otherwise enter any of the watercourse except as specified herein or unless authorized by MNR or TRCA.
- Defined construction access areas, as well as non-access/protected areas adjacent to the water where construction access is not permitted, will be delineated to prevent unnecessary or inadvertent disturbance.
- Control of all activity so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourse. No storage, maintenance or refuelling of equipment will be conducted near the watercourse. A Spills Prevention and Response Plan will be developed by the Contractor and kept on site at all times.
- Location of all temporary storage/stockpile areas, maintenance and refuelling areas, and other temporary construction areas a safe distance from the water (minimum 30 m) and on flat ground that does not drain directly to the water. These areas will be properly contained. No storage, maintenance or refuelling of equipment or stockpiling of erodible material will be permitted near the water.
- Removal and proper disposal of all construction-related debris and excess materials following construction.
- Specification of appropriate containment measures to prevent construction debris associated with the construction of the new and widened structures from entering the channel. Any material that is inadvertently dropped into the watercourse will be retrieved carefully with minimal disturbance to the channel bed or banks.
- Notification of TRCA and MNR as appropriate prior to construction and strict adherence to all conditions on any agency permits that may be required.
- Regular inspection of all in-water and near-water construction activities and mitigation measures. The environmental inspector will be responsible for ensuring the sediment and erosion control measures are functioning and all of the mitigation measures are being properly implemented. Post construction monitoring will also be conducted to ensure vegetative cover is re-established prior to the removal of the silt fencing.

Significance

The greatest potential for adverse impacts in relation to fish habitat and watercourses occur during the construction phase. With the application of the identified mitigation measures potential for adverse impacts will be minimized and no significant residual impacts will occur.

Potential impacts during the operational and maintenance phases relate primarily to increased stormwater runoff and release of other contaminants during ROW maintenance activities and will be managed with the implementation of standard mitigation measures.

6.1.2.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

The daily operation and maintenance of the expanded rail corridor will have limited adverse impacts on fish and fish habitat. As with any transportation facility, there is some potential for impacts to the quality of the surface water that reaches a watercourse as a result of runoff during storm events. Potential water quality impacts are associated with the increased potential for generation of runoff contaminants and right-of-way management issues (e.g., fertilizer etc). However this is an existing condition along the rail system and within the urbanized area generally.

General maintenance activities in the long-term may involve repair or rehabilitation of the structure which could potentially have localized impacts on fish and fish habitat. The impacts of such works will be limited to temporary, localized disturbances during construction of the repairs. These impacts are generally predictable, temporary and limited in extent, and will be managed with the implementation of standard mitigation measures.

Proposed Mitigation Measures

Similar construction-related mitigation measures and commitments to future work as outlined in **Section 6.1.2.1** will be employed for any maintenance or rehabilitation activities.

6.1.2.3 *Significance of the Potential Impacts*

The greatest potential for adverse impacts in relation to the aquatic environment occur during the construction phase. With the application of the identified mitigation measures potential for adverse impacts will be minimized and no significant residual impacts will occur.

Potential impacts during the operational and maintenance phases relate primarily to increased stormwater runoff and release of other contaminants during right-of-way maintenance activities and will be managed with the implementation of standard mitigation measures. With the implementation of the above noted mitigation measures and commitments to future work potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.1.3 Species at Risk

6.1.3.1 *Potential Impacts and Proposed Mitigation Measures*

Potential Impacts

As noted in Section 4.1.1.4:

- No species at risk or provincially rare plant or animal species were recorded during field work conducted in 2004, 2008 and 2009.
- There are no current records for federally designated Species at Risk (SAR) or provincially designated Species at Risk in Ontario (SARO) in the study area

In addition, given the predominance of urban land uses within the study area, habitat for species that are intolerant of anthropogenic disturbance is limited. As a result, it is not surprising that no species at risk have been recorded during field work and that there are no records of SAR or SARO in the study area.

Given the predominance of urban land uses within the study area, habitat for species that are intolerant of anthropogenic disturbance is limited.

Proposed Mitigation Measures

No mitigation measures are proposed specifically to address potential impacts to species at risk since no species at risk are believed to occur within the study area. However, with the implementation of the mitigation measures identified in **Sections 6.1.1** and **6.1.2**, potential for adverse impacts to any flora or fauna will be mitigated.

6.1.3.2 Significance of the Potential Impacts

With the implementation of the mitigation measures identified in **Sections 6.1.1** and **6.1.2**, potential for adverse impacts to species at risk (should any be present in the study corridor) can be minimized as no significant residual impacts will occur.

6.1.4 Soil and Groundwater

Based on the analysis of data obtained from the project Geotechnical Report (under separate cover) the recommendations for excavations and groundwater control for each location in the vicinity of the proposed major excavations and grade separations areas discussed. Groundwater is discussed below; first, generally and then in specific construction areas:

6.1.4.1 Potential Construction Impacts and Proposed Mitigation Measures

General

Potential Impacts

As noted in **Section 4.1.2**, groundwater within the study corridor is not used as a potable water source as municipal water supply is available throughout the study corridor. As a result, the project has no potential adverse impacts on potable water.

At some locations (see 'Specific Construction sites' below) there are potential impacts to non-potable groundwater. During construction groundwater will be intercepted or otherwise affected by the proposed works at some locations (i.e. quantity or quality impacts).

Proposed Mitigation Measures

Any water takings in Ontario that exceed 50,000 litres/day require a Permit to Take Water (PTTW) from the Ministry of the Environment (MOE). This could be either for consumptive use (e.g. dust control, compaction) or non-consumptive use (e.g. excavation dewatering).

Water takings in Ontario are governed by the *Ontario Water Resources Act* and the *Water Taking and Transfer Regulation* (O.Reg. 387/04). There are three PTTW categories as stipulated under O.Reg 387/04 based on the potential adverse risk that the water taking may pose on the natural environment, groundwater users, and existing permit holders in the area of water taking. There are also various technical requirements and assessments required for the different categories, in addition to whether the water taking is from surface water, groundwater, or both.

Construction activities associated with the project such as deep cuts and foundation works have the potential to affect groundwater and surface water resources within the study area. As a result, it is possible that a PTTW will be required for one or more components of the construction works. During detailed design the PTTW requirements for the construction works will be identified in consultation with the MOE. All PTTW applications and supporting documents will be prepared and signed by a Qualified Person in accordance with MOE requirements.

In addition to any mitigation developed as part of the PTTW process, construction mitigation measures will be implemented to prevent and manage any spills that could potentially adversely effect the environment (including potential groundwater impacts).as outlined in **Section 6.11.1.2**.

Strachan Avenue and the Lowered Rail Corridor

Potential Impacts

The proposed construction of the track and retaining wall at this location is expected to be about 5 m deep and will be made through the fill and into the clayey silt till and/or silty clay till. Considering the highly developed urban environment, the excavation likely will require shoring for support to reduce the impact on adjacent properties. The excavation will be about one metre below groundwater level at the time of this investigation. Some groundwater seepage into the excavations is expected, but the seepage rate is expected to be slow to moderate, except where the tills contain thick sand seams.

Proposed Mitigation

It should be possible to handle the seepage by gravity drainage and pumping from filtered sumps. Only minimal impact on groundwater level is expected. A PTTW should not be required.

Dennison Road East Grade Separation

Potential Impacts

The proposed excavation is expected to be about 7 m deep and will be about 5 m below the groundwater table at the time of the investigation. The excavation is expected to be made through the existing fill into sand, which, being below water table, would not be stable unless the water level is temporarily lowered to below excavation level.

Proposed Mitigation

It is expected that positive construction dewatering at this location will require the use of wells or well points. The rate of seepage into the excavation is expected to be large, and a permit to take water likely will be required

Lawrence Avenue West

Potential Impacts

Only minor excavations are expected for foundation construction. No impact to groundwater is expected.

Proposed Mitigation

Not required.

Lowered Rail Corridor through Weston

Potential Impacts

A long excavation will be required from north of Lawrence northerly under John, Church and King Streets in Weston. The excavation is proposed to extend to a maximum of 8 m below existing road grades, and could be up to 6 m into shale. The ground water table is generally less than 2 m below existing road grades and permanent drainage will be required for the retaining structures. The permanent drainage will lower the groundwater level in the immediate area. However, since bedrock is shallow in this area, and most of the overburden soils are clayey, the cone of drawdown is expected to extend to less than 30 m from the excavation.

Proposed Mitigation

During construction, only minor to moderate seepage into the excavation is expected. It should be feasible to handle the seepage by gravity drainage and pumping from filtered sumps.

Carlingview Drive Underpass

Potential Impacts

The proposed excavation at this location is expected to be 7 m deep, and will be constructed through the fill and clayey silt till. The groundwater level was at about 7 m deep at the time of the investigation. Permanent subsoil drains would be required, and will locally drawdown the groundwater table. Based on the single borehole, the cone of drawdown should extend to less than 30 m from the excavation. There should be little impact on wells or streams in the area.

During construction, it may be necessary to depressurize the sand stratum at 8.5 m depth, using deep wells. This could cause a more widespread drawdown, but the effect is temporary. There should be no long term impact due to the depressurization of the sand.

Proposed Mitigation

If necessary, the excavation can be carried out within interlocking sheet piles driven to a sufficient depth below the excavation to eliminate the need for dewatering

6.1.4.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

Potential impacts to groundwater during operation and maintenance of the project are anticipated to be limited to potential impacts associated with spills.

No permanent impacts are anticipated after construction of the facility on adjacent properties or nearby watercourses. However, general recommendations for the design stage are described below to mitigate possible issues.

Proposed Mitigation

It is recommended that all structures in the cut-and-cover sections be designed as “water-tight” structures to minimize the inflow of water into the structure and permanent changes to the groundwater flow. At the trench in Weston the groundwater table is generally above the level of the tracks and permanent dewatering system would typically be necessary to control groundwater to the depth of the base of the excavation. Continuous excavation support walls (e.g., contiguous caisson walls, concrete diaphragm walls, etc.) may be used to minimize flow into the excavations from surrounding soils. Use of a contiguous secant or slurry wall will minimize impacts of the ground seepage. Most of the run-off in the area is collected in the sump pits and will be pumped to the municipal sewer system.

Wherever a pumping station is required (decided during the detailed design process) a monitoring system should be in place, so that in case of any train derailment, diesel fuel should be prevented from entering the municipal sewer system. In such a case the pumping system shall be shut down for a short period of time. An oil separator system shall be in place to separate the oil so that it can be disposed of to an appropriate location.

6.1.4.3 *Significance of the Potential Impacts*

As discussed above, it is anticipated that seepage flows and the effect of the permanent structures on the surrounding groundwater regime should be minimal provided appropriate design and construction measures are implemented, examples of which are outlined above,. With the implementation of the above noted mitigation measures the potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.1.5 Drainage and Stormwater Management

6.1.5.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

The proposed construction activities pose a potential impact due to sediment transport into surrounding natural areas including watercourses and municipal drainage infrastructure.

Proposed Mitigation Measures

Detailed sediment and erosion control plans will be prepared, implemented and monitored in accordance with *The "Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guideline for Urban Construction"* December, 2006 for construction throughout the Study Area.

6.1.5.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

In general, the proposed works will not result in a significant increase to impervious areas due to the already urbanized nature of the rail corridor. The tracks themselves will be built on a gravel bed and thus will not be considered impervious.

However, the proposed platform expansions at Bloor, Weston and Etobicoke North Stations may result in minor alterations to local drainage patterns. The proposed platform expansions also provide an opportunity to enhance water quality in these areas.

The area that has the highest potential for release of contaminants during the operation stage is the Operations Management Centre (OMC) being constructed for service and storage of the UPRL vehicles.

Due to the proposed addition of rail tracks there is a potential loss of storage/conveyance capacity in some areas adjacent to existing rail corridor. The reduced storage/conveyance area adjacent to the rail corridor may require an increase in maintenance of the swale/ditches to ensure they provide positive drainage.

Improvements to the existing crossing of the Black Creek, Humber River and the new crossing of the Mimico Creek are proposed as part of this project. This has the potential to impact the flood levels. Hydrotechnical analysis have been undertaken at all crossings. The results have concluded that there are no significant impacts to flood levels.

The Humber River crossing is currently experiencing slope stability and erosion issues; it is possible that the proposed widening will exacerbate the erosion issue at this location.

Proposed Mitigation Measures

During the design stage, an assessment of the receiving capacity of the municipal storm sewers at the outlets from the proposed platform expansions will be undertaken. Stormwater management facilities will be incorporated in the design to ensure, at a minimum, there are no negative impacts with respect to water quantity, quality and

erosion potential and to meet the City of Toronto Wet Weather Flow Management Guidelines (City of Toronto 2006).

Opportunities to enhance water quality at these locations will also be investigated. The use of oil/grit separators and detention storage (e.g. pipe storage, parking lot storage, detention pockets etc.) will be considered, where practical.

During the design stage, a detailed assessment of the proposed ditches along the rail corridor will be undertaken to ensure that there is sufficient capacity in the rail side ditching system for conveyance of flows from any outside contributing catchment areas. The effectiveness of these ditches with respect to water quality treatment will also be assessed.

Anti-erosion protection measures will be incorporated into the design of the proposed bridge piers and foundations at the Humber River using information from geotechnical studies and input from a fluviogeomorphy specialist.

A detailed Drainage and Stormwater Management Plan for the proposed Operations Management Centre (OMC) will be developed as part of design. That plan will be consistent with the goals and objectives of the City of Toronto Wet Weather Flow Management Guidelines (City of Toronto 2006). The Drainage and Stormwater Management Plan will include a number of on-site water quality protection procedures that will ensure contaminated water does not reach receiving water bodies. These could include, but are not necessarily limited to:

- exterior cleaning will occur in a cleaning shed (open at each end) with a serial cleaner: water application, soap (acid based) application, scrub brushing and rinsing with full fluid recovery;
- the washing bays will include a grey water collection system (no discharge to surface runoff system);
- fuelling by trucks from off-site supply depots will occur at a designated OMC location outfitted with an apron larger than individual UPRL vehicles (or train consists, as final design permits), and an associated catch basin system for recovery of any fuel spillage;
- catch basins or drip trays will be constructed for capture, retention and retrieval (self-recovery system for recycling residual petroleum products); and
- overall grading will be such that all other overland flows will be directed to oil-grit separators prior to release.

6.1.5.3 Significance of the Potential Impacts

The erosion potential during the construction phase poses the greatest potential for adverse impacts with respect to drainage and stormwater management. The adherence to the “*Greater Golden Horseshoe Area Conservation Authorities’ Erosion and Sediment Control Guideline for Urban Construction*” December, 2006 will be key to the mitigation of this impact.

Due to the already urbanized nature of the rail corridor, potential water quantity impacts during the operational and maintenance phases are not anticipated to be significant.

Regional flood elevations will not be increased as a result of the proposed structures at watercourse crossings.

6.1.6 Contaminated Properties

As noted in **Section 4.1.4**, previous contaminant investigations (Phase I and Phase II Environmental Site Assessments) have been completed along the GO Georgetown South Corridor between Strachan Avenue and Highway 427, and at former industrial properties along the proposed UPRL Spur Line alignment and OMC site at Dorman Road. Those investigations found a number of existing and potential site contamination issues along the corridor attributed to the nature of past and current land uses within and adjacent to the rail corridor.

6.1.6.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

As a result of the potential site contamination in the study area, construction operations could expose contaminated materials and/or result in the spreading of contaminated materials. In addition, the use of equipment, chemicals and other potentially hazardous materials during construction presents the potential for spills to occur that may result in site contamination.

Proposed Mitigation Measures

Prior to construction an excess materials management plan will be developed to address proper handling of all excess materials that may be potentially contaminated.

All contaminated materials will be handled in accordance with applicable provincial/federal legislation, regulations and standard policies and procedures. For example, contaminated soils will be managed per O.Reg. 347 which is a regulation under the Ontario *Environmental Protection Act*. O. Reg. 347 identifies hazardous wastes through a series of listings and tests and outlines requirements for on-site handling, mixing, and processing of waste, on-site storage of hazardous and liquid industrial wastes, and the requirements for waste disposal sites and waste management systems.

In addition, the contractor(s) that complete the construction works will be required to have a suitable site specific health and safety plan, spills management plan, and be prepared to respond to spills in a timely and effective manner.

6.1.6.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

The area that has the highest potential for release of contaminants during the operational stage is the maintenance facility which is being constructed to service and store the Union-Pearson Rail Link vehicles. Examples of activities that will occur at the maintenance facility that may result in contamination include: exterior cleaning of

vehicles, fuelling, repairs and retrofits. The majority of the day-to-day and long-term/heavy maintenance activities will occur on the inspection tracks to be located on the interior of the maintenance facility.

Along the corridor, potential risks are limited primarily to diesel, oil, etc leaks associated with the trains running in the corridor. As a result, the potential exists for spills to occur that may result in site contamination and potential exposure of hazardous materials to workers.

Proposed Mitigation Measures

The following mitigation measures apply to the Union-Pearson Rail Link maintenance facility:

- Exterior cleaning of vehicles will occur in a cleaning shed (open at each end) with a serial cleaner: water application, soap (acid based) application, scrub brushing and rinsing with full fluid recovery. The washing bays will include a grey water collection system (no discharge to surface runoff system);
- Fuelling of each vehicle will occur daily (one tank per vehicle, with sufficient fuel to operate the vehicle for 24 hours – fuel tank size dependent upon final vehicle selection); however, no fuel will be stored on site. Fuelling by trucks from off-site supply depots will occur in a designated OMC location (at the maintenance facility) outfitted with an apron larger than individual UPRL vehicles (or train consists, as final design permits), and an associated catch basin system for recovery of any fuel spillage. This location would be close to the entrance where fuelling can occur in an area isolated from buildings and the main ladder track (vehicle storage) area of the yard, which will provide enhanced safety/security (fuel trucks do not have to travel very far into the operational area of the yard) and minimize access road space dedicated to the refuelling operation. The catch basins or drip trays will be constructed for capture/retention, retrieval (self-recovery system) and recycling of residual petroleum hydrocarbon products.
- Repairs and retrofits to the vehicles that are completed at the maintenance facility will involve self-recovery and recycling of usable material.

Potential contaminant concerns may be observed as part of regular maintenance and inspection activities. If potential areas of contamination are identified during operations and maintenance, further investigations will be completed to determine if contamination is present and what remedial action is necessary. All contaminated materials will be handled in accordance with applicable provincial/federal legislation, regulations and standard policies and procedures.

All operators along the rail corridor will be required to have a site specific health and safety plan, spills management plan, and be prepared to respond to spills in a timely and effective manner.

6.1.6.3 Significance of the Potential Impacts

As discussed above, there is the potential for impacts to contaminated sites and potential exposure of hazardous materials to workers during construction and potential for further contamination as a result of any spills during construction, operations or maintenance. With the implementation of the above noted best management practices,

mitigation measures and commitments to future work the potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.2 SOCIO-ECONOMIC ENVIRONMENT

6.2.1 Direct Property Impacts

Given the preliminary nature of the design, no temporary needs have been identified. However, heavy equipment maintenance, storage / material lay-down areas and temporary easements for temporary access roads are a requirement of the railway expansion. During the detailed design process, these needs and properties which may be affected will be identified. During the construction of this project, temporary access permission or easements may be required. Temporary takings are temporary easements for a limited period of time in order to construct the project. These takings typically have no implications following the completion of construction. Accesses to properties may be affected during construction. Although not physically affected, residential and commercial property owners may be inconvenienced by construction activities. The impacts related to the construction activities, will be addressed indirectly through the mitigation efforts noted in other sections of this report.

For direct property requirements (impacts) as a result of the transit project, refer to **Section 2.3.3**

6.2.1.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

Given the preliminary nature of the design, no temporary property requirements have been identified. However, heavy equipment maintenance, storage / material lay-down areas and temporary easements for temporary access roads are a requirement of the railway expansion. During the detailed design process, these needs and properties which may be affected will be identified. During the construction of this project, temporary access permission or easements may be required. Temporary takings are temporary easements for a limited period of time in order to construct the project. These takings typically have no implications following the completion of construction. Accesses to properties may be affected during construction. Although not physically affected, residential and commercial property owners may be inconvenienced by construction activities. The impacts related to the construction activities, will be addressed indirectly through the mitigation efforts noted in other sections of this report.

Proposed Mitigation Measures

Contractor(s) will be required to minimize any inconvenience caused by construction activities to adjacent properties. A monitoring program will be implemented prior to construction. Existing conditions will be assessed and used to develop a pre-condition survey. Monitoring will be conducting during the construction of adjacent structures, utilities and excavation. During excavation, measurement of ground settlement will be taken regularly, using inclinometers and surface monitoring points for structures. If the

Proponent should receive property damage claims, the monitoring program may be utilized during claim resolution.

A vibration monitoring program will be developed during detailed design for implementation in construction. In particular:

- Vibration levels will be monitored on a continuous basis for operations that cause particularly notable vibration. This will be especially important in areas that are dominated by fine, sandy soils.
- When vibration levels are anticipated to exceed 5 mm/s, foundation and structural element inspections will be carried out on nearby dwellings to determine an inventory of existing conditions. Those inspections will be carried out prior to the commencement of construction.

If property damage claims are received, the monitoring program may be utilized during claim resolution.

Temporary access roads will be provided at all times during construction. Detailed arrangements for temporary accesses will be made during the detailed design stage.

6.2.1.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

Impacts to residential or commercial properties are either permanent property requirements or temporary impacts related to the construction of the project, as detailed in **Sections 2.3.3** and **6.2.1.1**, respectively. For temporary access for corridor maintenance purposes, agreements with adjacent property owners would be required. Noise and vibration impacts are identified in **Sections 6.2.2** and **6.2.3**, respectively.

6.2.1.3 Significance of the Potential Impacts

The proposed project will not have notable impacts on adjacent properties during construction, operation and maintenance. Impacted properties will be partially or fully acquired. An appropriate monitoring system will minimize potential structural damage to the existing buildings; a settlement may be negotiated with the corresponding property owner if damage is identified. The proposed project will have temporary impacts on accesses during construction. Coordination with the owners of the affected properties will help provide continuous access during and upon completion of the project. The proponent is committed to discussions with adjacent property owners, regarding other construction works and maintenance responsibilities.

6.2.2 Noise Impacts

A noise assessment has been completed to allow for an understanding of what the potential noise impacts of the project are and to assist in identifying locations where noise mitigation measures need to be considered. The focus of the noise assessment was on potential noise impacts during the proposed future operations; however, potential construction impacts have also been considered and are discussed in **Section 6.2.2.1**.

The noise assessment has been completed using standard procedures and computer modelling programs. Potential noise impacts during operations have been examined based on a comparison of future sound levels with and without the project.

The assumptions used in the assessment were chosen to ensure that a conservative 'worst-case' scenario was examined. As a result, the impacts identified in the assessment are likely to be greater than the actual impacts of the project. This included the assumptions used for time horizon, train volumes, road traffic and operating speed. Details on these assumptions are discussed below.

For the purposes of this assessment, a time horizon of 15 years has been used for the future sound levels. This 15 year horizon is based on the service levels identified in the Regional Transportation Plan (RTP). Thus, a comparison has been made based on the future sound levels if the project were not implemented and the future sound levels if the project were implemented in accordance with the RTP projected ridership and service levels. This allows for assessment of the proposed project at a point in time when traffic volumes are at the service levels identified in the RTP but prior to the any changes in sound levels as a result of the introduction of electrification. The rail volumes included all the trains in the corridor (various GO services, VIA, CN, CP and UPRL).

The assessment also included consideration of both rail and road transportation sources as those are the major contributors to the future ambient sound in the surrounding areas.

In completing the assessment design speeds were used rather than operating speeds. Operating speeds are likely to be lower. Higher speeds result in higher potential noise impacts.

The assessment of noise impacts is based on sound levels experienced by sensitive receptors. Sensitive receptors are defined as residential dwellings, institutional uses such as schools, day-care facilities, hospitals, seniors' residences, and religious buildings.

The following criteria were used in assessing the findings of the noise assessment:

- < 3 dB increase is generally considered imperceptible in terms of in human perception and is therefore considered no impact to low impact. Mitigation will not be considered for changes at this level.
- 3 to <5 dB increase is considered to be a noticeable difference in human perception, but is not considered sufficient to warrant a review of the technical and economic feasibility of mitigation.
- 5 dB to <10 dB increase is considered to be a substantial and a noticeable difference in human perception sufficient to warrant a review of the technical and economic feasibility of mitigation.
- 10 dB or greater increase is considered very substantial and as a doubling in sound level. This warrants a review of the technical and economic feasibility of mitigation and special efforts to mitigate are normally attempted if technically and economically feasibility of mitigation.

Figures 6.2.2-1 to 6.2.2-10 outlines the anticipated changes in noise, both increases and decreases, as a result of this project.

As can be seen from **Figures 6.2.2-1 to 6.2.2-10**, the predicted sound level increases throughout much of the corridor are anticipated to generate impacts in the 5 to 10dB

range for the first 2-3 rows (~100m) of houses on each side of the rail corridor. Because of these 5dB or more increases in sound levels, the technical and economic feasibility of applying mitigation measures has been investigated throughout the corridor.

The effectiveness of mitigation measures has been reviewed and, as a result, acoustical barriers are proposed to be implemented. In order to determine the actual barrier's effectiveness at various locations, detailed grading information outlining the elevations of the track, base elevations of the proposed barriers, and elevations of the receptors adjacent to the corridor is required. This information typically is prepared as part of detailed design and is not available at this point in the study. As such, final barrier heights cannot be fully determined at this time, however, there is only a limited range of variables of barrier, receiver, and track elevation combinations that could occur. The final height of the proposed barriers will be determined during detailed design. As train traffic is expected to increase gradually over the planning horizon, Metrolinx may consider staging the construction of acoustical barriers or providing alternative measures. This decision would be based on when they are warranted (as per the previously stated criteria) and subject to technical and economic feasibility. Additional detail on this is provided in Section 6.2.2.2.

Table 6.2.2-1 outlines the typical future sound levels along the corridor in the first three rows of houses with and without a noise barrier of approximately 5.5m height. Existing protected receivers are not proposed to be treated with barriers other than those that are already in place. The future sound levels without the project have also been included as a comparison.

Table 6.2.2-1 Future Absolute Sound Levels With and Without Barriers

Location	Row of Houses	Future Sound Levels Without the Project	Future Sound Levels With the Project		
		Currently Unprotected Receptors No Barriers	Currently Unprotected Receptors No Barriers	Locations with Existing Barriers	Currently Unprotected Receptors With New Barriers
Strachan Avenue to the GO Barrie Branch	First Row (within 30m of tracks)	68dB	77dB	67dB	69dB
	Second Row (within 70m of tracks)	61dB	70dB	65dB	65dB
	Third Row (within 120m of tracks)	58dB	65dB	60dB	60dB
GO Barrie Branch to the West Toronto Diamond	First Row (within 30m of tracks)	66dB	75dB	None	67dB
	Second Row (within 70m of tracks)	57dB	65dB	None	61dB
	Third Row (within 120m of tracks)	51dB	60dB	None	58dB
West Toronto Diamond to the Mactier Subdivision	First Row (within 30m of tracks)	70dB	75dB	61dB	67dB
	Second Row (within 70m of tracks)	59dB	65dB	60dB	61dB
	Third Row (within 120m of tracks)	55dB	60dB	56dB	58dB
Mactier Subdivision to the Humber River	First Row (within 30m of tracks)	67dB	75dB	67dB	67dB
	Second Row (within 70m of tracks)	56dB	65dB	66dB	61dB
	Third Row (within 120m of tracks)	51dB	60dB	61dB	58dB

Figures 6.2.2-11 to 6.2.2-20 depict both the location of existing barriers as well as the location of the recommended new barriers. The height and design of the new barriers will be determined during detailed design.

As can be seen from **Figure 6.2.2-1**, there are 10-15dB sound level impacts anticipated immediately adjacent to the openings of the covered tunnel section between King Street and Church Street.. The impacts warrant consideration mitigation measures. In this unique case, the most effective form of mitigation is to line the lowered rail corridor with acoustically-absorptive material. This will negate the 'tunnel' effect in concentrating the sound at the two portals. The remaining impact could be handled by the barriers as shown on **Figure 6.2.2-11**. .

Based on the impact zones identified in **Figures 6.2.2-1 to 6.2.2-10**, the number of residences that will experience the various degrees of increases in sound level can be determined both prior to and following the installation of the proposed noise barriers. **Table 6.2.2-2** outlines the number of residences, low-rise and high-rise, in each category and the numbers affected before and after implementation of the proposed barriers. These counts are estimates rather than an exact count.

Table 6.2.2-2: Number of Residences Affected Before and after Proposed Mitigation

Impact Level	Approximate Number of Low Rise Residences	Approximate Number of High Rise Residences	Total Affected
5-9dB before mitigation (after mitigation)	2425 (125)	4790 (3500)	7215 (3675)
10dB or more before mitigation (after mitigation)	30 (0)	180 (0)	210 (0)

As can be seen from **Table 6.2.2-2**, with the proposed mitigation no residences will experience an increase noise level of 10dB or more during operations.

6.2.2.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

Construction activities have the potential to be noisy at times. Noisy construction activities are anticipated to cause the most annoyance when they are long-term activities. Construction is considered short term when the construction crews will be located in a specific area for a relatively short period of time (i.e. construction duration of less than 2 months).

Short-term construction activities for this project are classified as the following:

- Minor track modifications, such as the installation of switches and track realignments.

Short-term construction throughout the corridor will be both extensive and isolated.

Long-term construction activities for this project have been identified as the following and are listed in decreasing order of their expected duration:

- Construction of new tracks and signals
- Utility relocations
- Bridge widenings (spans to carry additional tracks on existing structures)
- Weston Road bridge replacement
- Building of grade (including culvert extensions)
- Retaining wall construction (from small gravity walls to large retaining walls)
- Grade Separations (road/rail and pedestrian/rail):
 - o Weston lowered rail corridor and new overpass structures at Church Street, King Street and John Street) with a covered portion of the corridor between King and Church Street
 - o Strachan Avenue road/rail overpass and lowered rail corridor
 - o Carlingview road/rail
 - o Denison Avenue road/rail

The Weston lowered rail corridor and Strachan Avenue overpass and lowered rail corridor are expected to take the longest to complete (approximately 4 years), while the Denison grade separation and Carlingview (approximately 2 years) are expected to take the least amount of construction time. All of these activities will last longer than 2 months and as a result are considered long-term construction activities.

It is expected that in addition to the standard construction equipment, the grade separations may require pile installation as may bridge work and major retaining walls. Due to the duration of the long-term construction activities even the standard construction activities are likely to be more of an annoyance to residents due to their prolonged presence in neighbourhoods.

For the lowered rail corridor through Weston the rock elevation is only from 2 to 5 metres while the lowered rail corridor excavation is up to 10 metres deep. The result is that,

while piling will be relatively shallow, there will be considerable rock excavation required. There are various methods for excavating shale including the use of heavy duty hydraulic equipment to rip and excavate the fragmented shale. All methods will result in elevated construction noise at various times during the construction duration

For the lowered rail corridor through the Strachan Avenue area the rock is generally below the final excavation and the groundwater table is relatively low. This area will require various length of piling to support the surrounding ground

Construction activities are generally noisy and will include, but are not limited to, pile installation, rock and soil excavation, grading, concrete piers, forming and pouring concrete walls, utility relocations, material haulage and landscaping.

Proposed Mitigation Measures

The following outlines the commitments to future work and the best management practices and mitigation measures to be implemented during construction. These measures apply to both short-term and long-term construction activities.

Communications

Communication with stakeholders (e.g. individual members of the public, ratepayer groups, business associations, etc) will focus on the following activities:

- Obtaining input on construction mitigation measures that affect the community
- Communication of project status and activities
- Enquiries/Complaints procedures

The following provide additional details on these activities.

Input on construction mitigation measures

- There will be communications with stakeholders to identify local and site-specific issues so that specific mitigation measures can be developed to minimize impacts to the extent possible. This may include discussions on issues such as;
 - o construction access;
 - o temporary road closures;
 - o construction schedule; and
 - o critical community activities that may be affected.

Communications of status and activities

- o A website will be developed to provide ongoing updates to facilitate communications during design and construction.
- o Whenever construction activity impacts a residential or business area, advance notice will be provided to the residents and businesses within the zone of influence.
- o Neighbourhoods will be kept updated on construction duration and progress.
- o Community liaison officers will be available for neighbourhoods to contact with specific information requests.

Enquiries/Complaints Procedures

- o Community liaison officers will be available for neighbourhood residents and business to hear and assist with issues that may arise during construction.

Technical

- All equipment used must adhere to guidelines as placed in MOE's NPC115 guidelines for construction equipment.
- Whenever possible work zone and time will adhere to local municipal by laws. The majority of the work will be conducted during business hours Monday to Friday.
- In the event that construction is to occur overnight or on weekends, effort will be made to minimize potential impacts on residents.
- In rail corridors, night work is often required for activities such as track shifts or bridge span installation. As such, every effort will be made to minimize impacts on the neighbourhood. Night work requires lighting, which can often be a cause of discomfort for neighbourhoods, but is required for safety of the construction workers.
- Trains passing construction zones are required to use bell and whistle by construction personnel and equipment for safety reasons. This will be minimized as much as practicable.
- Construction equipment has safety features such as backup alarms while backing up (beeping sound). This is for the protection and safety of the workers, and is legally required.
- If piling is required, the type of pile installation required, will be determined during detailed design. Wherever soil conditions allow, driven piles will not be used. If driven piles are required various methods will be assessed during detailed design to minimize noise while at the same time considering cost and length of time for construction.
- Where rock excavation is required (through Weston) various methods for excavation will be assessed during detailed design to minimize noise while at the same time considering cost and length of time for construction.

6.2.2.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

As outlined in **Section 6.2.2**, prior to the implementation of mitigation the project is anticipated to generate impacts in the 5 to 10dB range for the first 2-3 rows (~100m) of housing on each side of the railway.

Proposed Mitigation Measures

As outlined in **Section 6.2.2**, new acoustical barriers in select locations (as shown in **Figures 6.2.2-11 to 6.2.2-20**) and use of acoustically-absorptive material as part of the design for the covered tunnel section between King Street and Church Street are proposed to mitigate potential impacts.. The height and design of the new barriers will be determined during detailed design.

Given that the noise impact assessment was completed for the 15 year Metrolinx planning horizon and, for some areas (specifically north of the Junction), the increase in sound for that horizon year was slightly above the trigger for mitigation, Metrolinx may consider staging the construction of acoustical barriers or providing alternative measures. This decision would be based on when they are warranted by future service levels and subject to technical and economic feasibility.

Worst-case maintenance noise levels have the potential to be quite loud during some short periods of time. Since noise impacts associated with maintenance activities are relatively short compared to operational noise they are typically better tolerated by the community at large. During maintenance activities the best management practices identified in **Section 6.2.2.1** will be implemented as appropriate.

6.2.2.3 Significance of the Potential Impacts

Although some noise impacts are anticipated best management practices, mitigation measures will be employed to reduce the potential impacts. In addition, it is noteworthy that with the implementation of the identified mitigation measures noise increases are anticipated to be less than 10dB throughout the corridor during operations i.e. to 2025, prior to implementation of electrification, as is indicated in **Table 6.2.2-2**. While the increase is an impact it not considered to be a significant impact. In addition, the assessment of potential impacts has been based on a worst-case scenario and as a result the actual impacts are anticipated to be less than potential impacts.

Overall, with the implementation of the above noted best management practices and mitigation measures potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.2.3 Vibration Impacts

A vibration assessment has been completed to assess the potential vibration impacts of the project and identify locations where vibration mitigation measures are required are technically and economically feasible. The focus of the assessment was on potential vibration impacts during operations; however, potential construction impacts have also been considered and are discussed in **Section 6.2.3.1**.

Vibration is typically measured in mm/s root mean square (RMS). The relative increases in vibration can be measured in decibels or as percentage increase. Decibels have been used in this assessment to provide a parallel approach to that taken for the noise impact analysis.

The vibration impact assessment followed similar procedure to that of the noise impact analysis described in **Section 6.2.2**. As part of the assessment, series of vibration measurements were taken at seven points adjacent to the study corridor. The seven points were selected to get a complete representation of conditions that occur at various soil types that occur along the rail corridor.

Although some of the critical factors affecting vibration are similar to that of noise, there are some differences to note.

Vibration propagation is not directly dependent on the distance. Instead, the extent and

magnitude to which vibration is generated and then propagates is related to the stiffness and damping characteristics of the soil. Since the soil conditions vary throughout the corridor, the vibration levels at comparable setbacks from tracks vary as well. Soft, clay-like soils tend to have higher damping and slower wave speeds, reducing the extent and magnitude of vibration propagation. Fine, sandy well-compacted soils tend to have high wave speeds, increasing the extent and magnitude of vibration propagation for a given distance. Generally, the firmer soils produce higher frequencies of vibration than the soft soils.

The vibration levels generated by the train itself are dependent on a number of factors. The speed and mass of the train each contributes linearly to the amount of vibration transmitted into the soil. As the mass of the train increases the vibration levels also increase. The speed of the trains is also a critical factor in determining the vibration levels. The relationship is generally a doubling of vibration for a doubling of speed.

It is interesting to note that compared to the overall GO train, with locomotive and cars, the vibration levels caused by the UPRL train will be about half that of the GO train. As such, the UPRL trains are not anticipated to contribute to any of the potential vibration impacts.

As with the noise assessment, the assumptions used in the vibration assessment were chosen to ensure that a conservative 'worst-case' scenario was examined. As a result, the impacts identified in the assessment are anticipated to be greater than the actual impacts of the project. This included the assumptions used for time horizon, train volumes, and operating speed.

The extent of the vibration impacts was determined by first confirming if the vibration levels are or will be above 0.14mm/s. Individuals are typically more sensitive to increases in vibration levels than they are to increases in sound levels. Thus, a 26% increase in vibration levels could generate a higher impact upon the receiver than a similar increase in sound levels. The following is the recommended approach to determine vibration impacts. It is similar in structure to the MTO/MOE noise protocol.

Vibration levels from the proposed train operations along the study corridor will not reach levels high enough to cause concern for structural damage (this becomes a concern once levels begin to exceed 5mm/s). Therefore, the focus of the vibration impact assessment was related to the changes in the perception of vibration.

Vibration impacts were measured relative to the existing levels or 0.14 mm/s RMS velocity, whichever is higher.

- up to 25% increase in vibration levels A change in vibration levels in this order is sometimes noticeable, but not high enough to warrant special attention. These changes correspond to the addition of a track directly beside another (4.2m offset).
- 26-67% increase in vibration levels A change in vibration levels in this order is readily noticeable and produces enough of an impact to warrant consideration of vibration mitigation measures.
- 68% increase or more in vibration levels A change in vibration levels in this order represents a serious vibration impact on sensitive receptors. The use of vibration control measures would most likely be necessary to address an impact of this level.

In the past, railways have been able to add a single track to most corridors without significant impacts to nearby receivers. Adding one track, at an offset of 4-5m from an existing track, typically increases vibration levels by approximately 12-25% increase. Increases above these typical increases are likely to cause noticeable impact on residents. It should be noted that because of the statistical nature of the vibration events, there is an uncertainty of approximately +/- 20% of the reading of the absolute measured values.

Figures 6.2.3-1 to 6.2.3-10 outline the anticipated changes in vibration. As discussed above, a 12-25% increase is not anticipated to result in impacts that warrant mitigation. As a result, **Figures 6.2.3-1 to 6.2.3-10** only document increases in vibration at or above 26%. Mitigation, as discussed later in this section, is proposed at all of these locations.

Impacts are not expected to propagate further than the first row of houses in most situations.

The effectiveness of mitigation measures has been reviewed and as a result the following vibration mitigation measures are proposed to be implemented, as outlined below.

For the purposes of dealing with impacts it appears, from European examples, that ballast mats will be adequate to bring the vibration levels of treated track to the vibration levels currently experienced along the corridor. A description of a ballast mat is provided below:

- *Ballast mats* – Ballast mats are essentially rubber or rubber composite mats placed directly under the ballast of train tracks to cushion the ballast. This cushioning provides some damping and reduces the amount of vibration transferred into the soil. This technique works best for stiff soils.

More extensive vibration is likely required at two, or perhaps three locations, (i.e. the apartment on the northeast corner of Bloor and the bridge, possibly the apartment on the east side of the corridor at Wallace Avenue, and the apartment in the northwest quadrant of the corridor and Lawrence Avenue).. The mitigation in these cases would be a floating slab. A description of a floating slab is provided below:

- *Floating slab* - A trench is constructed and lined with concrete and a heavy concrete slab is constructed within the trench with rubber pads placed beneath the slab. The concrete slab is necessary to provide better low frequency performance than can be achieved by other methods of track isolation.

All three of these locations are affected by bringing the tracks noticeably closer to the receivers that are already built at a short setback. The reason for the track offset is to accommodate larger station platforms that allow for all future rail corridor services to operate safely and provide optimal passenger convenience. These three locations, along with the other stretches where lesser measures are required, are shown in **Figures 6.2.3-1 to 6.2.3-10**.

Final details regarding the location and design of the proposed vibration mitigation measures will be determined during detailed design when more detailed geotechnical information will be available (e.g. required thickness of a ballast mats, etc.).

Implementation of vibration isolation is anticipated to be carried out at the time of the installation of new track. For purposes of making the treatment economically feasible, it is proposed that the balance of the treatment for the older tracks be carried out as the existing tracks undergo major rehabilitation sometime in the future.

6.2.3.1 Potential Construction Impacts and Proposed Mitigation Measures

Potential Impacts

Construction activities may cause perceptible vibration at times and are anticipated to cause the most annoyance when they are long-term activities.

As outlined in **Section 6.2.2.1**, construction is considered short-term if the duration of complete construction activity in the area is less than 2 months. Construction activities in an area lasting more than 2 months are considered long-term.

Proposed Mitigation Measures

As short-term construction sites are temporary in nature, their treatment may differ from long-term construction sites. This is to account for the persistent annoyance caused by long-term construction areas.

The following outlines the commitments to future work and the best management practices and mitigation measures to be implemented during construction. These measures apply to both short-term and long-term construction activities.

Communications

Communication with stakeholders (e.g. individual members of the public, ratepayer groups, business associations, etc) will focus on the following activities:

- Obtaining input on construction mitigation measures that affect the community
- Communication of project status and activities
- Enquiries/Complaints procedures

The following provide additional details on these activities.

Input on construction mitigation measures

- There will be communications with stakeholders to identify local and site-specific issues so that specific mitigation measures can be developed to minimize impacts to the extent possible. This may include discussions on issues such as;
 - o construction access;
 - o temporary road closures;
 - o construction schedule; and
 - o critical community activities that may be affected.

Communications of status and activities

- o A website will be developed to provide ongoing updates to facilitate communications during design and construction.
- o Whenever construction activity impacts a residential or business area, advance notice will be provided to the residents and businesses within the zone of influence.
- o Neighbourhoods will be kept updated on construction duration and progress.
- o Community liaison officers will be available for neighbourhoods to contact with specific information requests.

Enquiries/Complaints Procedures

- o Community liaison officers will be available for neighbourhood residents and business to hear and assist with issues that may arise during construction.

Technical

- Vibration levels will be monitored on a continuous basis for operations that cause particularly notable vibration. This will be especially important in areas that are dominated by fine, sandy soils. The vibration monitoring plan will be determined during detailed design.
- When vibration levels are anticipated to exceed 5mm/s, foundation and structural

element inspections will be carried out on nearby dwellings to determine an inventory of existing conditions. Those inspections will be carried out prior to the commencement of construction.

- All equipment used must adhere to guidelines as placed in MOE's NPC115 guidelines for construction equipment.
- Whenever possible work zone and time will adhere to local municipal by laws.
- In the event that construction is to occur overnight, effort will be made to minimize potential impacts on residents.
- In rail corridors, night work is often required for activities such as track shifts or bridge construction. As such, every effort will be made to minimize impacts on the neighbourhood. Night work requires lighting, which can often be a cause of discomfort for neighbourhoods, but is required for safety of the construction workers.
- Trains passing construction zones are required to whistle.
- Construction equipment has safety features such as beeping while backing up. This is for the protection and safety of the workers, but will be a common occurrence on the construction sites.
- Type of pile installation is determined during detailed design. Wherever soil conditions allow, driven piles will not be used.
- Where applicable temporary acoustic barriers will be considered for construction work.

6.2.3.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

As outlined in **Section 6.2.3**, prior to the implementation of mitigation the project is anticipated to generate vibration increases of 26% or more in some areas of the corridor (as identified in **Figures 6.2.3-1 to 6.2.3-10**) and those impacts are generally not expected to propagate further than the first row of houses in most situations.

Proposed Mitigation Measures

As outlined in **Section 6.2.3**, proposed mitigation measures will include the use of ballast mats or floating slabs in select locations. Final details regarding the location and design of the proposed vibration mitigation measures will be determined during detailed design when more detailed geotechnical information will be available (e.g. required thickness of a ballast mats, etc.).

As a result of the implementation of the proposed mitigation measures, vibration impacts are anticipated to be sufficiently mitigated to result in no notable or serious vibration impacts. As previously noted, the assessment of potential impacts has been based on a worst-case scenario and as a result the potential impacts identified are anticipated to be worse than the actual impacts of the project.

Worst-case maintenance vibration levels have the potential to be quite notable during some short periods of time. Since vibration impacts associated with maintenance activities are relatively short compared to operational impacts they are typically better

tolerated by the community at large. During maintenance activities the best management practices identified in **Section 6.2.3.1** will be implemented as appropriate.

6.2.3.3 Significance of the Potential Impacts

Although some vibration impacts are anticipated best management practices and mitigation measures will be employed to reduce the potential impacts. In addition, the assessment of potential impacts has been based on a worst-case scenario and as a result the actual impacts are anticipated to be less than potential impacts.

Overall, with the implementation of the above noted best management practices and mitigation measures potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.2.4 Air Quality Impacts

The following provide an overview of the air quality assessment completed for this project by RWDI. The purpose of this assessment was to determine the potential impacts of the project on ambient air quality criteria/objectives. The potential human health implication of increased air emissions in the corridor is discussed in **Section 6.2.5**.

Local air quality impacts related to project emissions were assessed using the United States Environmental Protection Agency's (U.S. EPA's) preferred/recommended air dispersion model, CAL3QHCR. This is a steady-state Gaussian dispersion model designed to determine air pollution concentrations at receptor locations downwind of linear emission sources (e.g., railways, roads), which are commonly referred to as "line sources".

The dispersion model was used to assess two scenarios: the Metrolinx 15 year plan (2025) future *build* and future *no-build* scenarios. The future build scenario included projected emissions from freight train traffic (CPR and CNR), passenger train traffic (VIA, GO and UPRL), emissions from vehicles using the future Weston Station parking facility and emissions from nearby roadway arteries and intersections. The future no-build scenario differs from the future build scenario only in that it involves lower GO train volumes (levels that could be attained without this project) and does not include Union-Pearson Rail Link train volumes.

Emissions of the following pollutants were included in this assessment:

- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂)
- Respirable Particulate Matter (PM₁₀)
- Inhalable Particulate Matter (PM_{2.5})
- Volatile Organic Compounds (VOCs): Formaldehyde, Acetaldehyde, 1,3-Butadiene, Benzene and Acrolein
- Polycyclic Aromatic Hydrocarbon PAHs: Benzo[a]pyrene

- Greenhouse Gases: Carbon Dioxide (CO₂), methane (CH₄) and Nitrous Oxide (N₂O)

The first five pollutants are those that are emitted in the largest amounts from motor vehicle exhausts. The specific VOC's and PAH's identified in the list are those that are emitted in the largest amounts and tend to have the most stringent criteria.

The list of included pollutants does not explicitly include any trace metals. Metals potentially make up a portion of the PM emissions. While locomotive emissions data for metals are not widely available, some data exist based on measurements taken in the exhausts of similar-sized locomotives to those in the present study (S.G. Fritz 2000). The measurements covered 12 species of metals, all load settings on the engines, and three types of diesel fuel. The only metal that was measured above the instrument detection limits was chromium and the maximum reported emission rate was a small fraction, approximately 0.2% of the total PM emission. On this basis, metals in the diesel exhaust were not explicitly modelled.

Airborne metals may also be generated by the friction of the locomotive wheels on the tracks. Sufficient emission data to model these potential emissions were not found, but some literature on the subject was found.

Emissions of the identified pollutants were estimated for the following emissions sources:

- Mobile locomotives (freight and passenger)
- Idling locomotives (passenger only)
- Tailpipe and re-suspended particulate matter emissions (dust disturbed by the roadway) from vehicles using parking facilities at Weston Station
- Tailpipe and re-suspended particulate matter emissions from vehicles using roadways in the vicinity of the rail corridor

Figures 6.2.4-1 and 6.2.4-9 show the locations of the rail and road emission sources that were modelled.

Receptors

Air quality impacts of the project were predicted at private residences, schools, child care centres and long term care centres throughout the study area. Receptors representative of these facilities were identified and included in the dispersion model. In some cases a representative worst-case receptor was selected to represent a grouping of receptors. Based on RWDI's previous experience, predicted local air quality impacts associated with roadways and railways tend to drop off significantly at downwind distances greater than 300 metres from a roadway or railway. Therefore, the residential receptors included in this assessment have generally been restricted to within 300 metres of the railway, but sensitive receptors such as schools, child care facilities and long term care facilities were examined up to 750 metres away. The receptors included in the assessment can be seen in **Figures 6.2.4-1 and 6.2.4-9**.

Relevant Guidelines

The Ontario Ministry of the Environment (MOE) has developed Ambient Air Quality Criteria (AAQCs) for numerous contaminants, including those that are typically emitted from vehicular traffic and are known to have the potential to cause human health or environmental impacts (MOE 2005a). Environment Canada (EC) has established National Ambient Air Quality Objectives (NAAQOs) for some of the same contaminants (Health Canada 1999). In general, these objectives represent desirable or acceptable ambient contaminant levels. Finally, the Canadian Council of Ministers of the Environment (CCME) created a Canada Wide Standard (CWS) for PM_{2.5} (CCME 2000). The CWS for PM_{2.5} was established for the year 2010 and is based on the 98th percentile ambient measurement (24-hour) annually averaged over three consecutive years.

The aforementioned air quality criteria, objectives and standards are collectively referred to as air quality thresholds in this report. The thresholds used to assess potential impacts from transportation projects are summarized in **Table 6.2.4-1**. It should be noted that these values represent target levels and are not specifically enforceable for motor vehicle emissions within any of the jurisdictions.

Table 6.2.4-1 Summary of Relevant Air Quality Thresholds (g/m³)

Contaminant	Averaging Time			Source			Air Quality Threshold
	1 hr	8 hr	24 hr	AAQC	NAAQO	CWS	
CO	X			X			36,200*
	X				X		35,000*
		X		X			15,700*
		X			X		15,000*
NO ₂	X			X			400
			X		X		200
PM _{2.5}			X			X	30
PM ₁₀			X				50
1,3-Butadiene							N/A
Benzene							N/A
Formaldehyde			X	X			65
Acetaldehyde			X	X			500
Acrolein			X	X			0.08

Note: The AAQC and NAAQO for CO represent the same value in parts per million (ppm). The two jurisdictions base their conversion from ppm to (g/m³) on different ambient temperatures.

Assessment of Air Quality – Local Air Quality

The pollutants selected for the local air quality study included respirable particulate matter (PM_{2.5}), inhalable particulate matter (PM₁₀), carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), benzo(a)pyrene, and the volatile organic compounds benzene, 1,3-butadiene, acrolein, acetaldehyde and formaldehyde. Trace metals were also considered. These pollutants were chosen for the local study because they are typically of greatest concern by government agencies and have the highest potential to exceed government thresholds.

Local air quality was determined at representative sensitive and critical receptors by combining modelled concentrations for key emission sources within the study area, as derived from the CAL3QHCR dispersion model, with 90th percentile background concentrations based on ambient monitoring measurements. These ambient data were collected by the Ontario Ministry of the Environment (MOE) and Environment Canada (EC) throughout the project area and beyond where necessary and was used to estimate background concentrations. Future predicted concentrations at sensitive and critical receptors were assessed for attainment by comparison to applicable government thresholds.

Assessment of Air Quality – Regional Air Quality

Regional air quality was assessed by examining how the proposed project will change the overall emissions of PM, NO_x, and VOCs in the region. Those pollutants were selected because they are those associated with the complex secondary atmospheric reactions and lead to the formation of smog. Emissions from the proposed project were derived by calculating the total tonnes of the pollutants emitted annually into the atmosphere. Emissions from all sources in Ontario and Canada were obtained from the CAC06 emission inventory developed by Environment Canada.

The impact of the proposed project on the formation of smog pollutants in the region can be evaluated by examining how the proposed project will change the overall emissions of PM, NO_x and VOCs in the region. If, for example, the project leads to a small increase in overall emissions of NO_x, VOCs and PM in the region, then it can be concluded that this will translate into a small increase in smog pollutants during air pollution episodes. The chemical reactions that lead to the formation of the smog pollutants are not linear in nature and, in general, the relative increase in smog pollutant concentrations would be less than the proportional increase in emissions.

Emissions from the proposed study area were derived using emission factors compiled from standards for original manufacture (EPA 2008, Pechan Report 2007), combined with data on predicted future rail traffic flow, as provided by the traffic consultants for the project. First, emissions were calculated for individual segment and then the overall emissions were calculated by combining the individual emissions.

For comparison, overall emissions from all sources in Ontario and Canada were obtained from the CAC06 emission inventory developed by Environment Canada (2006, 2007). This inventory contains estimates of pollutant emissions for point sources, area sources and mobile sources (on-road and off-road) throughout Canada. The City of Toronto's CAC emission report (ICF, 2007) was also used to compare emissions. The Government of Canada has targeted reduction initiatives of 40% for nitrogen oxides (NO_x), 55% for sulphur oxides (SO_x), 45% for volatile organic compounds (VOCs), and 20% for particulate matter (PM) from the 2006 levels. The targets for air pollutants will come into force as early as 2012 (Environment Canada 2007). Thus, CAC emissions from all sectors in 2021 are likely to be less than the current levels. Therefore, the comparison of future project to existing regional emissions is an approximate comparison, but sufficient enough to show the relative contribution from the proposed project.

Assessment of Greenhouse Gas Emissions (GHG's)

One of the key environmental issues at present day is global warming. The Intergovernmental Panel on Climate Change (IPCC) concludes that anthropogenic greenhouse gases (GHG) are responsible for most of the observed global warming with only a small contribution from natural phenomena.. Carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄) are the dominant greenhouse gases (GHG) emitted from transportation sources.

GHG emissions from the rail corridor were derived based on the projected rail traffic volumes, train speeds, rated locomotive horsepower. This calculation also required information on the average locomotive fuel consumption as a function of horsepower. For this purpose, a value of 0.048 gallons per break-horsepower hour was used (0.048 gal/bhp-hr or, equivalently, 20.8 bhp-hr/gal), as adopted by the US Environmental Protection Agency. The assessment of GHG emissions included all locomotive traffic on the rail corridor (project-related and non-project) in the future-build scenario. It did not include any other emissions, such as traffic on major roadways in the study area. An estimate of the overall GHG emissions from all sources within the City of Toronto, for comparison to the rail corridor emissions, was available from published data.

A further analysis was conducted of the net GHG emissions associated with the project, taking into consideration the fact that increases in GO train traffic would displace commuter traffic on highways in the area. An approximate, screening-level analysis was performed for this purpose. It was based on a 30 km travel distance, whether by GO train or by automobile. The average GO train speed over the corridor for the future-build scenario of 76 km/h (48 mph) was used. Locomotives were assumed to run at full horsepower (5000 hp, including hotel power). Estimated annual emissions were based on 5 days per week of operation. The number of GO trains per day was based on the average for the future-build scenario within the study area (184 trains/day).

Locomotive fuel consumption was based on the US EPA estimate mentioned previously, and automobile fuel consumption was based on present-day Canadian averages for small and large passenger cars (8 and 11 litres/100 km, respectively), combined with the present-day average mix of small and large cars (57% small cars), as published by Natural Resources Canada. For the GO trains, the trains were assumed to be at a capacity of 1900 passengers/train. Results for other average capacities can be inferred. For automobiles, the commuter ridership was assumed to be approximately 1 passenger/car.

6.2.4.1 Local Air Quality - Assessment Results and Discussion

Predicted Maximum Combined Concentrations

The receptor with the highest predicted concentrations are summarized in **Tables 6.2.4.1-1 through 6.2.4.1-3**. **Table 6.2.4.1-1** shows results for the future build scenario, **Table 6.2.4.1-2** shows results for the future no-build scenario, and **Table 6.2.4.1-3** compares the two scenarios. The following provides a brief discussion of the results, by contaminant.

Table 6.2.4.1-1 Summary of Maximum Predicted Future Build Concentrations

Pollutant	Modelled (µg/m³)	Background (µg/m³)	Combined (Modelled + Background) (µg/m³)	Air Quality Threshold (µg/m³)	Percentage of Threshold (%)	Receptor ID*
1-hr Averaging Period						
PM _{2.5}	27.3	25.0	52.3	N/A	N/A	41
PM ₁₀	27.1	41.7	68.8	N/A	N/A	41
CO	562	1556	2117	36200	5.85%	38
NO _x	802	226	1028	N/A	N/A	41
NO ₂	164	97.1	262	400	65.4%	41
SO ₂	19.7	24.8	44.5	690	6.45%	115
Benzene	3.45	2.80	6.25	N/A	N/A	41
1,3-Butadiene	3.03	0.400	3.43	N/A	N/A	41
Acrolein	0.493	0.159	0.652	N/A	N/A	41
Acetaldehyde	2.11	2.61	4.72	N/A	N/A	41
Formaldehyde	3.93	4.83	8.76	N/A	N/A	41
Benzo(a)pyrene	7.19E-05	0.00E+00	7.19E-05	N/A	N/A	41
24-hr Averaging Period						
PM _{2.5}	4.56	25.0	29.6	30.0	98.5%	7
PM ₁₀	4.33	41.7	46.0	50.0	92.0%	7
CO	126	1556	1682	N/A	N/A	38
NO _x	236	226	462	N/A	N/A	57
NO ₂	108	97.1	205	200	102%	57
SO ₂	4.72	24.8	29.6	275	10.7%	27
Benzene	0.550	2.80	3.35	N/A	N/A	7
1,3-Butadiene	0.480	0.400	0.880	N/A	N/A	7

Pollutant	Modelled (µg/m³)	Background (µg/m³)	Combined (Modelled + Background) (µg/m³)	Air Quality Threshold (µg/m³)	Percentage of Threshold (%)	Receptor ID*
Acrolein	0.0700	0.159	0.229	0.0800	286%	27
Acetaldehyde	0.280	2.61	2.89	500	0.579%	27
Formaldehyde	0.610	4.83	5.44	65.0	8.37%	7
Benzo(a)pyrene	2.00E-05	0.00E+00	2.00E-05	N/A	N/A	6
Annual Averaging Period						
PM _{2.5}	1.32	10.6	11.9	N/A	N/A	9
PM ₁₀	1.32	17.7	19.0	N/A	N/A	9
CO	30.7	1073	1104	N/A	N/A	38
NO _x	67.1	105	172	N/A	N/A	57
NO ₂	50.4	54.7	105	N/A	N/A	57
SO ₂	1.38	14.9	16.3	55.0	29.6%	9
Benzene	0.160	1.40	1.56	N/A	N/A	9
1,3-Butadiene	0.130	0.200	0.330	N/A	N/A	6
Acrolein	0.0200	0.0900	0.110	N/A	N/A	6
Acetaldehyde	0.0800	1.42	1.50	N/A	N/A	6
Formaldehyde	0.180	2.50	2.68	N/A	N/A	6
Benzo(a)pyrene	1.00E-05	0.00E+00	1.00E-05	N/A	0.000300.33%	6

* The Receptor ID column indicates the receptor with the highest predicted concentration

Table 6.2.4.1-2 Summary of Maximum Predicted Future No-Build Concentrations

Pollutant	Modelled (µg/m³)	Background (µg/m³)	Combined (Modelled + Background) (µg/m³)	Air Quality Threshold (µg/m³)	Percentage of Threshold (%)	Receptor ID
1-hr Averaging Period						
PM _{2.5}	9.09	25.0	34.1	N/A	N/A	41
PM ₁₀	8.25	41.7	49.9	N/A	N/A	115
CO	553	1556	2109	36200	5.82%	38
NO _x	465	226	691	N/A	N/A	57
NO ₂	131	97.1	228	400	57.0%	57
SO ₂	4.46	24.8	29.3	690	4.25%	26
Benzene	1.20	2.80	4.00	N/A	N/A	41
1,3-Butadiene	1.03	0.400	1.43	N/A	N/A	41
Acrolein	0.157	0.159	0.316	N/A	N/A	41
Acetaldehyde	0.674	2.61	3.29	N/A	N/A	41
Formaldehyde	1.22	4.83	6.05	N/A	N/A	41
Benzo(a)pyrene	3.75E-05	0.00E+00	3.75E-05	N/A	N/A	115
24-hr Averaging Period						
PM _{2.5}	2.39	25.0	27.4	30.0	91.3%	7
PM ₁₀	2.29	41.7	44.0	50.0	87.9%	7
CO	121	1556	1677	N/A	N/A	38
NO _x	210	226	436	N/A	N/A	57
NO ₂	105	97.1	202	200	101.1%	57
SO ₂	1.17	24.8	26.0	275	9.45%	7
Benzene	0.330	2.80	3.13	N/A	N/A	7
1,3-Butadiene	0.280	0.400	0.680	N/A	N/A	7

Pollutant	Modelled (µg/m ³)	Background (µg/m ³)	Combined (Modelled + Background) (µg/m ³)	Air Quality Threshold (µg/m ³)	Percentage of Threshold (%)	Receptor ID
Acrolein	0.0300	0.159	0.189	0.0800	236.3%	6
Acetaldehyde	0.130	2.61	2.74	500	0.549%	7
Formaldehyde	0.230	4.83	5.06	65.0	7.78%	7
Benzo(a)pyrene	1.00E-05	0.00E+00	1.00E-05	N/A	N/A	6
Annual Averaging Period						
PM _{2.5}	0.690	10.6	11.3	N/A	N/A	37
PM ₁₀	0.700	17.7	18.4	N/A	N/A	37
CO	29.6	1073	1103	N/A	N/A	38
NO _x	60.6	105	166	N/A	N/A	57
NO ₂	49.7	54.7	104	N/A	N/A	57
SO ₂	0.320	14.9	15.2	55.0	27.7%	6
Benzene	0.100	1.40	1.50	N/A	N/A	26
1,3-Butadiene	0.0800	0.200	0.280	N/A	N/A	6
Acrolein	0.0100	0.0900	0.100	N/A	N/A	6
Acetaldehyde	0.0400	1.42	1.46	N/A	N/A	6
Formaldehyde	0.0700	2.50	2.57	N/A	N/A	37
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00	3.00E-04	0.00E+00	1

Table 6.2.4.1-3 Comparison of Maximum Predicted Future Build and Future No-Build Concentrations

Pollutant	Future Build Modelled (µg/m³)	Future No-Build Modelled (µg/m³)	Background (µg/m³)	Future Build Combined (Modelled + Background) (µg/m³)	Future No-Build Combined (Modelled + Background) (µg/m³)	Percentage Increase Due to Project (%)
1-hr Averaging Period						
PM _{2.5}	27.3	9.09	25.0	52.3	34.1	53.4%
PM ₁₀	27.1	8.25	41.7	68.8	49.9	37.8%
CO	562	553	1556	2117	2109	0.407%
NO _x	802	465	226	1028	691	48.8%
NO ₂	164	131	97.1	262	228	14.8%
SO ₂	19.7	4.46	24.8	44.5	29.3	52.0%
Benzene	3.45	1.20	2.80	6.25	4.00	56.3%
1,3-Butadiene	3.03	1.03	0.400	3.43	1.43	140%
Acrolein	0.493	0.157	0.159	0.652	0.316	106%
Acetaldehyde	2.11	0.674	2.61	4.72	3.29	43.7%
Formaldehyde	3.93	1.22	4.83	8.76	6.05	44.8%
Benzo(a)pyrene	7.19E-05	3.75E-05	0.00E+00	7.19E-05	3.75E-05	91.7%
24-hr Averaging Period						
PM _{2.5}	4.56	2.39	25.0	29.6	27.4	7.92%
PM ₁₀	4.33	2.29	41.7	46.0	44.0	4.64%
CO	126	121	1556	1682	1677	0.321%
NO _x	236	210	226	462	436	5.94%
NO ₂	108	105	97.1	205	202	1.28%
SO ₂	4.72	1.17	24.8	29.6	26.0	13.7%
Benzene	0.550	0.330	2.80	3.35	3.13	7.03%

Pollutant	Future Build Modelled ($\mu\text{g}/\text{m}^3$)	Future No-Build Modelled ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Future Build Combined (Modelled + Background) ($\mu\text{g}/\text{m}^3$)	Future No-Build Combined (Modelled + Background) ($\mu\text{g}/\text{m}^3$)	Percentage Increase Due to Project (%)
1,3-Butadiene	0.480	0.280	0.400	0.880	0.680	29.4%
Acrolein	0.0700	0.0300	0.159	0.229	0.189	21.2%
Acetaldehyde	0.280	0.130	2.61	2.89	2.74	5.47%
Formaldehyde	0.610	0.230	4.83	5.44	5.06	7.51%
Benzo(a)pyrene	2.00E-05	1.00E-05	0.00E+00	2.00E-05	1.00E-05	100%
Annual Averaging Period						
PM _{2.5}	1.32	0.690	10.6	11.9	11.3	5.58%
PM ₁₀	1.32	0.700	17.7	19.0	18.4	3.38%
CO	30.7	29.6	1073	1104	1103	0.103%
NO _x	67.1	60.6	105	172	166	3.92%
NO ₂	50.4	49.7	54.7	105	104	0.623%
SO ₂	1.38	0.320	14.9	16.3	15.2	6.96%
Benzene	0.160	0.100	1.40	1.56	1.50	4.00%
1,3-Butadiene	0.130	0.0800	0.200	0.330	0.280	17.9%
Acrolein	0.0200	0.0100	0.0900	0.110	0.100	10.0%
Acetaldehyde	0.0800	0.0400	1.42	1.50	1.46	2.74%
Formaldehyde	0.180	0.0700	2.50	2.68	2.57	4.28%
Benzo(a)pyrene	1.00E-05	0.00E+00	0.00E+00	1.00E-05	0.00E+00	>100%

Respirable Particulate Matter (PM_{2.5})

The discussion focuses on the 24-hour averaging period, which has an ambient air quality criterion of $30\mu\text{g}/\text{m}^3$ (micrograms of contaminant per cubic metre of air). The highest predicted 24-hour concentrations were 29.6 and $27.4\mu\text{g}/\text{m}^3$, in the future build and future no-build scenario, respectively. These values were predicted at Receptor 7,

which is the closest point on a townhome complex at Strachan Avenue, south of the corridor. Both of these values approach within 90% of the $30\mu\text{g}/\text{m}^3$ criterion, but do not exceed it.

These values apply to worst-case meteorological conditions. Under more typical conditions, the predicted concentrations are much lower, as indicated by the predicted annual average value of just under $12\mu\text{g}/\text{m}^3$.

The rail corridor's contributions to the highest predicted 24-hour concentrations were 4.6 and $2.4\mu\text{g}/\text{m}^3$, in the future build and future no-build scenarios, respectively. These contributions are both less than 15% of the criterion, indicating that the predicted maximum concentrations in both scenarios are dominated by the background concentration.

For the future build scenario, predicted maximum 24-hour concentrations above $29\mu\text{g}/\text{m}^3$ occurred at 5 receptor locations (R6, R7, R9, R26, and R27). These are all residential locations that abut the rail corridor. The concentrations decrease with distance from the corridor. At Receptor R34, for example, which is about 60m away from the corridor, the maximum predicted concentration was $26.4\mu\text{g}/\text{m}^3$ in the future build scenario, with the project's contribution at under $2\mu\text{g}/\text{m}^3$. At Receptor 33, which is about 250m away, the maximum predicted concentration was $25.8\mu\text{g}/\text{m}^3$, which is only slightly above the background level of $25\mu\text{g}/\text{m}^3$.

Inhalable Particulate Matter (PM_{10})

Results are similar to those for $\text{PM}_{2.5}$, with the maximum predicted 24-hour levels being 46 and $44\mu\text{g}/\text{m}^3$, in the future build and future no-build scenarios, which occurred at Receptor 7. As with $\text{PM}_{2.5}$, both of these values are approaching, but below the criterion of $50\mu\text{g}/\text{m}^3$. Predicted annual average levels are much lower, at around $19\mu\text{g}/\text{m}^3$. Trends with distance are similar to those discussed under $\text{PM}_{2.5}$, with the predicted maximum concentration being only slightly above background at a distance of 250m away.

Ultrafine Particulate Matter ($\text{PM}_{0.1}$)

The potential health impact of ultrafine particulate matter (i.e., $\text{PM}_{0.1}$) is an emerging area of scientific enquiry. Currently, there are no established regulatory benchmarks or standardized approaches to evaluation of the health impact related to exposures to this particulate matter fraction. For the current assessment, the ultrafine fraction was considered as part of the evaluation of health impacts related to the $\text{PM}_{2.5}$ (i.e., particulate matter less than 2.5 microns in size) group.

Carbon Monoxide (CO)

Since diesel engines have relatively low CO emissions, there is little difference between the future build and future no-build scenarios, with the predicted maximum 1-hour concentrations being 2117 and $2109\mu\text{g}/\text{m}^3$, respectively. These levels occurred at Receptor 38, which is somewhat removed from the rail corridor (about 150m away, but is adjacent to a roadway (Bloor Street) that was included in the simulation. These predicted levels are far below (about 6% of) the criterion, which is $36200\mu\text{g}/\text{m}^3$.

Nitrogen Oxides (NO_x)

NO_2 is a key oxide of nitrogen, having criteria for both the 1-hour and 24-hour averaging periods (400 and $200\mu\text{g}/\text{m}^3$, respectively). The predicted highest 1-hour concentrations were 262 and $228\mu\text{g}/\text{m}^3$, for the future build and future no-build scenarios, both of which

are less than 65% of the criterion. These levels occurred at Receptor 57, which abuts a section of rail at the junction of the Georgetown and Milton rail corridors.

The highest 24-hour concentrations were 205 and 202 $\mu\text{g}/\text{m}^3$, for the future build and future no-build scenarios, respectively. These values also occurred at Receptor 57 and both slightly exceed the criterion of 200 $\mu\text{g}/\text{m}^3$. The rail corridor contributed approximately half of the predicted level, indicating an equal contribution from the corridor and from background. However, much of this was due to existing rail freight traffic in the area and, as a result, the concentrations change little between the future build and future no-build scenario. As with PM, these levels are associated with worst-case meteorology, and typical levels are lower, as indicated the annual average at R57 of 105 $\mu\text{g}/\text{m}^3$.

Maximum 24-hour levels approaching within 5% the criterion (i.e., above 190 $\mu\text{g}/\text{m}^3$) occurred at 18 of the 125 modelled receptors (R6, R7, R9, R10, R25-R27, R37, R41-R43, R52-57, R115). These locations abut the rail corridor, and R115 is located at an exit of the proposed covered section of rail in Weston.

The concentrations decrease with distance from the rail corridor. At R34, which is about 60m away, the predicted maximum 24-hour concentration is 137 $\mu\text{g}/\text{m}^3$, which is about 69% of the criterion, and the annual average is only 65 $\mu\text{g}/\text{m}^3$. At R33, which is about 250m away, it is 118 $\mu\text{g}/\text{m}^3$, which is about 60% of the criterion, and the annual average is about 61 $\mu\text{g}/\text{m}^3$.

Sulphur Dioxide (SO₂)

SO₂ has criteria for maximum 1-hour and 24-hour concentrations. The highest predicted 1-hour concentrations were 44.5 and 29.3 $\mu\text{g}/\text{m}^3$, for the future build and future no-build scenarios, respectively. These levels were predicted at Receptor 26 (future no-build) and Receptor 115 (future build), both of which abut the rail corridor. They show that the future build scenario causes an increase in concentrations but the highest predicted value remains less than 10% of the criterion (690 $\mu\text{g}/\text{m}^3$).

The highest predicted 24-hour concentrations were 29.6 and 26 $\mu\text{g}/\text{m}^3$, for the future build and future no-build scenarios, respectively. They were predicted at Receptor 27, which abuts the rail corridor. Similar to the maximum 1-hour concentrations, these levels are about 10% of the 24-hour criterion (275 $\mu\text{g}/\text{m}^3$).

Benzene and 1,3-Butadiene

Benzene and 1,3-Butadiene are key aromatic compounds of concern that are present in diesel fuel. These compounds are either known or possible carcinogens, but currently do not have ambient air quality criteria in Ontario. For Benzene, the highest predicted 1-hour concentrations are 6.3 and 4 $\mu\text{g}/\text{m}^3$, for the future build and future no-build scenarios, respectively. These levels were predicted at Receptor 7, which abuts the rail corridor. On an annual average basis, the predicted concentrations are much lower, at 1.6 and 1.5 $\mu\text{g}/\text{m}^3$ for the future build and future no-build scenarios, respectively, with about 10% of the total coming from the rail corridor and the remaining 90% due to background.

For 1,3-Butadiene, predicted annual average levels are lower than for benzene, at 0.33 and 0.28 $\mu\text{g}/\text{m}^3$, for the future build and future no-build case, respectively. This is mainly due to lower background levels. The rail corridor's contribution in the future build case is somewhat lower but comparable to the background contribution.

Acrolein

Acrolein is one of the aldehydes, which are by-products of internal combustion. It has a 24-hour criterion of $0.08\mu\text{g}/\text{m}^3$. Estimated background levels currently exceed the criterion, with the 90th percentile level being $0.16\mu\text{g}/\text{m}^3$. The highest predicted overall concentration (background plus rail corridor and local car traffic) is $0.23\mu\text{g}/\text{m}^3$, in the future build scenario, and $0.19\mu\text{g}/\text{m}^3$ in the future no build scenario. The concentrations are dominated by the background concentration which is responsible for more than two-thirds of the total.

Acetaldehyde and Formaldehyde

Acetaldehyde and formaldehyde have 24-hour criteria of 500 and $65\mu\text{g}/\text{m}^3$, respectively. The highest predicted 24-hour concentrations of acetaldehyde were 2.9 and $2.7\mu\text{g}/\text{m}^3$, for the future build and future no-build scenario, respectively. These levels are dominated by the background level ($2.6\mu\text{g}/\text{m}^3$) and are less than 1% of the criterion.

The highest predicted 24-hour concentrations of formaldehyde were 5.4 and $5.1\mu\text{g}/\text{m}^3$, for the future build and future no-build case, respectively. As with acetaldehyde, these levels are dominated by the background concentration ($4.8\mu\text{g}/\text{m}^3$) and are far below the criterion (around 8% of it).

Benzo(a)pyrene

This key polycyclic aromatic hydrocarbon (PAH) has a criterion for annual average concentration of $0.0003\mu\text{g}/\text{m}^3$. Since benzo(a)pyrene is not routinely monitored, the background concentration is not well known. However, the predicted annual average contribution of the rail corridor and adjacent roadway traffic is $0.00001\mu\text{g}/\text{m}^3$, which is only about 3% of the criterion. Therefore, the predicted contribution of the project is very small in relation to the criterion.

It should be mentioned that initial estimates of pollutant concentrations predicted at receptor 56 may be underestimated due to the fact that emissions from a short length of track that connects the study rail line (Mactier Subdivision) to the CP North Toronto Subdivision were not represented in the model. It is noted that receptor 56 represents residences that are approximately 50 metres away from this short length of track and therefore, it is important that associated impacts are considered. This issue was addressed by replacing the pollutant concentrations generated by the model for this receptor, which are likely to be underestimates, with the maximum of the set of concentrations predicted for receptors 43, 44 and 52. These receptors are within 50 metres of the study rail line, which supports higher train traffic volumes than the short length of track near receptor 56. Therefore, the results that are reported for receptor 56 are likely to be overestimates.

Trace Metals

As mentioned previously, metals potentially make up a portion of the PM emissions from locomotives. Data on measurements taken in the exhausts of similar-sized locomotives to those in the present study were found (S.G. Fritz 2000). The only metal that was measured above the instrument detection limits was chromium and the maximum reported emission rate was a small fraction, approximately 0.2% of the total PM emission. On this basis, metals in the diesel exhaust were not explicitly modelled.

Airborne metals may also be generated by the friction of the locomotive wheels on the tracks. Sufficient emission data to model these potential emissions were not found, but some literature on the subject was found (N.R. Bukowiecki et al. 2007). The air quality assessment measured the metals of concern for railway abrasion (iron, manganese, chromium and copper) at a distance of 10m away from the tracks. Hourly samples were taken over a 47-day winter period in 2003/2004 at a location in Switzerland. Train frequencies were similar to those proposed for the Georgetown South Service Expansion and Union Pearson Rail Link, with 30 to 40 passenger trains per hour during daytime and evening hours, and 10 to 20 cargo trains per hour throughout the day. Maximum observed concentrations, which would include background concentrations, are outlined in **Table 6.2.4.1-4**. In all cases the observed levels were well below current criterion levels used in Ontario.

Table 6.2.4.1-4 Maximum Observed Trace Metal Concentrations

Metal	Measured 1-hr Concentration	Current Ontario 24-hr Limit
Iron	2.1 µg/m ³	4 µg/m ³
Manganese	0.026 µg/m ³	2.5 µg/m ³
Chromium	0.016 µg/m ³	1.5 µg/m ³
Copper	0.1 µg/m ³	50 µg/m ³

Combined Effects Analysis

A more detailed combined effects analysis was performed for the two contaminants for which the predicted maximum contribution from the modelled sources, in combination with the 90th percentile background level, most closely approached the threshold. The two contaminants were NO₂ and PM_{2.5}, with the relevant averaging time being 24-hours. Three receptors were selected for the analysis: R7, R34, and R57. R7 (near Strachan Avenue) and R57 (at the Junction) were selected as they are adjacent to the rail corridor, and represent locations of maximum PM and NO₂ impact, respectively. Receptor 34 was chosen to show how the combined effect looks at a typical receptor that is somewhat further from the rail corridor.

Rather than simply adding the predicted maximum concentration from project-related sources to the 90th percentile background concentration, predicted daily project-related concentrations for the 1-year simulation period were added to corresponding daily background concentrations, resulting in 365 cumulative concentrations from which statistics could be developed. The daily background concentration data used in the combined effects analysis were obtained from MOE website and are applicable to the Toronto West monitoring station (MOE Station No. 35125) for the year 2007.

Statistics for both the combined concentrations and the background measurements, on their own, for future build and future no-build alternatives were plotted to show the frequency or percentage of time that concentrations exceed the threshold of interest. The relative difference between the frequency distribution for combined concentrations and that for the background concentrations is used to get a more detailed indication of the local increase in pollutant levels associated with the proposed project. The resulting plots are shown in **Figures 6.2.4.1-3 through 6.2.4.1-8**.

Figures 6.2.4.1-1 to 6.2.4.1-3 show that, for NO₂, a noticeable difference between background levels and future no-build or future-build levels occurs at locations R7 and R57. At R34, on the other hand, the difference is relatively small. This is because R34

is further from the rail corridor (on the order of 100m away) as mentioned previously. At R7, there is also a noticeable difference between the future no-build and the future-build scenarios. At R57, however, this difference is small, as the predicted levels are dominated by freight traffic along the existing CPR North Toronto line, which does not change between the future no-build and future build scenarios. In all cases (background, future no-build, future build), the predicted concentrations for NO_2 remain below the threshold at all times.

Figures 6.2.4.1-4 to 6.2.4.1-6 show that the background 24-hour levels of $\text{PM}_{2.5}$ actually exceed the threshold from time-to-time at R7, R34, and R57 locations. The background frequency of exceeding the threshold is 1.8%, or about 7 days per year. For both future build and future no-build alternatives, the predicted combined frequency of exceeding the threshold at R7, R34, and R57 locations are in the range of 1.8% to 1.96% of the time or about 7 days per year, which is essentially the same as the background frequency of exceeding the threshold. In other words, the project has little effect on either the maximum concentration over the year or the frequency of exceeding the threshold.

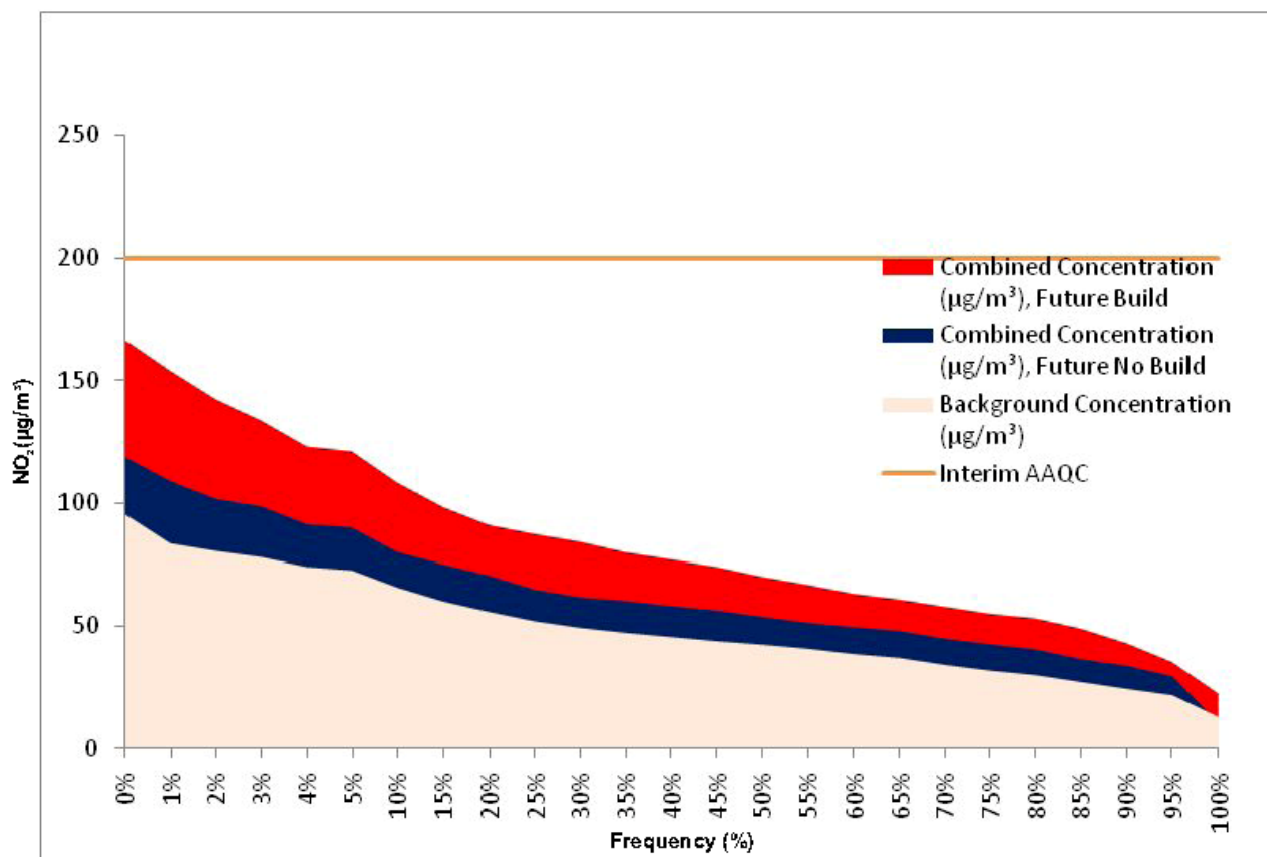


Figure 6.2.4.1-1 Combined Effects Curve of 24-hr NO_2 and R7

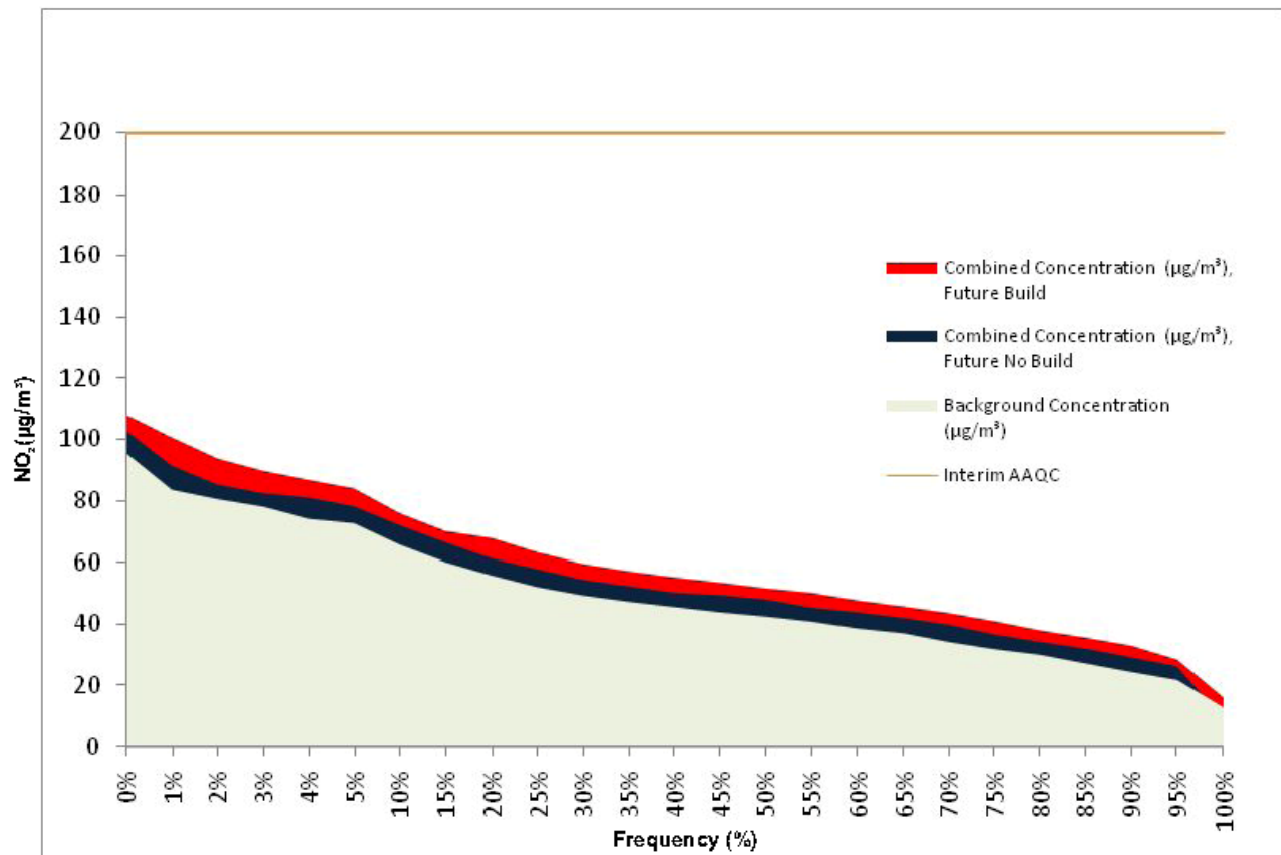


Figure 6.2.4.1-2 Combined Effects Curve of 24-hr NO_2 and R34

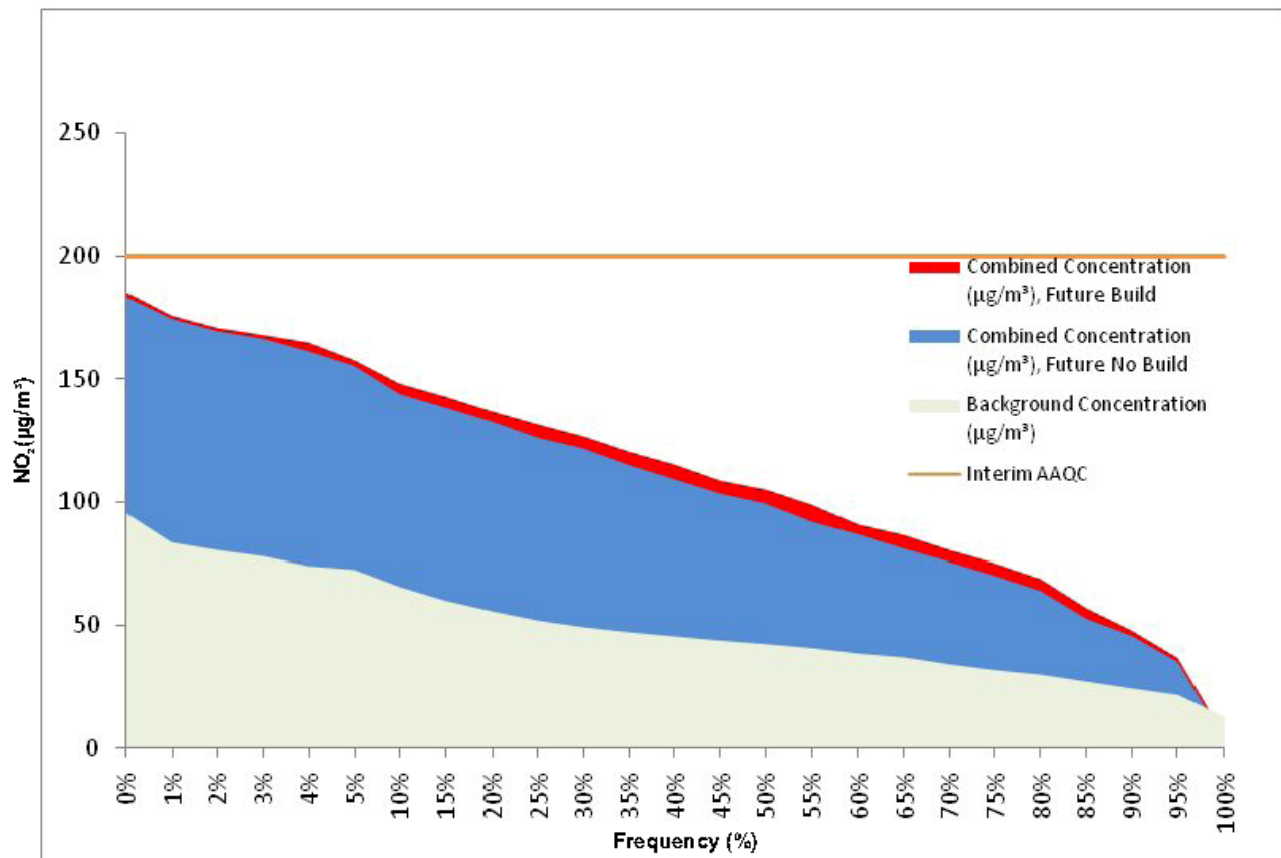


Figure 6.2.4.1-3 Combined Effects Curve of 24-hr NO₂ and R57

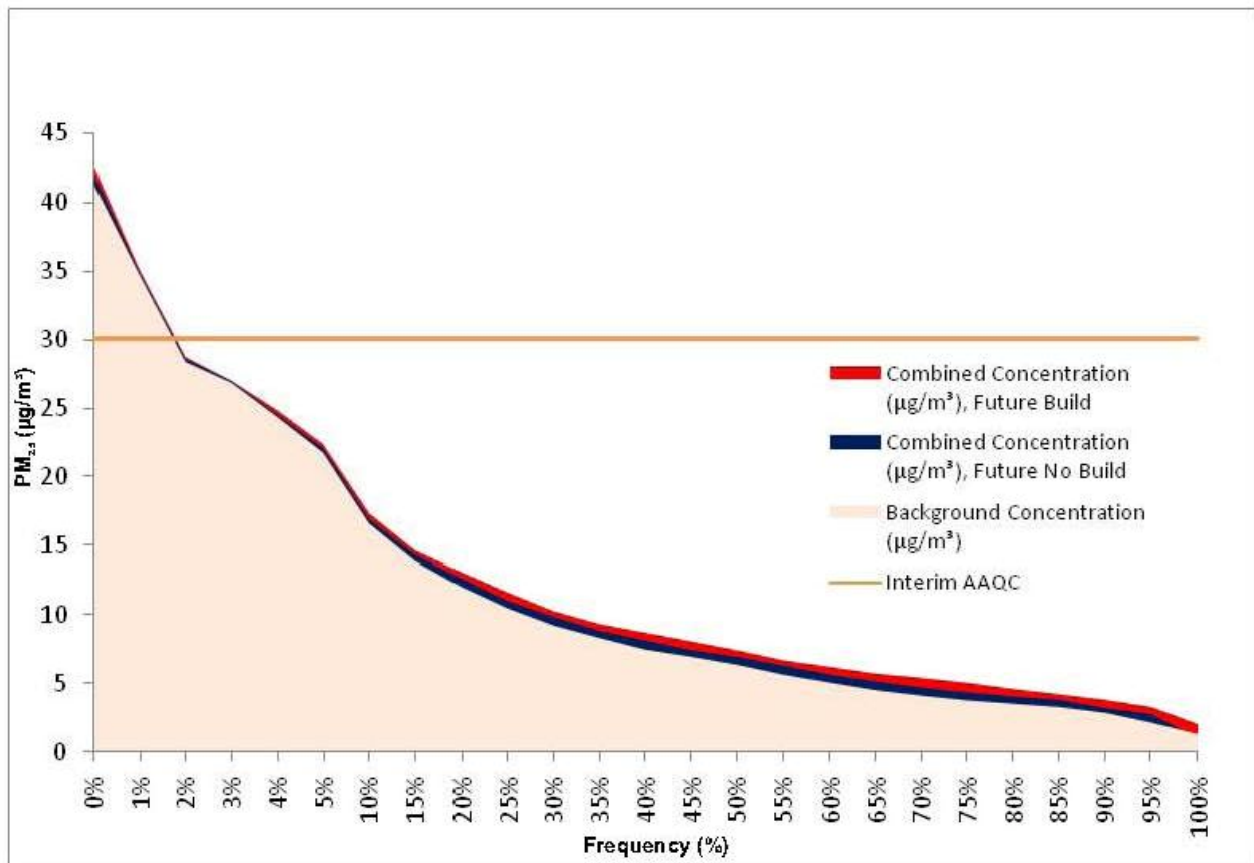


Figure 6.2.4.1-4 Combined Effects Curve of 24-hr PM_{2.5} at R7

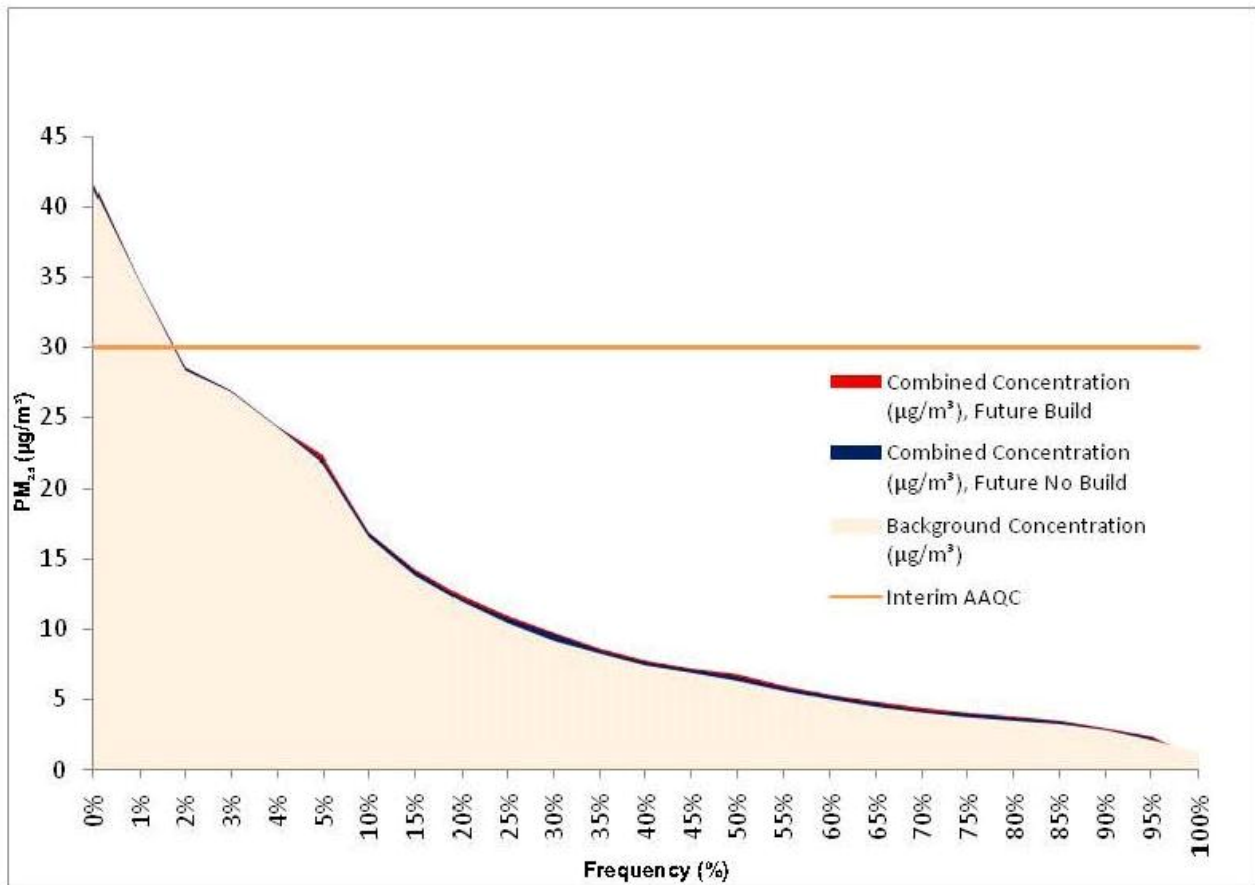


Figure 6.2.4.1-5 Combined Effects Curve of 24-hr $PM_{2.5}$ at R34

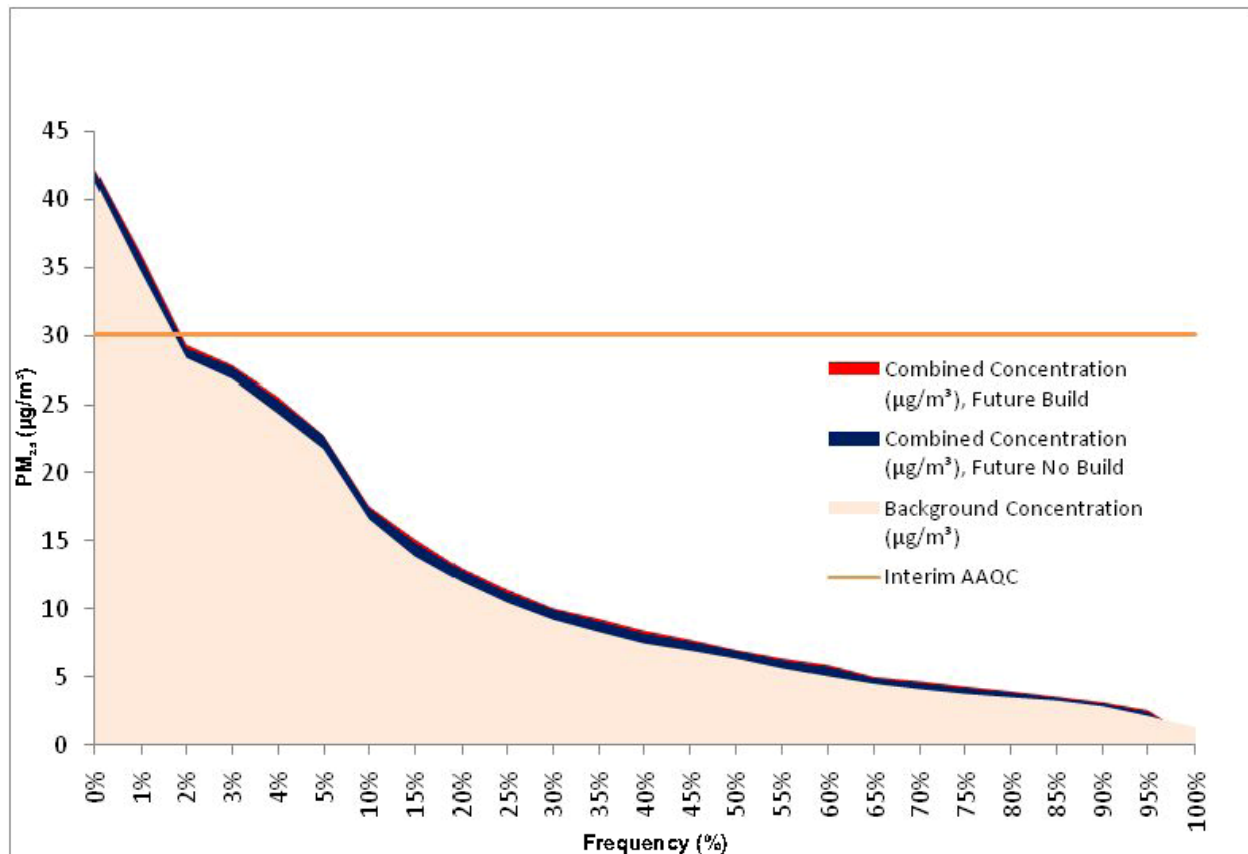


Figure 6.2.4.1-6 Combined Effects Curve of 24-hr PM_{2.5} at R57

Concentration versus Distance

Concentration profiles investigate the relationship between the maximum predicted concentrations and increasing downwind distance away from the railway. Profiles were generated for two selected contaminants: NO₂ and PM_{2.5} (Figures 6.2.4.1-7 and 6.2.4.1-8). Generally, a representative section of the proposed study area is selected to generate the concentration profile. The profiles discussed here were based on results from Receptors 13 to 22, which are located in the part of the study area lying between Queen Street and Dundas Street.

The concentration profiles illustrate that as the downwind distance from the railway section increases, the predicted concentrations decrease. This is expected to occur as atmosphere dilution reduces the influence of the railway emissions at larger distances. This is true in both the future build (FB) and future no-build (FNB) scenarios. The concentrations decrease relatively steeply at first, and then more gradually they approach the background level. Taking PM_{2.5} as an example, 6.2.4.1-8 shows that, at a distance of 20m from the centreline of the railway, the maximum predicted concentration in the future build (FB) scenario under worst meteorological conditions is approximately 29.5µg/m³, while at a distance of 100m away, it is 27µg/m³, and at a distance of 300m away, it is about 26µg/m³, which only slightly above the background level of 25µg/m³.

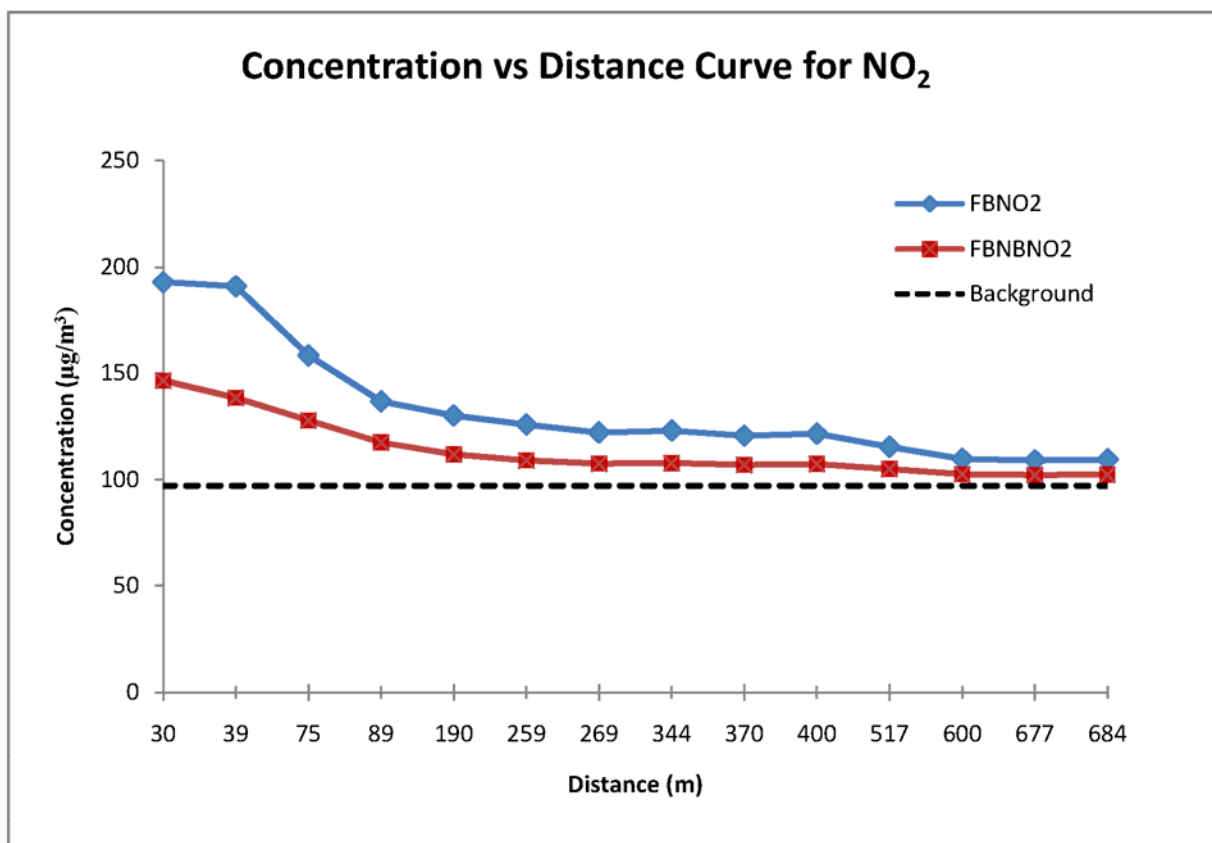


Figure 6.2.4.1-7 Concentration vs Distance Curve for NO₂

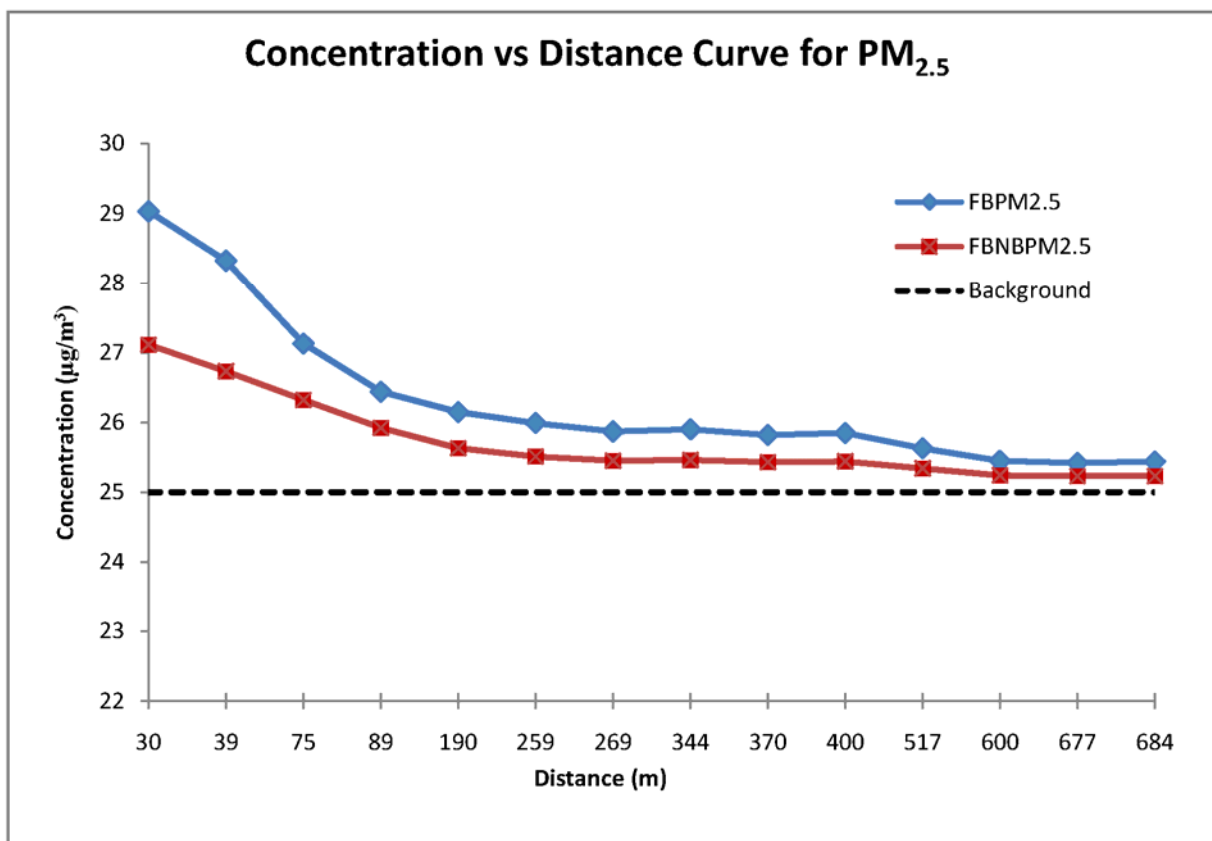


Figure 6.2.4.1-8 Concentration vs Distance Curve for PM_{2.5}

6.2.4.2 Regional Air Quality - Assessment Results and Discussion

The rail traffic emissions for the future-build scenario that could be associated with regional effects were compared with the total on-road emissions, and total transportation emissions in the City of Toronto. The assessment was also performed on the provincial and nationwide basis. **Table 6.2.4.2-1** presents emissions from transportation sectors and from all sectors for the City of Toronto, Ontario, and Canada as a whole. Additional burden to the airshed from the project for NO_x and VOCs are 1.6% and 0.08%, respectively, compared with emissions from all sectors in the City of Toronto. PM₁₀, and PM_{2.5} emission data for the City of Toronto could not be obtained from literature since they only report total particulate matter (TPM). However, in comparison with provincial and national levels, project contribution to the provincial and nationwide fine particulate fractions, PM_{2.5} and PM₁₀, levels would be negligible.

For the pollutants that contribute to regional effects, no significant contributions were associated with project sources.

Table 6.2.4.2-1 Summary of Overall Emissions (kTonnes/year)

Pollutants	Sectors	Project (2025)	Toronto (2004)	Ontario (2006)	Canada (2006)
NO _x	Transportation	0.684	26.5	324	1231
	Overall	0.684	43.2	480	2551
	% Project Contribution		1.6%	0.14%	0.03%
VOCs	Transportation	0.01	11.7	166	572
	Overall	0.01	12.1	4778	31785
	% Project Contribution		0.08%	0.00%	0.00%
PM ₁₀	Transportation	0.025	n/a	19	73.2
	Overall	0.025		1131	6083
	% Project Contribution			0.00%	0.00%
PM _{2.5}	Transportation	0.025		17	66.1
	Overall	0.025		252	1333
	% Project Contribution			0.00%	0.00%

Note: Toronto data were from the City of Toronto Emission Summary Report (ICF International, 2007)

6.2.4.3 Greenhouse Gas Assessment Results

The calculated annual GHG emission for all rail traffic in the study area, in the future-build scenario, was approximately 0.062 megatonnes. The estimated total GHG emissions for the City of Toronto is approximately 24 megatonnes for the year 2004, and 29 megatonnes for the year 2024 (15 years from now). The transportation sector within the City of Toronto accounted for approximately 9 of the 24 megatonnes in 2004, and about 10 megatonnes in 2024. Thus, the project-related contribution represents a very small fraction of overall GHG emissions in the region (less than 0.2%).

The screening-level analysis of net GHG emissions, which accounted for emissions saved by displacing automobile commuter traffic, indicated that the future build GO train traffic will lead to a net reduction in GHG emissions of approximately 0.5 megatonnes/year, if the GO train average ridership is 1900 passengers/train. If the average ridership were half as much, the estimated net reduction in GHG emissions would be about 0.23 megatonnes/year.

6.2.4.4 Potential Construction Impacts and Proposed Mitigation Measures

Potential Impacts

As with any construction work, construction activities associated with this project are anticipated to result in some localized impacts to air quality as a result of emissions from construction equipment and the creation of dust.

Proposed Mitigation Measures

To mitigate potential impacts associated with emissions from construction equipment, the Contractor will be required to keep equipment in good operating conditions and will be asked to avoid unnecessary idling of equipment.

To mitigation potential air quality impacts resulting from the creation of dust during construction, dust suppressant measures, as identified in Ontario Provincial Standard Specification (OPSS) 506, will be used during construction. OPSS 506 outlines the requirements for dust suppressants and their application. In addition, any disturbed lands will be vegetated (e.g. seeded) as appropriate to reduce the potential for dust to develop from exposed soil.

6.2.4.5 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

An overview of the air quality assessment completed for this project are provided in **Sections 6.2.4 to 6.2.4.2**. For the criterion pollutants, NO₂, PM_{2.5}, PM₁₀, and NO_x, it has been found that only short-term maximum concentrations of particulate matter (PM) and NO₂ would be affected under specific meteorological conditions. Annual average levels would be affected to a lesser extent and are generally a reflection of high background levels in the area. These local impacts would be experienced within a short distance of the railway tracks (less than 300m). Any impacts would decrease exponentially with distance from the railway. On a regional basis, the contribution of the railway expansion was found to be of little significance. In fact, the project is anticipated to result in savings in greenhouse gases and smog producing pollutants, due to the replacement of private vehicles by public mass transportation offered by this project.

For the speciated organic compounds associated with project sources, it was found that background levels dominate the local levels, with the exceptions of 1,3-butadiene and acrolein, for which the modelled sources make a more substantial contribution compared to background. For benzene, acetaldehyde and formaldehyde, it was found that less than about 10% of the total contribution was attributable to the modelled sources, including the future railway. The aldehydes of interest to transportation sources, acetaldehyde and formaldehyde were found to be well under criterion values for the future build scenario of the project.

In summary, adverse impacts of the project on local air quality would be limited to receptors directly adjacent to the railway under very specific meteorological conditions and would be short in duration. On a regional basis, limited adverse impact is predicted; but this would be offset somewhat by the savings in emissions from the substitution of public mass transportation for motor vehicles.

Proposed Mitigation Measures

Operational and maintenance impacts will be managed through the use of best management practices such as those identified in **Section 6.2.4.4** for construction works (e.g. dust control, operation of equipment in good working order, minimizing idling).

In addition, to address some of the potential human health risks associated with increased air emissions documented in **Section 6.2.5**, the following outline short-term, mid-term and long-term mitigation strategies:

Short-Term

An air quality monitoring/mitigation program will be developed in consultation with the Ministry of the Environment during detailed design. It is anticipated that the program will

likely focus on Air quality monitoring at worst-case areas to verify the results of the air quality modelling given the very conservative assumptions made during the assessment.

It is anticipated that the monitoring results will be made available to MOE and the general public through the operational phase. Specific details on frequency and how it will be made available will be developed in consultation with the Ministry of the Environment during detailed design.

Mid-Term

This will focus on ongoing improvements to the existing rolling stock. The air quality assessment assumed the CN, CP and VIA vehicles were meeting Tier 0 standards and GO vehicles were meeting Tier 2 standards. Overtime, emission standards will become more stringent resulting in reduced emissions from the corridor.

On May 17, 2007, GO, CN, CP and VIA signed a Memorandum of Understanding (MOU).. The MOU commits to reducing criteria air contaminants and greenhouse gases. Each of the companies have agreed to acquire new and freshly manufactured locomotives that meet applicable EPA standards, retire medium horsepower locomotives (2k-3k hp) built between 1973 and 1999, and upgrade / remanufacture high horsepower locomotives (greater than 3k hp) to applicable EPA standards.

Long-term

Mitigation in the long-term focuses on:

- The Province's commitments to funding and implementing transit projects in the Greater Golden Horseshoe. This will have benefits on regional air quality which will improve local air quality.
- Other Provincial and Federal initiatives aimed at reducing emissions for industrial and transportation uses. This will have benefits on regional air quality which will improve local air quality.

6.2.4.6 Significance of the Potential Impacts

The following provides an overview of the findings of the assessment of potential impacts to air quality:

- The highest predicted 24-hour PM_{2.5} concentrations were 29.6 and 27.4µg/m³, in the future build and future no-build scenario, respectively. Both of these values approach within 90% of the 30µg/m³ criterion, but do not exceed it.
- The maximum predicted 24-hour PM₁₀ levels were 46 and 44µg/m³, in the future build and future no-build scenarios, respectively. As with PM_{2.5}, both of these values are approaching, but below the criterion of 50µg/m³.
- Since diesel engines have relatively low CO emissions, there is little difference between the future build and future no-build scenarios, with the predicted maximum 1-hour concentrations being 2117 and 2109µg/m³, respectively. These predicted levels are far below (about 6% of) the criterion, which is 36200µg/m³.
- The predicted highest 1-hour NO₂ concentrations were 262 and 228µg/m³, for the future build and future no-build scenarios, both of which are less than 65% of the criterion. The highest 24-hour concentrations were 205 and 202µg/m³, for the future and no-build scenarios, respectively. Both slightly exceed the criterion of 200µg/m³;

however, the rail corridor contributed only approximately half of the predicted level, indicating an equal contribution from the corridor and from background.

- The highest predicted 1-hour SO₂ concentrations were 44.5 and 29.3 µg/m³, for the future build and future no-build scenarios, respectively. This shows that the future build scenario causes an increase in concentrations but the highest predicted value remains less than 10% of the threshold (690 µg/m³).
- For benzene, the highest predicted 1-hour concentrations are 6.3 and 4 µg/m³, for the future build and future no-build scenarios, respectively. On an annual average basis, the predicted concentrations are much lower, at 1.6 and 1.5 µg/m³ for the future build and future no-build scenarios, respectively, with about 10% of the total coming from the rail corridor and the remaining 90% due to background.
- For 1,3-butadiene, predicted annual average levels are lower than for benzene, at 0.33 and 0.28 µg/m³, for the future build and future no-build case, respectively. This is mainly due to lower background levels.
- Estimated acrolein background levels currently exceed the criterion, with the 90th percentile level being 0.16 µg/m³. The highest predicted overall concentration (background plus rail corridor and local car traffic) is 0.23 µg/m³, in the future build scenario, and 0.19 µg/m³ in the future no build scenario. The concentrations are dominated by the background concentration which is responsible for more than two-thirds of the total.
- The highest predicted 24-hour concentrations of acetaldehyde were 2.9 and 2.7 µg/m³, for the future build and future no-build scenario, respectively. These levels are dominated by the background level (2.6 µg/m³) and are less than 1% of the criterion (5007 µg/m³).
- The highest predicted 24-hour concentrations of formaldehyde were 5.4 and 5.1 µg/m³, for the future build and future no-build case, respectively. These levels are dominated by the background concentration (4.8 µg/m³) and are far below the criterion of 65 µg/m³ (around 8% of it).
- Since benzo(a)pyrene is not routinely monitored, the background concentration is not well known. However, the predicted annual average contribution of the rail corridor and adjacent roadway traffic is 0.00001 µg/m³, which is only about 3% of the criterion. Therefore, the predicted contribution of the project is very small in relation to the criterion.
- The concentration profiles illustrate that as the downwind distance from the rail corridor increases, the predicted concentrations decrease. This is expected to occur as the benefit of atmosphere dilution reduces the influence of the vehicular emission;
- As discussed in **Section 6.2.4.1**, more detailed analysis of the combined effects of project-related emissions and background concentrations indicated that the cumulative concentrations actually may occasionally exceed the threshold. Background 24-hour levels of PM_{2.5} actually exceed the threshold from time-to-time at R7, R34, and R57 locations. Receptors R7 and R57 were chosen because they were in close proximity to multiple rail lines and major intersections. R34 was chosen as a more typical site near the railway. The background frequency of exceeding the threshold is 1.8%, or about 7 days per year. For both future build and future no-build alternatives, the predicted combined frequency of exceeding the threshold at these locations are in the range of 1.8% to 1.96% of the time or about 7 days per

year, which is essentially the same as the background frequency of exceeding the threshold. In other words, the project has little effect on either the maximum concentration over the year or the frequency of exceeding the threshold.

- The combined effects analysis for NO₂ shows that background and predicted combined 24-hour levels are lower than the applicable threshold for both future build and future no-build scenarios. For receptor R7, which is located adjacent to the rail corridor, future build predicted combined concentration is relatively higher than that for future no-build scenario. However, future build combined concentrations for R34 and R57, which are further from the rail corridor or in areas dominated by existing emission sources, are only slightly higher than those for future no-build scenario. Thus, the proposed project has very little effect on the maximum concentration over the year at those locations.

From a regional perspective, the additional burden to the airshed from the project for NO_x and VOCs are 1.6% and 0.08%, respectively, compared with emissions from all sectors in the City of Toronto. PM₁₀ and PM_{2.5} emission data for the City of Toronto could not be obtained from literature since they only report total particulate matter (TPM). However, in comparison with provincial and national levels, project contribution to the provincial and nationwide fine particulate fractions, PM_{2.5} and PM₁₀, levels would be negligible.

As noted in **Section 6.2.4.4** and outlined above, some localized air quality impacts are anticipated to result during construction; however, with the implementation of mitigation measures the potential for adverse impacts can be minimized and no significant residual impacts will occur.

As noted in **Section 6.2.4.5** and outlined above, some air quality impacts are anticipated to result from the project during operations; however, the majority of the pollutants assessed were found not to exceed standard criterion. At some receptors NO_x and PM were found to have minor increases compared to the future no-build; however, based on the results of a combined effects analysis (see **Section 6.2.4.5** for details) it was determined that those exceedences will have very little effect on the maximum concentration over a year. As a result, with the implementation of mitigation measures the potential for adverse impacts can be minimized and no significant residual impacts are anticipated.

Overall, although the proposed project is anticipated to result in air quality impacts, including adverse impacts as well as some improvements, with the implementation of the above-noted mitigation measures potential for adverse impacts can be minimized. Therefore, from an air quality perspective, this project is not anticipated to result in and adverse impacts and no significant residual impacts will occur.

It is recognized that this project will result in some local increases to emissions. The human health effects associated with those impacts are discussed in **Section 6.2.5**.

6.2.5 Human Health Implications Associated with Increased Air Emissions

Overview of the Study

Intrinsik Environmental Services Inc. (Intrinsik) was retained to assess the potential human health implications associated with increased air emissions in the corridor as a result of service levels as outlined in the Metrolinx 15-year plan. It is noted that this is the first Transit Project in Ontario to have a human health risk assessment. Metrolinx is

pioneering new fields of impact assessment in that regard. The inputs to this assessment were the results of the air quality modeling completed by RWDI (summarized in **Section 6.2.4**). The following provides an overview of this assessment.

The potential impacts and risks identified are related to the “worst-case” receptor under worst-case metrological conditions. These conditions occur very rarely. In addition, it assumes for the acute condition, that the individual is exposed for the full 1 hour or 24 hour period, and for the chronic condition that the individual is exposed to this concentration constantly.

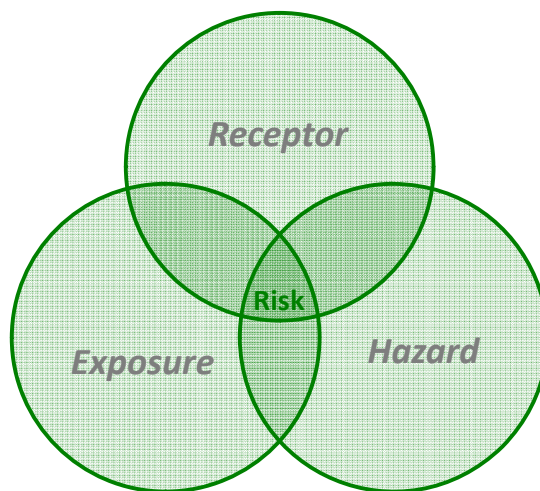
Overall, this project is being completed in accordance with the new Transit Project Assessment Process (Ontario Regulation 231/08). However, as this regulation does not provide specific guidance on risk assessment methodology, the current human health risk assessment was conducted according to widely accepted risk assessment methodologies and guidance published and endorsed by regulatory agencies including the Ontario Ministry of the Environment (MOE), Health Canada, the Canadian Council of the Ministers of the Environment (CCME), and the United States Environmental Protection Agency (U.S. EPA).

What is a Human Health Risk Assessment (HHRA)?

In general, a human health risk assessment (HHRA) is a scientific study that evaluates the potential for the occurrence of adverse health effects from exposures of people to chemicals of concern (COC) present in surrounding environmental media (e.g., air, soil, sediment, surface water, groundwater, food and biota, etc.), under existing or predicted exposure conditions. HHRA procedures are based on the fundamental dose-response principle of toxicology. The response of an individual to a chemical exposure increases in proportion to the chemical concentration in critical target tissues where adverse effects may occur. The concentrations of chemicals in the target tissues (the dose) are determined by the degree of exposure, which is proportional to the chemical concentrations in the environment where the receptor resides, works or visits.

All chemicals (both natural and man-made) have the potential to cause environmental effects in people and the ecosystem. However, it is the chemical concentration, the route of exposure, and the inherent toxicity of the chemical that determines the level of environmental effect and potential for unacceptable risk to the exposed receptor. As illustrated in the diagram to the right, if all three components are present (*i.e.*, where the three circles intersect), the possibility of adverse risk exists.

It is acknowledged that the various uncertainties associated with the HHRA process have the potential to influence estimates of exposure and risk. The methods and assumptions used in this HHRA were designed to be conservative (*i.e.*, health protective), and have a built-in tendency to overestimate, rather than underestimate, potential health risks.



The current HHRA followed the standard human health risk assessment framework (see Figure below) that is composed of the following steps:

- I. Problem formulation;
- II. Exposure assessment;
- III. Hazard assessment; and,
- IV. Risk characterization.

Typically, where potential adverse impacts are predicted through risk characterization, an additional step providing risk management and recommendations for mitigative measures to address these concerns is added. For the current EA process, it is this step that would provide any conclusions and recommendations to Metrolinx, should any unacceptable health risk related to diesel emissions along the Georgetown service corridor be identified.

Problem Formulation Step

The first step in the HHRA process is an information gathering and interpretation stage that plans and focuses the study on critical areas of concern for the Project. Problem formulation defines the nature and scope of the work to be conducted, permits practical boundaries to be placed on the overall scope of work and ensures that the assessment is directed at the key areas and issues of concern.

The key tasks that comprise the problem formulation step of this HHRA include the following:

- **Site characterization**, which consists of a review of available project-specific data to identify factors affecting the availability of chemicals to potential receptors;
- **Chemical characterization**, which involves the identification of the COC;
- **Receptor characterization** to identify “receptors of concern”, which include those individuals with the greatest probability of exposure to chemicals from the rail corridor and those that have the greatest sensitivity to these chemicals; and,
- **Identification of exposure scenarios and pathways** takes into account chemical-specific parameters, such as solubility and volatility, characteristics of the site, such as physical geography, as well as the physiology and behaviour of the receptors.

The outcome of these tasks forms the basis of the approach taken in the HHRA. The following subsections describe the methodological details and outcomes of problem formulation, specific to identification of chemicals, receptors and pathways.

Site Characterization

To assess potential risks related to the projected diesel emissions from the planned increased level of rail traffic in the future, 125 discrete sensitive receptor locations along the corridor were selected by the project team (see **Figures 6.2.4-1 to 6.2.4-9**). These selected locations represented four discrete categories of exposure situations: 1) Residential areas (44 locations); 2) Schools (37 locations); 3) Child care facilities (40 locations); and, 4) Long-term care facilities (4 locations).

These sensitive receptor locations (see **Figures 6.2.4-1 to 6.2.4-9**) were selected based upon proximity to the rail lines, and likelihood for worst-case exposures to diesel emissions arising from increased levels of rail traffic along the corridor. It is important to note that specific homes were not selected for the residential receptor locations. Rather, these receptor locations were selected to represent residential areas where the highest potential exposures would be expected (e.g., groups of homes or apartment buildings backing onto the corridor).

Chemical Characterization

The primary source of concern for the current assessment is the increased amount of diesel traffic proposed to use the rail corridor in the future, and the potential health implications emissions from these diesel-powered vehicles may have on the surrounding community. As such, one must understand the typical contaminants emitted by diesel engines to properly select the chemicals of concern for the current study.

Based upon the primary components present in diesel exhaust from the proposed vehicle fleet using the rail corridor, the following contaminants were selected as COC for the current assessment.

Criteria Air Contaminants (CACs)	Volatile Organic Contaminants (VOCs)
• Carbon monoxide (CO) • Oxides of nitrogen (NO_x) • Inhalable coarse particulate matter (PM₁₀) • Fine particulate matter (PM_{2.5}) • Sulphur dioxide (SO₂)	• 1,3-Butadiene • Acetaldehyde • Acrolein • Benzene • Formaldehyde
Polycyclic Aromatic Hydrocarbons (PAHs)	
• Benzo[a]pyrene (as a surrogate for the carcinogenic PAH group)	

It should be noted that some regulatory jurisdictions (such as the California EPA) consider diesel particulate to be carcinogenic, and evaluate the risk arising from this mixture group in its entirety. However, a more recent scientific review by the US EPA generally disagreed with this approach, and concluded that while diesel exhaust is “likely to be carcinogenic in humans by inhalation” at environmental or higher exposure conditions, due to the uncertainty in available exposure-response data, a specific cancer potency benchmark for diesel exhaust could not be derived.

For purpose of the current assessment, particulate matter (*i.e.*, PM₁₀ and PM_{2.5}), in itself, is not considered to be carcinogenic. Rather, the potential carcinogenicity of the diesel particulate mixture is considered to be primarily a result of the carcinogenic nature of various chemicals adsorbed to the surface of the particulate, with the PM (such as PM_{2.5}) being the delivery vehicle by which these carcinogenic chemicals are carried deep into an individual’s lungs. For the current assessment, a number of the VOCs (specifically 1,3-butadiene, acetaldehyde, benzene, and formaldehyde) and the PAH group are considered to be carcinogenic, and the implications of exposure to these diesel particulate contaminants to the surrounding community has been evaluated. Furthermore, the current assessment also provides an evaluation of potential additive risks arising from the overall mixture of COC within the diesel particulate.

The potential health impact of ultrafine particulate matter (*i.e.*, $PM_{0.1}$) is also an emerging area of scientific enquiry. Currently there are no established regulatory benchmarks or standardized approaches to evaluation of the health impact related to exposures to this particulate matter fraction. For the current assessment, the ultrafine fraction was considered as part of the evaluation of health impacts related to the $PM_{2.5}$ (*i.e.*, particulate matter less than 2.5 microns in size) group.

Receptor Characterization

The HHRA must be sufficiently comprehensive to ensure inclusion of those receptors with the greatest potential for exposure to COC, and those who have the greatest sensitivity, or potential for developing adverse health outcomes from these exposures. With this in mind, the selection of hypothetical, reasonable “worst-case” receptors, with somewhat exaggerated life style habits, were used to ensure a conservative (*i.e.*, protective) assessment.

Identifying Exposure Scenarios and Pathways

For the current assessment, two specific exposure scenarios were evaluated: 1) Future No Build; and, 2) Future Build.

The *Future No Build* scenario evaluates the potential health impact related to the projected air quality in the absence of the proposed project, but assumes existing service is slightly increased (to match the capacity of the existing infrastructure). The emissions predicted for this scenario, in conjunction with the contribution from City of Toronto background levels of the COC, most closely resembles those ambient concentrations expected for current day conditions at locations along the corridor. This scenario provides a baseline by which to compare the incremental impacts expected on air quality related to the planned increased rail traffic along the service corridor.

The *Future Build* scenario evaluated the potential health impact to the projected air quality at Metrolinx’s 15-year plan, assuming the predicted increase in rail traffic and related support structures are in place.

Due to the nature of the diesel emissions arising from the rail corridor, the primary exposure pathway under consideration in the current assessment will be through inhalation. However, potential deposition of particulate matter onto the soil on properties along the corridor has also been considered, permitting the assessment of health risks related to oral and dermal exposures to impacted soils by children, as well as through the ingestion of home produce grown in these soils.

Exposure Assessment Step

To effectively estimate the potential impacts on air quality related to the proposed increase in rail traffic along the corridor, ground level air concentrations for each of the COC were provided by the air quality assessment team at each of the 125 sensitive receptor locations. Reported 1-hour, 24-hour, and annual average concentrations were predicted based upon air dispersion modeling taking into account diesel emissions from the various fleets of vehicles proposed for the corridor, as well as other key emission sources within the study area (*e.g.*, automobile traffic at key roadways surrounding the corridor).

The project area is an urban setting with various point sources (such as light industrial), mobile sources (*e.g.*, roadways, railways, and air transport), as well as a variety of miscellaneous area sources (residential and commercial space heating, *etc.*) and an

influx of pollutants *via* long range transport from other regions. While the air dispersion modelling component of this study provides an estimate of the contribution of rail traffic and road traffic (under both Future No Build and Future Build scenarios) to air quality along the corridor, it is also important to establish a baseline level of the various COC in the local air shed to which the corridor emissions can be compared, and combined to produce an overall estimate of predicted local air quality under either scenario (*i.e.*, superimposing predicted emissions from the rail corridor on top of local Toronto background). These background or “baseline” COC concentrations were established using ambient air quality data collected at federal and provincial air monitoring stations near the project area. Refer to the air quality technical report for further details.

For the purpose of the current assessment, the combination of emissions from the corridor (either Future No Build or Future build) and the baseline concentrations from the local air shed were termed the “Cumulative Future No Build” and “Cumulative Future Build” scenarios. These maximum predicted worst-case ground level air concentrations were used to evaluate potential health risks arising from acute and chronic exposures to these COC along the rail corridor.

Hazard Assessment Step

The hazard assessment involves identifying and understanding potential health outcomes that can result from exposure to each COC and the conditions under which the outcomes might be observed. The hazard, or toxicity, assessment methodology is based on the fundamental dose response principle. That is, the response of biological systems to chemical exposures increases in proportion to the concentration of a chemical in critical target tissues where adverse health outcomes may occur.

Two basic and quite different chemical categories are commonly recognized by regulatory agencies, depending on the compound's mode of toxic action, and applied when estimating toxicological criteria for humans. These are the *threshold approach* (or the no-observed-adverse-effect levels [NOAELs]/benchmark dose with extrapolation/uncertainty factor approach) typically used to evaluate non-carcinogens, and the *non-threshold approach* (or the mathematical model-unit risk estimation approach), typically used for carcinogenic compounds.

In the case of threshold chemicals, a benchmark or threshold level must be exceeded for toxicity to occur. A NOAEL can be identified for threshold chemicals, which is the dose or amount of the chemical that results in no observable response in the most sensitive test species and test endpoint. The application of uncertainty or safety factors to the NOAEL provides an added level of protection, allowing regulatory agencies to derive a *toxicity reference value* (TRV) that is expected to be safe to sensitive individuals following exposure for a prescribed period of time.

Non-threshold chemicals are capable of producing cancer by altering genetic material. Regulatory agencies, such as Health Canada and the U.S. EPA, assume that any level of long-term exposure to carcinogenic chemicals is associated with some “hypothetical cancer risk”. To address these types of risk, regulatory agencies have establish *unit risk* and *cancer slope factors* which allow one to quantify the excess cancer risk based upon inhalation and oral/dermal exposures to a given carcinogenic COC, respectively. For example, the U.S. EPA defines a unit risk value as “...the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 µg/L in water, or 1 µg/m³ in air...”. A unit risk value of 3.0×10^{-5} per µg/m³ would mean that under an upper worst-case estimate, three excess cancer cases

are expected to develop per one hundred thousand (100,000) people, if exposed every day for a lifetime to $1 \mu\text{g}$ of the chemical per m^3 of air.

The toxicity of a chemical has been observed to vary between acute (short-term) and chronic (long-term) exposure. Thus, it is important to differentiate TRVs based on duration of exposure.

Risk Characterization Step

The final step of a risk assessment is risk characterization. This involves the estimation, description, and evaluation of risk associated with exposure to COC by comparing the estimated exposure to the appropriate TRV for a specific chemical or group of compounds. Risk characterization involves the comparison of estimated exposures (identified in the exposure assessment) with TRVs (identified during the hazard/toxicity assessment) to identify potential human health risks. This comparison is typically expressed as a Concentration Ratio (CR) or Hazard Quotient (HQ) for non-carcinogenic chemicals and is calculated by dividing the predicted exposure by the TRV. Using this method, there is a potential for an elevated level of risk if the estimated exposures received by the individual exceed the regulatory reference limit (*i.e.*, $\text{CR} > 1.0$). Predicted health risks are considered acceptable when the estimated exposures are less than or equal to the regulatory reference limit (*i.e.*, $\text{CR} \leq 1.0$). Added assurance of protection is provided by the high degree of conservatism (protection) incorporated in the derivation of the exposure limit.

In the case of direct acting non-threshold carcinogenic chemicals, potential risks are expressed as incremental lifetime cancer risks (ILCRs), and represents the incremental risk of an individual within a given population developing cancer over his or her lifetime due to exposures from a specific carcinogenic COC. As there is no concentration at which no incremental risk of developing cancer would occur, regulatory agencies have typically employed acceptable ILCR levels (*i.e.*, incremental cancer risks over and above background cancer incidence) between 1-in-100,000 and 1-in-1,000,000. ILCRs generally consider risks related to a particular facility (facility alone) in that the cancer risks are expressed on an incremental or additional basis as compared to cancer risks related to all sources.

As this HHRA is being conducted as part of the EIA process for the Province of Ontario, a benchmark ILCR of 1-in-1,000,000 (1×10^{-6}) was selected, based upon MOE policy for risk assessments in Ontario. The definition of a benchmark ILCR of 1-in-1,000,000 is a policy based decision, not a scientifically derived value. An ILCR of 1-in-1,000,000 increases a person's lifetime cancer risk from 0.400000 (based on the 40% lifetime probability of developing cancer in Canada) to 0.400001. It is recognized that some amount of the "background" cancer risk of 40% is likely associated with exposures to environmental pollution. It must be noted, however, that an ILCR of 1-in-1,000,000 (a level below which the MOE considers acceptable) represents a 0.00025% increase over the background cancer incidence, an increase that cannot be detected using epidemiological data from the study area. It is noted that other regulatory agencies, including Health Canada, consider an ILCR of 1-in-100,000 as the *de minimus* risk level considered protective of public health (*i.e.*, considered acceptable, tolerable or essentially negligible).

Separate assessments were completed for short-term (acute) and long-term (chronic) durations because the health outcomes produced by some COC depend on the duration

of exposure. It is important to distinguish between the health outcomes that might result from acute exposures *versus* effects that may occur following chronic exposures. In the chronic assessment, further distinction was made between inhalation and multiple pathway exposures (*i.e.*, oral and dermal) since the pathway of exposure could also influence the potential health outcomes associated with each of the COC.

Assessment Results

The following section provides a summary of the results of the assessment of inhalation health risks arising from exposures related to proposed increased train traffic along the Georgetown South Service Corridor. As noted previously, the potential human health implications of air quality along the rail corridor were evaluated for two distinct exposure scenarios: (i) Future No Build; and, (ii) Future Build. The Future No Build operational scenario represents slight increases to existing service (to match the capacity of the existing infrastructure). As such, the Future No Build operational scenario, in conjunction with established Baseline concentrations from the existing provincial air monitoring stations, provides the closest worst-case approximation of current day air quality along the rail corridor.

The potential impacts and risks identified are related to the “worst-case” receptor under worst-case metrological conditions. These conditions occur very rarely. In addition, it assumes for the acute condition, that the individual is exposed for the full 1 hour or 24 hour period, and for the chronic condition that the individual is exposed to this concentration constantly, 24 hours per day, 7 days per week, 365 days per year.

The results of the assessment of incremental risks for the Cumulative Future Build scenario indicated that predicted concentrations for 8 of the 11 assessed pollutants were below the relevant regulatory benchmarks and do not pose a health risk under even the worst-case exposure conditions. Predicted maximum ground level air concentrations for NO_x, acrolein and 1,3-butadiene were above the regulatory benchmarks at some receptor locations, under “worst-case” diesel emission exposure conditions and “worst-case” meteorological conditions.

The projected increase in train traffic will lead to short-term, acute “spikes” in NO_x concentrations around some receptor locations (*e.g.*, the Bloor GO station, the Junction area) where ambient concentrations are impacted by higher traffic demands, idling vehicles at stations (*i.e.*, train, bus, car, and truck), and automobile traffic at significant roadways crossing or adjacent to the corridor. In the case of the 1-hour exposures, it should be noted that these actual ambient concentrations would be observed very rarely (*i.e.*, less than 1.5% of the time). The results of the acute inhalation assessment suggest that the Future Build scenario has some potential to result in adverse health outcomes (specifically respiratory irritation) in very sensitive individuals living at a relatively small number of locations along the corridor, during these rare 1-hour events.

In the case of acrolein, the actual incremental increase in acrolein emissions from the corridor is relatively small (*i.e.*, a worst-case 1-hour increase of 0.3 µg/m³), and predicted ambient concentrations are considered to be similar to those measured in other Canadian cities. Nevertheless, the predicted worst-case acute concentrations of acrolein do exceed the relevant regulatory benchmarks, even under current background conditions in the absence of a contribution from the rail corridor. However, the levels are well below those which would likely cause adverse effects (eye irritation, throat irritation and decreased respiration rate) in humans. Given the considerable uncertainty factors and conservatism built into the reference concentrations, it is unlikely

that prolonged exposure to this ambient concentration of acrolein predicted for the Future Build Scenario would result in any appreciable health risk to sensitive members of the population.

Results of the chronic inhalation assessment for 1,3-butadiene indicate that the predicted cancer risks are well below the regulatory benchmark of 1-in-100,000 established by Health Canada. These risks would be considered minimal and likely undetectable using epidemiological data from the study area. Considering Ontario's regulatory benchmark of 1-in-1,000,000, the projected chronic ground level air concentrations of 1,3-butadiene could result in incremental lifetime cancer risks at some locations along the corridor that would marginally exceed the benchmark. These predicted cancer risks are highly cautious based upon an individual being exposed to that same maximum predicted air concentration for their entire lifetime (*i.e.*, 75 years). If one assumed a more likely residency period (typically 30 years is considered a reasonable duration), none of predicted cancer risks related to 1,3-butadiene exposure along the rail corridor would exceed the Ontario regulatory benchmark of 1-in-1,000,000 incremental lifetime cancer risk.

It should be noted that as the projected rail fleet moves towards higher emission standards for new locomotive purchases (mandated by U.S. regulations for 2015), the ambient concentrations of NO_x and the other COC being emitted from the rail corridor is expected to drop significantly. Stricter emission standards on automobiles in the near future are also expected to assist in reducing the ambient concentrations of NO_x and related contaminants in urban areas.

The following section provides an overview of the detailed assessment results, focusing specifically on the potential health issues noted above.

Detailed Assessment Results

This section provides a discussion and context for the results of the acute and chronic human health assessments for each of the COC.

Acute Inhalation Assessment

The results of the acute inhalation assessment indicates that the maximum predicted worst-case ground level air concentrations along the entire corridor would not result in an acute health risk for any of the criteria air contaminants, with the exception of NO_x (at some locations). Furthermore, none of the maximum predicted ground level air concentrations for any of the VOCs, with the exception of acrolein, exceeded their respective acute regulatory benchmarks at any point along the rail corridor.

Predicted NO_x Acute Risks

Summary of Results

Studies of acute exposure to elevated concentrations of NO_x have demonstrated increased respiratory symptoms (*e.g.*, cough, wheeze), particularly in children and asthmatics as well as pulmonary edema, pneumonitis, and bronchitis. Several observations indicate that among healthy individuals, acute NO₂ (as a surrogate for NO_x) exposures in the range of 1.5 to 2.0 ppm cause small but significant increases in airway responsiveness. The lower threshold concentration of NO₂ for causing increases in nonspecific airway responsiveness in healthy subjects appears to be in the 1 to 2 ppm

range (*i.e.*, 1,900 to 3,800 $\mu\text{g}/\text{m}^3$), which is above the maximum worst-case 1-hour NO_x concentration (*i.e.*, 1,028 $\mu\text{g}/\text{m}^3$) predicted along the rail corridor.

Both the 1-hour and 24-hour regulatory benchmarks have been established to be protective of potential respiratory irritation effects on sensitive individuals, such as children or asthmatics. Specifically, epidemiological studies have shown increased potential for respiratory effects in asthmatics as ambient levels approach these benchmark concentrations.

Background concentrations of NO_x in the GTA on worst-case days already exceed the 24-hour acute regulatory benchmark demonstrating that current urban activities have resulted in an over-burdened airshed in some areas of the city. With respect to the current project, the incremental increase in risk related to 24-hour exposures to NO_x arising from the Future Build Scenario is small (*i.e.*, a 5.9% increase in ambient 24-hour concentrations of NO_x).

Based upon the available information, the predicted maximum worst-case exposures along the corridor have the potential to result in adverse health impacts in sensitive individuals present within the surrounding community (and the GTA as a whole, for that matter). In particular, 1-hour exposure risks are particularly elevated in the residential community living immediately north of the Bloor GO station during the predicted rare 1-hour events.

The maximum predicted worst-case concentrations for both 1-hour and 24-hour exposure periods are more than two-fold higher than the recommended regulatory benchmark at some locations along the corridor. One would expect the potential for adverse health effects to be observed in sensitive individuals at these worst-case locations along the corridor, under worst-case exposure conditions. In the case of the 1-hour exposures, it should be noted that these actual worst-case ambient concentrations would be observed very rarely (*i.e.*, less than 1.5% of the time, or 132 distinct hours out of the 8760 total hours in a year, would concentrations exceed the 1-hour regulatory benchmark).

Summary of Analysis

Predicted maximum 1-hour exposures to NO_x for the Cumulative Future No Build scenario already exceed the appropriate regulatory benchmark at a number of sensitive receptor locations along the corridor (*i.e.*, 7 of the 125 locations exceeded the 1-hour acute regulatory limit) under worst-case exposure conditions. The highest 1-hour NO_x concentration was predicted to occur at receptor location 57, which is a residential area located just north of the Junction. The maximum worst-case 1-hour NO_x concentrations predicted for this location under the Cumulative Future No Build scenario (*i.e.*, representative of current conditions) resulted in a predicted risk 1.7-times the regulatory limit.

When one evaluates the potential incremental acute 1-hour health risk arising from NO_x emissions under the Cumulative Future Build scenario (*i.e.*, proposed maximum future vehicle traffic along the corridor), potential risks increase by 84% of the TRV, resulting in a maximum worst-case predicted 1-hour inhalation exposure that is 2.6-times higher than the established regulatory limit. Exceedance of the regulatory threshold was also observed at a number of other receptor locations along the entire corridor (*i.e.*, 46 of the 125 locations exceeded the 1-hour regulatory limit). The maximum worst-case exposure was predicted to occur at receptor location 41, which is in a residential area located just north of the proposed Bloor GO station location. This location is directly adjacent to the

boarding platform, and is heavily impacted by emissions from idling trains, as well as those moving along the corridor.

It should be noted that these predicted risks are based upon the maximum, absolute worst-case concentrations predicted for any 1-hour along the corridor, and typically represent a very rare occurrence. For example, 1-hour air concentrations of NO_x at receptor location 41 are predicted to exceed the regulatory benchmark only 1.5% of the time.

In the case of the maximum worst-case 24-hour exposures to NO_x , the Cumulative Future No Build already exceed the recommended regulatory benchmark at every receptor location along the corridor. The highest concentration was predicted to occur at receptor location 57, which were 2.2-times higher than the established regulatory limit. It should be noted that 24-hour ground level air concentrations of NO_x , reported by ambient air quality monitoring stations for the City of Toronto (*i.e.*, regional background levels), already exceed the recommended regulatory acute threshold limit, in absence of any contribution from the rail corridor.

Under the Cumulative Future Build scenario, the potential risks increase over those predicted for the current condition by 13% of the TRV, resulting in a maximum worst-case predicted 24-hour inhalation exposure that is 2.3-times higher than the established regulatory limit. Again, exceedances of the recommended regulatory limit was predicted at all 125 receptor locations, with the highest 24-hour concentration also predicted to occur at receptor location 57.

Predicted Acrolein Acute Risks

Acrolein is a product of incomplete combustion. Small amounts of acrolein can be formed and enter the environment when trees, tobacco, other plants, gasoline, or oil are burned. Vehicular sources account for the majority of acrolein emissions in Canada, including emissions from gasoline- and diesel-powered on-road vehicles. Although acrolein may be found in soil, water, or air, it evaporates quickly from soil and water and breaks down fairly rapidly in air (about half will disappear within one day).

Studies have shown that acrolein (in air) acts primarily as an eye and upper respiratory tract irritant in humans. Exposure to concentrations as low as $140 \mu\text{g}/\text{m}^3$ for five minutes may elicit subjective complaints of irritation, with increasing concentrations leading to more intense eye, nose and respiratory symptoms. In a study that exposed 36 healthy volunteers for five minutes to concentrations of acrolein in air of $140 \mu\text{g}/\text{m}^3$, mild eye irritation was observed. This study formed the basis of the more conservative acute inhalation regulatory benchmark used in this assessment.

In one very comprehensive clinical study of acute outcomes of acrolein exposure in humans, investigators concluded that the average threshold of acute outcome for acrolein is between $210 \mu\text{g}/\text{m}^3$ (eye irritation) and $700 \mu\text{g}/\text{m}^3$ (throat irritation and decreased respiration rate), with nasal irritation at $350 \mu\text{g}/\text{m}^3$. Given the lowest concentration at which mild eye irritation has been observed in humans (*i.e.*, $140 \mu\text{g}/\text{m}^3$) is more than 215-times higher than the baseline 1-hour air concentration of acrolein predicted for the worst-case maximum receptor location under the Cumulative Future Build scenario (*i.e.*, $0.65 \mu\text{g}/\text{m}^3$), it is highly unlikely that the maximum worst-case ground level air concentration predicted along the rail corridor under the Future Build scenario would result in a substantive health risk.

For the current assessment, potential acute (1-hour) risks related to exposures to acrolein were evaluated based upon a comparison to a conservative toxicological reference value (TRV), and not a specific promulgated national or provincial ambient air quality objective or standard. Neither Health Canada or the Ontario Ministry of the Environment have established specific 1-hour air quality standards for the evaluation of inhalation exposures to this chemical.

Summary of Results

The actual incremental increase in acrolein emissions from the corridor is relatively small (*i.e.*, a worst-case 1-hour increase of $0.3 \mu\text{g}/\text{m}^3$) small, and the levels are well below those which would likely cause adverse effects (eye irritation, throat irritation and decreased respiration rate) in humans. The predicted ambient concentrations are considered to be similar to those measured in other Canadian cities. The predicted worst-case acute concentrations of acrolein do, however, exceeded the relevant TRV benchmarks, even under current background conditions in the absence of a contribution from the rail corridor. Given the considerable uncertainty factors and high level of caution built into the reference concentrations, it is unlikely that prolonged exposure to this ambient concentration of acrolein predicted for the Future Build Scenario would result in any appreciable health risk to sensitive members of the population.

Summary of Analysis

Predicted maximum 1-hour exposures to acrolein for current day conditions (*i.e.*, Cumulative Future No Build scenario) already exceed the appropriate TRV acute benchmark at a number of sensitive receptor locations along the corridor (*i.e.*, 41 of the 125 locations exceedance the 1-hour acute TRV limit) under worst-case exposure conditions. The highest 1-hour acrolein concentration was predicted to occur at receptor location 41, which is a residential area located just north of the Bloor GO Station. The maximum worst-case 1-hour acrolein concentrations predicted for this location under the Cumulative Future No Build scenario (*i.e.*, representative of current conditions) resulted in a predicted risk 1.7-times the TRV limit.

When one evaluates the potential incremental acute 1-hour health risk arising from acrolein emissions under the Cumulative Future Build scenario (*i.e.*, proposed maximum future vehicle traffic along the corridor), potential risks increase by 180% of the TRV, resulting in a maximum worst-case predicted 1-hour inhalation exposure that is 3.4-times higher than the established TRV limit. In other words, predicted worst-case concentrations of acrolein doubled when one evaluated the impacts of the increased traffic proposed for the rail corridor under the Future Build scenario. Exceedance of the TRV threshold was also observed at a number of other receptor locations along the entire corridor (*i.e.*, 90 of the 125 locations exceeded the 1-hour TRV limit). The maximum worst-case exposure was predicted to occur at receptor location 41, which is in a residential area located just north of the proposed Bloor GO station location. As noted previously, this location is directly adjacent to the boarding platform, and is heavily impacted by emissions from idling trains, as well as those moving along the corridor.

It should be noted that these predicted risks are based upon the maximum, absolute worst-case concentrations predicted for any 1-hour along the corridor, and typically represent an infrequent occurrence. For example, the average predicted cumulative 1-hour air concentration of acrolein at receptor location 41 represented 92% of the regulatory limit, and the 1-hour air concentrations of acrolein at this worst-case location were predicted to exceed the TRV benchmark only 15% of the time.

In the case of the maximum worst-case 24-hour exposures to acrolein, current day concentrations (*i.e.*, Cumulative Future No Build) already exceed the recommended TRV benchmark at every receptor location along the corridor. The highest concentration was predicted to occur at multiple locations along the corridor, and was 2.4-times higher than the established TRV limit. It should be noted that 24-hour ground level air concentrations of acrolein, reported by regional ambient air quality monitoring stations (due to an absence of data from stations in the GTA, monitoring data from the Simcoe and Windsor stations were used), already exceed the recommended TRV acute threshold limit by two-fold, in absence of any contribution from the rail corridor.

Under the Cumulative Future Build scenario, the potential risks increase over those predicted for the current condition by 50% of the TRV, resulting in a maximum worst-case predicted 24-hour inhalation exposure that is 2.9-times higher than the established TRV limit. Again, exceedances of the recommended TRV limit was predicted at all 125 receptor locations, with the highest 24-hour concentration predicted to occur at receptor location 27 (*i.e.*, in a residential area located just east of Landsdowne Avenue as it crosses the corridor). However, the average incremental increase in non-cancer risk along the rail corridor was 0.12 of the 24-hour acute benchmark (*i.e.*, 12% of the benchmark).

To put these risk predictions into context, it is important to evaluate both the toxicological basis to the risk predictions, as well as typical background concentrations observed in other urban settings. Globally, the mean and maximum background concentrations of acrolein detected in ambient urban air are 15 $\mu\text{g}/\text{m}^3$ and 32 $\mu\text{g}/\text{m}^3$, respectively. Canadian urban background air concentrations are typically lower than these concentrations, with maximum concentrations of acrolein not exceeding 2.5 $\mu\text{g}/\text{m}^3$, when measured by the National Air Pollution Surveillance between 1989 and 1995. As such, maximum worst-case concentrations of acrolein predicted for the Cumulative Future Build scenario are still less than those typical background air concentrations observed in other urban cities.

Acrolein is a product of incomplete combustion. Small amounts of acrolein can be formed and enter the air when trees, tobacco, other plants, gasoline, or oil are burned. Vehicular sources account for the majority of acrolein emissions in Canada, including emissions from gasoline- and diesel-powered on-road vehicles. Although acrolein may be found in soil, water, or air, it evaporates quickly from soil and water and breaks down fairly rapidly in air (about half will disappear within one day).

Studies have shown that acrolein (in air) acts primarily as an eye and upper respiratory tract irritant in humans. Exposure to concentrations as low as 140 $\mu\text{g}/\text{m}^3$ for five minutes may elicit subjective complaints of irritation, with increasing concentrations leading to more intense eye, nose and respiratory symptoms. In a study that exposed 36 healthy volunteers for five minutes to concentrations of acrolein in air of 140 $\mu\text{g}/\text{m}^3$, mild eye irritation was observed. This study formed the basis of the more conservative acute inhalation regulatory limit used in this assessment.

In one very comprehensive clinical study of acute outcomes of acrolein exposure in humans, investigators concluded that the average threshold of acute outcome for acrolein is between 210 $\mu\text{g}/\text{m}^3$ (eye irritation) and 700 $\mu\text{g}/\text{m}^3$ (throat irritation and decreased respiration rate), with nasal irritation at 350 $\mu\text{g}/\text{m}^3$. Given the lowest concentration at which mild eye irritation has been observed in humans (*i.e.*, 140 $\mu\text{g}/\text{m}^3$) is more than 215-times higher than the baseline 1-hour air concentration of acrolein predicted for the worst-case maximum receptor location under the Cumulative Future

Build scenario (*i.e.*, $0.65 \mu\text{g}/\text{m}^3$), it is highly unlikely that the maximum worst-case ground level air concentration predicted along the rail corridor under the Future build scenario would result in a substantive health risk.

Chronic Inhalation Assessment

The results of the chronic inhalation assessment indicates that the maximum predicted worst-case ground level air concentrations along the entire corridor would not result in a chronic non-cancer health risk for any of the criteria air contaminants, with the exception of NO_x . Furthermore, none of the maximum predicted ground level air concentrations for any of the VOCs, with the exception of acrolein, exceeded their respective chronic non-cancer regulatory benchmarks at any point along the rail corridor.

As noted previously, for the purpose of evaluating carcinogenic risks related to an airborne emission source as part of a Transit Project Assessment, the evaluation of incremental lifetime cancer risks *versus* the Ontario regulatory benchmark of acceptable incremental cancer risk (*i.e.*, one-in-one-million or 1×10^{-6}) is done by calculating the incremental increase in lifetime cancer risk related to emissions predicted for the Future Build scenario **above** those predicted for the Future No Build scenario (*i.e.*, the incremental lifetime cancer risks related to expansion of the rail corridor *versus* status quo). The results of the chronic inhalation assessment indicates that the maximum predicted worst-case ground level air concentrations along the entire corridor would not result in an unacceptable incremental lifetime cancer risk for any of the COCs, with the potential exception of 1,3-butadiene.

Predicted NO_x Chronic Non-Cancer Risks

Summary of Results

Similar to the acute results for NO_x , background concentrations of NO_x in the GTA already exceed the 24-hour acute regulatory benchmark demonstrating that current urban activities have resulted in an over-burdened airshed in some areas of the city, on worst-case exposure days. With respect to the current project, the incremental increase in risk related to chronic exposures to NO_x arising from the Future Build scenario at the worst-case receptor location was minimal (*i.e.*, a 3.9% increase in ambient annual average concentrations of NO_x).

Based upon the available information, predicted maximum worst-case chronic exposures along the corridor have the potential to result in adverse health impacts in sensitive individuals present within the surrounding community (and the GTA as a whole, for that matter) should these individuals be exposed to these elevated ambient concentrations over an extended period of time. This issue is more related to worst-case conditions in the regional airshed than it is with the incremental increase in predicted contributions from the rail corridor.

Summary of Analysis

Predicted maximum worst-case annual average concentration of NO_x for current day concentrations (*i.e.*, Cumulative Future No Build) already exceed the recommend regulatory benchmark at every receptor location along the corridor. The highest concentration was predicted to occur at receptor location 57, which were 2.8-times higher than the established chronic regulatory limit. It should be noted that annual average ground level air concentrations of NO_x , reported by ambient air quality monitoring stations for the City of Toronto (*i.e.*, regional background levels), already

exceed the recommended regulatory chronic threshold limit by nearly two-fold, in absence of any contribution from the rail corridor.

Under the Cumulative Future Build scenario, the potential risks increase over those predicted for the current condition by 39% of the TRV, resulting in a maximum worst-case predicted 24-hour inhalation exposure that is 2.9-times higher than the established chronic regulatory limit. Again, exceedances of the recommended regulatory limit was predicted at all 125 receptor locations, with the highest annual average concentration also predicted to occur at receptor location 57.

Studies of chronic exposure to NO_x have demonstrated the ability to cause respiratory disease and impairment of lung function in sensitive individuals and children. To address these concerns, the National Ambient Air Quality Objective (NAAQO) Maximum Desirable Level (MDL) established by Health Canada is considered protective of health and environmental effects, and was selected to evaluate potential chronic risks for the current assessment. Given the maximum predicted worst-case annual average concentration of NO_x was nearly three-fold higher than the recommended regulatory limit, one would expect the potential for adverse health effects to be observed in sensitive individuals at these worst-case locations along the corridor if they continued to be exposed to these ambient concentrations over an extended period of time.

As with the analysis of the 24-hour exposure period, the fact that the background concentrations of NO_x in areas of the City of Toronto already exceed the chronic NAAQO continues to demonstrate that current urban activities have resulted in a burdened airshed in some regions.

With respect to the current project, the incremental increase in risk related to chronic exposures to NO_x arising from the Future Build scenario at the worst-case receptor location was small (*i.e.*, 3.9% increase in NO_x concentrations on an annual average basis). Based upon the available information, sensitive individuals who are exposed to maximum worst-case ambient concentrations and chronic exposure conditions over an extended period of time have the potential to experience adverse health impacts.

Predicted Acrolein Chronic Non-Cancer Risks

Potential chronic health risks related to exposures to acrolein were evaluated based upon a comparison to a conservative toxicological reference value (TRV), and not a specific promulgated national or provincial ambient air quality objective or standard. Neither Health Canada or the Ontario Ministry of the Environment have established specific air quality standards for the evaluation of inhalation exposures to this chemical.

Summary of Results

Similar to the acute results, the actual predicted incremental increase in acrolein emissions from the rail corridor is relatively small (*i.e.*, a worst-case annual average increase of 0.01 µg/m³), and predicted ambient concentrations are considered to be similar to those measured in other Canadian cities. Given the considerable uncertainty factors and caution built into the regulatory TRV benchmarks, it is, therefore, unlikely that prolonged exposure to this ambient concentration of acrolein would result in any appreciable health risk to sensitive members of the population. In addition, the levels are well below the levels that would likely cause adverse effects (eye irritation, throat irritation and decreased respiration rate) in humans. Even when exposed to the maximum worst-case ground level air concentration predicted along the rail corridor under the Future build scenario, it is unlikely a health concern would result.

Summary of Analysis

The acute risks related to acrolein exposures and the chronic endpoints of concern are specifically nasal irritation potentially leading to nasal lesions due to continuous long term exposures to this irritant. A detailed review of the scientific and regulatory literature indicates that no studies detailing chronic toxicity to humans by inhalation were available (refer to toxicity profile for acrolein in Appendix A2 of the Human Health Assessment of Air Quality Impacts for further details). As such, the inhalation TRV used in the current assessment was established by the US EPA, based upon observations in a sub-chronic inhalation study of rats exposed to acrolein. In the underlying study used to develop this regulatory benchmark, the selected concentrations (0.9 mg/m^3) resulted in slight nasal irritation in one of the 12 studied rats. Though the same study was also conducted in hamsters and rabbits, none of these health-related environmental effects were observed at this exposure concentration (*i.e.*, rats were the most sensitive species). A 1,000-fold uncertainty factor (to account for the considerable uncertainty inherent within the derived TRV) was applied to derive the ultimate reference concentration of $0.02 \text{ } \mu\text{g/m}^3$. The standardized uncertainty factors applied, which are recognized by the US EPA, Health Canada, and the WHO, included adjustments to address animal to human extrapolation (three-fold), potential human sensitive sub-population (10-fold), the use of a sub-chronic to convert to an equivalent chronic study (10-fold), and for the use of the lowest-observed-effects-level (three-fold). It is these uncertainty factors that account for a great deal of conservatism in HHRA.

The annual average airborne concentration of acrolein estimated for the Cumulative Future Build scenario was $0.11 \text{ } \mu\text{g/m}^3$. Given this ambient concentration is considered to be similar to those measured in other Canadian cities, the considerable uncertainty factors built into the reference concentration, and the fact this regulatory benchmark is based upon minor nasal irritation for a very sensitive test species (*i.e.*, in only 1 of 12 studied rats), it is unlikely that prolonged exposure to this ambient concentration of acrolein would result in any appreciable health risk to sensitive members of the population.

The predicted maximum worst-case annual average concentration of acrolein for current day concentrations (*i.e.*, Cumulative Future No Build) already exceed the recommended regulatory TRV benchmark at every receptor location along the corridor, on worst-case days, involving assumed vehicle volumes in the future and worst-case meteorological conditions. The highest concentration was predicted to occur at multiple receptor location along the corridor, and was estimated to be five-fold higher than the established chronic regulatory benchmark. It should be noted that annual average ground level air concentrations of acrolein, reported by regional ambient air quality monitoring stations (due to an absence of data from stations in the GTA, monitoring data from the Simcoe and Windsor stations were used), already exceed the recommended chronic TRV benchmark by 4.5-times, in absence of any contribution from the rail corridor.

Exceedance of the TRV benchmark was predicted at all 125 receptor locations. Under the Cumulative Future Build scenario, the potential risks increase over those predicted for the current condition by 50% of the TRV, resulting in a maximum worst-case predicted annual average inhalation exposure that is 5.5-times higher than the selected TRV benchmark.

Predicted 1,3-Butadiene Chronic Incremental Lifetime Cancer Risks

Summary of Results

Results of the chronic inhalation assessment for 1,3-butadiene indicate that the predicted cancer risks are well below the regulatory benchmark of 1-in-100,000 established by Health Canada. These risks would be considered minimal, and likely undetectable using epidemiological data from the study area. Under Ontario's regulatory benchmark of 1-in-1,000,000 the projected chronic ground level air concentrations of 1,3-butadiene could result in incremental lifetime cancer risks at some locations along the corridor that would marginally exceed the benchmark. These predicted cancer risks are highly cautious and are based upon an individual being exposed to that same maximum predicted air concentration for their entire lifetime (*i.e.*, 75 years). If one assumed a more likely residency period (typically 30 years is considered a reasonable duration), none of predicted cancer risks related to 1,3-butadiene exposure along the rail corridor would exceed the Ontario regulatory benchmark of 1-in-1,000,000 incremental lifetime cancer risk.

Summary of Analysis

Exceedance of the acceptable non-cancer and cancer risk levels is used as a general indicator of unacceptable or elevated risk; however, elevated risk may occur to varying degrees. Recognized experts in the field of risk communication have suggested the use of qualitative terminology to express the varying levels of numerical risk. A carcinogenic risk level of less than 1-in-1,000,000 is considered *negligible*; between 1-in-1,000,000 and 1-in-100,000 is considered *minimal*; between 1-in-100,000 and 1-in-10,000 is considered *very low*; between 1-in-10,000 and 1-in-1,000 is considered *low*; between 1-in-1,000 and 1-in-100 is considered *moderate*; and greater than 1-in-100 is considered *high*. These definitions may be useful in understanding the relative risks expressed below.

The worst-case incremental lifetime cancer risk for 1,3-butadiene related to the maximum predicted difference between Future No Build and Future Build at each receptor location along the corridor, was 1.5×10^{-6} (*i.e.*, 1.5-in-1,000,000). As such, these maximum predicted worst-case increases in annual average air concentration of 1,3-butadiene arising from projected rail traffic for the Future Build scenario **over** those estimated for the Future No Build scenario (*i.e.*, status quo) exceed the regulatory benchmark of acceptable cancer risk (*i.e.*, 1×10^{-6}) by 1.5-fold at the worst-case location. Based upon the predicted incremental increase in annual average air concentrations of 1,3-butadiene at each receptor location along the rail corridor between the Future Build and Future No Build scenarios, exceedance of the regulatory benchmark (*i.e.*, an increase of $0.033 \mu\text{g}/\text{m}^3$ would be equivalent to a 1×10^{-6} incremental lifetime cancer risk level) occurred at 12 of 125 receptor locations along the corridor.

As noted previously, the definition of a benchmark ILCR of 1-in-1,000,000 is a policy based decision, not a scientifically derived value. An ILCR of 1-in-1,000,000 increases a person's lifetime cancer risk from 0.400000 (based on the 40% lifetime probability of developing cancer in Canada) to 0.400001. It must be noted, however, that an ILCR of 1-in-1,000,000 (a level below which the MOE considers acceptable) represents a 0.00025% increase over the background cancer incidence, an increase that cannot be detected using epidemiological data from the study area. In the case of the current study, if one used the Health Canada recommended *de minimus* incremental lifetime

cancer risk of 1-in-100,000 as the acceptable risk benchmark, none of the 125 receptor locations would exceed this level.

It should be noted that the regulatory cancer unit risk value for 1,3-butadiene used in the current assessment is considered highly conservative. The basis for the inhalation unit risk value developed by the US EPA for the evaluation of carcinogenic risk related to exposure to 1,3-butadiene is the increased risk of leukemia in exposed populations. More recent examinations of 1,3-butadiene cancer risk conducted by the State of Texas in 2008 and the State of North Carolina in 2007 were based on the dataset used by the US EPA in the derivation of its current value, but incorporated new data not available to the US EPA in 2002. The use of updated exposure estimates from recent follow-up toxicological and epidemiological studies, as well as further analysis of the leukaemia dataset, has resulted in the derivation of less conservative cancer risk estimates and helped to address concerns over the misclassification of exposures in the original study. A recent validation study reported that the earlier estimates of 1,3-butadiene exposure in the core epidemiological study used by the US EPA had underestimated exposure; on average, estimates were 10% lower than measurements, leading to overestimations of cancer potency for 1,3-butadiene exposures. As a result, the Texas Commission on Environmental Quality (TCEQ) and the North Carolina Science Advisory Board (NCSAB) have recommended inhalation unit risk values that are 60- and 38-fold less conservative than the current US EPA value, respectively.

The risk analysis and unit risk derivation conducted by the TCEQ underwent an exhaustive peer review process under the auspices of the Toxicology Excellence for Risk Assessment (TERA) in 2008, sponsored by the TCEQ and the US EPA. The inhalation unit risk derived by the TCEQ was also cited by the MOE in their Science Discussion Document on the Development of an Air Standard for 1,3-Butadiene, and is being considered for use in the derivation of proposed new 1,3-butadiene air standards for the Province of Ontario. Though under review by the MOE and US EPA, as this revised inhalation unit risk estimate has not yet been fully adopted by a major regulatory agency, it could not be selected for use in the current assessment. However, if either of these two more recent inhalation cancer unit risk values were to be selected for use in the current assessment, incremental lifetime cancer risks at **none** of the 125 sensitive receptor locations along the corridor would exceed either the Health Canada 1-in-100,000 or MOE 1-in-1,000,000 regulatory cancer risk benchmarks.

Furthermore, these predicted cancer risks are conservatively based upon an individual being exposed to that same maximum predicted air concentration for their entire lifetime (i.e., 75 years). If one assumed a more likely residency period (typically 30 years is considered a reasonable duration), none of predicted cancer risks related to 1,3-butadiene exposure along the rail corridor would exceed the Ontario regulatory benchmark of 1-in-1,000,000 incremental lifetime cancer risk, even if one uses the current US EPA cancer unit risk value.

Chronic Multi-Pathway Assessment

Potential risks related to the deposition of particulate onto soils and home gardens along the rail corridor were also evaluated in the current assessment to determine potential risks from oral and dermal exposures to impacted soils/dusts and home-grown produce. Based on an evaluation of the volatility and persistence of each of the COC, only the PAH group (using benzo[a]pyrene as a surrogate) was determined to potentially accumulate in soils along the corridor over an extended period of time. The various VOCs (all COC except the PAH group) are volatile and short lived in the environment,

and as such are not expected to be of concern for the soil-based portion of the assessment.

Results of the multi-pathway assessment indicated that potential incremental lifetime cancer risks related to exposures to residual PAH present in soil/dust and home-grown produce impacted by rail corridor emissions were below the MOE 1-in-1,000,000 regulatory cancer risk benchmark (*i.e.*, the maximum predicted ILCR was 1.6×10^{-7}). These results are not surprising given the very low predicted air concentrations of PAH at each of the sensitive receptor locations along the corridor (*i.e.*, the maximum incremental increase due to the project would be $0.00001 \mu\text{g}/\text{m}^3$, and in most cases was not detectable). As such, deposition of these very low air concentrations would not lead to significant accumulation of concentrations of PAHs in soil or home garden produce.

6.2.5.1 *Proposed Mitigation Measures*

The proposed air quality monitoring, mitigation measures, best management practices and commitments to future work for human health implications associated with increased air emissions are the same as those proposed to address potential air quality impacts. Please refer to **Sections 6.2.4.3** and **6.2.4.4** for details regarding the proposed measures to address potential air quality impacts.

6.2.5.2 *Significance of Potential Impacts*

Overall, although the proposed project may result in some human health impacts as a result of air quality impacts, with the implementation of the air quality monitoring, mitigation measures, best management practices and commitments to future work identified in **Sections 6.2.4.3** and **6.2.4.4** the potential for adverse impacts can be minimized. Therefore, from a human health perspective as it relates to air quality, with the presence of ongoing air quality monitoring and associated plan with mitigative measures to prevent elevated concentrations along the corridor, this project is not anticipated to result in any adverse impacts and no significant residual impacts will occur.

6.2.6 Human Health and Wellbeing

The purpose of this section is to provide an overview of the potential impacts, proposed mitigation and significance of the potential impacts to human health and wellbeing of this project. This section does not deal with the potential human health effects associated with increased air emissions as that is documented in **Section 6.2.5**.

6.2.6.1 *Potential Construction, Operation and Maintenance Impacts and Mitigation Measures*

Many aspects of this project may result in impacts to human health and well being. Of those impacts some will be negative and others will be positive. Of particular note are the potential impacts associated with contamination, air quality, noise and the design of the project. As previously noted, human health impacts associated with increased air emissions are discussed in **Section 6.2.5**. The following provides an overview of the potential impacts to human health and wellbeing associated with contamination, noise and the design of the project.

Contamination

As noted in **Section 6.1.6**, there is the potential for impacts to contaminated sites. This may in turn result in potential impacts to human health and wellbeing such as the potential exposure of hazardous materials to workers during construction and potential for further contamination as a result of any spills during construction, operations or maintenance. With the implementation of the best management practices, mitigation measures and commitments to future work identified in **Sections 6.1.6.1** and **6.1.6.2** the potential for adverse impacts can be minimized and no significant residual impacts will occur.

Noise

As noted in **Section 6.2.2**, although some noise impacts are anticipated best management practices and mitigation measures will be employed to reduce the potential impacts. With the implementation of the best management practices and mitigation measures identified in **Sections 6.2.2.1** and **6.2.2.2**, potential for adverse impacts can be minimized and no significant residual impacts will occur.

Design of the Project – Safety Implications

The design of the project will have some notable net benefits to human health and well being. In particular, there will be improved safety for pedestrians, cyclists and other motorists using roads that currently cross the rail corridor at grade.

The existing at-grade crossing will be replaced by grade separations, or a pedestrian/cyclist bridge in the case of John Street, that will remove interaction between trains and pedestrians, cyclists and other motorists along roads that cross the corridor. The grade separations will improve safety and this benefit is perhaps most notable in the vicinity of schools where there are numerous children travelling (e.g. along King Street and Church Street in Weston).

In addition, during detailed design the design of the Weston GO Station will be further refined. That station, like all GO stations, will include a variety of safety features (e.g. sufficient lighting, safety line at the edge of platforms to remind passengers to stand back from the edge) to ensure that the station can be safely used by both employees and customers alike.

Overall, it is anticipated that the design of the project will result in a net improvement to safety for pedestrians, cyclists and other motorists. As a result, no adverse environmental impacts are anticipated and no adverse residual impacts will occur.

6.2.6.2 Significance of Potential Impacts

As discussed in **Section 6.2.6.1**, when taking into consideration the potential impacts associated with contamination, noise and design (safety) no adverse environmental impacts to health and wellbeing are anticipated and no residual adverse impacts will occur. In fact, it is anticipated that there will be some positive residual impacts to human health and wellbeing as a result of improvements to safety based on the design of the project (e.g. removal of at-grade crossings).

6.2.7 Business and Economics

The following provides a summary of the business and economy related impacts of the undertaking.

6.2.7.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

There will be normal and varied construction related impacts on businesses and communities immediately adjacent to the corridor. As noted in section 6.5 this will be related to temporary traffic delays and detours during construction.

On the economic side, the extensive construction proposed with this expansion, will result in several thousand employment opportunities over a 4 to 5 year period. In addition the workers employed on the various construction sites will provide some potential business opportunities for local business with respect to various supplies required and restaurant/ fast food establishments.

GO commuters will generally be able to conduct there normal daily activities with minimal disturbance, since the disruption to existing train operations will be kept to a minimum.

Proposed Mitigation Measures

As outlined in section 6.5.1, traffic detours will be implemented during construction to ensure local traffic will be redirected as best as possible to reduce the overall impacts to the community. Additional signage may be placed along the detours to ensure customers have easy accessibility to businesses. Metrolinx will work with local residents and businesses to assist with inconveniences as a result of road closures and traffic disruptions.

Mitigation related to noise and vibration construction impacts will be implemented. **Sections 6.2.2.1 and 6.2.3.1** outline the proposed mitigation measures.

6.2.7.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

Once the project is implemented the adjacent communities should benefit from the increased frequency of service and the new activity generated around new and modernized stations. By increasing community accessibility and interconnection with other transit lines potential new development may be encouraged and will be supported by Metrolinx. Development around the Bloor station area will be encouraged as part of development as a mobility hub. New activity associated with the GO Weston Station should potentially add new life and vibrancy to the area with new opportunities for BIA parking, market relocation and additional residential/commercial development. The proposed new Eglinton Station will also provide a connection with the future Eglinton LRT line providing additional opportunities for both development and increased travel flexibility for transit users. The Union-Pearson rail link will provide other opportunities for

users of both the Weston and Bloor station to access the airport or to continue downtown to Union station.

Proposed Mitigation Measures

As outlined in Section 6.2.2.2 and 6.2.3.3 mitigation measures will be employed to reduce the potential noise and vibration impacts. These mitigation measures include acoustical barriers in selected locations and the use of ballast mats or floating slabs. With the implementation of the proposed mitigation measures, potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.2.7.3 Significance of the Potential Impacts

Although during the construction stages, this project will have some temporary impacts to the community, with the implementation of the above noted best management practices and mitigation measures, the long term residual effect should be positive for communities along the line as noted above.

6.3 CULTURAL HERITAGE VALUES OR INTERESTS

6.3.1 Built Heritage and Cultural Heritage Landscapes

As outlined in **Section 4.3.1**, within the study area there are some built heritage features that are listed on the City of Toronto's Inventory of Heritage Properties. Those are properties that have not been designated under the *Ontario Heritage Act* but are considered by the City to be of cultural heritage interest or value and have been placed on the municipal registrar. Listing of non-designated properties does not offer any specific protection under the *Ontario Heritage Act*. No heritage features within the study area have been designated under the *Ontario Heritage Act*.

In addition to the properties listed on the City of Toronto's Inventory of Heritage Properties, there are a number of properties over 40 years old of heritage interest that have been considered as part of the assessment of potential impacts to heritage resources.

Within the study corridor there are no identified built heritage resources of provincially or federal recognized sites of significance. The Humber River is recognized as a federally Designated Canadian Heritage River (1999).

Although not immediately within the study corridor, the Weston Heritage Conservation District is located nearby (see **Figure 4.3.1-1**). That district has been designated under Part V of the *Ontario Heritage Act*.

6.3.1.1 Potential Construction Impacts and Proposed Mitigation Measures

Potential Impacts

The project has the potential to adversely affect cultural heritage landscapes and built heritage resources by displacement and/or disruption during construction. Cultural heritage landscapes and/or built heritage resources may experience displacement, i.e., removal, if they are located within the right-of-way of the undertaking. There may also be

potential for disruption, or indirect impact, to cultural heritage resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and, or setting.

The potential displacement and disruption impacts of this project are principally associated with the construction of the new rail and the associated replacement or widening of existing rail bridges and the introduction of new grade separation structures. Potential impacts at each identified cultural heritage resource are noted in **Table 6.3.1.1-1**.

The disruption impacts to identified cultural heritage resources related to indirect impacts outside of the rail corridor right-of-way will be limited to potential change in context. This is principally related increased rail transit traffic following construction. The contextual changes are not considered to be provincially significant. The rail corridor is representative of Toronto's industrial and passenger rail history and this thematic and physical history will continue.

Proposed Mitigation Measures

Mitigation measures and best management practices will be implemented towards addressing potential impacts. Identified mitigation measures will be carried through the detailed design as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project.

The principal impacts in the Georgetown South Service Expansion and Union-Pearson Rail Link Project are indirect. Proposed mitigation measures for this project are described in **Table 6.3.1.1-1**.

Table 6.3.1.1-1 includes some commitments to complete additional documentation for some features. Where additional documentation is to be completed those documents will be completed during detailed design and submitted to the Ministry of Culture.

Table 6.3.1.1-1 Identified Cultural Heritage Landscapes and Built Heritage Resources – Impacts and Mitigation

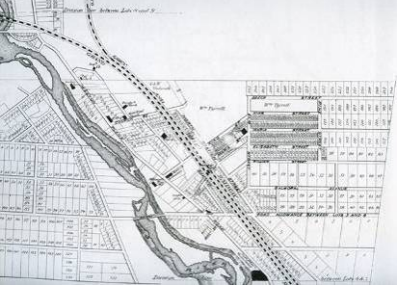
Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
1	CHL	Railway corridor	Bathurst Street, City of Toronto to the east to Torbram Road, City of Mississauga to the west (1+750 to 26+000)	Linear rail corridor comprising former Grand Trunk Railway (1856) and in part, Toronto, Grey and Bruce Railway (1867) lines, now Canadian National Railway (CN) and Canadian Pacific Railway (CP), respectively. Passing through features such the below ground Fort York Military Hospital and the communities of West Toronto, Mount Dennis and Weston.	 West along rail corridor from the Bathurst Street Bridge.	Disruption: General construction/ operational impacts related to the construction of additional tracks.	Review during detailed design to confirm design has not changed in this area.
2	BHR	Transportation: road bridge	Bathurst Street, south of Front Street (1+750)	Bathurst Street Bridge. Steel through truss, originally Humber River Railway Bridge; built 1903; moved to present location in 1916; and direction adjusted in 1931. Listed on the City of Toronto's Inventory of Heritage Properties (1985).	 South to Bathurst Street Bridge.	Disruption: No impact.	None
3	BHR	Industrial building	No. 805 Wellington Street West at Strachan Avenue (2+450)	Former industrial building, possibly garage associated with No. 805A. Two storey brick structure with formerly a one-storey wing to the east. John B. Smith & Sons painted on south and east brick walls and Maple Green Inc. on north (front) wall.	 Southwest to former industrial building.	Disruption: General construction/ operational impacts of new tracks closer to building.	Review during detailed design to confirm design has not changed in this area.
4	BHR	Industrial building	No. 805A Wellington Street West at Strachan Avenue (2+500)	Former warehouse converted to housing. Three storey brick structure with piers and corbelled brick cornice dividing length of building into bays, flat roof, segmental arch window openings with radiating voussoirs and hopper style sash. Altered: brick painted, sash replaced with hopper style and fixed units, addition at east end.	 Southwest to the former warehouse building.	Disruption: General construction /operational impacts of tracks closer to building; introduction of Strachan Ave. grade separation.	Review during detailed design to confirm design has not changed in this area.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
5	CHL	Roadscape	Strachan Avenue south of Wellington Street West (2+550)	Strachan Avenue Level Crossing. Four tracks, crossing marked with signals and gates.	 South to the at-grade crossing.	Disruption: Introduction of grade separation structure; loss of \existing, historical context by physical change in street pattern.	Review during detailed design to confirm design has not changed in this area. Complete a CHL Cultural Heritage Evaluation Report Report.
6	BHR	Transportation: rail bridge	King Street West, west of Sudbury Street and east of Atlantic Avenue (3+200)	King Street West Railway Subway. Built 1888, two-span, cut limestone abutments and centre pier, steel plate girders, sidewalks on King Street, clearance 4.2 m. Charles Sproatt, City Engineer; B. Gibson, contractor; wooden deck for CN and CP concrete deck in 1975. Listed on City of Toronto's Inventory of Heritage Properties (1992).	 East to railway subway on King Street.	Disruption: General construction/ operational impacts; no proposed change to bridge structure.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
7	BHR	Industrial building	No. 99 Sudbury Street (3+500)	Former warehouse converted to offices, two storey masonry building with one storey wing at east end, flat roof, segmental arch window openings with radiating brick voussoirs. Altered: brick painted, window sash replaced and some openings modified.	 Southeast to former industrial building.	Disruption: General construction/ operational impacts of tracks closer to building. Potential for more audible effects.	Review during detailed design to confirm design has not changed in this area.
8	BHR	Transportation: rail bridge	Queen Street West at Dufferin Street (3+970)	Queen Street Railway Subway One-span, cut limestone abutments, steel plate girder structure, two sidewalks on Queen St., clearance 4.1 m. E. H. Keating, City Engineer; W.C. Grant and Co. & Hamilton Bridge Works Co., contractors; built 1897; rehabilitation: CP in 1930 and CN in 1977. Listed on the City of Toronto's Inventory of Heritage Properties (1992).	 West to railway subway.	Disruption: General construction/ operational impacts; bridge widening on east side to accommodate three tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
9	BHR	Transportation: rail bridge	Brock Street north of Queen Street West (4+480)	Brock Street Railway Subway Four-span, concrete abutments, steel piers, riveted steel plate girder, clearance 4.1 m, '1914' date stamped in abutments, metal railings on bridge deck and along sidewalks, two sidewalks on Brock Street.	 North to railway subway.	Disruption: General construction/ operational impacts; bridge widening on east side to accommodate one track.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
10	BHR	Transportation: rail bridge	Lansdowne Avenue south of Dundas Street West (5+000)	Lansdowne Avenue Railway Subway. Comprises five, one-span structures, concrete abutments, plate girder structures, No date, reconstruction in 1992-1993 with concrete repairs and new railings.	 Southeast across the deck of the structure.	Disruption: General construction/ operational impacts; bridge widening on east side to accommodate two tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
11	BHR	Transportation: rail bridge	Dundas Street west of Lansdowne Avenue (5+550)	Dundas Street West Railway Overhead. Superstructure and piers rebuilt, retains the original limestone abutment at east end. Plaque on bridge indicates structure built in 1938 and rehabilitated in 1984 and 2007.	 The east abutment is limestone.	Disruption: General construction/ operational impacts; no proposed change to bridge structure.	Review during detailed design to confirm design has not changed in this area.
12	BHR	Transportation: rail bridge	Bloor Street West, east of Dundas Street West (6+400)	Bloor Street West Railway Subway. Four-span, concrete abutments, steel piers and riveted steel plate girder structure, metal handrail and brackets, maker's plaque: "Canada Bridge Company, 1925", two sidewalks on Bloor Street. Stairs on the north side of the structure accesses the GO Transit Bloor Station.	 East to the Bloor Street railway subway.	Disruption: General construction/ operational impacts; bridge widening to accommodate two tracks and station platform.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
13	BHR	Industrial building	No. 371 Wallace Avenue, east side of tracks (6+850)	Former industrial building converted to residential. Three storey brick masonry structure, flat roof, large rectangular window openings with brick voussoirs. Window sash replaced.	 Southeast to former industrial building.	Disruption: General construction/ operational impacts, tracks closer to building.	Review during detailed design to confirm design has not changed in this area.
14	BHR	Transportation: Pedestrian bridge	Wallace Avenue, east of Dundas Street West (6+880)	Wallace Avenue Footbridge. Steel structure. Frazer Matthews, Chief Engineer, Ontario Bridge Company, C.H. Rust, City Engineer; contractors: Ontario Bridge Company (bridge), and City of Toronto Works Department (footings). Built 1907. Listed on the City of Toronto's Inventory of Heritage Properties (1997).	 Northwest to footbridge at west end of Wallace Avenue.	Disruption: General construction/ operational impacts; no proposed change to bridge structure.	Review during detailed design to confirm design has not changed in this area.
15	BHR	Industrial building	30 Edwin Avenue/ 26 Ruskin Avenue, east side of tracks (7+080)	Toronto Hydro Junction Substation. Edwardian classical style building, three storey brick structure, flat roof with skylights, decorative masonry detailing. Robert McCallum, City Architect, Built 1911, and expanded in 1916, 1920 and 1931. Listed on the City of Toronto's Inventory of Heritage Properties (1998).	 North to the hydro substation.	Disruption: General construction/ operational impacts; tracks closer to building.	Review during detailed design to confirm design has not changed in this area.
16	BHR	Industrial building	1655 Dupont Street, east side of tracks (7+400)	Viceroy Manufacturing Company Factory (former). Four-storey brick warehouse, flat roof, rectangular shaped windows with brick voussoirs and steel sash. Built c1929 with addition to east. Company made hard rubber products, including hockey pucks. Listed on the City of Toronto's Inventory of Heritage Properties (2005).	 Southeast to former factory building.	Disruption: General construction/ operational impacts; tracks closer to building. Located in West Diamond project area.	Review during detailed design to confirm design has not changed in this area.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
17	BHR	Transportation: rail bridge	Dupont Street, at Dundas Street West (7+400)	Dupont Street Railway Subway. Four-span, concrete abutments, steel piers and riveted steel plate girder structure, metal railing and brackets, maker's plaque: "Canadian Bridge Company, Walkerville, Ontario, 1925" and two sidewalks along Dupont Street. Clearance 4.0 m.	 West to Dupont Street bridge.	Disruption: General construction/ operational impacts; bridge widening on east side to accommodate one track in West Diamond project area.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
18	BHR	Pubic Building	143 Old Weston Road (7+880)	West Toronto Pumping Station. One storey, masonry structure, flat roof, rectangular shaped openings with concrete surrounds, Metro Toronto seal, c1960	 South to pumping station.	Disruption: General construction/ operational impacts; tracks closer to building. Site in West Diamond area.	Review during detailed design to confirm design has not changed in this area.
19	BHR	Transportation: rail bridge	St. Clair Avenue West, east of Keele Street and west of Old Weston Road (8+580)	St. Clair Avenue Railway Subway. Two-span, concrete abutments, centre pier and beam structure, concrete brackets, date '1931' stamped in abutments, decorative concrete paneling and sidewalks along St. Clair Avenue. Clearance 4.6 m.	 East to St. Clair Avenue bridge.	Disruption General construction/ operational impacts; included in West Toronto Diamond project.	Review during detailed design to confirm design has not changed in this area.
20	BHR	Transportation: rail and road bridge	Eglinton Avenue west, west of Black Creek Drive and east of Weston Road (10+700)	Eglinton Avenue Railway Subway. Two, two-span structures with precast concrete panel abutments, concrete centre pier, riveted steel plate girders, metal railings, Metro Toronto crest with date of 1966 on north abutment at east end; sidewalks along Eglinton Avenue. Road bridge into former Kodak property east of the rail bridges.	 West to railway structures.	Disruption General construction/ operational impacts; bridge widening on east side to accommodate three tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
21	CHL	Settlement	Eglinton Avenue West and Weston Road (10+500 to 11+500)	Community of Mount Dennis. Developed c1890 at the intersection of Weston Road and Eglinton Avenue, adjacent the railway tracks. Located on a height of land between Black Creek and the Humber River. Named after early settlers in the area. The adjacent Kodak Plant opened in 1913 contributed to the economic growth of the Mount Dennis area.	 Aerial view of the community of Mount Dennis.	Disruption General construction/ operational impacts; tracks closer to neighbouring 20th century residences.	Review during detailed design to confirm design has not changed in this area.
22	BHR	Transportation: rail bridge	Ray Avenue, (11+540)	Ray Avenue Railway Subway. Two, two-span, cast-in-place concrete structures, decorative paneling, date '1929' stamped on side of concrete beams and sidewalks along Ray Avenue. Clearance 4.1 m.	 East to railway subway.	Disruption: General construction/ operational impacts; bridge widening on east side to accommodate three tracks.	Review during detailed design to confirm design has not changed in this area. *Prepare a Heritage Bridge Assessment.
23	CHL	Settlement	East and west of the railway corridor from Clouston Avenue (12+600) north to Oak Street (15+400)	Town of Weston. Weston developed first along the Humber River in the 1790s. The Weston Plank Road and after 1856, the Grand Trunk Railway contributed to the economic growth of Weston. It was incorporated as a village in 1881 and a town in 1915. The Weston Heritage Conservation District (HCD) was designated in 2006.	 Map of Weston in 1878.	Disruption: General construction/ operational impacts; tracks closer to residential areas within 1 st Weston HCD.	Review during detailed design to confirm design has not changed in this area.
24	CHL	Roadscape	Denison Road East, Weston, east of Weston Road (12+800)	Denison Road Level Crossing. Three tracks, crossing marked with signals and gates. Adjacent lands largely residential with 19th and early 20th century dwellings located at Nos. 4, 6 and 22 on the north side of the street and Nos. 11 and 15 on the south side as well as No. 1631 Weston Road.	 West to at-grade crossing Denison.	Displacement Introduction of grade separation structure; realignment of road to north and removal of 7 residential buildings.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
25	BHR	Residence	Denison Road East Weston, east of Weston Road (12+800)	No. 22 Denison Road East. 19th century, one and-a-half storey, frame residence with centre gable, three bay with rectangular window to either side, one storey bay window on west wall. Altered: vinyl siding, window sash replaced.	 North to residence.	Displacement Introduction of grade separation structure; realignment of road and removal of residences.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
26	BHR	Transportation: rail bridge	Lawrence Avenue West, Weston, east of Weston Road (13+580)	Lawrence Avenue Railway Subway. Two, two-span pour-in-place concrete structures with concrete abutments, centre piers and deck, metal railings and sidewalks along Lawrence Avenue. Date of '1959' is incised in the concrete. The Weston GO Station is accessed from the north side of Lawrence at the west end of the bridge.	 East to railway subway on Lawrence.	Disruption: General construction/ operational impacts; widening of bridge on north and south for two tracks, station platform.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
27	CHL	Roadscape	John Street, Weston, east of Weston Road (13+870)	John Street Level Crossing. Three tracks, crossing marked with signals and gates. Lands to the east are largely residential with 19th and early 20th century dwellings. The Weston GO station and residences are located to the south of John St. with GO parking to the north.	 East to the at-grade crossing on John.	Displacement Road closed to vehicular traffic; introduction of grade separation structure for pedestrians.	Prepare a Heritage Impact Assessment.
28	CHL	Roadscape	King Street, Weston, east of Weston Road (14+060)	King Street Level Crossing. Three tracks, crossing marked with signals and gates. Adjacent lands largely residential with 19th and early 20th century dwellings.	 East to the at-grade crossing on King.	Disruption: General construction/ operational impacts; introduction of grade separation structure.	Review during detailed design to confirm design has not changed in this area.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
29	CHL	Roadscape	Church Street, Weston, east of Weston Road (14+380)	Church Street Level Crossing. Three tracks, crossing marked with signals and gates. Lands to the east are largely residential with 19th and early 20th century dwellings. High-rise and contemporary residential characterize lands to the west.	 East to the at-grade crossing on Church.	Disruption: General construction/ operational impacts; introduction of grade separation structure.	Review during detailed design to confirm design has not changed in this area.
30	BHR	Residence	Weston Road, no municipal number – north of rail corridor and south of 2427 Weston Road (15+250)	Residence. One and-a-half storey frame building dating to the latter part of the 1800s, 'L'-plan, one storey bay window, window openings with rounded corners, stylized keystone and moulded surrounds. Altered: vinyl siding, window sash replaced replacement decorative vergeboard.	 East to residence on Weston Road north of the railway bridge.	Disruption: General construction/ operational impacts, tracks closer to building	Review during detailed design to confirm design has not changed in this area.
31	BHR	Transportation: rail bridge	Weston Road, north of St. Philip's Road (15+300)	Weston Road Railway Subway Two-span, cast-in-place concrete structure carrying one track, decorative concrete panels, date '1929' stamped in abutments, 'Canadian National Railway Courtesy and Service' painted on the side of the bridge, metal railing and two sidewalks along Weston Road. Posted clearance: 4.0 m/13' 5".	 South to Weston Road bridge.	Displacement Replacing with new bridge structure to accommodate four tracks, loss of physical resource.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
32	BHR	Residence	No. 6 Humberview Crescent, Weston, west of Weston Road (15+400)	Holley House. Built c1845, one and-a-half storey, hip roof, mud brick covered in stucco, Humber River stone foundation, three bays with centre door and large, flanking windows, garage addition at south end. Reputed to be earliest house in the area. Listed on the City of Toronto's Inventory of Heritage Properties.	 West to the Holley House.	Disruption: Tracks on the north side mean general construction/ operational impacts.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
33	CHL	Waterscape	Humber River, west of Weston Road (15+500)	Humber River. The 100 km Humber River has its headwaters in the Niagara Escarpment and Oak Ridges Moraine. Historically the site of earliest settlement in the Weston area with water powered mills. Designated a Canadian Heritage River in 1999.	 South to the Humber River valley.	Disruption: General construction/ operational impacts.	Review during detailed design to confirm design has not changed in this area.
34	BHR	Transportation: rail bridge	Humber River, west of Weston Road (15+500)	Humber River. The 100 km Humber River has its headwaters in the Niagara Escarpment and Oak Ridges Moraine. Historically the site of earliest settlement in the Weston area with water powered mills. Designated a Canadian Heritage River in 1999.	 Northwest to railway bridge over the Humber River.	Disruption: General construction/ operational impacts; bridge widening to north to accommodate three tracks.	Prepare a Heritage Bridge Assessment. Contribute to Heritage Conservation principles for the bridge Design Study. Ensure that bridge is widened in a manner that is sympathetic to its existing character (similar to widening the 16 Mile Creek Structure on the Lakeshore Line)
35	CHL	Golf Course	No. 50 St. Philips Road, west of the Humber River and north of Dixon Road (15+500 to 16+500)	Weston Golf and Country Club. Established in 1909 it expanded to 9 holes in 1914 and 18 holes in 1915 on land rented from the Wadsworth Estate on the west side of the Humber River. The land was purchased in 1920 and noted Scottish golf course designer, Willie Park Jr. (b1864-d1925) designed a new 18-hole course.	 North across the golf course.	Disruption: General construction/ operational impacts; new four track tunnel grade separation	Review during detailed design to confirm design has not changed in this area.
36	BHR	Transportation: road bridge	Islington Avenue, south of Highway 401 (16+750)	Islington Avenue Railway Overhead. Three-span structure with concrete piers and steel girders, concrete deck, metal railing. Plaque indicates it a joint federal, provincial and municipal project built in 1961 with James McKay & Sons, contractor and Damas & Smith Ltd., Consultants. Altered: North abutment modified for Resources Road.	 East to Islington Avenue bridge.	Disruption: General construction/ operational impacts; adjustments to structure to accommodate four tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
37	BHR	Transportation: road bridge	Highway 401, west of Islington Avenue (17+100 to 17+300)	Highway 401 Railway Overhead. One-span (40-ft.), reinforced concrete rigid frame structure carries Highway 401 over two tracks. Original overhead structure built in the early 1950s by the Department of Highways Ontario (DHO) for the Toronto Bypass on the Highway 401 and widened for the eastbound and westbound collector lanes in 1965, rehabilitated in 1982.	 West elevation of railway overhead at the Highway 401, westbound lanes.	Disruption: General construction/ operational impacts; adjustments to structure to accommodate four tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
38	BHR	Transportation: rail bridge	Kipling Avenue, north of Belfield Road (17+750)	Kipling Avenue Railway Subway. Two-span concrete structure, '1967' incised in concrete retaining wall, metal railing, sidewalks along Kipling. Etobicoke North GO Station on east side of bridge, road bridge, Site No. 37-763, built 1968 on south side of rail bridge.	 Northeast to Kipling Road bridge.	Disruption: General construction/ operational impacts, widening of bridge on north side for accommodate two tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
39	BHR	Transportation: rail bridge	Martin Grove Road, north of Belfield Road (18+870)	Martin Grove Road Railway Subway. Two-span concrete structure, date of '1966' stamped in concrete abutment, solid soffit, metal railing, two sidewalks along Martin Grove Road.	 North to Martin Grove Road bridge.	Disruption: General construction/ operational impacts; bridge widening on both sides to accommodate two service tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.
40	BHR	Transportation: rail bridge	Highway 27, south of Grandstand Entrance Road, Woodbine Race Track (19+900)	Highway 27 Railway Subway. Four-span concrete structure with unusual 'W'-shaped piers, metal railing. Road bridge providing access to Woodbine Race Track located to the north of the railway subway.	 Northwest to Highway 27 bridge.	Disruption: General construction/ operational impacts; bridge widening on both sides to accommodate two service tracks.	Review during detailed design to confirm design has not changed in this area. Prepare a Heritage Bridge Assessment.

Site #	Resource Category	Resource Type	Location	Description	Photograph/Digital Image	Impact	Mitigation
41	CHL	Roadscape	Carlingview Drive, east of Highway 427 (21+010)	Carlingview Drive Level Crossing. Four tracks, crossing marked by gates and signals. Provides access to Woodbine Race Course to the north. Lands to the south of the crossing are largely industrial.	 South to at-grade crossing at Carlingview Drive.	Disruption: Introduction of grade separation structure, change in physical context of existing street pattern.	Review during detailed design to confirm design has not changed in this area.
42	CHL	Waterscape	West of Goreway Drive and north of Zahavy Drive (22+040)	Mimico Creek. A 33 km watercourse flowing from Brampton to Lake Ontario. Through urban areas it is frequently channelized in a concrete spillway. The valley lands contrast with the surrounding industrial landscape. Mimico Creek watershed has a long history of human habitation.	 North to Mimico Creek.	Disruption: General construction/ operational impacts; bridge widening on both sides to accommodate two service tracks.	Review during detailed design to confirm design has not changed in this area.

6.3.1.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

During operations and maintenance there may be potential for disruption, or indirect impact, to cultural heritage resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and, or setting. Isolation of cultural heritage resources may occur due to severance of land for new tracks and/or structures following construction. Isolation of a built heritage resource often leads to demolition due to neglect and/or vandalism.

Potential impacts during operations and maintenance include disruption impacts related to the increased proximity and frequency of trains on the residential, commercial and industrial lands adjacent the rail corridor.

The disruption impacts to identified cultural heritage resources related to indirect impacts outside of the rail corridor right-of-way will be limited to potential change in context. This is principally related increased rail transit traffic. The contextual changes are not considered to be provincially significant. The rail corridor is representative of Toronto's industrial and passenger rail history and this thematic and physical history will continue.

Proposed Mitigation Measures

The implementation of mitigation measures is primarily focused on the construction stage when direct impacts could occur. As noted above, the disruption impacts to identified cultural heritage resources related to indirect impacts outside of the rail corridor right-of-way will be limited to potential change in context. This is principally related increased rail transit traffic following construction. The contextual changes are not considered to be provincially significant. The rail corridor is representative of Toronto's industrial and passenger rail history and this thematic and physical history will continue. As a result, no specific mitigation measures are proposed during operations and maintenance; however, mitigation measure identified in other parts of this report will assist in ensuring that the overall impacts of operations and maintenance are minimize within the study corridor and that in turn will help to minimize potential indirect impact to cultural heritage resources.

6.3.1.3 *Significance of the Potential Impacts*

The principal heritage impacts of the project are indirect. Proposed mitigation measures for this project are described in **Table 6.3.1.1-1**.

During operations and maintenance there may be potential for disruption, or indirect impact, to cultural heritage resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and, or setting.

Potential impacts during operations and maintenance include disruption impacts related to the increased proximity and frequency of trains on the residential, commercial and industrial lands adjacent the rail corridor.

The disruption impacts to identified cultural heritage resources related to indirect impacts outside of the rail corridor right-of-way will be limited to potential change in context. This is principally related increased rail transit traffic following construction. The contextual

changes are not considered to be provincially significant. The rail corridor is representative of Toronto's industrial and passenger rail history and this thematic and physical history will continue.

As previously noted, no heritage features within the immediate study area have been designated under the *Ontario Heritage Act*. As a result, there are no identified cultural heritage resources of provincial significance that will be directly impacted by this project.

With the implementation of mitigation measures and commitments to future work identified in **Table 6.3.1.1** the potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.3.2 Archaeological Features

6.3.2.1 *Potential Construction Impacts and Proposed Mitigation Measures*

Potential Impacts

As with any construction project, the potential exists that archaeological resources may be discovered as a result of the construction works

Proposed Mitigation Measures

As noted in **Section 4.3.2**, a Stage 1 Archaeological Assessment of the study corridor has been undertaken. The purpose of that investigation was to identify known and potential archaeological resources within the vicinity of the study corridor and to identify any additional archaeological assessments that will be required prior to construction. The Stage 1 Archaeological Assessment did identify some lands has having archaeological potential (see **Figures 4.3.2-1 to 4.3.2-3**) and indicated that those areas must be subject to Stage 2 Archaeological Assessment if they may be impacted by the project.

Based on the proposed design, there are three general areas of archaeological potential where Stage 2 Archaeological Assessment may be required - lands within the rail corridor adjacent to Fort York, the land around the Weston Golf and Country Club adjacent to the Humber River, and the Mimico Creek valley lands (as shown on **Figures 4.3.2-1 to 4.3.2-3**). Neither of these areas are impacted directly by the project, but it is possible that they could be required for construction access or staging. During detailed design it will be determined if either of those areas may be required for construction access or staging. If they are required, a Stage 2 Archaeological Assessment will be conducted as early as possible prior to construction Timing for the completion of any Stage 2 Archaeological Assessment work will be subject to field conditions and property access.

The proposed project will not impact Fort York, however, should the proposed project encroach upon undisturbed land with archaeological potential into the Fort York ASA, a Stage 2 Archaeological Assessment will be conducted

The following outlines the mitigation and commitments to future work required to mitigate potential adverse environmental impacts to archaeological resources:

- Undertake a Stage 2 Archaeological Assessment for works in the identified undisturbed areas. If archaeological finds are discovered, Stage 3-4 mitigation will be undertaken as required in accordance with the guidelines and policies of the Ministry of Culture. Consultation will occur with the Ontario Ministry of Culture and, if applicable, potentially interested First Nations to discuss mitigation strategies if sites are found as part of the Stage 2 Assessments. Copies of the Stage 2 Archaeological Assessments will be provided to Transport Canada and Infrastructure Canada for their review.
- Submit any additional Archaeological Assessments a minimum of 90 days prior to construction to the Ministry of Culture.
- Complete archaeological monitoring during any construction excavations along the rail corridor adjacent to Fort York (see **Figure 4.3.2-1**).
- Should buried archaeological deposits be found along any section of the corridor during construction activities, the Ministry of Culture and any relevant First Nations will be notified immediately.
- In the event that human remains are encountered during construction activities the Ministry of Culture, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations, the Peel Regional Police and any relevant First Nations will be notified immediately.
- Potentially interested First Nation communities will be notified of the discovery of any archaeological remains, human remains or burials that may be of First Nation interest.

As noted above, the commitment has been made to complete all necessary archaeological assessments towards ensuring that the proposed works do not result in any significant adverse impacts. The following provides a description of Stage 2, 3 and 4 Archaeological Assessments.

Stage 2 Archaeological Assessment: This stage covers the initial field assessment of the identified undisturbed areas. The areas will be assessed by employing a test pit survey strategy, with all transects spaced at a 5 metre interval or by ploughing the subject properties and walking the ploughed fields to observe. Ploughing will be the preferred approach to assessment. A test pit survey will only be employed where site conditions or conditions of property access do not allow for ploughing. When employing the test pit survey strategy, all topsoil from each test pit will be sieved through mesh hardware cloth. If any artifacts are located, their position will be recorded and they will be collected.

Stage 3 Archaeological Assessment: This covers the archaeological testing of any sites located during the Stage 2 assessment. Stage 3 is used to determine if sites are significant and whether they require further work.

Stage 4 Archaeological Assessment: Any sites deemed to be significant during the Stage 3 assessment will require Stage 4 mitigation. Mitigation can include either excavation or avoidance.

6.3.2.2 *Potential Operational and Maintenance Impacts and Proposed Mitigation Measures*

Potential Impacts

No adverse environmental impacts to archaeological resources are anticipated during the operation and maintenance phase of the project as no additional land will be impacted. As a result, no mitigation is warranted and no significant residual impacts will occur.

6.3.2.3 *Significance of the Potential Impacts*

The potential for archaeological finds in areas of construction exists at some relatively undisturbed sites. With the implementation of the above noted mitigation measures and commitments to future work potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.4 POTENTIAL IMPACTS TO TREATY RIGHTS AND LANDS AND RESOURCES USED FOR TRADITIONAL PURPOSES

As noted in **Section 3.3**, there are no First Nation lands effected by the project. As a result, the potential for impacts would be limited to potential impacts to lands and resources uses for traditional purposes by aboriginal persons.

Potential impacts to lands and resources used for traditional purposes by aboriginal persons have been examined by taking into account the knowledge of the study area and identifying potential impacts on specific resources. Metrolinx is not aware of any current use of lands and resources for traditional purposes within the study area. The urban nature of the study area limits many traditional land uses including hunting, fishing and the gathering or harvesting of plants for traditional use.

The project is not anticipated to result in any adverse impacts to treaty rights or lands and resources used for traditional purposes. The sections specified below provide the information from which is has been concluded that this project will not likely result in significant adverse environmental impacts to fish or fish habitat (**Section 6.1.2**), wildlife and vegetation (**Section 6.1.1** and **Section 6.1.3**), or archaeological resources (**Section 6.3.2**).

6.4.1 Potential Impacts and Significance

As noted above, the project is not anticipated to result in any adverse impacts to treaty rights or lands and resources used for traditional purposes. The sections specified below provide the information from which is has been concluded that this project will not likely result in significant adverse environmental impacts to fish or fish habitat (**Section 6.1.2**), wildlife and vegetation (**Section 6.1.1** and **Section 6.1.3**), or archaeological resources (**Section 6.3.2**). With the implementation of mitigation measures, best management practices and commitments to future work identified in the above noted sections, it is anticipated that any possible adverse impacts can be minimized and as a result no significant residual impacts will occur.

6.5 TRANSPORTATION

The following provides a summary of the transportation related impacts of the project. This section focuses on traffic and access issues and transit services (GO and TTC). For discussion of issues of noise related to construction methods refer to Section 6.2.2.1.

The majority of traffic/access related impacts are as a result of construction involved with new grade separation works and other structures being widened or added and adjustments to connecting roads. As a result of this work there will be temporary detours and road closures at various times during the project implementation.

With respect to GO operations construction works will be required to lay the proposed tracks and signalling system for the transit project. Currently, the GO Georgetown South Corridor utilizes between one and two mainline tracks within the study corridor. During construction, there is room to keep existing tracks in operation as construction takes place in the other portion of the corridor and new tracks are laid. As a consequence, disruption to existing train operations will be kept to a minimum.

Construction access for the UPRL spur will be achieved via the existing local road network. However, there will be minor, temporary disruptions to operations on several local and arterial roadways, as well as to landside transportation facilities within Pearson International Airport. Foundation construction, in particular, will require intermittent lane closures. Any such disruptions will be coordinated, as appropriate, with the City of Mississauga, the Region of Peel and the Greater Toronto Airports Authority (GTAA).

6.5.1 Potential Construction Impacts and Proposed Mitigation Measures

Potential Impacts

John Street, King Street and Church Street and the lowering of the Rail Corridor through Weston

For John Street, King Street and Church Street, the project involves lowering the rail corridor, construction of new roadway overpasses at King and Church Streets and a new pedestrian overpass at John Street. This construction involves significant excavation to lower the corridor from west of Lawrence Avenue to the new Weston Road bridge.

The assembly, setup of the excavation equipment, actual excavation and disposal of earth will require temporary roadway closures and some traffic delays as the construction is being undertaken.

TTC service along Church Street may also have to be rerouted on a temporary basis at some time during the construction of the Church Street structure. However, the frequency of the services are anticipated to remain unaffected.

Denison Road

Denison Road is being constructed on a new alignment under the rail corridor. The construction works involving the new underpass and addition of the tracks will result in intermittent impact on traffic operation on Denison Road. The closure of Sam Frustaglio Drive will require review of the signalized intersections in the vicinity along Jane Street.

Strachan Avenue and the lowering of the Rail Corridor

The existing corridor contains four tracks and an additional four tracks will be added as part of this project. A new overpass structure will be constructed over a lowered rail corridor. In order to lower the rail corridor and construct the new Strachan Avenue structure, Strachan Avenue will be subject to closures at times during construction.

Transit services along Strachan Avenue will require detours during construction. However, the frequency of the services are anticipated to remain unaffected.

Access to Quality Meats Processing Plant will require rerouting of the delivery trucks along Bathurst Street, King Street and some local streets which will have significant impacts on Quality Meats and residents during construction. Temporary closure plans will be determined during construction.

Carlingview Drive

The privately owned extension of Carlingview Drive into the Woodbine Raceway grounds will be grade separated with a new structure built under the existing rail corridor. There may be temporary closures of this road access during construction.

Union-Pearson Rail Link

The following transportation network components will be affected during construction of the Union-Pearson Rail Link.

Goreway Drive/Zahavy Way

The elevated portion of the guideway between the GO Transit Weston Subdivision tracks/Highway 427 bridge and the area north of Northwest Drive will be erected from the curb lane of Goreway Drive. Additionally, the elevated portion of the guideway crossing Mimico Creek will be erected from the table land above the gabion-lined banks of the Creek, with access from Goreway Drive. Some temporary lane closures on Goreway Drive and Zahavy way will be required for the delivery of beams and other required items.

Northwest Drive/Dorman Road

The at grade section from north of Northwest Drive to the GTAA 6B parking area will be delivered via Northwest Drive, the proposed OMC, Dorman Road and the adjacent laydown area. Some short term lane closures will be required for delivery of beams and other items. The east end of both Northwest Drive and Dorman Road will be shortened and the cul-de-sac bulbs reconfigured to accommodate construction of and access to the OMC. Local property access in the area will not change.

Network Road

Re-routing traffic to key destinations will be accomplished by detours during the partial and full closure of Network Road. Closures will be necessary to allow relocation of buried utilities and the construction of a tunnel under the road.

Viscount Road/Airport Road

Some short term lane closures on Viscount Road and Airport Road will be required for installation of foundation caissons and the elevated guideway. In addition, a minor

modification to the cross-section of Airport Road will be required to accommodate the median pier for the elevated guideway.

Internal Transportation Facilities at Pearson International Airport

Temporary closures of several roads within the Airport will be required and will be coordinated with the GTAA. The Airport's Automated People Mover (LINK Train) will also be closed during some construction activities; closure(s) will be closely coordinated with GTAA operational requirements, including alternative means of providing employee and passenger transit (i.e., bussing).

Proposed Mitigation Measures

Most of the construction of the new structures and roadways in the Georgetown South Corridor will result in traffic delays and some road closures during construction. In order to partially mitigate these construction impacts, proposed traffic staging and management plans will be developed in consultation with the Municipalities during detailed design.

Dust suppressant measures, as identified in Ontario Provincial Standard Specification (OPSS) 506, will be used during construction. OPSS 506 outlines the requirements for dust suppressants and their application. In addition, any disturbed lands will be vegetated (e.g. seeded) as appropriate to reduce the potential for dust to develop from exposed soil.

As the construction proceeds the proposed traffic management plans may be adjusted based on changes to activity in the surrounding area.

The adjacent community will be apprised of initial plans and any future changes as they occur.

Other mitigation such as special directional construction signing for local businesses may also be considered when roads have to be closed during construction.

Metrolinx will also meet with TTC to coordinate and formulate plans for any required temporary routing changes for services across or along the corridor.

Union-Pearson Rail Link

In order to minimize the disruption caused by the proposals for temporary road closures as a result of the construction of the Union-Pearson Rail Link, extension traffic management measures will be required and these will have to be coordinated with the GTAA.

Additionally, the construction impacts to traffic will be reduced by utilizing a number of dedicated construction laydown areas along the length of the Spur Line as follows:

- Goreway Drive laydown area – east side of Goreway Drive opposite Zahavy Way. This site has been used by others as a construction laydown area.
- Dorman Road/Network Road laydown area – a vacant asphalted area owned by the federal government (on GTAA leased lands).
- Laydown area in, or near, GTAA Parking Area 6B.
- Two laydown areas within the Airport between Airport Road and the existing Terminal 1 parking structure.

Access to these areas will be available from the existing road network.

6.5.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

Once construction is complete there will be ongoing improvements to traffic flow across any of the new grade-separate municipal roads. Traffic will no longer be delayed waiting for crossing trains to pass. John Street vehicular traffic will use other nearby streets such as King, Church or Lawrence to cross the corridor in the future. The relatively light traffic on John Street can be accommodated on these nearby parallel streets with minimal impact on the level of service on those streets.

In addition, as noted in Section 4.4.4, there are a number of existing transit routes that connect with GO stations within the Georgetown South corridor. Metrolinx will work with the TTC to further coordinate any nearby bus routes that can reasonably be rerouted to these GO stations.

Proposed Mitigation Measures

No additional mitigation is required.

6.5.3 Significance of the Potential Impacts

With the implementation of the above noted mitigation measures and commitments to future work, potential for adverse impacts can be minimized and no significant residual impacts will occur.

6.6 UTILITIES

Existing public and private utilities and underground infrastructure (utilities) have been identified within the study area. The locations of these utilities are based on plans received from the individual utility companies and municipalities during the study process. A thorough review of existing and proposed future utilities plans, as well as all necessary relocations or modifications will be undertaken during detailed design of this Transit Project. The following sections discuss the utility impacts and proposed mitigation measures based on the preferred alternatives.

6.6.1 Potential Construction Impacts and Proposed Mitigation Measures

6.6.1.1 Utilities at Existing Grade Separations (Rail over Roadway)

At the existing grade separations, where the tracks cross over existing roadways, impacts to existing utilities and underground infrastructure will depend on the work required at the existing grade separation structures (i.e. widening or new structure). At King Street no relocations should be required as all utilities are located within the King Street right-of-way and no structure modifications are proposed. At Queen Street,

Brock Avenue, Landsdowne Avenue, Bloor Street, Black Creek Drive, Eglinton Avenue, Ray Avenue, Weston Road, Kipling Avenue, Martin Grove Road, Highway 27 and Goreway Drive modifications to the existing structures or replacement of the existing structure may require localized utility relocations.

The exact locations of the existing utilities will be determined during detailed design. Working with the utility companies and municipalities, a plan will be developed to relocate any utilities impacted by the proposed work. These will be permanent relocations within the existing road allowance so as not to impact future utility maintenance and repair.

6.6.1.2 Utilities Crossing at Grade

At the existing grade separations, where the roadway crosses over the rail, existing utilities and underground infrastructure cross the rail corridor below grade. Utilities at these locations and at crossings away from the existing road crossings may be impacted by the additional proposed tracks. These utilities include the pipeline crossings at Mile 11.2. (just west of Kipling)

Typically utilities will be buried deeper or protected in casings where they cross under the tracks to guard against damage which could be caused by the railway above. The existing buried utilities may not be located sufficiently deep or be adequately protected to cross under the proposed additional tracks.

During the detailed design process, the exact locations and depths of these utilities will be determined. Based on the requirements of each utility company these utilities will be relocated deeper or protected to allow for the construction of the new tracks and allow trains to pass above without damage.

Utilities at Proposed Grade Separations

The proposed grade separations at Strachan Avenue, Denison Road, John Street, King Street, Church Street and Carlingview Road have the most significant impact on existing utilities and underground infrastructure.

Strachan Avenue

Strachan Avenue is one of the few north/south corridors in downtown Toronto which crosses the Weston Subdivision. As a result numerous utilities are located along the Strachan Avenue right-of-way and will be impacted by the proposed grade separation. The preferred alternative of lowering the tracks by 5 metres and raising Strachan Avenue by 4 metres will require the relocation of the existing utilities and underground infrastructure along the roadway and the crossing roads. These utilities include 300mm & 150mm diameter watermains, a 675mm diameter sanitary sewer, a 3.0m x 3.0m combined sewer, a 200mm diameter gas main, significant aerial and buried Toronto Hydro plant, buried Bell Canada plant and buried Rogers Cable fibre.

Utilities along the crossing roads of Wellington Street, Douro Street, East Liberty Street, Western Battery Road and Ordinance Street will also be affected by the new grade separation as these utilities may have to be adjusted as part of the profile adjustments of these roads. The existing buried Hydro One high voltage crossing at Tecumseth Street, east of Strachan Avenue may also be affected by the lowering of the tracks to go under Strachan Avenue.

One of the impacts resulting from the lowering of the rail corridor will be to the 3.0m x 3.0m combined sewer. This sewer connects to the Western Beaches storage tunnel at Princess Boulevard. The storage tunnel intercepts combined sewers flowing from the north before flowing into Lake Ontario. A percentage of the flows from this system are pumped via a forcemain northerly along Strachan Avenue and discharged to a gravity system for treatment. This forcemain will need to be extended to the northerly limits of the Weston Subdivision. Alternatives were developed to modify the existing sewer in order to facilitate the objectives of the EA.

Alternative A – Reroute sewer 150-200m to the west to cross under the lowered tracks as a gravity sewer.

This alternative would reroute the existing sewer along the south side of Duoro Street to cross the lowered tracks approximately 150-200m to the west. The sewer would then continue back towards Strachan Avenue along the north side of Western Battery Road to East Liberty Street and then along East Liberty Street to reconnect to the existing sewer at Strachan Avenue. The grade of the sewer would be flattened from the new connection at East Liberty Street to the rail corridor to gain as much clearance as possible at the new crossing under the tracks.

This alternative would require a much longer reconstruction length; however, the sewer would remain a gravity sewer. Also there would be no need to flatten the sewer to go under the lowered rail corridor.

Alternative B – Reroute sewer to Western Battery Road and cross under the lowered tracks as a gravity sewer.

This alternative would reroute the sewer along Duoro Street to cross the lowered rail corridor in line with the north-south portion of Western Battery Road. The sewer would continue south along Western Battery Road then east along East Liberty Street and then south along east side of Strachan Avenue to connect to the existing sewer just north of the Oakville Subdivision tracks. Relocation to the east side of Strachan Avenue is required to avoid a number of existing utilities on the west side of Strachan Avenue. The additional reconstruction length along Strachan Avenue is required to flatten the grade as much as possible to be able to remain a gravity sewer and still clear the bottom of the tracks. At the rail crossing the sewer dimension would be modified, flattened and widened, to maintain the appropriate flow. A special structure would also have to be designed at the rail crossing due to the close proximity of the sewer and the track ballast.

This alternative would require complicated construction staging where the relocated sewer crosses the existing sewer at the intersection of Strachan Avenue and East Liberty Street. However, the relocation length is much shorter than Alternative A. The alternative also maintains a gravity sewer.

Alternative C – Reroute sewer to Western Battery Road and cross under the lowered tracks in a siphon.

This alternative would follow the same route as Alternative B; however, relocation south of East Liberty Street would not be required. The relocated sewer would reconnect to the existing at East Liberty Street. At the tracks the sewer would cross in a siphon.

Although this alternative has a shorter relocation length and avoids reconstruction of the sewer along Strachan Avenue and the associated complicated construction staging, a

siphon is required to cross under the lowered rail corridor. Typically the City of Toronto avoids using siphons for their sanitary and storm sewers.

Alternative D – Sewer to remain in Strachan Avenue right-of-way and be pumped under the lowered tracks.

For this alternative the sewer would remain in its existing alignment and connect into a holding tank on the north side of the rail corridor. The sewer would then be pumped under the lowered rail corridor from the holding tank. The pump would be located at the south west corner of the intersection of Strachan Avenue and Duoro Street. Depending on the size of the holding tank, additional property may be required along Strachan Avenue.

This alternative would require the least amount of reconstruction; however, the additional cost and maintenance of a pumping station would be significant. As noted there may be additional property impacts.

It should be noted that for any of the above mentioned alternatives further geo-technical investigation and storm water management reports will be required before selecting a final design.

The existing sanitary forcemain on Strachan Avenue would be lengthened to go under the lowered Weston Subdivision and then reconnect to the gravity sewer north of the tracks. The capacity of the existing pump must be reviewed to ensure it is of adequate to pump under both rail corridors. If not a new pump would be required.

The temporary relocation or protection of all utilities during construction will depend on the final construction staging scheme. Relocation of the existing watermains will take place during construction as the watermain will have to be rerouted to go under the lowered rail corridor. Once construction of the new bridge is complete, the remaining utilities can be relocated to cross the tracks using the new structure. During the detailed design process, the exact locations and depths of these utilities will be determined. Working with the utility companies, a plan will be developed to relocate the utilities impacted by the proposed work.

Denison Road

At Denison Road the utilities crossing the rail corridor which are affected by the proposed grade separation include 150mm & 300mm diameter watermains, a 50mm diameter gas line, aerial hydro lines and buried Bell Canada conduit. A combined sewer which runs along the public lane from Arthur Street then west along Denison Road will be affected as will the 150mm diameter watermain running along the public way. Existing 200mm & 225mm diameter sanitary sewers and buried Rogers Cable fibre located along Denison Road west of the existing rail corridor will also be affected.

Existing utilities which cross the rail corridor could be relocated to the south side of Denison Road and cross under the rail corridor in the footprint of the existing roadway. This would avoid impacts during construction and maintain services to the existing properties on the south side of the road. A permanent easement may be required on the east side of the rail corridor to move the utilities an appropriate distance away from the proposed construction.

The temporary relocation or protection of the remaining utilities during construction will depend on the final construction staging scheme. During the detailed design process, the exact locations and depths of these utilities will be determined. Working with the

utility companies, a plan will be developed to relocate the utilities impacted by the proposed work.

John Street, King Street, and Church Street (Weston)

At John Street, King Street and Church Street utilities crossing the rail corridor which will be affected by the proposed grade separation include 200mm, 150mm & 300mm diameter watermain, 200mm & 225mm diameter sanitary sewers, 100mm & 150mm diameter gas lines, aerial hydro lines, buried Bell Canada conduit and buried Rogers Cable fibre.

The biggest impacts will be to the sanitary sewers on John Street and Church Street as these are gravity sewers. Options were reviewed to maintain the existing sewers in their present locations and go under the lowered tracks. However due to the depth of the proposed rail profile, gravity sewers could not be maintained and pumping stations would be required. The location of the pumping station may require additional property so the possibility of rerouting the sewers was reviewed.

Based on preliminary analysis the existing sanitary sewers on Church and John Streets could be redirected along Rosemount Avenue to the existing combined sewer at Lawrence Avenue. At King Street the existing sewer, north of the tracks would be rebuilt to flow towards Rosemount Avenue, south of the tracks the existing sewer would remain. The flow would continue along the existing 200mm dia. sewer between Church Street and John Street. At John Street the existing sewer, north of the tracks would also be rebuilt to flow towards Rosemount Avenue, south of the tracks the existing sewer would remain. Depending on analysis to be done during detailed design, the sewer would flow along Rosemount Avenue either in the existing 200mm dia sewer or in a new larger pipe to connect to the existing sewer trunk at Lawrence Avenue.

Although not typically covered under utilities, the existing storm sewer on King Street was also reviewed. A new sewer would be constructed from the tracks north to Rosemount Avenue, south of the tracks the existing sewer would remain. A new storm sewer would be constructed along Rosemount Avenue from King Street to connect to the existing storm sewer trunk on Lawrence Avenue. A new branch would also be required at John Street to direct storm flow north from the tracks to Rosemount Avenue.

During the detailed design process, the exact locations and depths of these utilities will be determined. Also, as noted above further analysis is required regarding existing flows and existing sewer capacities. Working with the utility companies, a plan will be developed to relocate the utilities impacted by the proposed work.

Carlingview Drive

At Carlingview Drive the utilities crossing the rail corridor which will be affected by the proposed grade separation Toronto Hydro aerial plant and Bell buried plant. There are also utilities which terminate just south of the rail corridor including a 300mm diameter watermain and a 100mm diameter gas line. These utilities will also be affected by the proposed grade separation. In addition Woodbine Live (private development on the Woodbine entertainment site north of the GO corridor) has been requested by the City of Toronto to provide a 675mm diameter sanitary sewer from the site to the south side of the tracks either in or near the Carlingview crossing.

During the detailed design process, the exact locations and depths of these utilities will be determined. Working with the utility companies, a plan will be developed to relocate

the utilities impacted by the proposed work. Woodbine live will have to negotiate with GO Transit to find a suitable location for their proposed sewer.

Communications Utilities within the Right-of-Way

The exact locations of the existing signaling, communications and fibre optic cables located within the rail right-of-way will be determined during detailed design. Because of the number of tracks being added to the proposed corridor, these cables will most likely require relocation.

Once the final alignment of the new tracks has been determined, the existing signaling, communications and fibre optic cables should be relocated to the edge of the rail corridor so as not to be impacted during construction. This would be a permanent relocation to avoid impacting these cables twice.

Relocation will certainly be required at the proposed new grade separations at Carlingview Drive, Church Street, King Street, John Street, Denison Road and Strachan Avenue. Temporary relocation may be required for the staged construction of these grade separations.

Proposed Mitigation Measures

Utilities affected by the construction of the grade separations and track work will be temporarily relocated along the roadway and railway right-of-way. The staging and relocations approach will be determined during the design phase. The relocations of these utilities will occur prior to or in conjunction with the construction of this project.

As outlined in **Section 4.5.1**, pipeline crossings will not require approval from the National Energy Board but will require approval from the pipeline owners. Consultation with the pipeline owners will occur during detailed design and construction as warranted. All necessary approvals from the pipeline owners will be obtained prior to completing construction in the vicinity of the pipelines, towards ensuring that potential effects are minimized and effectively mitigated both through design and during construction.

6.6.1.3 Utilities at Union Pearson Rail Link Spur Line

Following a preliminary investigation, the following utility conflicts have been identified near the Union Pearson Rail Link spur line:

- The 300 mm Enbridge gas main at Airport Road will have to be locally adjusted in order to avoid conflicts with the proposed spur line elevated guideway columns.
- The lines associated with the Public Service Network aerial plant at Goreway Drive and Northwest Drive will need to be buried or relocated aerially where they conflict with the spur line elevated guideway.
- Where the Rogers Cable aerial plant conflicts with the spur line elevated guideway, it will need to be buried.

A thorough review of existing and proposed future utilities plans, as well as all necessary relocations or modifications, will be undertaken during detailed design.

6.6.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

The largest operational and maintenance effect resulting from the required utility relocations will occur as a result of the proposed grade separations.

At Strachan Avenue, John Street and Church Street sanitary sewer pumping stations may be required as the tracks will be lowered in these areas cutting off the existing gravity sewers. These pumping stations will require continuous maintenance to ensure proper operation. In addition, any utilities relocated to go under the lowered tracks at these crossings may be more difficult to maintain or repair as access could be required from the rail corridor. If the utilities are relocated instead to the new structures then watermain must be protected from freezing.

Future maintenance of the fibre optic cables located within the rail right-of-way may also be impacted due to the additional tracks as there may not be sufficient room for maintenance vehicles. These areas will have to be accessed using high-rail vehicles.

6.6.3 Significance of the Potential Impacts

The greatest potential for adverse impacts in relation to utilities occur during the construction phase, specifically at proposed grade separations and the existing communications utilities along the corridor. With the application of the identified mitigation measures, and commitments to future work potential for adverse impacts will be minimized and no significant residual impacts will occur.

Potential impacts during the operational and maintenance phases relate primarily to sanitary sewer pumping stations at proposed grade separations. No other permanent impacts resulting from the operation and maintenance associated with this project are anticipated.

6.7 NAVIGABILITY

6.7.1 Potential Construction Impacts and Proposed Mitigation Measures

Potential Impacts

As noted in **Section 4.6**, Transport Canada's Navigable Waters Protection Office has confirmed that within the study area the Humber River is the only navigable waterway for the purposes of the *Navigable Waters Protection Act (NWPA)* (Transport Canada, 2009). As a result, the potential impacts of the project on navigability are limited to potential impacts associated with works in, on or over the Humber River. In particular, the possibility exists for debris to fall into the watercourse thereby resulting in potential hazards for boaters.

Proposed Mitigation Measures

The widening of the Humber River Bridge has been designed so as to maintain sufficient clearance for navigation under the bridge during construction. The widening of the

Humber River Bridge will be constructed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and other recreational users of the valley below. As a result, potential adverse impacts during and after construction are considered to be mitigated (approval under the *NWPA* will be required). The crossing of the Humber River will require the following mitigation and commitment to future work:

- Apply to Transport Canada for approval under the *NWPA*;
- Consult with Transport Canada and the TRCA to finalize design, methodology and timing;
- Abide by all Conditions of Approval that may be identified in the approval under the *NWPA*; and
- Ensure debris does not fall into the water during construction.

It should be noted that all applications under the *NWPA* will be reviewed for its impact on navigation both temporary impacts during construction and permanent impacts following completion and during maintenance operations. Conditions of approval as necessary for the safety of navigation will be included in the *NWPA* approval and monitored and enforced by NWP Officers.

6.7.2 Potential Operational and Maintenance Impacts and Proposed Mitigation Measures

Potential Impacts

During operations and maintenance potential impacts to navigability at the Humber River will be limited to the possibility of debris falling into the watercourse thereby resulting in potential hazards for boaters. It is noteworthy that the design of the Humber River Bridge provides sufficient navigable clearance.

Proposed Mitigation Measures

The widening of the Humber River Bridge has been designed so as to maintain sufficient clearance for navigation under the bridge. Any maintenance works at the Humber River Bridge will be completed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and other recreational users of the valley below.

Should any proposed maintenance work at the Humber River Bridge require approval under the *NWPA* that approval will be sought and obtained prior to completing the work. In such a case, the following mitigation measures and commitments to future work apply:

- Apply to Transport Canada for approval under the *NWPA*;
- Abide by all Conditions of Approval that may be identified in the approval under the *NWPA*; and
- Ensure debris does not fall into the water during construction.

It should be noted that all applications under the *NWPA* will be reviewed for its impact on navigation both temporary impacts during the proposed works and permanent impacts following completion and during maintenance operations. Conditions of approval as necessary for the safety of navigation will be included in the *NWPA* approval and monitored and enforced by NWP Officers.

6.7.3 Significance of the Potential Impacts

As discussed above, the widening of the Humber River Bridge has been designed to maintain navigable clearance. With application of the appropriate approval process and the implementation of mitigation measures potential adverse impacts to navigation can be minimized and/or avoided during construction and operations/maintenance and no significant residual impacts will occur.

6.8 OTHER APPROVAL REQUIREMENTS

The following sections outline the typical provincial, federal and municipal permits and approvals required for the implementation of this type of project. All permits and approvals requirements will be confirmed in detailed design and the necessary permits and approvals will be obtained prior to construction.

6.8.1 Provincial

The following provincial permits and approvals will be required:

- Permit to Take Water will be required from the Ministry of the Environment if dewatering or diversion of flow from any of the watercourses by means of active pumping in exceedance of 50,000 litres per day will result from construction activities.
- Certificates of Approval, as required
- Ministry of Culture sign-off on proposed archaeological assessment documentation and agreement with findings of the additional documentation to be completed for heritage features (reports as outlined in **Section 6.3.1**).

In addition, in accordance with Ontario Regulation 231/08 a notice to proceed must be obtained from the Minister of the Environment before the project can proceed to implementation.

6.8.2 Federal

The following federal permits and approvals will be required:

- Approval under the *Navigable Waters Protection Act* for the proposed works at the Humber River Bridge.
- Approval for the project under the *Canadian Environmental Assessment Act*.

6.8.3 Municipal

The following outline the typical municipal permits and approvals that are required for the construction of a transit project:

- Planning approvals through the City of Toronto, Region of Peel and City of Mississauga, as applicable.
- Building permits for station works and the maintenance facility from the City of Toronto, Region of Peel and City of Mississauga, as applicable.
- Toronto and Region Conservation Authority (TRCA) permits and approvals for work within a regulated area.
- Approval for stormwater management in accordance with the City of Toronto, City of Mississauga and TRCA requirements, as applicable.
- Sewer discharge approvals in accordance with the City of Toronto, City of Mississauga and TRCA requirements, as applicable.
- Municipal Noise Bylaw exemptions, as required.

Metrolinx is a Provincial Agency and therefore does not require municipal permits and approvals; however, their policy is to adhere to the intent of the specific permit and approvals requirements and submit applications for review and information.

6.9 CUMULATIVE IMPACTS

6.9.1 Definition

A cumulative impact assessment typically goes beyond the evaluation of site-specific direct environmental impacts. It deals with evaluating the impacts on the environment that result from incremental effects of the project combined with other past, present, and reasonably foreseeable future projects regardless of the person undertaking the other projects. A cumulative impact assessment recognizes that individual impacts, even if they are relatively minor, can lead to significant environmental changes.

6.9.2 Spatial and Temporal Boundaries

The spatial boundaries of the cumulative impact assessment extend approximately 300m from the study corridor. The spatial boundary of 300m was selected, as it is believed that, given the urban nature of the study area, the boundary is sufficient to provide a cumulative impact assessment that considers the potential impacts while not diluting the impacts by assessing an overly large area. This has been demonstrated by reviewing the noise and air quality impact assessments completed for this project. These studies have shown that, at 300m, receivers will experience air quality levels that are very close to, or at, ambient levels and that noise impacts are generally most notable within 300m as beyond that distance noise is blocked by acoustical barriers, buildings or dominated by other noise sources (e.g. local road).

The temporal boundaries of the assessment extend into the past, accounting for project previously completed and reflected in the existing conditions, to approximately 15 years

in the future (limited to reasonably foreseeable projects) and to match the planning horizon of Metrolinx's RTP 15 year plan.

6.9.3 Likely Residual Impacts of the Project

The predicted residual impacts of the project have been outlined in column one of **Table 6.9.4-1**; these residual impacts have been identified in more detail in **Sections 6.1 to 6.8**. Overall the potential residual environmental impacts of the project are anticipated to be relatively minor with the implementation of identified mitigation measures.

6.9.4 Past, Present and Future Land Development and Infrastructure Projects

Table 6.9.4-1 outlines the cumulative impact assessment for this project, the second column of that table specifically outlines the potential residual effects of the past, present and future projects that could interact cumulatively with the Georgetown South Service Expansion and Union-Pearson Rail Link Project. Below are the past, present and future land development and infrastructure projects that were considered for the cumulative impact assessment:

PROJECTS	EA APPROVAL REQUIREMENTS
Past, present (ongoing) projects	
Construction of the railway infrastructure along the Georgetown South Corridor	Provincial Transit Project Assessment Process (TPAP) and Federal EA
Construction, rehabilitation and/or widening of local arterial and collector roads	MeA Class EAs as required
West Toronto Diamond rail to rail grade separation	GO Class EA and Federal EA
Construction of residential and commercial developments (see Section 4.2.1 for existing land use information)	Planning Act Approvals and any site specific permits required from TRCA
Construction of the West Toronto Railpath from Cariboo Avenue to Dundas Street West	None
Existing (and future) CN/CP and VIA service in the corridor	None
Airport activities	Federal EA
Proposed projects	

PROJECTS	EA APPROVAL REQUIREMENTS
Upgrading of track and signals at the Bathurst Street Rail Yard	None unless Federal funds are provided and then a Federal EA would be required
Additional train service along the GO Milton Line and Bradford Line	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
Davenport Diamond rail to rail grade separation	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
Georgetown North Expansion	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
Union Station rail corridor track, switching, signaling and platform improvements	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
Eglinton Crosstown Light Rail Transit	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
City of Toronto bridge rehabilitations at Dundas Street, Dupont Street, St. Clair Avenue, Rogers Road, Weston Road <i>Note: the existing Weston Road Bridge is to be replaced as part of this project</i>	MeA Class EAs as required
City of Toronto resurfacing of major roads, including Dufferin Street and Lansdowne Avenue	MeA Class EAs as required
City of Toronto resurfacing of local roads, including Shaw Street, Gwynne Avenue, McCormack Street, Avon Avenue, Lavender Road, Regent Street, Hillary Avenue, Cordella Avenue, Jasper Avenue, Sunneybrae Court, John Street, King Street, Rosemont Avenue, King George Road, Coulter Avenue, Resources Road, Lemsford Road, Precision Road	MeA Class EAs as required
Other capital work projects within the City of Toronto (e.g. works along/under roads by utilities and Toronto Water)	MeA Class EAs as required
Other projects that are known to potentially occur in or within 300m of the rail corridor in the future	
Possible GO Transit service to Bolton on the CP line with service connecting back into the GO	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)

PROJECTS	EA APPROVAL REQUIREMENTS
Georgetown line south of Weston	
Possible extension of the Georgetown corridor to Kitchener-Waterloo	Provincial TPAP and Federal EA (if Federal Funding or Permits are required)
Continuation of the West Toronto Railpath south of Dundas Street West	None

In addition, there are likely a number of infill land use development projects that will occur along the rail corridor as Toronto's older industrial lands are revitalized. These projects are not anticipated to result in significant environmental impacts as they will occur on lands that have previously been developed and will be serviced through municipal services. In addition, new development is required to meet or exceed the requirements of all existing and future provincial and federal legislation, city bylaws and policies (as applicable).

6.9.5 Potential Cumulative Impacts

As previously mentioned, the study area being considered for the cumulative impact assessment is a relatively urbanized area. Therefore commercial, residential and future infrastructure works will be occurring in an area that has already been disturbed by those types of developments. That being said, minimal residual impacts from these types of projects will still be experienced. Residual impacts typically associated with these types of projects include increased stormwater run-off (e.g. increased paved areas), fringe effects to vegetation units, changes to watercourses (may include improvements), and minor and localized changes to air quality and noise. Overall, these types of projects have a generally predictable range of environmental impacts that will be responsive to standard mitigation measures and best management practices including, but not limited to, community outreach and engagement.

All of the projects noted in **Section 6.9.3** are subject to their own approvals and permitting processes. It is recognized that for these projects to be constructed they must meet or exceed the requirements of all existing and future provincial and federal legislation, city bylaws and policies (as applicable). In addition, it is anticipated that all projects have or will implement best management practices and necessary site-specific mitigation measures, as warranted, in order prevent any significant residual impacts. Overall, it can be concluded that there will be no significant cumulative impacts on the environment from the Georgetown South Service Expansion and Union-Pearson Rail Link Project in combination with past, existing and reasonably foreseeable projects and activities.

Table 6.9.4-1 provides a summary of the potential impacts of the known surrounding projects. The potential impacts of projects currently in the initial planning stages cannot reasonably be identified at this time. However, it is anticipated that, through the applicable planning, approval and permitting processes, potential adverse impacts will either be avoided or mitigated to acceptable levels (i.e. no significant residual environmental impacts).

The existing conditions documented in this report reflect the combined impacts of past projects. As a result, based on the impact assessments documented in this report it can

be concluded that the combined impacts of past projects and the proposed project will not result in any significant residual impacts.

The assessment of potential impacts to noise, vibration, air quality and human health documented in this report have been based on an assessment of the future condition with the implementation of the proposed project and other foreseeable rail infrastructure projects (e.g. Kitchener/Waterloo, Bolton, Barrie and Milton service expansions). Therefore, cumulative effects have already been built into the assessment of effect for these factor areas. As a result, based on the impact assessments documented in this report it can be concluded that the combined impacts of the foreseeable rail infrastructure projects, including the proposed project, will not result in any significant residual impacts.

Table 6.9.4-1 Cumulative Impact Assessment

Environmental Component and Potential Residual Impacts of this Project ¹	Environmental Component and Potential Residual Impacts of Past, Existing and Reasonably Foreseeable Projects/Activities ²	Potential Cumulative Impacts	Significance of the Impacts	Mitigation Measures ³	Residual Cumulative Impacts and Significance
Terrestrial Environment (vegetation, wildlife, habitat, breeding birds, wetlands): Site specific impacts – vegetation clearing/damage, removal of riparian vegetation, disturbance or accidental harm to wildlife or nesting birds, temporary habitat/vegetation disturbance, sedimentation, drainage pattern changes, noise, contaminants carried in run-off, spills.	Terrestrial Environment (vegetation, wildlife, habitat, breeding birds, wetlands): Site specific impacts – fringe impacts, removal of vegetation and/or wetlands from past, existing and future urban development (roads, residential and commercial/industrial development). Stormwater run-off and maintenance impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development). Site specific impacts – removal and/or disturbance of wildlife/migratory birds/habitat relating to past, existing and future road construction and urban development (rail, roads, residential and commercial/industrial development). Stormwater run-off and maintenance impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to vegetation – e.g. removal of vegetation communities, edge impacts, removal of riparian vegetation, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Impacts to wildlife and migratory birds – e.g. removal or alteration of habitat, disturbance or accidental harm to wildlife or nesting birds.	NS	Not required	NS
Aquatic Environment: Site specific impacts – e.g., temporary and permanent removal of valley and riparian vegetation, removal of a relatively small amount of stream bed, erosion, sedimentation, water quality or quantity changes, construction debris, contaminants carried in run-off, spills.	Aquatic Environment: Site specific impacts from past, existing and future roads and infrastructure including bridge construction and rehabilitation projects. Stormwater run-off and maintenance impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to fish habitat and watercourses due to removal of riparian vegetation, alteration of channel bed, flow diversion, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills.	NS	Not required	NS

Environmental Component and Potential Residual Impacts of this Project ¹	Environmental Component and Potential Residual Impacts of Past, Existing and Reasonably Foreseeable Projects/Activities ²	Potential Cumulative Impacts	Significance of the Impacts	Mitigation Measures ³	Residual Cumulative Impacts and Significance
Species at Risk: Site specific habitat impacts (e.g. those identified above under “Terrestrial Environment” and “Aquatic Environment”; however, no species at risk are believed to occur within the study area.	Species at Risk: Site specific impacts – removal and/or disturbance of habitat relating to past, existing and future road construction and urban development (rail, roads, residential and commercial/industrial development). Stormwater run-off and maintenance impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to species of conservation concern and Species at Risk – e.g. removal or alteration of habitat, disturbance or accidental harm to species.	NS	Not required	NS
Groundwater: Groundwater interference and/or interception, changes to quantity and/or quality, impacts associated with spills.	Groundwater: Site specific impacts associated with deep cuts and interception of groundwater as a result of past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to groundwater – e.g. water quality or quantity changes, groundwater interference or interception.	NS	Not required	NS
Drainage and Stormwater Management (Surface Water): Site specific impacts – erosion, sedimentation into surrounding natural areas and municipal drainage infrastructure, water quality or quantity changes, alteration to local drainage patterns, flood level impacts at the watercourses, contaminants carried in run-off, spills.	Drainage and Stormwater Management (Surface Water): Site specific impacts associated with stormwater run-off from past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts associated with stormwater management – e.g. water quality or quantity changes, removal or alteration of habitat (to implement measures), contaminants carried in run-off.	NS	Not required	NS
Contaminated Properties: Site specific impacts – contamination resulting from spills and/or excavation, storage, disposal of materials, equipment, chemicals and other materials.	Contaminated Properties: Site specific impacts associated with the excavation and disposal of materials from past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts associated with contaminated sites, waste management and storage of excess materials – e.g. spills, contaminants carried in run-off, habitat and/or floodplain disturbance/alteration associated with storage.	NS	Not required	NS

Environmental Component and Potential Residual Impacts of this Project ¹	Environmental Component and Potential Residual Impacts of Past, Existing and Reasonably Foreseeable Projects/Activities ²	Potential Cumulative Impacts	Significance of the Impacts	Mitigation Measures ³	Residual Cumulative Impacts and Significance
Noise: Site-specific construction noise, noise associated with operation and maintenance.	Noise: Site specific construction noise and minor noise impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development). Note: There will be no overlap in construction with the West Toronto Diamond and therefore no cumulative construction noise impacts with that project. The noise from existing (and future) services and roads has been factored into the assessment outlined in Chapter 6.	Impacts associated with noise – e.g. nuisance noise, increase overall noise exposure at receptors.	NS	Not required	NS
Vibration: Site-specific construction vibration, vibration associated with operation and maintenance.	Vibration: Site specific construction/operation vibration impacts from past, existing and future urban development (rail, roads, residential and commercial/industrial development). Note: There will be no overlap in construction with the West Toronto Diamond and therefore no cumulative construction vibration impacts with that project.	Vibration impacts – e.g. increased vibration -	NS	Not required	NS
Air Quality: Creation of dust during construction, emissions from construction equipment, air quality impacts during construction, operation and maintenance.	Air Quality: Increase in dust, particulate matter and other airborne materials from past, existing and future urban development (rail, roads, residential and commercial/industrial development). Note: There will be no overlap in construction with the West Toronto Diamond and therefore no cumulative construction air quality impacts with that project. The emissions from existing (and future) services and roads has been factored into the assessment outlined in Chapter 6.	Impacts to air quality – e.g. release of dust, changes to local air quality, increased creation and release of air pollutants, human health impacts.	NS	Not required	NS

Environmental Component and Potential Residual Impacts of this Project ¹	Environmental Component and Potential Residual Impacts of Past, Existing and Reasonably Foreseeable Projects/Activities ²	Potential Cumulative Impacts	Significance of the Impacts	Mitigation Measures ³	Residual Cumulative Impacts and Significance
Direct Property Impacts: Temporary construction access permission or easements, temporary impacts to local property access, permanent property requirements.	Direct Property Impacts: Site specific property impacts associated with past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to property – e.g. temporary disturbances and changes to access during construction, permanent property requirements, permanent changes to property access.	NS	Not required	NS
Human Health Implications Associated with Increased Air Emissions / Human Health and Wellbeing: Impacts associated with air quality, contamination, noise and safety.	Human Health Implications Associated with Increased Air Emissions / Human Health and Wellbeing: Impacts associated with air quality, contamination, noise and safety.	Impacts to human health – e.g. release of dust, changes to local air quality, increased creation and release of air pollutants, other human health and wellbeing impacts (e.g. safety).	NS	Not required	NS
Built Heritage and Cultural Heritage Landscapes: Displacement of and/or change in context for heritage resources, indirect impacts to heritage resources.	Built Heritage and Cultural Heritage Landscapes: Site/structure specific impacts associated with past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to built heritage and cultural heritage landscapes – e.g. displacement of and/or change in context for heritage resources, indirect impacts to heritage resources.	NS	Not required	NS
Archaeological Features: Impacts to archaeological resources (e.g., damage, disruption).	Archaeological Features: Site specific impacts associated with past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to archaeological features – e.g. damage, disruption	NS	Not required	NS
Treaty Rights and Lands and Resources used for Traditional Purposes: Impacts to lands and resources used for traditional purposes.	Treaty Rights and Lands and Resources used for Traditional Purposes: Impacts to lands and resources used for traditional purposes as a result of past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to treaty rights and lands and resources used for traditional purposes – e.g. changes to access or available resources	NS	Not required	NS
Utilities – Pipelines: Impacts associated with work in the vicinity of pipeline crossings.	Utilities – Pipelines: Site specific works over or near pipelines and potential pipeline construction/relocation as a result of past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts associated with pipelines – e.g. pipeline spills or leaks.	NS	Not required	NS

Environmental Component and Potential Residual Impacts of this Project ¹	Environmental Component and Potential Residual Impacts of Past, Existing and Reasonably Foreseeable Projects/Activities ²	Potential Cumulative Impacts	Significance of the Impacts	Mitigation Measures ³	Residual Cumulative Impacts and Significance
Navigability: Site-specific construction impacts associated with works over the Humber River (the only navigable waterway within the project limits), falling debris.	Navigability: Site specific construction impacts associated with works over a navigable waterway, changes to navigable clearance and/or navigability as a result of past, existing and future urban development (rail, roads, residential and commercial/industrial development).	Impacts to navigability – e.g. alteration of navigable clearance, alteration of access to navigable waterways.	NS	Not required	NS

¹ Only the adverse impacts of the project remaining after the application of mitigation measures (i.e. the adverse residual impacts) are the focus of the cumulative impact assessment.
² Only those projects that have a potential to contribute or may impact the same environmental components as this project.
³ It is anticipated that all projects have or will implement best management practices and necessary site-specific mitigation measures, as warranted, towards preventing any significant residual impacts.

NS: Not a significant adverse impact.

6.10 SUMMARY OF MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK

Table 6.10-1 summarizes the construction mitigation measures and commitments to future work identified in this report.

Operation and maintenance mitigation measures and commitments to future work are primarily related to air quality, noise, track inspection, accidents and malfunctions, and potential spills. Please refer to **Chapter 5** and **Section 6.11** for additional information regarding operation and maintenance mitigation measures and commitments to future work.

Table 6.10-1 Summary of Construction Mitigation Measures and Commitments to Future Work

Environmental Component	Mitigation Measures and Commitments to Future Work
Terrestrial Environment (vegetation, wildlife, breeding birds and wetlands)	To minimize direct impacts to vegetation and associated habitat features, especially at the major valley crossings, and to protect adjacent vegetation/habitat features from indirect impacts during construction, the following mitigation measures will be implemented: ▪ The Humber River and Mimico Creek valleys will be identified as a 'sensitive area' on contract drawings to restrict contractor activities in the valley. Black Creek is considered less sensitive given that the valley portion within the rail crossing consists of terrafix lined channel and valley slopes however, the valley upstream (within Keelesdale Park) will be identified as a 'sensitive area' on contract drawings to restrict contractor activities outside of the existing rail corridor. ▪ A re-vegetation plan will be developed for the portions of the Black Creek, Humber River, and Mimico Creek valleys disturbed by the proposed works. ▪ The bridge structure design will maintain existing wildlife movement opportunities. ▪ Vegetation clearing zones and vegetation retention zones will be clearly delineated in both the contract documents and in the field to minimize the risk of unnecessary or inadvertent vegetation impacts and avoid incidental impacts as a result of temporary stockpiling, debris disposal and access. Works zones will be delineated in the field using construction fencing to minimize the area of disturbance and prevent disturbance of adjacent areas. ▪ Temporary vegetation protection fencing will be installed to protect valley and riparian vegetation adjacent to work areas, specifically woody vegetation located at vegetation unit BC1 at Black Creek, vegetation units HR1, HR2, HR3 and HR5 at the Humber River valley, and riparian vegetation along the northeast bank of Mimico Creek south of Zahavy Way. The fencing should be sturdy and may require attachment of silt fencing for erosion control depending on site conditions. Paige wire fencing with attached silt fencing is commonly used for this purpose. ▪ Appropriate vegetation clearing techniques (e.g., trees to be felled away from the retained natural areas) will be used to remove vegetation required for the proposed works. ▪ Erosion and sediment control measures will be designed, implemented and maintained throughout construction. This includes installing sediment and erosion control fencing along the edge of the required working area to protect the edges of all retained natural areas, as well as proper containment and filtering of all construction-generated sediment (whether from dewatering or soil exposure from clearing and grubbing). ▪ All exposed surfaces will be re-stabilized and re-vegetated as soon as possible following construction, using an appropriate native seed mix. ▪ All construction-related debris will be appropriately contained during construction and cleaned-up and properly disposed of following construction. ▪ All activity will be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to natural areas and particularly the Black Creek, Humber River, and Mimico Creek valleys. No petroleum products storage, maintenance or refuelling of equipment will be conducted within these valleys. A Spills Prevention and Response Plan will be

Environmental Component	Mitigation Measures and Commitments to Future Work
	developed by the Contractor and spills cleanup materials will be kept on site at all times. ▪ An environmental inspector will be responsible for ensuring that all environmental mitigation and design measures are properly installed/constructed, implemented and maintained, and appropriate contingency, response plans and remedial measures are in place and implemented if required. ▪ The Contractor shall not destroy the active nests (nests with eggs or young birds), or wound or kill birds, of species protected under the <i>Migratory Birds Convention Act</i> and/or Regulations under that Act. All works will be complete in compliance with the <i>Migratory Birds Convention Act</i>. ▪ Where feasible, timing constraints will be applied to schedule vegetation clearing and structure works (where birds may nest on a structure) outside of the breeding bird season (May 1st to July 31st). ▪ If vegetation clearing cannot be scheduled outside the breeding bird season timing noted above, then an Avian Biologist will be employed to conduct a nest survey in the area to be cleared. The Avian Biologist shall have completed a university or college education in a pertinent environmental discipline and shall have experience and/or training in the identification of birds and their nests and eggs as well as the assessment and development of appropriate mitigation measures to address the presence of migratory birds during construction. If active nests of migratory birds are located, then clearing must discontinue until after the breeding bird season (i.e. clearing is allowed August 1st to April 30th). This may involve delays to allow for fledging. ▪ If structure works cannot be scheduled outside the identified nesting season, ensure that bird nesting preventative measures (such as wire screens or tarps) are implemented to prevent new nesting prior to May 1 and are maintained until July 31st of the calendar year in which they were installed. At a minimum, the preventative measures will be installed at structures where evidence of past nesting was observed. These measures will be periodically checked, and maintained as required, so as not to entrap birds, and removed following construction when no longer needed. ▪ Remove “inactive” nests (previous season, adult birds are not seen flying in and out of) prior to construction, or prior to undertaking the preventative measures outlined above. ▪ Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed. As required, the environmental inspector will capture and release any small wildlife (e.g. turtles, amphibians) stranded within the construction zone.
Aquatic Environment	There are no highly sensitive or specialized aquatic habitats or aquatic Species at Risk identified in the immediate vicinity of the Black Creek, Humber River, and Mimico Creek crossings. Based on the preliminary design available at the time of preparation of this report, the Humber River is the only crossing that requires in-water works and will result in a permanent removal of a small area of fish habitat (associated with the pier extensions). The associated impacts to the Humber River will be minor, with the implementation of appropriate mitigation measures. The TRCA will be consulted during Detail Design in order to finalize construction access and mitigation measures. In-water construction timing restrictions will be implemented during the widening of the existing pier and abutments, to protect the warmwater fishery including COSEWIC candidate species. No in-water work will be

Environmental Component	Mitigation Measures and Commitments to Future Work
	permitted from March 31 to July 1. Fish passage must be maintained for migratory Rainbow Trout. Other related mitigation measures are outlined below. The proposed structure at Black Creek fully spans the watercourse and therefore, the implementation of standard mitigation measures will address potential impacts to the stream and its associated fish and fish habitat. Additional construction details regarding the footing installation and potential impacts to Black Creek (e.g. potential need for in-water works or dewatering) will be confirmed in subsequent design phases. The structure at Mimico Creek fully spans the watercourse and therefore, the implementation of standard mitigation measures will address potential impacts to the stream and its associated fish and fish habitat. Additional construction details regarding the caisson installation and potential impacts to Mimico Creek (e.g. potential need for in-water works or dewatering) will be confirmed in subsequent design phases. The following standard mitigation measures are also recommended in order to minimize impacts to fish and fish habitat within and adjacent to the right-of-way during and following construction. Additional measures will be identified during subsequent design phases once additional design details are complete and construction access and staging plans are developed. Preliminary mitigation measures include: ▪ Implementation of comprehensive sediment and erosion control measures to prevent migration of sediment laden runoff (or other contaminants) from the adjacent construction zones to the bay, including inspection and maintenance. This plan must meet the requirements, guidelines and design standards provided in TRCA's 2006 <i>Erosion and Sediment Control Guidelines for Urban Construction</i>. These measures will include, but not be limited to the following elements: - Isolation of the near-water construction zones using standard perimeter silt fencing of areas of the general construction zone that drain directly to the water. The silt fencing will be heavy duty/re-enforced fencing for disturbed areas that are sloping (e.g. embankments, depending on design of widening and direct encroachment; see below re silt curtain) or will collect drainage from relatively large areas. - Temporary isolation of the near-shore embankment fill zones in the Humber River using a 'containment' system that will prevent migration of any fine substrate disturbed during the work. - Proper stabilization and re-vegetation of all disturbed surfaces that drain to the water, prior to removal of sediment and erosion control measures. The erosion and sediment control measures will be left in place and maintained until vegetative cover is established. ▪ Any temporary dewatering discharge from the work zones will be appropriately managed using properly designed, sited and operated temporary settling facilities to filter all discharge water prior to release to river. ▪ Any fish stranded within the temporary work zones in the Humber River will be removed using appropriate techniques by qualified individuals and released downstream of the temporary work zones. ▪ Cofferdams will be used to construct the piers in or near the Humber River to isolate the temporary in and near water construction zones and contain temporary in-water disturbance. ▪ The details on construction access at the Humber River will be finalized during Detail Design in consultation with

Environmental Component	Mitigation Measures and Commitments to Future Work
	TRCA. Most access will be provided via the Golf Course. The use of a temporary Bailey Bridge is recommended from an environmental perspective in preference to the concrete block bridge to access the in-water piers for access to the pier in the water and the pier of the east bank; the Bailey avoids interference with flow and incremental disturbance of the bed to install and remove the blocks. Construction of a temporary access down the east slope to access the east pier is acceptable provided that the risks of erosion/partial slope failure and sediment transfer to the river can be managed and appropriate restoration undertaken to re-instate a stable slope. Recognizing that there are other construction related considerations, the various options will be reviewed further in Detail Design to develop the preferred access plan in consultation with TRCA. This process will involve: - Geotechnical assessment of the feasibility of the east access and development of an appropriate slope and bank rehabilitation plan. - Further assessment of the bed conditions to verify stability and content of materials susceptible to downstream migration if the block bridge remains under consideration. - Design of the plan to minimize obstruction of flow to levels particularly during the fall migratory window. - Adherence to the <i>Navigable Waters Protection Act</i> (NWP) requirements. - Design of a bank rehabilitation plan to re-instate and re-vegetate a stable bank configuration. - Further detailing and addressing of any other potential impacts during Detail Design once the preferred plan is developed. ▪ Rehabilitation and construction works on the bridges above the water will be isolated/contained using a temporary protection/containment system (e.g. platforms and /or nets) to prevent release of concrete, particles and construction debris into the water. The containment system will be regularly monitored and material removed. All material will be disposed of off-site. ▪ Incremental impacts potentially associated with finalization of additional design and construction details will be assessed and addressed during Detail Design. ▪ The disturbance and removal impacts to riparian vegetation based on the final construction and access details will be quantified during Detail Design, and an appropriate replacement plan developed in consultation with TRCA. Options for replacement of riparian vegetation (given potential constraints on active bank and slope areas at the Humber River and hardened surfaces at the other crossings) include the open floodplain area at Mimico Creek west of the alignment and immediately south of Zahavy way. This land is owned by the TRCA. ▪ Only clean materials free of fine particulate matter will be placed in the water for any temporary construction containment measures (e.g. coffer dams will be constructed of sheet piling, 'pea gravel' bags, or other clean material that will be removed following construction) or permanent works (e.g. rock protection if required). ▪ No equipment shall ford or otherwise enter any of the watercourse except as specified herein or unless authorized by MNR or TRCA. ▪ Defined construction access areas, as well as non-access/protected areas adjacent to the water where construction access is not permitted, will be delineated to prevent unnecessary or inadvertent disturbance. ▪ Control of all activity so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourse. No storage,

Environmental Component	Mitigation Measures and Commitments to Future Work
	maintenance or refuelling of equipment will be conducted near the watercourse. A Spills Prevention and Response Plan will be developed by the Contractor and kept on site at all times. ▪ Location of all temporary storage/stockpile areas, maintenance and refuelling areas, and other temporary construction areas a safe distance from the water (minimum 30 m) and on flat ground that does not drain directly to the water. These areas will be properly contained. No storage, maintenance or refuelling of equipment or stockpiling of erodible material will be permitted near the water. ▪ Removal and proper disposal of all construction-related debris and excess materials following construction. ▪ Specification of appropriate containment measures to prevent construction debris associated with the construction of the new and widened structures from entering the channel. Any material that is inadvertently dropped into the watercourse will be retrieved carefully with minimal disturbance to the channel bed or banks. ▪ Notification of TRCA and MNR as appropriate prior to construction and strict adherence to all conditions on any agency permits that may be required. ▪ Regular inspection of all in-water and near-water construction activities and mitigation measures. The environmental inspector will be responsible for ensuring the sediment and erosion control measures are functioning and all of the mitigation measures are being properly implemented. Post construction monitoring will also be conducted to ensure vegetative cover is re-established prior to the removal of the silt fencing.
Species at Risk	No mitigation measures are proposed specifically to address potential impacts to species at risk since no species at risk are believed to occur within the study area. However, with the implementation of the mitigation measures identified in Sections 6.1.1 and 6.1.2, potential for adverse impacts to any flora or fauna will be mitigated.
Soil and Groundwater	Any water takings in Ontario that exceed 50,000 litres/day require a Permit to Take Water (PTTW) from the Ministry of the Environment (MOE). This could be either for consumptive use (e.g. dust control, compaction) or non-consumptive use (e.g. excavation dewatering). Water takings in Ontario are governed by the <i>Ontario Water Resources Act</i> and the Water Taking and Transfer Regulation (O.Reg. 387/04). There are three PTTW categories as stipulated under O.Reg 387/04 based on the potential adverse risk that the water taking may pose on the natural environment, groundwater users, and existing permit holders in the area of water taking. There are also various technical requirements and assessments required for the different categories, in addition to whether the water taking is from surface water, groundwater, or both. Construction activities associated with the project such as deep cuts and foundation works have the potential to affect groundwater and surface water resources within the study area. As a result, it is possible that a PTTW will be required for one or more components of the construction works. During detailed design the PTTW requirements for the construction works will be identified in consultation with the MOE. All PTTW applications and supporting documents will be prepared and signed by a Qualified Person in accordance with MOE requirements. Section 6.1.4.1 outlines an

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	initial assessment as to where PTTW's will be required. In addition to any mitigation developed as part of the PTTW process, construction mitigation measures will be implemented to prevent and manage any spills that could potentially adversely effect the environment (including potential groundwater impacts).as outlined in Section 6.11.1.2.
Drainage and Stormwater Management	Detailed sediment and erosion control plans will be prepared, implemented and monitored in accordance with <i>The "Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guideline for Urban Construction"</i> December, 2006 for construction throughout the Study Area.
Contaminated Properties	Prior to construction an excess materials management plan will be developed to address proper handling of all excess materials that may be potentially contaminated. All contaminated materials will be handled in accordance with applicable provincial/federal legislation, regulations and standard policies and procedures. For example, contaminated soils will be managed per O.Reg. 347 which is a regulation under the Ontario <i>Environmental Protection Act</i>. O. Reg. 347 identifies hazardous wastes through a series of listings and tests and outlines requirements for on-site handling, mixing, and processing of waste, on-site storage of hazardous and liquid industrial wastes, and the requirements for waste disposal sites and waste management systems. In addition, the contractor(s) that complete the construction works will be required to have a suitable site specific health and safety plan, spills management plan, and be prepared to respond to spills in a timely and effective manner.
Direct Property Impacts	Contractor(s) will be required to minimize any inconvenience caused by construction activities to adjacent properties. A monitoring program will be implemented prior to construction. Existing conditions will be assessed and used to develop a pre-condition survey. Monitoring will be conducting during the construction of adjacent structures, utilities and excavation. During excavation, measurement of ground settlement will be taken regularly, using inclinometers and surface monitoring points for structures. If the Proponent should receive property damage claims, the monitoring program may be utilized during claim resolution. A vibration monitoring program will be developed during detailed design for implementation in construction. In particular: ▪ Vibration levels will be monitored on a continuous basis for operations that cause particularly notable vibration. This will be especially important in areas that are dominated by fine, sandy soils. ▪ When vibration levels are anticipated to exceed 5 mm/s, foundation and structural element inspections will

Environmental Component	Mitigation Measures and Commitments to Future Work
	be carried out on nearby dwellings to determine an inventory of existing conditions. Those inspections will be carried out prior to the commencement of construction. If property damage claims are received, the monitoring program may be utilized during claim resolution. Temporary access roads will be provided at all times during construction. Detailed arrangements for temporary accesses will be made during the detailed design stage.
Noise	The following outlines the commitments to future work and the best management practices and mitigation measures to be implemented during construction. These measures apply to both short-term and long-term construction activities. <i>Technical</i> ▪ All equipment used must adhere to guidelines as placed in MOE's NPC115 guidelines for construction equipment. ▪ Whenever possible work zone and time will adhere to local municipal by laws. The majority of the work will be conducted during business hours Monday to Friday. ▪ In the event that construction is to occur overnight or on weekends, effort will be made to minimize potential impacts on residents. ▪ In rail corridors, night work is often required for activities such as track shifts or bridge span installation. As such, every effort will be made to minimize impacts on the neighbourhood. Night work requires lighting, which can often be a cause of discomfort for neighbourhoods, but is required for safety of the construction workers. ▪ Trains passing construction zones are required to use bell and whistle by construction personnel and equipment for safety reasons. This will be minimized as much as practicable. ▪ Construction equipment has safety features such as backup alarms while backing up (beeping sound). This is for the protection and safety of the workers, and is legally required. ▪ If piling is required, the type of pile installation required, will be determined during detailed design. Wherever soil conditions allow, driven piles will not be used. If driven piles are required various methods will be assessed during detailed design to minimize noise while at the same time considering cost and length of time for construction. ▪ Where rock excavation is required (through Weston) various methods for excavation will be assessed during detailed design to minimize noise while at the same time considering cost and length of time for construction.

Environmental Component	Mitigation Measures and Commitments to Future Work
	<i>Communications</i> Communication with stakeholders (e.g. individual members of the public, ratepayer groups, business associations, etc) will focus on the following activities: • Obtaining input on construction mitigation measures that affect the community • Communication of project status and activities • Enquiries/Complaints procedures The following provide additional details on these activities. <i>Input on construction mitigation measures</i> • There will be communications with stakeholders to identify local and site-specific issues so that specific mitigation measures can be developed to minimize impacts to the extent possible. This may include discussions on issues such as; - o construction access; - o temporary road closures; - o construction schedule; and - o critical community activities that may be affected. <i>Communications of status and activities</i> - o A website will be developed to provide ongoing updates to facilitate communications during design and construction. - o Whenever construction activity impacts a residential or business area, advance notice will be provided to the residents and businesses within the zone of influence. - o Neighbourhoods will be kept updated on construction duration and progress. - o Community liaison officers will be available for neighbourhoods to contact with specific information requests. <i>Enquiries/Complaints Procedures</i> - o Community liaison officers will be available for neighbourhood residents and business to hear and assist with issues that may arise during construction.

Environmental Component	Mitigation Measures and Commitments to Future Work
Vibration	The following outlines the commitments to future work and the best management practices and mitigation measures to be implemented during construction. These measures apply to both short-term and long-term construction activities. <i>Technical</i> ▪ Vibration levels will be monitored on a continuous basis for operations that cause particularly notable vibration. This will be especially important in areas that are dominated by fine, sandy soils. The vibration monitoring plan will be determined during detailed design. ▪ When vibration levels are anticipated to exceed 5mm/s, foundation and structural element inspections will be carried out on nearby dwellings to determine an inventory of existing conditions. Those inspections will be carried out prior to the commencement of construction. ▪ All equipment used must adhere to guidelines as placed in MOE's NPC115 guidelines for construction equipment. ▪ Whenever possible work zone and time will adhere to local municipal by laws. ▪ In the event that construction is to occur overnight, effort will be made to minimize potential impacts on residents. ▪ In rail corridors, night work is often required for activities such as track shifts or bridge construction. As such, every effort will be made to minimize impacts on the neighbourhood. Night work requires lighting, which can often be a cause of discomfort for neighbourhoods, but is required for safety of the construction workers. ▪ Trains passing construction zones are required to whistle. ▪ Construction equipment has safety features such as beeping while backing up. This is for the protection and safety of the workers, but will be a common occurrence on the construction sites. ▪ Type of pile installation is determined during detailed design. Wherever soil conditions allow, driven piles will not be used. ▪ Where applicable temporary acoustic barriers will be considered for construction work. <i>Communications</i> Communication with stakeholders (e.g. individual members of the public, ratepayer groups, business associations, etc) will focus on the following activities: • Obtaining input on construction mitigation measures that affect the community • Communication of project status and activities • Enquiries/Complaints procedures

Environmental Component	Mitigation Measures and Commitments to Future Work
	The following provide additional details on these activities. <i>Input on construction mitigation measures</i> • There will be communications with stakeholders to identify local and site-specific issues so that specific mitigation measures can be developed to minimize impacts to the extent possible. This may include discussions on issues such as; - o construction access; - o temporary road closures; - o construction schedule; and - o critical community activities that may be affected. <i>Communications of status and activities</i> - o A website will be developed to provide ongoing updates to facilitate communications during design and construction. - o Whenever construction activity impacts a residential or business area, advance notice will be provided to the residents and businesses within the zone of influence. - o Neighbourhoods will be kept updated on construction duration and progress. - o Community liaison officers will be available for neighbourhoods to contact with specific information requests. <i>Enquiries/Complaints Procedures</i> - o Community liaison officers will be available for neighbourhood residents and business to hear and assist with issues that may arise during construction.
Air Quality	To mitigate potential impacts associated with emissions from construction equipment, the Contractor will be required to keep equipment in good operating conditions and will be asked to avoid unnecessary idling of equipment. To mitigation potential air quality impacts resulting from the creation of dust during construction, dust suppressant measures, as identified in Ontario Provincial Standard Specification (OPSS) 506, will be used during construction. OPSS 506 outlines the requirements for dust suppressants and their application. In addition, any disturbed lands will be vegetated (e.g. seeded) as appropriate to reduce the potential for dust to develop from exposed soil.
Human Health	The proposed air quality monitoring, mitigation measures, best management practices and commitments to future

Environmental Component	Mitigation Measures and Commitments to Future Work
Implications Associated with Increased Air Emissions	work for human health implications associated with increased air emissions are the same as those proposed to address potential air quality impacts. Please refer to Sections 6.2.4.3 and 6.2.4.4 for details regarding the proposed measures to address potential air quality impacts.
Human Health and Wellbeing	As discussed in Section 6.2.6.1 , when taking into consideration the potential impacts associated with contamination, noise and design (safety) no adverse environmental impacts to health and wellbeing are anticipated and no residual adverse impacts will occur. In fact, it is anticipated that there will be some positive residual impacts to human health and wellbeing as a result of improvements to safety based on the design of the project (e.g. removal of at-grade crossings).
Business and Economics	As outlined in Section 6.5.1 , traffic detours will be implemented during construction to ensure local traffic will be redirected as best as possible to reduce the overall impacts to the community. Additional signage may be placed along the detours to ensure customers have easy accessibility to businesses. Mitigation related to noise and vibration construction impacts will be implemented. Sections 6.2.2.1 and 6.2.3.1 outline the proposed mitigation measures.
Built Heritage and Cultural Heritage Landscapes	Proposed mitigation measures for this project are described in Table 6.3.1.1-1 . Identified mitigation measures will be carried through the Detail Design as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project. Table 6.3.1.1-1 includes some commitments to complete additional documentation for some features. Where additional documentation is to be completed those documents will be completed during Detail Design and submitted to the Ministry of Culture.
Archaeological Features	As noted in Section 4.3.2 , a Stage 1 Archaeological Assessment of the study corridor has been undertaken. Based on the proposed design, there are three general areas of archaeological potential where Stage 2 Archaeological Assessment may be required - lands within the rail corridor adjacent to Fort York, the land around the Weston Golf and Country Club adjacent to the Humber River, and the Mimico Creek valley lands (as shown on Figures 4.3.2-1 to 4.3.2-3). Neither of these areas are impacted directly by the project, but it is possible that they could be required for construction access or staging. During Detail Design it will be determined if either of those areas may be required for construction access or staging. If they are required, a Stage 2 Archaeological Assessment will be conducted as early as possible prior to construction Timing for the completion of any Stage 2 Archaeological Assessment work will be subject to field conditions and property access.

Environmental Component	Mitigation Measures and Commitments to Future Work
	The proposed project will not impact Fort York, however, should the proposed project encroach upon undisturbed land with archaeological potential into the Fort York ASA, a Stage 2 Archaeological Assessment will be conducted The following outlines the mitigation and commitments to future work required to mitigate potential adverse environmental impacts to archaeological resources: ▪ Undertake a Stage 2 Archaeological Assessment for works in the identified undisturbed areas. If archaeological finds are discovered, Stage 3-4 mitigation will be undertaken as required in accordance with the guidelines and policies of the Ministry of Culture. Consultation will occur with the Ontario Ministry of Culture and, if applicable, potentially interested First Nations to discussion mitigation strategies if sites are found as part of the Stage 2 Assessments. Copies of the Stage 2 Archaeological Assessments will be provided to Transport Canada and Infrastructure Canada for their review. ▪ Submit any additional Archaeological Assessments a minimum of 90 days prior to construction to the Ministry of Culture. ▪ Complete archaeological monitoring during any construction excavations along the rail corridor adjacent to Fort York (see Figure 4.3.2-1). ▪ Should buried archaeological deposits be found along any section of the corridor during construction activities, the Ministry of Culture and any relevant First Nations will be notified immediately. ▪ In the event that human remains are encountered during construction activities the Ministry of Culture, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations, the Peel Regional Police and any relevant First Nations will be notified immediately. ▪ Potentially interested First Nation communities will be notified of the discovery of any archaeological remains, human remains or burials that may be of First Nation interest. As noted above, the commitment has been made to complete all necessary archaeological assessments towards ensuring that the proposed works do not result in any significant adverse impacts. Section 6.3.2.1 provides a description of Stage 2, 3 and 4 Archaeological Assessments.
Treaty Rights and Lands and Resources used for Traditional Purposes	As noted in Section 6.4.1, the project is not anticipated to result in any adverse impacts to treaty rights or lands and resources used for traditional purposes. The sections specified below provide the information from which it has been concluded that this project will not likely result in significant adverse environmental impacts to fish or fish habitat (Section 6.1.2), wildlife and vegetation (Section 6.1.1 and Section 6.1.3), or archaeological resources (Section 6.3.2). With the implementation of mitigation measures, best management practices and commitments to future work identified in the above noted sections, it is anticipated that any possible adverse impacts can be minimized and as a result no significant residual impacts will occur.

Environmental Component	Mitigation Measures and Commitments to Future Work
Transportation	Most of the construction of the new structures and roadways in the Georgetown South Corridor will result in traffic delays and some road closures during construction. In order to partially mitigate these construction impacts, proposed traffic staging and management plans will be developed in consultation with the Municipalities during detailed design. Dust suppressant measures, as identified in Ontario Provincial Standard Specification (OPSS) 506, will be used during construction. OPSS 506 outlines the requirements for dust suppressants and their application. In addition, any disturbed lands will be vegetated (e.g. seeded) as appropriate to reduce the potential for dust to develop from exposed soil. As the construction proceeds the proposed traffic management plans may be adjusted based on changes to activity in the surrounding area. The adjacent community will be apprised of initial plans and any future changes as they occur. Other mitigation such as special directional construction signing for local businesses may also be considered when roads have to be closed during construction. Metrolinx will also meet with TTC to coordinate and formulate plans for any required temporary routing changes for services across or along the corridor. <i>Union-Pearson Rail Link</i> In order to minimize the disruption caused by the proposals for temporary road closures as a result of the construction of the Union-Pearson Rail Link, extension traffic management measures will be required and these will have to be coordinated with the GTAA. Additionally, the construction impacts to traffic will be reduced by utilizing a number of dedicated construction laydown areas along the length of the Spur Line as follows: ▪ Goreway Drive laydown area – east side of Goreway Drive opposite Zahavy Way. This site has been used by others as a construction laydown area. ▪ Dorman Road/Network Road laydown area – a vacant asphalted area owned by the federal government (on GTAA leased lands). ▪ Laydown area in, or near, GTAA Parking Area 6B. ▪ Two laydown areas within the Airport between Airport Road and the existing Terminal 1 parking structure. Access to these areas will be available from the existing road network.
Utilities	<u><i>Utilities at Existing Grade Separations (Rail over Roadway)</i></u> The exact locations of the existing utilities will be determined during detailed design. Working with the utility companies and municipalities, a plan will be developed to relocate any utilities impacted by the proposed work. These will be permanent relocations within the existing road allowance so as not to impact future utility maintenance and

Environmental Component	Mitigation Measures and Commitments to Future Work
	repair. <u>Utilities Crossing at Grade</u> Utilities affected by the construction of the grade separations and track work will be temporarily relocated along the roadway and railway right-of-way. The staging and relocations approach will be determined during the design phase. The relocations of these utilities will occur prior to or in conjunction with the construction of this project. As outlined in Section 4.5.1, pipeline crossings will <u>not</u> require approval from the National Energy Board but will require approval from the pipeline owners. Consultation with the pipeline owners will occur during detailed design and construction as warranted. All necessary approvals from the pipeline owners will be obtained prior to completing construction in the vicinity of the pipelines, towards ensuring that potential impacts are minimized and effectively mitigated both through design and during construction. <u>Utilities at Union Pearson Rail Link Spur Line</u> A thorough review of existing and proposed future utilities plans, as well as all necessary relocations or modifications, will be undertaken during detailed design.
Navigability	The widening of the Humber River Bridge has been designed so as to maintain sufficient clearance for navigation under the bridge during construction. The widening of the Humber River Bridge will be constructed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and other recreational users of the valley below. As a result, potential adverse impacts during and after construction are considered to be mitigated (approval under the <i>NWPA</i> will be required). The crossing of the Humber River will require the following mitigation and commitment to future work: ▪ Apply to Transport Canada for approval under the <i>NWPA</i>; ▪ Consult with Transport Canada and the TRCA to finalize design, methodology and timing; ▪ Abide by all Conditions of Approval that may be identified in the approval under the <i>NWPA</i>; and ▪ Ensure debris does not fall into the water during construction. It should be noted that all applications under the <i>NWPA</i> will be reviewed for their impact on navigation, both temporary impacts during construction and permanent impacts following completion and during maintenance operations. Conditions of approval as necessary for the safety of navigation will be included in the <i>NWPA</i> approval and monitored and enforced by NWP Officers.

6.11 COMPLIANCE MONITORING AND IMPACT MONITORING

6.11.1 Monitoring Procedures

6.11.1.1 *Construction Mitigation*

Prior to construction, a compliance monitoring plan will be developed describing how compliance with all commitments outlined in this report and conditions of any permits and approvals will be monitored during construction. Compliance reports will be prepared summarizing the results of the compliance monitoring plan for construction projects and stating compliance with commitments outlined in this report and conditions of any permits and approvals.

6.11.1.2 *Operational Mitigation*

GO Transit has standard procedures for spills management, accidents or malfunctions and track inspection. These procedures will be followed during the operations phase.

In addition specific monitoring requirements have been proposed as mitigation for this project. This includes measures for air quality and noise:

Air Quality Operational Mitigation

Operational and maintenance impacts will be managed through the use of best management practices such as those identified in **Section 6.2.4.4** for construction works (e.g. dust control, operation of equipment in good working order, minimizing idling).

In addition, to address some of the potential human health risks associated with increased air emissions documented in **Section 6.2.5**, the following outline short-term, mid-term and long-term mitigation strategies:

Short-Term

An air quality monitoring/mitigation program will be developed in consultation with the Ministry of the Environment during detailed design. It is anticipated that the program will likely focus on Air quality monitoring at worst-case areas to verify the results of the air quality modelling given the very conservative assumptions made during the assessment.

It is anticipated that the monitoring results will be made available to MOE and the general public through the operational phase. Specific details on frequency and how it will be made available will be developed in consultation with the Ministry of the Environment during detailed design.

Mid-Term

This will focus on ongoing improvements to the existing rolling stock. The air quality assessment assumed the CN, CP and VIA vehicles were meeting Tier 0 standards and GO vehicles were meeting Tier 2 standards. Overtime, emission standards will become more stringent resulting in reduced emissions from the corridor.

On May 17, 2007, GO, CN, CP and VIA signed a Memorandum of Understanding (MOU). The MOU commits to reducing criteria air contaminants and greenhouse gases.

Each of the companies have agreed to acquire new and freshly manufactured locomotives that meet applicable EPA standards, retire medium horsepower locomotives (2k-3k hp) built between 1973 and 1999, and upgrade / remanufacture high horsepower locomotives (greater than 3k hp) to applicable EPA standards.

Long-term

Mitigation in the long-term focuses on:

- The Province's commitments to funding and implementing transit projects in the Greater Golden Horseshoe. This will have benefits on regional air quality which will improve local air quality.
- Other Provincial and Federal initiatives aimed at reducing emissions for industrial and transportation uses. This will have benefits on regional air quality which will improve local air quality.

Noise Operational Mitigation

Given that the noise impact assessment was completed for the 15 year Metrolinx planning horizon and, for some areas (specifically north of the Junction), the increase in sound for that horizon year was slightly above the trigger for mitigation, As train traffic is expected to increase gradually over the planning horizon, Metrolinx may consider staging the construction of acoustical barriers or providing alternative measures. This decision would be based on when they are warranted by future service levels and subject to technical and economic feasibility..

6.11.1.3 *Commitments to Future Work and Studies*

Commitments to future work identified in this report that are to be completed prior to construction will be completed prior to construction and consultation with stakeholders will occur as appropriate.

6.11.2 Communication During Detailed Design and Construction

This report has outlined the consultation undertaken during the environmental assessment stage. It has also outlined mitigation commitments and subsequent approval requirements.

It is recognized that additional communications with government and non-government stakeholders will be required during detailed design and Construction. The following outline how Metrolinx will communicate with these stakeholders during detailed design and Construction.

Government Stakeholders

Meetings and discussions will be held during detailed design with government agencies (e.g. TRCA, MOE, MNR, etc) to obtain required approvals and permits. Appropriate Municipalities will be contacted to finalize details concerning proposed alterations to municipal roads and road structures as well as municipal utilities. Municipalities and School Boards will be kept apprised of proposed project staging and mitigation details as they are further developed during the design process and as outline in Chapter 6 of this report. They will also be kept informed of progress as construction procedures.

Non-government Stakeholders

Communication with this group of stakeholders (e.g. individual members of the public, ratepayer groups, business associations, etc) will focus on the following activities:

- Obtaining input on construction mitigation measures that affect the community
- Communication of project status and activities
- Enquiries/Complaints procedures

The following provide additional details on these activities.

Input on construction mitigation measures

- There will be communications with stakeholders to identify local and site-specific issues so that specific mitigation measures can be developed to minimize impacts to the extent possible. This may include discussions on issues such as;
 - o construction access;
 - o temporary road closures;
 - o construction schedule; and
 - o critical community activities that may be affected.

Communications of status and activities

- o A website will be developed to provide ongoing updates to facilitate communications during design and construction.
- o Whenever construction activity impacts a residential or business area, advance notice will be provided to the residents and businesses within the zone of influence.
- o Neighbourhoods will be kept updated on construction duration and progress.
- o Community liaison officers will be available for neighbourhoods to contact with specific information requests.

Enquiries/Complaints Procedures

- o Community liaison officers will be available for neighbourhood residents and business to hear and assist with issues that may arise during construction.

GLOSSARY

AAQC	Ambient Air Quality Criterion – air quality objectives and standards developed by the Ontario MOE
ANSIs	Areas of Natural or Scientific Interest - Life or Earth Science – typically unique and important ecological or geological areas identified and designated by the Ontario Ministry of Natural Resources
abutment	The outermost end supports on a bridge which carry the load from the bridge deck.
ASA	Archaeologically Sensitive Area
at-grade	A roadway and/or railway crossing at the same elevation as the surrounding land.
below-grade	A structure or slab built beneath the elevation of the surrounding land.
CAC	<i>Community Advisory Committee</i> ; as it refers to recently initiated Metrolinx's Study on Electrification of the entire GO Transit rail system
CEAA	The <i>Canadian Environmental Assessment Act</i> is a law requiring that an environmental assessment be conducted by federal departments for projects before a federal authority take action in regards to a project.
CHBDC	Canadian Highway Bridge Design Code – a set of design standard for bridges in Canada
CoCs	Contaminants of Concern
COSSARO	The <i>Committee on the Status of Species at Risk in Ontario</i> ; consisting of members with either scientific experience or traditional aboriginal knowledge that provides input on rare and endangered species.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada; consisting of members with either scientific experience or traditional aboriginal knowledge that provides input on rare, endangered species and species at risk.

CP	Canadian Pacific Railway
Cul-de-sac	A dead end street, in some cases having a turnaround loop at the closed end.
CWS	Canada Wide Standard
dB	Decibel – a unit of measurement of loudness as detected by the human ear.
dbh	The <i>diameter at breast height</i> is the outside bark diameter of a tree 1.37m above the forest floor.
deck	The roadway / platform of a bridge.
EC	<i>Environment Canada</i>
ELC	<i>Ecological Land Classification</i> is a system used to identify differing scales of landscape, or ecosystems, based on factors such as climate, landform, and vegetation.
Electrification of a railway	Supplies electrical energy to railway locomotives and multiple units so that they can operate without having an on-board prime engine.
ESA	Environmentally Sensitive Areas-is a type of land designation which protects an area identified to be of local interest. It may represent a sensitive landscape, the habitat of vulnerable, threatened or endangered species or represent an area of historical value.
erosion	Removal of solids (e.g. rocks and soil) in the natural environment (wind and rain).
floodplain	Flat land adjacent to a body of water and subject to flooding.
gabion basket	Cages filled with sand or rocks used to support soil against erosion.
girder	A main support beam in a structure.
GO Transit	The provincial agency that governs the interregional public transit system, linking Toronto with the surrounding regions of the Greater Toronto Area (GTA).

grade separation	Aligning a railway and/or roadway at different elevations so that neither one interrupts the flow of the other.
GTA	Greater Toronto Area (i.e. Toronto, Halton, Peel, York, Durham Regions)
GTHA	Greater Toronto and Hamilton Area (includes the GTA as described above and Hamilton).
GTTA	Greater Toronto Transportation Authority
HC	Health Canada
HRFMP	<i>Humber River Fisheries Management Plan</i>
INFC	Infrastructure Canada
Metrolinx	A provincial agency tasked to improve the coordination and integration of all modes of transportation in the Greater Toronto Hamilton area.
MNR	Ministry of Natural Resources (Ontario)
MTO	Ministry of Transportation (Ontario)
NEB	<i>National Energy Board</i>
NHIC	<i>Natural Heritage Information Centre</i> – keeps track of Ontario's rare and endangered species.
NRVIS	Natural Resources and Values Information System
NWPA	<i>Navigable Waters Protection Act</i>
OMC	Operations Management Centre, in this case, used for the maintenance of the Union-Pearson rail link trains.
OPSS	Ontario Provincial Standard Specification
overpass	A railway or roadway that crosses over another railway or roadway.
pier	A support for two adjacent bridge spans.
PM _{2.5}	Respirable (fine) particulate matter

PM ₁₀	Inhalable (coarse) particulate matter
PSW	Provincially Significant or Locally Significant Wetland
retaining wall	A structure that holds back soil or rock from a building, structure or area and prevents down slope movements.
riparian	A riparian zone or riparian area is the interface between land and stream.
ROW	right-of-way
RTP	Regional Transportation Plan
rail switch	A mechanical system which allows trains to be guided from one track to another at a railway junction.
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SARO	<i>Species at Risk in Ontario</i>
screenlines	An artificial position used, in this case, to determine the number of trains passing through a location.
span	The section between two intermediate supports on a bridge.
spur line	A short secondary rail line branching off of a main or through line.
substrate	The material that rests at the bottom of a stream or river (also known as sediment).
substructure	Supporting part of a structure; the foundation.
superstructure	All parts above and including the bridge deck.
swale	A low track of land which tends to be moist or marshy.
switch gear	The mechanical elements required to operate a rail switch.
TC	Transport Canada

TNHS	Terrestrial Natural Heritage System
ToR	Terms of Reference
track bed	The foundation onto which railway track is laid.
TRCA	Toronto and Region Conservation Authority
trench	An excavation or depression in the ground.
tunnel	A passage way through or under something, often underground.
underpass	A railway or roadway that crosses under another railway or roadway.
US EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

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