



Toronto Transit Commission / City of Toronto

**SCARBOROUGH-MALVERN LIGHT RAIL TRANSIT
TRANSIT PROJECT ASSESSMENT
ENVIRONMENTAL PROJECT REPORT**

ENVIRONMENTAL PROJECT REPORT

DECEMBER 2009



Table of Contents

EXECUTIVE SUMMARY I

E.1. INTRODUCTION I

E.2. PROJECT DESCRIPTION II

E.3. EXISTING CONDITIONS / POTENTIAL IMACTS / MITIGATION AND NET EFFECTS V

E.4. CONSULTATION IX

E.5. FUTURE COMMITMENTS XI

1. INTRODUCTION AND STUDY PROCESS 1

1.1 Study Purpose 1

1.2 Study Area 1

1.3 The Transit Project Assessment Process (2008) 2

 1.3.1 Environmental Project Report 3

 1.3.2 Transit Project Assessment Approvals 3

 1.3.3 Scarborough-Malvern LRT Pre-Planning Activities 4

1.4 Study Organization 4

1.5 Background and Context 4

 1.5.1 City of Toronto Planning Policies 4

 1.5.2 TTC Policies 8

 1.5.3 Provincial Planning Policies 9

 1.5.4 Additional Related Studies 9

2. PROJECT DESCRIPTION 10

2.1 Background Studies 10

 2.1.1 Technology Selection 10

 2.1.2 Stop Spacing 13

 2.1.3 Design Criteria 14

 2.1.4 Feasibility Study 16

 2.1.5 Alignment Evaluation 23

 2.1.6 Traffic Analysis 26

 2.1.7 Transit Interface Considerations 30

2.2 The Preferred Design 30

 2.2.1 Description of the Alignment 30

 2.2.2 Preferred Stops 33

 2.2.3 Special Trackwork 33

 2.2.4 Bike Lanes 34

 2.2.5 Drawings 34

 2.2.6 Structures 91

 2.2.7 Construction Staging 92

 2.2.8 Utilities 92

 2.2.9 Electrical Substations 92

 2.2.10 Property Requirements 93

 2.2.11 Cost Estimates 93

3. EXISTING AND FUTURE CONDITIONS 94

3.1 Existing Conditions 94

 3.1.1 Transportation 94

 3.1.2 Natural Environment 97

 3.1.3 Socio-Economic Environment 105

 3.1.4 Cultural Environment 107

3.2 Future Conditions 108

 3.2.1 Transportation 108

 3.2.2 Natural Environment 108

 3.2.3 Socio-Economic Environment 109

 3.2.4 Cultural Environment 110

4. ENVIRONMENTAL IMPACTS, MITIGATION MEASURES AND MONITORING 111

4.1 Toronto Environmental Plan 111

4.2	Environmental Benefits of LRT.....	111	5.4	During Operation	128
4.3	Transportation Impacts.....	112	5.5	On-Going Consultation	129
4.3.1	Transit Impacts	112	5.6	Utility Co-ordination	129
4.3.2	Traffic Impacts	112	6. PERMITS AND APPROVALS.....	130	
4.3.3	Fire/Police/Emergency Services	112	6.1	Federal Environmental Assessment (CEAA)	130
4.4	Natural Environment Impacts	112	7. CONSULTATION PROCESS.....	131	
4.4.1	Fish	112	7.1	External Agencies.....	131
4.4.2	Vegetation	113	7.1.1	Method of Consultation	131
4.4.3	Wildlife	114	7.1.2	Summary of Comments	131
4.4.4	Geology	116	7.2	General Public.....	133
4.4.5	Groundwater	116	7.2.1	Methods of Consultation	134
4.4.6	Stormwater	116	7.2.2	Summary of Comments	136
4.4.7	Erosion and Sedimentation	116	7.3	Aboriginal Communities	136
4.4.8	Surface Water Contamination and Debris Accumulation	117	7.3.1	Method of Consultation	137
4.4.9	Contaminated Soil	117	7.3.2	Summary of Comments	137
4.4.10	Air Quality	117	7.3.3	Commitments	137
4.5	Socio-Economic Impacts	119	7.4	Public Review Period/Notice of Completion	138
4.5.1	Land Use	119	7.5	Project Approval – TTC/City	138
4.5.2	Noise and Vibration	119	7.6	Statement of Completion	138
4.5.3	Property	120	8. CONCLUSION.....	139	
4.5.4	Economic Impacts	120			
4.6	Cultural Environment Impacts.....	120			
4.6.1	Archaeology	120			
4.6.2	Cultural Heritage	121			
4.7	Summary of Potential Impacts and Mitigation Measures.....	121			
5. FUTURE COMMITMENTS.....	127				
5.1	Property Acquisition.....	127			
5.2	During Design	127			
5.3	During Construction	128			

LIST OF EXHIBITS

Exhibit E-1: Study Area i
 Exhibit E-2: Typical Mid-Block Cross Section – Eglinton Avenue and Kingston Road (36.0 m) iii
 Exhibit E-3: Mid-Block Cross Section – Morningside Avenue South of Warnsworth Street (30.0 m)iv
 Exhibit E-4: Cross Section – Morningside Avenue over Highland Creek iv
 Exhibit E-5: Cross Section – Ellesmere Road v
 Exhibit E-6: Cross Section – Military Trail v
 Exhibit E-7: Preferred Design - Eglinton Avenue at Brimley Road and Danforth Road vi
 Exhibit E-8: Preferred Design - Eglinton Avenue and Kingston Road Intersection vi
 Exhibit E-9: Preferred Design - Kingston Road and Morningside Avenue Intersection vii
 Exhibit E-10: Preferred Design – Highway 401 / Morningside Avenue Area vii
 Exhibit E-11: LRT Stop Locations viii
 Exhibit 1-1: Study Area 2
 Exhibit 1-2: Transit Project Assessment Process 3
 Exhibit 1-3: Higher Order Transit Corridors (Except from Map 4 - Toronto Official Plan) 5
 Exhibit 1-4: Surface Transit Priority Network (Excerpt from Map 5 - Toronto Official Plan) 5
 Exhibit 1-5: Land Use Plan 6
 Exhibit 1-6: Portion of Scarborough-Malvern Study Area Requiring Official Plan Amendment 7
 Exhibit 1-7: Toronto Transit City Light Rail Plan 8
 Exhibit 1-8: Transit Studies Related To SMLRT Study 9
 Exhibit 2-1: Transit Forecast Demand and Technology Requirements 11
 Exhibit 2-2: Examples of LRT Vehicles 13
 Exhibit 2-3: LRT Design Criteria 14
 Exhibit 2-4: Roadway Design Criteria 14
 Exhibit 2-5: Typical Mid-Block Section 15
 Exhibit 2-6: Typical Section at Intersection 16
 Exhibit 2-7: Corridor Study Area 17
 Exhibit 2-8 : Alternative Corridors 17
 Exhibit 2-9: Alternative Corridor Assessment – Kingston Road / Morningside Avenue to UTSC 19
 Exhibit 2-10: Alternative Corridor Assessment – UTSC to Malvern Town Centre 20
 Exhibit 2-11: Recommended Corridor - Feasibility Stage 20
 Exhibit 2-12: Final Recommended Study Corridor 21
 Exhibit 2-13: Recommended Stop Locations 22
 Exhibit 2-14: Highland Creek Structural and Alignment Alternatives 24
 Exhibit 2-15: Preferred Design Alternative at West Hill C.I. Area on Morningside Avenue 25
 Exhibit 2-16: Typical Turning Movement Restrictions 26
 Exhibit 2-17: Preferred Design - Eglinton Avenue at Brimley Road and Danforth Road 27
 Exhibit 2-18: Preferred Design - Eglinton Avenue and Kingston Road Intersection 27
 Exhibit 2-19: Preferred Design - Kingston Road and Morningside Avenue Intersection 28
 Exhibit 2-20: Preferred Design - Highway 401 interchange area 29
 Exhibit 2-21: Potential Improvements at the Highway 401 Area 29
 Exhibit 2-22: Typical Mid-Block Cross Section – Eglinton Avenue and Kingston Road 32
 Exhibit 2-23: Mid Block Cross Section – Morningside Avenue 32
 Exhibit 2-24: Cross Section – Morningside Avenue Bridge over Highland Creek 32
 Exhibit 2-25: Cross Section – Ellesmere Road 33
 Exhibit 2-26: Storage Track Cross Section – Military Trail 33
 Exhibit 2-27: Stop Locations and Types 34
 Exhibit 2-28: Stop Spacing 34

Exhibit 2-29: Overall Property Requirements 93
 Exhibit 3-1: Existing Transit Services 94
 Exhibit 3-2: Existing (2007) Ridership in the Scarborough-Malvern Corridor 95
 Exhibit 3-3: Existing Arterial Road System in the SMLRT Corridor 95
 Exhibit 3-4: Volume / Capacity Ratio at most Severely Congested Intersections 96
 Exhibit 3-5: Existing Natural Environment Conditions 99
 Exhibit 3-6: Morningside Forest / Wetland Existing Conditions 103
 Exhibit 3-7: Toronto East 2007 Ambient Air Quality Monitoring for PM2.5 105
 Exhibit 3-8: Toronto East 2007 Ambient Air Quality Monitoring for Nitrogen Oxides 105
 Exhibit 3-9: Toronto Downtown 2007 Ambient Air Quality Monitoring for Carbon Monoxide 105
 Exhibit 3-10: Contamination Risk Rating Criteria 107
 Exhibit 3-11: Number of Potential Contaminated Sites 107
 Exhibit 3-12: Identified Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL)
 Located within the Scarborough-Malvern LRT Corridor 108
 Exhibit 3-13: Expected/Changes in Airborne Emissions 109
 Exhibit 3-14: Future Population and Employment Growth (2031) 110
 Exhibit 4-1: Corridor Specific CO2-Equivalent Pollutant Burden 117
 Exhibit 4-2: Corridor Specific NOx Pollutant Burden 118
 Exhibit 4-3: Corridor Specific PM10 Pollutant Burden 118
 Exhibit 4-4: Summary of Scarborough-Malvern LRT Potential Impacts, Mitigation Measures, Monitoring
 and Future Actions 122
 Exhibit 7-1: Agencies Comments and Responses 132
 Exhibit 7-2: Main Points of Contact 134
 Exhibit 7-3: Public Comments and Responses 136

LIST OF APPENDICES

Appendix A: Scarborough-Malvern LRT Feasibility Study
 Appendix B: Existing and Future Traffic Operations Report
 Appendix C1: Natural Heritage Report
 Appendix C2: Meander Belt Analysis
 Appendix C3: Existing Geology Conditions & Contaminated Property
 Appendix C4: Noise and Vibration & Air Quality Report
 Appendix C5: Archaeological Assessment & Built Heritage and Cultural Landscape Reports
 Appendix D: Structural Report
 Appendix E: Active Development Applications
 Appendix F: West Hill Area Evaluations
 Appendix G: Traction Power
 Appendix H: Preliminary Property Requirements
 Appendix I: Consultation
 Appendix J: Potential Utility Impacts

EXECUTIVE SUMMARY

E.1. INTRODUCTION

The Toronto Transit Commission (TTC) and the City of Toronto have undertaken a Transit Project Assessment Process (TPAP) study for the 13 km long Scarborough-Malvern Light Rail Transit (SMLRT) corridor that would link northeast Scarborough with the Kennedy Subway Station, connecting with the Bloor-Danforth Subway, Scarborough Rapid Transit (SRT) and planned Eglinton Crosstown Light Rail Transit (LRT). This study recommends that bus services along the Scarborough-Malvern corridor be replaced by Light Rail Transit (LRT) with electrically powered light rail vehicles operating in a designated centre of the street right-of-way.

This change in transit service in the Scarborough-Malvern corridor is recommended as part of the TTC Transit City plan for a widely-spaced network of electric light-rail lines throughout the city, with seamless interconnections to existing and future transit services. The SMLRT is one of seven new lines being planned as part of Transit City, and will provide an important link between Kennedy Subway Station and the north of Scarborough. It will also provide a new high quality transit service along several busy existing transit routes.

The SMLRT light rail service would run east from Kennedy Station on Eglinton Avenue, northeast on Kingston Road, and then north on Morningside Avenue, with service via Ellesmere Road and Military Trail to serve the University of Toronto Scarborough Campus (UTSC), and returning to Morningside Avenue and terminating at Sheppard Avenue.

Study Background and Context:

Study Area

The study area for this TPAP consists of three major corridors including the Eglinton Avenue, Kingston Road and Morningside Avenue Corridors as shown on Exhibit E-1. The study limits for each corridor are provided as follows:

1. Eglinton Avenue Corridor

- Eglinton Avenue, from 200m west of Midland Avenue to Kingston Road. The study of the connection at Kennedy Subway Station will be the subject of a separate EA amendment following completion of the Kennedy Subway Station study by TTC;

2. Kingston Road Corridor

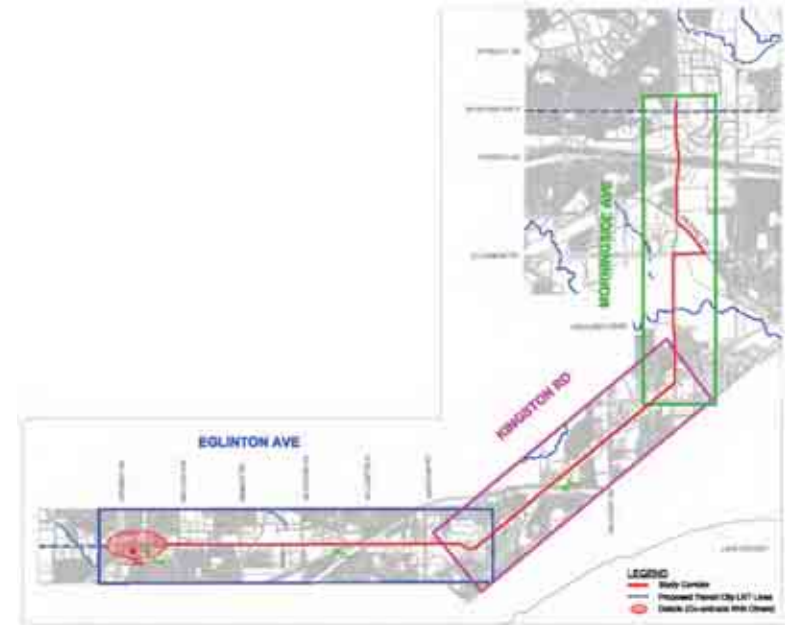
- Kingston Road, from Eglinton Avenue to Morningside Avenue;

3. Morningside Avenue Corridor

- Morningside Avenue and Ellesmere Road, from Kingston Road to the UTSC;
- From UTSC via Ellesmere Road/Military Trail and Morningside Ave. to Sheppard Avenue East (and 140 m north of the intersection) to connect with the Sheppard East LRT.

The study area was developed based on a feasibility study that was undertaken in early 2008. Alternative corridors from the Kingston Road/Morningside Avenue intersection to northeast Scarborough connecting to the Malvern Community were identified, developed and assessed, consistent with established City planning policies and the overall project objectives during the feasibility study phase. The Malvern Community is bounded by Highway 401 to the south, Morningside Avenue to the east, Finch Avenue East to the north and Markham Road to the west. Alternative corridors that were considered during the feasibility stage included using Kingston Road and Military Trail to provide a connection to UTSC and using Ellesmere Road and Neilson Road to access to Malvern Town Centre. During the review, it was decided to limit this project at Sheppard Avenue as an extension of the Scarborough Rapid Transit to Malvern Town Centre is now planned.

Exhibit E-1: Study Area



Study Process – Transit Project Assessment Process (TPAP)

This study was conducted following the Transit Project Assessment Process (TPAP) in accordance with Ontario Regulation 231/08 for Transit Projects and Greater Toronto Transportation Authority Undertakings. It is one of the TTC and City of Toronto LRT Transit Improvement Projects that is being carried out following this new process, which provides a framework for an accelerated consultation process for the assessment of potential environmental effects of a transit project.

Toronto Official Plan

The City's Official Plan strives to decrease dependency on private automobiles through a wide range of sustainable transportation objectives that support the development of a network of alternative forms of travel that are seamlessly linked, safe, convenient, affordable and economically competitive. LRT is one of the key elements of the City's transportation network and is crucial to supporting the growing travel needs of residents and workers over the next 30 years. Developing a LRT line in the Scarborough-Malvern study area supports the Official Plan.

Eglinton Avenue and Kingston Road are designated as Avenues in the Toronto Official Plan. These are important corridors along major streets where redevelopment and growth is encouraged. Growth and redevelopment must be supported by high quality transit services that promote a safe pedestrian environment and efficient commutes by placing priority on buses, streetcars, and LRT. Lands designated as mixed-use areas along the Avenues have the opportunity to perform a „Main Street‘ function and become meeting places for local neighbours and the wider community. By promoting alternative forms of travel, these areas become vibrant communities centred on activities and uses instead of automobiles. By directing growth to areas such as Avenues, the Official Plan provides greater certainty for land owners, businesses, and residents about what type of growth can be anticipated, and where growth will occur.

An amendment to Map 5 of the Official Plan is required in order to identify the segment of Morningside Avenue from Kingston Road to Ellesmere Avenue and from Military Trail to North of Sheppard Avenue as well as Ellesmere Road between Morningside Avenue and Military Trail and Military Trail from Ellesmere Road to Morningside Avenue as part of the City's "Surface Transit Priority Network". This amendment will enable public works related to the proposed Transit City – Scarborough-Malvern Light Rail Transit (LRT) to proceed north of Kingston Road.

In addition, City Planning is proceeding to amend the Right-of-Way widths shown on Map 3 of the Toronto Official Plan for a section of Morningside Avenue, north of Kingston Road to 36 metres (from 30m) and Military Trail between Ellesmere Road and Morningside Avenue to 36 metres (from 27m). The Official Plan amendment process includes community consultation, a community public meeting and a final decision by City Council.

Toronto Transit City Light Rail Transit Plan

In 2007, the TTC developed a plan that built upon the transit concepts contained in several studies, including the Toronto Official Plan, the TTC Ridership Growth Strategy, Building a Transit City and the Mayor's "Transit City" Platform (2006), and recommended a network of electric light-rail lines throughout the City, each with its own right-of-way. There are seven new lines proposed, with a total length of 120 km, all connecting with the City's existing and planned rapid transit routes. By 2031, it has been estimated that the new lines would carry 175 million riders per year.

Other Related Studies

Preparation of this study has also taken into consideration the policies, plans and strategies of the following municipal and provincial documents:

- Toronto Bike Plan – Shifting Gears
- Cycling and Transit Strategy: Bicycle Parking and Access to the Toronto Transit Commission
- Provincial Policy Statement
- Growth Plan for the Greater Golden Horseshoe
- Regional Transportation Master Plan (Metrolinx)
- Sheppard East LRT Class Environmental Assessment Study

E.2. PROJECT DESCRIPTION

The preferred Scarborough-Malvern LRT project includes the following key design components:

1. construction of the LRT in the centre of the roadway on a raised median to separate the LRT from vehicular traffic, crossing signalized intersections at-grade, with the exception of the areas adjacent to Highland Creek and UTSC, where a separate LRT right-of-way will be provided;
2. construction of 3.0 m wide farside passenger platforms or a minimum 5.0 m wide centre platform with an average spacing of 400-600 m in general;
3. provision of a 1.6 m delineated cycling lane on both sides along Eglinton Avenue, Kingston Road, Military Trail and Morningside Avenue with the exception of the Highway 401 area;
4. provision of 2 vehicular traffic lanes in each direction adjacent to the Scarborough-Malvern LRT corridor;
5. provision of left turn lanes at signalized intersections except at identified locations;
6. provision of U-turn opportunities at signalized intersections where there are no significant adverse traffic impacts;
7. construction of a new bridge to carry the LRT over Highland Creek parallel to the existing Morningside Avenue structure;
8. reconfiguration of the following intersections to minimize adverse traffic impacts: Eglinton Avenue & Kingston Road, Kingston Road & Morningside Avenue; Lawrence Avenue & Kingston Road and Eglinton Avenue/Brimley Road/Danforth Avenue;
9. provision of a new access road connection between Warnsworth Street and Beath Street across Morningside Avenue to ensure access to/from the communities adjacent to Morningside Avenue; and
10. minor realignment of lanes on the south-east ramp of the Highway 401/Morningside Avenue interchange for 200 m at the entrance area to accommodate the proposed LRT.
11. provision of utility and stormwater management facilities along the LRT line especially at intersections and water crossing.

LRT Alignment

The Scarborough-Malvern LRT alignment will generally follow the existing roadway alignments along the study corridor, with the exception of Morningside Avenue (between Beath Street and Ellesmere Road) and on Ellesmere Road. Beginning at the Kennedy Station west of Midland Avenue, the LRT will travel eastward along the existing centrelines of Eglinton Avenue, Kingston Road and Morningside Avenue from Kingston Road to just north of Beath Street. It will then cross the Morningside Avenue northbound lanes and tie into a new Highland Creek bridge structure located on the east side of Morningside Avenue. At Ellesmere Road it will turn east and run along the south side of Ellesmere Road to serve the University of Toronto Scarborough Campus. The LRT will then turn north into the centre of Military Trail from Ellesmere Road to Morningside Avenue. Thereafter, the LRT alignment will operate north in the centre of Morningside Avenue, pass over Highway 401, cross Sheppard Avenue East and terminate 140 m north of the intersection.

The existing horizontal alignment of Eglinton Avenue and Kingston Road will remain the same, except at the Eglinton Avenue and Kingston Road intersection. The Morningside Avenue right-of-way will be widened on both sides between Kingston Road and north of Warnsworth Street. The road alignment will be moved slightly to the west from Warnsworth Street to tie into the existing Highland Creek structure. The Morningside Avenue widening will be along the existing east side edge of pavement north from Warnsworth Street, to accommodate the existing travel lanes, the proposed LRT facilities and bicycle lanes. Vertical alignment for the LRT alignment will generally follow the existing road profile. The maximum grade for the LRT will be 5.0%.

Typical Cross-Sections

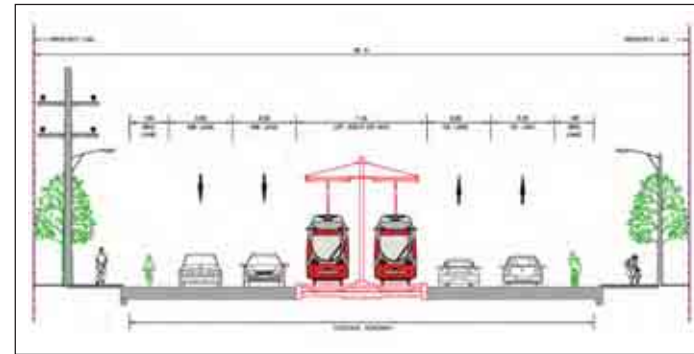
Typical 36.0 m cross-sections along the Scarborough-Malvern corridor were developed for both mid-block sections and at intersections. Typically, the LRT alignment is located in the middle of the corridor with a 150 mm high median to separate LRT traffic and general traffic between traffic signals. At intersections, the track will be at the same elevation as the crossing road. Light rail vehicles (LRVs) will be operating on standard TTC gauge embedded track. The proposed system will be double-tracked throughout, providing a separate track for each direction. Generally, a cross-section of at-grade double track for an LRT alignment requires 7.4 m. The minimum vertical clearance is approximately 4.0 m from top of rail. Crossovers will be provided at designated locations for special LRT operations to allow trains to cross to the opposite track.

Centre-located traction power poles are recommended from an urban design perspective (removal of some visual clutter from the street), and because they cost less to construct, are less prone to damage and have lower maintenance requirements. Pole locations will be confirmed at the detailed design stage.

The following Exhibit E-2 cross-section shows a typical mid-block condition on Eglinton Avenue and Kingston Road. On Eglinton Avenue, the existing 6 traffic lanes and continuous centre left turn lane will be replaced by the LRT right-of-way, 2 lanes of traffic in each direction, bicycle lanes and boulevard/sidewalk. Similarly, on Kingston Road, the existing 6 traffic lanes and raised median/centre left turn lane will be replaced by the LRT right-of-way, 2 lanes of traffic in each direction, bicycle lanes and boulevard/sidewalks.

The existing Morningside Avenue right-of-way between Kingston Road and Warnsworth Street will be widened to accommodate the LRT right-of-way, 2 lanes of traffic in each direction, bicycle lanes and boulevard/sidewalk as shown in Exhibit E-3.

Exhibit E-2: Typical Mid-Block Cross Section – Eglinton Avenue and Kingston Road (36.0 m)



The existing Highland Creek Structure will require widening by 1.7 m on the east side to accommodate the bicycle lanes as shown in Exhibit E-4; in addition, a new 10.0 m wide structure is proposed on the east side of Morningside Avenue for the LRT.

Ellesmere Road has a four-lane cross section with no median and a sidewalk on the south side. The existing roadway cross-section will be maintained with the LRT located on the south side of Ellesmere Road as shown in Exhibit E-5; bicycle lanes will not be provided. Military Trail will become a four lane road with the LRT facilities located in the median as shown in Exhibit E-6. The LRT right-of-way along Military Trail will be wider than other locations due to the special trackwork (two-track to three-track transition crossovers and turnback tracks) located within this area.

Stormwater management facilities will be maintained / provided along the study corridor. The documentation of the evaluation of Best Management Practices for the Stormwater Management facilities and the recommended design will be prepared during the design phase in consultation with Toronto and Region Conservation Authority (TRCA) and the Ministry of the Environment (MOE).

Left Turning Movements at Unsignalized Intersections

Left turns across the Scarborough-Malvern LRT tracks will be permitted only at signalized intersections where possible. Loss of left turn access to driveways/streets located between traffic signals will be facilitated at nearby signalized intersections where "U" turns will be permitted to allow motorists an opportunity to achieve the equivalent movement/access.

Exhibit E-3: Mid-Block Cross Section – Morningside Avenue
South of Warnsworth Street (30.0 m)



Exhibit E-4: Cross Section – Morningside Avenue over Highland Creek

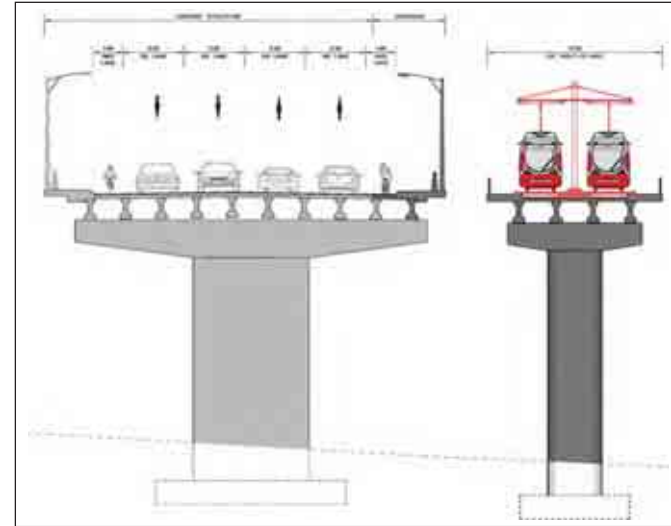


Exhibit E-5: Cross Section – Ellesmere Road

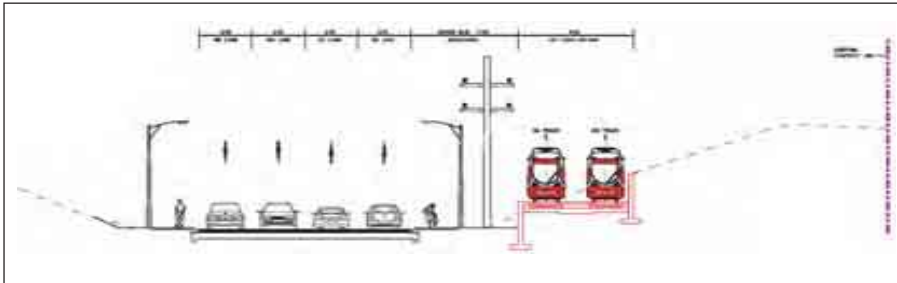
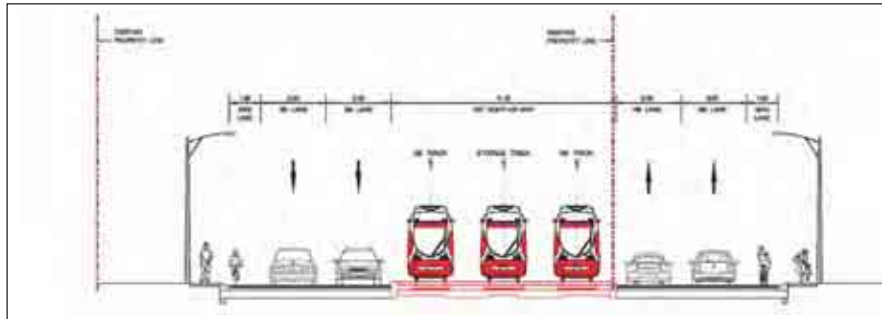


Exhibit E-6: Cross Section – Military Trail



E.3. EXISTING CONDITIONS / POTENTIAL IMPACTS / MITIGATION AND NET EFFECTS

Design alternatives for the SMLRT were developed to assess the potential impacts on all existing significant features and sensitive areas within the proposed corridor. A summary of some key findings is provided as follows.

Transportation System / Traffic Operations

The Toronto Transit Commission currently operates three bus routes in the Scarborough-Malvern corridor, the 34 Eglinton East, 86 Scarborough and 116 Morningside. These three routes have a combined daily ridership of 63,600 and a peak hour peak point ridership of 2,700 persons per hour per direction. An additional 12 bus routes cross the Scarborough-Malvern corridor.

GO Transit currently operates four routes serving the Scarborough-Malvern study area: the Lakeshore East and Stouffville rail services (with complementary bus service in the Stouffville corridor), the Highway 407 East GO Bus and UTSC/Centennial College GO Bus. The typical AM peak period / peak direction rail boardings are over 1,000 passengers per hour at both the Guildwood and Eglinton Stations.

Existing Eglinton Avenue, Kingston Road and Morningside Avenue do not currently provide any designated bicycle facilities. However, these corridors are included in the City of Toronto Bicycle Lane Network as part of the City of Toronto's Bike Plan. Provision of bicycle lanes on these streets is proposed as part of this project. With regard to pedestrian facilities, Eglinton Avenue, Kingston Road, and Morningside Avenue along the Scarborough-Malvern corridor currently include sidewalks along both sides of the road. Pedestrian crossings with traffic signals are provided at major cross streets. These will be maintained.

The major east-west roads in the study area include Eglinton Avenue, Lawrence Avenue, Ellesmere Road, Highway 401 and Sheppard Avenue. These run perpendicular to Morningside Avenue which runs north-south. Kingston Road runs at a diagonal connecting Eglinton Avenue with Military Trail and east to the Region of Durham, while Military Trail also runs at a diagonal connecting Kingston Road to Morningside Avenue.

Signalized intersections define the level of traffic congestion (typically called the "level of service") on any segment of the roadway. A detailed traffic analysis shows that 18 out of 30 intersections in the Scarborough-Malvern corridor are currently operating at or over capacity during the AM or PM peak hours.

Traffic analysis combined with LRT operation identified four locations that will require specialized treatment with the implementation of the LRT line as follows:

- 1) Eglinton Avenue at Brimley Road and at Danforth Road (Exhibit E-7)

The proximity of these two major road crossings resulted in a recommendation to provide farside platforms at Danforth Road only. In addition, operational measures including restricted left turns from Eglinton Avenue and cycle length adjustments will be implemented to facilitate traffic flows at these locations.

Exhibit E-7: Preferred Design - Eglinton Avenue at Brimley Road and Danforth Road



2) Eglinton Avenue at Kingston Road (Exhibit E-8)

This intersection will be redesigned to accommodate a connection between the SMLRT and the proposed Kingston Road BRT including the LRT platform, special trackwork to allow turnback of service and a bus terminal for the BRT and local bus services. The new design can be accommodated within the existing road allowance.

Exhibit E-8: Preferred Design - Eglinton Avenue and Kingston Road Intersection



3) Kingston Road at Morningside Avenue (Exhibit E-9)

Due to the heavy flow of traffic from Kingston Road East, several operational measures will be implemented in the general vicinity of Kingston Road / Morningside Avenue including the Kingston Road/Lawrence Avenue intersection. These measures will include restricted left turns, added right turn lanes, and signal phase adjustments.

Exhibit E-9: Preferred Design - Kingston Road and Morningside Avenue Intersection



4) Morningside Avenue / Highway 401 (Exhibit E-10)

A detailed traffic analysis was conducted at the Morningside Avenue / Highway 401 crossing resulting in recommendations that provide the most benefit to the LRT operation, and mitigation measures to effectively accommodate critical highway movements. The recommended changes have been agreed in principle by the MTO.

Exhibit E-10: Preferred Design – Highway 401 / Morningside Avenue Area



LRT Service

A successful transit system will maintain existing transit riders and attract new riders by offering a fast, reliable and safe transit service, while being affordable and environmentally sustainable. The existing bus services along the Scarborough-Malvern Corridor operate in mixed traffic, and therefore do not provide enough incentive, from a travel time and reliability perspective, to be an attractive alternative to continued auto use.

LRT is recommended as the preferred transit method over Subway / Scarborough Rapid Transit (SRT) or Bus Rapid Transit (BRT) technologies due to the more appropriate passenger carrying capacity. The forecasted peak point demand for the Scarborough-Malvern corridor ranges between 4,600 and 5,000 people per hour per direction, well below the threshold of 10,000 people per hour normally required to justify the very high cost to construct Subway/SRT facilities.

Transit Service Connections

The TTC is undertaking a separate study to expand the existing Kennedy Subway Station including the terminal of the Scarborough-Malvern LRT.

The City of Toronto has initiated a Transit Project Assessment Process study to identify potential transit improvements along the Kingston Road and Danforth Avenue Corridor. The study is to investigate how to improve transit service along Kingston Road and Danforth Avenue between Victoria Park Subway Station and Eglinton Avenue.

Local bus services in the corridor will be redesigned to provide integrated service with the new SMLRT. Bus Rapid Transit (BRT) may also be implemented along Kingston Road.

The connection between the Sheppard East LRT and Scarborough-Malvern LRT is located at the intersection of Sheppard Avenue East and Morningside Avenue. A track connection will be implemented to provide a link between the two LRT lines for servicing purposes.

Stop Locations

The recommended stop spacing for Scarborough-Malvern is in the order of 400 to 600 metres, based upon the pattern of development and the location of cross-streets. With an expected average speed of 22 to 23 km/h, this spacing is considered to be the best balance between the overall route speed and good local access for LRT service. The stop spacing may be longer at some locations for the Scarborough-Malvern LRT due to the presence of undeveloped zones along the corridor, including the crossings of the Highland Creek and Highway 401. The recommended stop locations are shown in Exhibit E-11:

According to the measurement data, vibration levels resulting from TTC vehicles are well below the MOE/TTC Protocol Criteria at distances beyond 12 m from the track. Given the shortest distance between the centreline of a proposed SMLRT track and any receptor in this assessment is 15 m, it is expected that no mitigation will be required.

Air Quality Analysis

The Air Quality Assessment study report conducted for this project concludes that installation of the Scarborough-Malvern Light Rail Transit (SMLRT) corridor will result in a reduction of particulate based pollutant emissions and will result in small reductions to all gaseous pollutants emissions; therefore, no impacts are predicted based on the operation of the SMLRT system. Particulate based pollutants from within the study area corridor will be reduced by approximately 25% and gaseous pollutants will be reduced by approximately 2%. It is estimated that carbon dioxide equivalent emissions (CO₂-e), which is the unit of measure for global warming potential, will be reduced within the study area corridor by 1.1 to 1.2 ktonnes/year.

Cultural Environment

A Stage 1 Archaeological Assessment identified no registered sites within or near the study area, but the historical land use exhibits some archaeological site potential. Research into built and cultural heritage within the study area also revealed twenty identified heritage areas and properties that may be affected by the planned LRT project. One built heritage (Identified) building, located in the West Hill area, has been identified as potentially requiring a full property acquisition.

Based on these potential impacts, it is recommended that the proposed light rail transit route be suitably planned in a manner that avoids all identified, above ground, cultural heritage resources. Where any identified, aboveground, cultural heritage resources are to be affected by loss or displacement, further research should be undertaken to identify the specific heritage significance of the affected cultural heritage resource. Based on the results of a detailed heritage evaluation, appropriate mitigation measures such as retention, relocation, salvage, and/or documentation, should be adopted. A Heritage Impact Assessment will be conducted during detailed design.

Economic Environment

The existing Eglinton Avenue, Kingston Road and Morningside Avenue corridors provide the essential visibility and accessibility needed by businesses and other economic activities along the corridors. The planned SMLRT will enhance this accessibility with improved transit service, bringing more patrons to and through the corridors. By stimulating land use redevelopment and intensification along these corridors, the SMLRT may attract even more business potential, resulting in positive economic benefits. Further economic benefits to the City will be achieved during the construction and operation of the SMLRT.

E.4. CONSULTATION

Public Consultation

The general public, government agencies and various interest groups were provided opportunities to review, and comment on this project during the course of the study. The City of Toronto Public Consultation Team was involved in the overall public consultation process. They provided a wide range of methods to communicate with the public including a project web site, a dedicated telephone number, and fax and email addresses for contacting the project team. The addresses/number used were:

Telephone: 416-392-6900
 TTY: 416-397-0831
 Fax: 416-392-2974
 Email: malverntransit@toronto.ca
 Mail: Public Consultation
 City of Toronto
 Metro Hall, 19th Floor
 55 John Street
 Toronto, ON M5V 3C6
 Web: http://www.toronto.ca/involved/projects/malvern_lrt/index.htm

Technical agencies, including federal, provincial and municipal agencies, utilities, and potential interested groups, were contacted in the beginning stage for their initial inputs.

Newsletters and/or emails outlining the project and frequently asked questions were sent directly to individuals on the project mailing list, and to all residents and businesses within the Scarborough-Malvern Corridor. This list included representatives from external agencies, municipalities, and members of the public within the study area or affected by the project, and the public who requested to be added to the mailing list.

Three rounds of Open Houses were held for the public and advertised in the local newspaper to have direct communication with Project Team members. Flyers were distributed throughout the study area prior to each open house. Information panels and audio-visual presentations were provided at the Public Open Houses. The Project Team including representatives from the TTC, the City of Toronto, IBI Group/Arup (prime consultant) and Lura Consulting (Public Consultation Unit) was in attendance at the meetings to answer questions regarding the study.

Public Open Houses No. 1

Two public open houses were held on July 23 and July 24, 2008 as part of the first series of Scarborough-Malvern LRT open houses. The purpose of the open house was to share information about the project with the community and gather feedback on the study area, objectives, background and supporting planning policies, existing conditions and the alternative and recommended transit solution. A total of 121 people signed into these open houses, with 23 comment forms received. There was general support for the project, with some concerns noted about station locations, LRT routing and increased traffic delays result from the LRT operation and left turn restrictions.

Public Open Houses No. 2

Two public open houses were held on May 20 and May 21, 2009 to present the preferred design, the assessment of impacts, construction staging and benefits. Almost 200 people signed in to these two sessions. Participants were invited to submit their ideas and opinions on comment forms, with 24 forms received plus about 40 other comments at the sessions. Once again there was general support for the project, but with concerns about left turn restrictions, potential traffic infiltration into neighbourhoods, LRT stop locations, impacts on surrounding property and roadway traffic congestion.

Public Open House No. 3

A Notice of Study Commencement and of the Third Public Open House was placed in Scarborough Mirror on June 19, 2009, with the open house held on June 29, 2009. The notice advised the public of the commencement of this Transit Project Assessment Study. The purpose of the open house was to share information about the project with the community and to gather feedback on the preferred design concept, the associated impacts and proposed mitigation measures. There was support for implementation of the project with concerns about traffic congestion on Eglinton Avenue and Kingston Road, left turn restrictions, property acquisitions, LRT stop locations and spacing, utilization of bicycle lanes and provision for commuter parking.

Additional Public Meetings

In addition to these Public Open Houses, the EA team met with the Coronation Community of West Hill on May 5, 2009 at Toronto Police 43 Division Community Room, and attended two Town Hall Meetings, arranged by the Councillor for Ward 43 on June 25, 2009 at West Hill Collegiate Institute and the Councillor for Ward 42 on June 19, 2009 at the Malvern Recreation Centre. Over 150 residents attended these question and answer meetings, where questions concerning left turn restrictions, potential traffic infiltration, roadway congestion (particularly on Kingston Road), preference for a subway and property impacts were raised.

The response to all these comments are summarized in Section 7 of the report

First Nations Consultation

This TPAP has addressed the new Ontario Regulation 231/08 requirement to involve and consult with interested First Nations agencies and communities. In 2008 the City of Toronto established a protocol to address First Nations communities consultation, referred to as the City of Toronto and federal Ministry of Indian and North Affairs (INAC) notification protocol for Environmental Assessments. Government officials at the federal and provincial level as well as the Mississaugas of the New Credit First Nation and the Williams Treaty Bands were notified of this project. From these notifications and contacts, no First Nations Community interests were recorded that would affect the TPAP or the preferred design of the project.

Technical Agencies Consultation

The following agencies were invited to be involved in the Preliminary Planning and the TPAP study.

Government Review Agencies

Canadian Environmental Assessment Agency

Technical Agencies

All Stream

Government Review Agencies

Environment Canada
 Department of Fisheries and Oceans
 Transport Canada - Ontario Region
 Ministry of Aboriginal Affairs
 Ministry of Agriculture, Food and Rural Affairs
 Ministry of Citizenship and Immigration
 Ministry of Culture
 Ministry of Municipal Affairs and Housing
 Ministry of Municipal Affairs and Housing
 Ministry of Natural Resources
 Ministry of the Environment
 Ministry of Tourism and Recreation
 Ministry of Transportation
 Ontario Realty Corporation
 Ministry of Health Promotion
 Ministry of Energy and Infrastructure
 Ministry of Health and Long-Term Care

Technical Agencies

MTS All Stream Inc.
 Telus
 Enwave Energy Corporation
 Group Telecom / 360 Networks
 Hydro One Network Inc.
 Toronto Hydro
 Toronto Hydro Telecommunications
 Enbridge Gas Distribution
 Rogers Cable Inc.
 Bell Canada
 Toronto and Region Conservation Authority
 Canadian National Railway
 Canadian Pacific Railway
 GO Transit
 Toronto District School Board
 University of Toronto Scarborough Campus
 Ontario Provincial Police
 City of Toronto Fire Department Services
 City of Toronto Police Services
 Toronto Emergency Medical Services

Comments that were received from several of these agencies assisted in the planning process and the development of the conceptual design. The comments and the team's responses are summarized in Section 7.

Further consultation was carried out with major stakeholder agencies that noted interest in the project throughout the study, including the Toronto and Region Conservation Authority (TRCA), the Ministry of Transportation Corridor Management Office and the University of Toronto Scarborough Campus (UTSC). A number of meetings were held with these groups to discuss potential impacts of the SMLRT and associated mitigation measures. The TRCA were interested in Regulated Areas, TRCA Program & Policy Areas and Provincial & Federal Program Areas located within the study area. Their resulting project requirements were listed in their letter to the TTC dated October 28, 2008 and included in Appendix I. MTO input focused on infrastructure crossing agreements, the use of full transit signal priority near their structures and traffic operation near their facilities. Their resulting project requirements were listed in their letter (email) to the TTC dated September 24, 2009 and is included in Appendix I. Input was provided by the UTSC on their current and future facility and operational plans.

E.5. FUTURE COMMITMENTS

The TTC and the City of Toronto have worked closely with the technical agencies to address any environmental concerns and issues associated with this project. The potential impacts, mitigation measures of the project on traffic operations, transit operations, the natural (including fisheries, vegetation and wildlife), socio-economic and cultural environment (including archaeological, built and as documented in this Environmental Project Report (EPR) cultural heritage, noise and vibration, air quality and property) have been identified, evaluated and assessed and mitigation measures identified. The design process, including both preliminary design and detailed design, may lead to refinement or modification of the proposed conceptual design as noted in the EPR. It is anticipated that such changes will be minor and will not alter the original project intent or commitments to the public and involved agencies.

The detailed design will also evaluate and assess construction methods and staging that will minimize the impacts to the surrounding properties. It will include mitigation plans to address traffic staging, noise, air quality, etc. This will involve ongoing liaison with the technical agencies, emergency services providers, and the affected property owners/communities.

The TTC and the City of Toronto will comply with the TRCA/MOE and other regulatory government agencies' regulations, standards and directives. TRCA has provided a number of specific issues that must be addressed during detailed design and construction phase as reported in the EPR.

