Schedule B Municipal Class Environmental Assessment

Garden Street (Dryden Boulevard to Taunton Road) Town of Whitby

Project File Report
April 25, 2018 (MOECC final comments on PFR addressed – see Appendix O)

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Executive Summary

Introduction

The Town of Whitby (Town) retained Cole Engineering to undertake a Municipal Class Environmental Assessment (EA) study for Garden Street between Dryden Boulevard and Taunton Road in the Town of Whitby. The Class EA was initiated in order to identify a suitable solution for potential future capacity constraints along the corridor and the proposed widening of Garden Street outlined within the Whitby Transportation Master Plan.

Garden Street is a Type C arterial road that runs north-south through the Town of Whitby from north of Taunton Road to Consumers Drive. While the corridor will not connect to the extension of Highway 407, it is proposed to extend northerly to a future mid-block east-west arterial road.

Within the study area, Garden Street is a 2-lane roadway with well spaced (>300 m) minor street intersections including left turn lanes at each intersection. South of Dryden, Garden Street has a 4-lane cross section with varying auxiliary lane configurations to Rossland Road. North of Taunton Road, the segment adjacent to commercial development has been widened to 4 lanes with a centre left-turn lane. Further north, Garden Street narrows to 2 lanes with a rural cross section.

The Garden Street study corridor is approximately 1.3 km in length and extends from Dryden Boulevard northerly to Taunton Road. Figure 1-1 illustrates the study area.

Figure 1-1 Study Area
Background

In July 2010, Council adopted the Whitby Transportation Master Plan (TMP) to guide the Town’s transportation policies, programs and infrastructure improvements to meet transportation needs to the year 2031. One of the roadway initiatives identified in the TMP was the widening of Garden Street between Dryden Boulevard and Taunton Road.

The aim of this study is to address existing and future transportation needs on Garden Street to accommodate the anticipated growth in the area.

The Town of Whitby retained Cole Engineering (CEG) in March 2011 to undertake a Municipal Class Environmental Assessment study for potential transportation improvements along Garden Street, between Dryden Boulevard to Taunton Road, in the Town of Whitby. The study was conducted as a ‘Schedule B’ classified project in accordance with the Municipal Class Environmental Assessment Act document (October 2000, as amended in 2011), by the Municipal Engineers Association, which is approved under the Ontario Environmental Assessment Act. However, for this project, a higher level of consultation was conducted in satisfying the requirements of a ‘Schedule C’ project. The objective of this Class Environmental Assessment is to provide the detailed assessment in definition of the solution and design of the improvements within the study area.

As a result of this extensive study, it was determined that road capacity and transportation system improvements are recommended within the study area. Primary objectives for this study were to examine opportunities to:

- Perform a detailed transportation study/analysis along the Garden Street corridor to identify the needs and opportunities for a preferred alternative solution.
- Complete Phases 1 and 2 in accordance with the Municipal Class EA process with public participation and interested parties at the initiation and the duration of the process.
- Provide a range of alternative solutions for consideration.
- Determine potential impacts and mitigation measures of the environment and an evaluation of alternatives.
- Present the preferred alternative solution and preferred design concept.

Problem and Opportunity Statement

In acknowledging future transportation demand and the need to accommodate development growth in the Town of Whitby, there is a need to identify long-term opportunities to improve Garden Street, between Dryden Boulevard and Taunton Road. As well, to address the TMP recommendation for widening from 2 lands to 4 lanes in the 2017 to 2021 timeframe with a re-classification of the Garden Street corridor from Type C arterial to Type B arterial.
The problem and opportunity statement will support the Town of Whitby transportation vision:

“To move people and goods within and across the municipality: safely, conveniently, and reliably by providing an integrated, accessible, and financially sustainable transportation system. This system will have a balanced range of mobility options and choice for all users which crosses and links into Regional and Provincial transportation infrastructure, connects all borders of Whitby including integration with the waterfront, and safeguards the natural environment, protects residents and the social community fabric, and enables economic prosperity.”

The identified problem is the current 2-lane road is inadequate to accommodate future traffic demand generated by the anticipated growth and planned transportation network. Opportunities exist to improve Garden Street with the objectives to support long-term development/growth, address future traffic demand, enhance safety (pedestrian crossing, transit), promote cycling and improve transit services.

**Alternative Solutions**

The Class Environmental Assessment process prescribes the examination of all reasonable alternatives, including alternatives to the undertaking, referred to as planning alternatives, in addressing the problem and opportunity statement. An evaluation methodology is used to ensure that the process is traceable and reproducible; considering technical, economic, social and environmental impacts. The following section provides details on the development and evaluation of planning alternatives.

**Identification of Alternative Solutions**

In reviewing the preliminary recommendations and the problem and opportunity statement, the following planning solutions for undertaking were considered:

- **Alternative 1: Do Nothing** – This alternative serves as a benchmark for other alternatives to be compared. No specific improvements are considered to the Garden Street Corridor; however those in the Town of Whitby Transportation Master Plan are included.

- **Alternative 2: Travel Demand Management** - Initiatives are implemented to shift demand to public transit, carpooling and alternative modes (walking and cycling). Action items include promotion of increasing bus ridership, sustainable transportation education and incentives.

- **Alternative 3: Improve Pedestrian/Cycling Facilities** - Addition of a multi-use path to one side of Garden Street for the use of pedestrian and cyclists and improvement of pedestrian crossing opportunities. Infrastructure includes pedestrian refuge islands, signage and markings.
• Alternative 4: Traffic Operations / Systems Management Improvements – Minor geometric or physical improvements that may include adding lanes at intersections, signal timing modifications, improved signage and pavement markings.

• Alternative 5: Widen Garden Street - Widening of Garden Street from the current two (2) lanes to four (4) lane cross-section with additional turning lanes, as necessary.

• Alternative 6: Combination of Alternatives – The combination of the widening of Garden Streets to a four (4) lane cross-section, addition of a multi-use path of Garden Street and improvement to pedestrian crossing opportunities.

Evaluation of Alternative Solutions

Alternative solutions were evaluated based on the addressing the problem and opportunity statement in comparison to the criteria outlined in Section 7.1.2, including transportation and engineering, the natural environment, socio-economic and cultural heritage and financial aspects. The overall evaluation was conducted with input from the project team, project stakeholders and the public.

Following the evaluation process, a recommendation of the planning alternatives was made which would be carried forward to the next phase as part of the preferred solution. The evaluation and results of the alternative solutions are presented in Section 7.1 of the report.

Preferred Alternative Solution

The preferred solution was found to be Alternative #6, which is a combination of a widening of Garden Street to a 4-lane cross-section and the introduction of a multi-use path with future pedestrian crossing connections (Intersection Pedestrian Signals) at Meadowglen Drive.

Preferred Alternative – Development of Design Concepts

The development of Design Concepts was completed through the implementation of the corridor features outlined in Alternative #6. The design concepts applied the proposed elements through various methods in order to determine the most suitable means of implementing the corridor elements. In addition to the development of Design Concepts a number of Design Decisions were required in order to configure specific design elements identified through the study process to be applied to the various design concepts.

Design Decisions

The existing Garden Street corridor has different characteristics throughout the 1.3 km study section, include different lane uses, boulevard grading, roadway cross-sections (auxiliary lanes), and right-of-way (presence of window streets). To address these various characteristics and other traffic issues raised by the public during the course of
the study, the development and evaluation of the following design decisions were required:

- Garden Street Multi-use path Location; and
- Pedestrian Crossing Opportunities.

**Design Concepts**

Five Design Concepts were identified and assessed to widen Garden Street to a 4-lane road plus auxiliary lanes at intersections as per the Preferred Alternative Solution described in Section 7.1.4. The Design Concepts developed and evaluated included:

- Design Concept #1 – Widen Garden Street about the centreline of the existing roadway
- Design Concept #2 – Widen Garden Street exclusively to the East of the existing roadway
- Design Concept #3 – Widen Garden Street exclusively to the West of the existing roadway
- Design Concept #4 – Widen Garden Street About the Centreline with altered design features to ensure minimum impacts to existing boulevard trees
- Design Concept #5 – Widen Garden Street about the Centreline with a modified design approach to provide a compromise between impacts to the corridor aesthetics and adjacent residents and the objective to minimize impacts to existing boulevard trees.

An evaluation was completed with input from the project team and applicable stakeholders, using the list of criteria provided in Section 7.3.2 and as summarized in Table 7.2.

Based on the detailed evaluation of the five design options, **Design Option #5 - Widen About the Centreline – Minimum Tree Impacts** was found to be the technically preferred design option.

**Description of the Preferred Design Concept**

The main features of the preferred design option are briefly described below and include the following elements:

- **Widening of Garden Street** - The widening of Garden Street symmetrically from the existing two lane cross section with left turn lanes to a four lane cross section with left turn lanes provided where they are currently provided.
- **Multi-use Path** – A multi-use path will be provided along the west side of Garden Street within the study limits with a varying width (2.5m Min.) to limit impacts to existing boulevard trees.
- **Intersection Pedestrian Signals (IPS)** – Intersection pedestrian signals have been identified as part of the preferred design concept at the intersection of Garden Street and Meadowglend Drive. The Town will monitor pedestrian movements along the Garden Street corridor to determine the applicable timing for implementation of the IPS and if additional IPS should be installed at alternate intersections on Garden Street.

- **Property Impacts** – No property acquisition is anticipated for the preferred design concept.

- **Utility Impacts** - There are minor utility impacts anticipated for existing Hydro (aerial) Rogers and Bell infrastructure and minor relocations will be required.

### Environmental Issues and Commitments

The following potential adverse effects associated with the proposed roadway works are anticipated, along with the various mitigation measures to minimize and/or eliminate these adverse effects.

- **Temporary Construction Work** - To implement the proposed roadway improvements, construction has the potential to create disturbances of noise, odour, and dust in the area. This effect can be mitigated by a detailed construction plan and schedule including limitations on hours of construction to accommodate local residents. Noise controls are recommended during construction. Measures should be consistent with Town of Whitby by-laws and incorporated into the tender document.

- **Stormwater Management** - The proposed widening of Garden Street will result in increased imperviousness and peak flows. The Stormwater Management Report (See Appendix J) has summarized that the increased minor system flow of 0.25 m³/s can be controlled by the existing storm sewers. The major system flow increased by 3.23 m³/s and can still be contained in the road right of way. This will allow the stormwater to be distributed and managed in the same manner as the existing conditions. Water quality control could be provided through the use of a Stormceptor Model STC 9000 OGS if it is determined the SWM pond cannot provide the required water quality treatment. As part of detailed design, a detailed assessment of receiving pipe capacity is recommended.

- **Tree Impacts** - The widening of Garden Street requires removal of existing ornamental landscape trees and/or relocation of small trees and saplings. The number of trees impacted will require further investigation through detail design and incorporate the effects of road widening, provision of the path and grading. It is recommended that the Town of Whitby implement an Advanced Tree Planting program in an effort to offset removals of existing Ornamental and Street Trees within the existing boulevards of Garden Street as a result of the widening and construction of the multi-use path.

- **Noise Impacts** – A Noise Impact Assessment was completed as part of this study. The results of the assessment determined noise mitigation is not warranted as a
result of the undertaking. A detailed outline of the noise impacts and assessment is provided in Section 8.1.3.

- **Mitigation Measures** - A complete summary of potential impacts and the mitigation measures has been prepared and is provided in Table 8.1 of the report.
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1.0 Introduction

Cole Engineering was retained by the Town of Whitby to undertake a Municipal Class Environmental Assessment (EA) study for Garden Street between Dryden Boulevard and Taunton Road in the Town of Whitby. This report documents the Class Environmental Assessment Study planning and design process and recommendations for the preferred alternative solution and design concept.

1.1. Introduction and Project Context

In July 2010, Council adopted the Whitby Transportation Master Plan (TMP) to guide the Town’s transportation policies, programs and infrastructure improvements to meet transportation needs to the year 2031. One of the roadway initiatives identified in the TMP was the widening of Garden Street between Dryden Boulevard and Taunton Road.

The aim of this study is to address existing and future transportation needs on Garden Street to accommodate the anticipated growth in the area.

The Town of Whitby retained Cole Engineering (CEG) in March 2011 to undertake a Municipal Class Environmental Assessment study for potential transportation improvements along Garden Street, between Dryden Boulevard to Taunton Road, in the Town of Whitby. The study was conducted as a ‘Schedule B’ classified project in accordance with the Municipal Class Environmental Assessment Act document (October 2000, as amended in 2011), by the Municipal Engineers Association, which is approved under the Ontario Environmental Assessment Act. However, for this project, a higher level of consultation was conducted in satisfying the requirements of a ‘Schedule C’ project. The objective of this Class Environmental Assessment is to provide the detailed assessment in definition of the solution and design of the improvements within the study area.

As a result of this extensive study, it was determined that road capacity and transportation system improvements are recommended within the study area. Primary objectives for this study were to examine opportunities to:

- Perform a detailed transportation study/analysis along the Garden Street corridor to identify the needs and opportunities for a preferred alternative solution.
- Complete Phases 1 and 2 in accordance with the Municipal Class EA process with public participation and interested parties at the initiation and the duration of the process.
- Provide a range of alternative solutions for consideration.
- Determine potential impacts and mitigation measures of the environment and an evaluation of alternatives.
- Present the preferred alternative solution and preferred design concept.
1.2. Study Area

The Garden Street study corridor is approximately 1.3 km in length and extends from Dryden Boulevard northerly to Taunton Road. **Figure 0-1** S illustrates the study area.

![Study Area Map](image-url)

**Figure 0-1  Study Area**

Garden Street is a Type C arterial road that runs north-south through the Town of Whitby from north of Taunton Road to Consumers Drive. While the corridor will not connect to the extension of Highway 407, it is proposed to extend northerly to a future mid-block east-west arterial road. The future Garden Street extension and mid-block arterial connection is shown in **Figure 1-2**.
Figure 0-2 Garden Street Future Extension and Mid-Block Arterial Connection

Within the study area, Garden Street is a 2-lane roadway (see Figure 0-3) with well spaced (>300 m) minor street intersections with left turn lanes at each intersection. South of Dryden, Garden Street has a 4-lane cross section with varying auxiliary lane configurations to Rossland Road. North of Taunton Road, the segment adjacent to commercial development has been widened to 4 lanes with a centre left-turn lane. Further north, Garden Street narrows to 2 lanes with a rural cross section.
1.3. Project Team

The Garden Street EA Study is being conducted by a consultant team led by Cole Engineering, on behalf of the Town of Whitby. The study team is outlined below.

1.3.1. Consultant Team:

Cole Engineering Group
- Ray Bacquie – Project Manager
- Drew Stirling – Deputy Project Manager, Design Lead
- Suzette Shiu – Transportation Planning Lead
- Laurella Chadee – Transportation Planner

Town of Whitby Team
- Greg Hardy – Manager of Engineering and Infrastructure Services
- Tara Painchaud – Manager of Transportation and Parking Services
- Horace Look – Project Engineer
1.4. Study Schedule

Initial investigations for the study began in April 2011 and the announcement of study commencement was issued in June 2011 together with the notice of the first Public Information Centre (PIC) meeting. Key milestones of the study process are described below:

- **June 6, 2011** - Notice of Study Commencement and PIC No. 1 - Notices mailed to residents/businesses, First Nations and review/environmental agencies.
- **June 16, 2011** - Notice of Study Commencement and PIC No. 1 - Newspaper advertisement appeared in Whitby This Week.
- **June 29, 2011** - PIC No. 1 - Solicit public input for identified background issues, preliminary recommendations, problem and opportunity statement, potential alternative solutions for consideration.
- **January 14, 2013** - Notice of PIC No. 2 - Notices mailed to residents/businesses, First Nations and review/environmental agencies.
- **January 23, 2013** - Notice of PIC No. 2 - Newspaper advertisement appeared in Whitby This Week.
- **January 29, 2013** - PIC No. 3 - To present preferred alternative solutions and design concepts to the public and interested parties and receive any additional public comments.
- **February 23, 2017** - Notice of Study Completion - Newspaper ad appeared in Whitby This Week and notices mailed to residents/businesses, First Nations and review/environmental agencies. Project File Report is available for public review for a period of 30-day.
- **March 3, 2017** - Notice of Study Completion - Newspaper ad appeared in Whitby This Week.

1.5. Class Environmental Assessment Process

The Garden Street (Dryden Boulevard to Taunton Road) Environmental Assessment Study is carried out in accordance with the planning and design process under the classification as a ‘Schedule B’ project as set forth in the *Municipal Class Environmental Assessment* (June 2000, as amended in October 2007) document by the Municipal Engineers Association (MEA). However, for this project, a higher level of consultation was conducted in satisfying the requirements of a ‘Schedule C’ project.

Class EA projects are categorized based on the following schedules:

**Schedule A:**

- Generally includes normal or emergency operational and maintenance activities.
- The environmental effects of these activities are usually minimal and, therefore, these projects are pre-approved.

**Schedule A+:**
• In 2007, MEA introduced Schedule A+. These projects are pre-approved; however the public is to be advised prior to project implementation.

**Schedule B:**

• Generally includes improvements and minor expansions to existing facilities.

• There is the potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.

**Schedule C:**

• Generally includes the construction of new facilities and major expansions to existing facilities.

These projects proceed through the environmental assessment planning process outlined in the Class EA.

To achieve the aims of this project, the Garden Street Class EA was conducted in compliance Schedule B. The study phases are presented in Figure 0-4 and described below:

• **Phase 1** – Identify the problem (deficiency) or opportunity.

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

• **Phase 3** – Examine alternative methods of implementing the preferred solution, based on the existing environment, public and review agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects.

• **Phase 4** – Document in a Project File Report (PFR) a summary of the rationale, and the planning, design, and consultation process of the project. Place PFR on public record for a minimum 30 calendar days for review, and notify completion of the project and provision for Part II Order request.

• **Phase 5**, which involves detail design, preparation of contract drawings and tender documents, construction, operation, and monitoring, is not part of this study.

The Town of Whitby has included in this study sufficient scope consistent with Phases 3 and 4 of a “Schedule C” project in order to obtain public input on the proposed design concept in advance of the Detail Design stage.
The Project File Report (PFR) provides information on the background to the study, the problem statement, alternative solutions, alternative design concepts, and the public consultation process. The recommended design concept is included in Appendix A.

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

Under the Environmental Assessment Act, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment and Climate Change to require the proponent (the Town of Whitby) to comply with Part II of the Environmental Assessment Act before proceeding with the proposed undertaking. Part II of the Act addresses Individual Environmental Assessments. The request for a Part II order must also be copied to the proponent at the same time it is submitted to the Minister. Written requests for a Part II order must be submitted to the Minister within the 30-calendar day review period after the proponent has filed the Project File Report and has issued the Notice of Completion of the Project File Report.
If concerns regarding this project cannot be resolved in discussion with the Town of Whitby, a person or party may request that the Minister of Environment and Climate Change make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order).

The Garden Street PFR has been submitted for the public record at the Public Works Department (575 Rossland Road East, Whitby, Ontario L1N 2M8) and Whitby Central Library (405 Dundas Street West, Whitby, Ontario L1N 6A1). The review period is between February 23, 2017 and March 31, 2017. Provided no Part II order requests are received, the Town of Whitby may proceed to detailed design and construction stages subject to Council approval.

**Part II Order Request Received**

Two Part II Order requests were received by the Town and the Minister of Environment and Climate Change on February 26 and March 30, 2017 respectively. The Part II Order requesters were asking that the Town of Whitby be required to prepare an individual environmental assessment for the Garden Street (Dryden Boulevard to Taunton Road) Widening.

Based on these two requests, the Ontario Ministry of Environment and Climate Change - Environmental Approvals Branch has approached Town of Whitby staff to ask for additional project information to determine if an individual environmental assessment is needed.

On March 19, 2018, the Minister of Environmental and Climate Change issued a decision letter to the Town and the Part II Order requesters. The letter indicates that the Town has planned and developed this project in accordance with the Municipal Class Environmental Assessment, and an individual environmental assessment is not required. However, the Minister has imposed the following conditions on this project:

1. Prior to proceeding to construction, an updated traffic analysis must be completed by the Town to confirm the need for additional lanes to be built.
2. Following the completion of construction of the project, the Town must validate the noise assessment results based on actual field measurements. If the noise level in any areas exceed 60 decibels, per Durham Region Noise Guideline/Policy, the Town must replace or provide noise barriers.
3. The Town shall consider dedicated cycle lanes as part of the final design, where feasible and safe to implement.
4. The Town shall ensure that the Project’s detailed design storm water flow capacity analysis includes severe storm events.
5. The Town shall provide a written summary to the Director, Environmental Assessment and Permissions Branch, indicating how it has satisfied conditions 1 to 4.

All correspondence including the Part II Order requests and the decision letter issued by the Minister of Environment and Climate Change are included in Appendix N of this report.
1.6. Agency and Stakeholder Consultation

As part of the Communication Plan from the outset of the study, a number of agencies, provincial ministries and utilities were identified for engagement and contact throughout the study process. Comments and information collected were recorded and documented.

Opportunities for agency and stakeholder participation were through the distribution of notice of study commencement, invites for comments, two (2) public information centres and notice of study completion and review periods.

**Federal Departments:**
- Canada Post
- Environment Canada
- Indian and Northern Affairs Canada

**Provincial Ministries:**
- Ontario Ministry of Indigenous Relations and Reconciliation
- Ontario Ministry of Natural Resources and Forestry
- Ontario Ministry of Environment and Climate Change
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Ministry of Municipal Affairs
- Ontario Ministry of Housing
- Ontario Ministry of Tourism, Culture and Sport

**Agencies and Authorities:**
- Durham Region
- Durham Regional Transit
- Central Lake Ontario Conservation
- Durham District School Board
- Durham Catholic District School Board

**Utilities:**
- Bell
- Enbridge
- Rogers
- Whitby Hydro
1.7. Summary of Public Consultation Process

In accordance with the Municipal Class EA process, the Town conducted a comprehensive public consultation program, with the following components:

- **Property Owners Mailing List** – This consisted of all residents fronting or backing onto Garden Street, in addition to others who wrote, telephoned, emailed, or filled in comment sheets during the study. Opportunities for public input were provided throughout the process. Public input was gathered through public meetings, telephone inquiries, letters, email and faxes.

- **Stakeholder Contact** – The first point of contact with key and potential stakeholders was established through the notice of study commencement and PIC #1 notice. These notices appeared on the Town website and in the local newspaper and mailed out property owner, businesses, review/environmental agencies, First Nations and utility companies. The two (2) Public Information Centres (PICs) offered additional opportunities for stakeholder interaction directly with Project Team members. Another opportunity was provided for Study comment as the Project File Report was placed on public record for review. A Notice of Study Completion was published in the local newspaper and sent directly to property owners, businesses, tenants along the corridor, project mailing and emails lists, review/environmental agencies, First Nations and utility companies. The Notice provided the location and dates for the public review period and outlined the Stakeholder rights to request of a Part II Order to the Minister of Environment.

- **Public Information Centres (PICs)** – The first PIC was held on June 29, 2011 at the Town of Whitby Municipal Building, 575 Rossland Road East. Attendees were presented with background information, project data, problem and opportunity statement, proposed evaluation and alternatives and next steps. Display panels were exhibited in an open house format where attendees were encouraged to ask questions and provide comments to the project team. The consultant team recorded issues raised by the public during and after each meeting. The second PIC was held on January 29, 2013 at the Town of Whitby Municipal Building, 575 Rossland Road East. Attendees were presented with a summary of comments from PIC #1 and responses, design concepts and a summary of impacts and mitigation measures. Display panels were exhibited in an open house format and the consultant team recorded issues raised by the public and provided clarification of the recommendations.

Additional details pertaining to the first and second public information centres, notices and PIC materials are provided in Appendix B.

Further details on the public consultation process are documented in other sections of this report.
1.8. Correspondence with First Nations

Communication was established with representatives of First Nations who may have an interest in the study area as part of the consultation process. The opportunities for First Nations participation in the project was provided through the distribution of the Notice of Commencement, invitation to participate at project Public Information Centres (PICs) and through the distribution of the Notice of Completion.

The following Agencies, First Nations and Metis Councils were contacted:

- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Indian and Northern Affairs Canada
- Ministry of Indigenous Relations and Reconciliation
- Metis Nation of Ontario
- Mississaugas of Scugog Island
- Peterborough and District Wapiti Metis Council
- Oshawa and Durham Region Metis Council

Indian and Northern Affairs Canada (INAC) confirmed by correspondence that there were no comprehensive claims within the study area, at the time of the request. Correspondence with INAC and First Nations and contact lists are included in Appendix C of the PFR.

The Curve Lake First Nation has identified through consultation that they wish to be provided a copy of the proposed works for consultation. It is recommended that the Town of Whitby provide updates to the Curve Lake First Nation on the project details in advance of and during the Detail Design Stage of the project.

2.0 Planning Policy Review

2.1 Provincial Policy Statement

The current Provincial Policy Statement (P.P.S.) provides guidelines for development and lays out the policies for building strong communities and identifying current and projected infrastructure needs. The P.P.S. established directions in transportation systems through the following policies:

“1.6.7.3 – As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections that cross jurisdictional boundaries.”
“1.7.1 – Providing for an efficient, cost effective, reliable multi-modal transportation system that is integrated with adjacent systems and those other jurisdictions and is appropriate to address expected growth.”

This study complies with these policies via improving system connectivity, encouraging multi-modal transportation, and providing improvements within the existing corridor.

2.2 The Growth Plan for the Greater Golden Horseshoe


The Growth Plan established the Province’s vision for the planning and strategic investment for transportation, infrastructure, land use planning, housing, natural heritage and resources protection to support efficient growth in the Greater Golden Horseshoe area.

The Growth Plan presents population and employment forecasts for the Region of Durham. Based on the Amendment 2 of the Growth Plan dated June 17, 2013, it is noted that the 2031 population and employment statistics for the Region of Durham will increase to approximately 970,000 and 360,000 by 2031. By 2041, the population and employment in the Region of Durham is anticipated to increase to approximately 1,190,000 and 430,000 respectively. The widening of Garden Street between Dryden Boulevard and Taunton Road is necessary and will provide the required capacity to accommodate the anticipated growth in the area.

2.3. Official Plan

The Town of Whitby’s current Official Plan (OP) was adopted in 1994. In 2007, an OP Review was initiated by the Town to incorporate changes in planning policy (i.e. the Province’s Growth Plan) and extend the planning horizon to 2031.

The transportation-related goals in the Town’s OP are:

- 8.1.1.1 - To provide a safe, convenient and efficient transportation system for the benefit of all resident groups and businesses in the Municipality.
- 8.1.1.2 - To promote a system which is responsive to environmental and aesthetic principles.
- 8.1.1.3 - To provide a high level of road network capacity and transit that operates efficiently without substantial delay.

The OP defines Garden Street as a Type C Arterial Road. The role and function of a Type C Arterial are also described in the OP:
8.1.3.3 (iii) **Type C arterial roads** are designed to move lower volumes of traffic at slower speeds over relatively short distances. When considering local road intersection and private access, the needs of abutting land uses will be given paramount consideration subject to site specific conditions and accepted traffic engineering principles. Accesses and intersections should not impact efficient transit operation.

### 2.4. Transportation Master Plan

The Town of Whitby completed its Transportation Master Plan (TMP) in June 2010. The TMP defines, at a strategic level, an integrated mobility plan and guiding principles for the accommodation of future anticipated growth in a cost-effective, efficient, balanced and environmentally sensitive manner. The **transportation vision** for Whitby is:

“To move people and goods within and across the municipality: safely, conveniently, and reliably by providing an integrated, accessible, and financially sustainable transportation system. This system will have a balanced range of mobility options and choice for all users which crosses and links into Regional and Provincial transportation infrastructure, connects all borders of Whitby including integration with the waterfront, and safeguards the natural environment, protects residents and the social community fabric, and enables economic prosperity.”

The TMP recommended changes to transportation-related policies in the OP including modifications to roadway classifications.

For Garden Street, the TMP recommended widening from 2 lanes to 4 lanes between Taunton Road and Dryden Boulevard in the 2017 to 2021 timeframe. Furthermore, the TMP recommended changing the classification of the Garden Street corridor from **Type C arterial** to **Type B arterial**. While the corridor will not connect to the Highway 407 corridor, it is proposed to extend to a future mid-block east-west arterial road to the north and to a potential new Highway 401 interchange to the south.

### 3.0 Existing Study Area Conditions

The following sections describe the features of existing socio-economic, archaeological, cultural heritage, natural environment, utilities and other services, and current development proposals in the study area.

#### 3.1. Socio-Economic Conditions

##### 3.1.1. Population and Employment

The population of the Town of Whitby was approximately 115,600 in 2006, based on Regional OPA 128 (Growing Durham Plan). By 2031, the population of Whitby is expected to grow to 192,860, with an annual growth rate of 2.1%. Employment growth is on average 2.3% per year. Population and Employment Forecasts for Whitby are shown in **Table 0.1**.
### Table 0.1 – Population and Employment Forecast for Whitby

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2021</th>
<th>2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>115,600</td>
<td>156,915</td>
<td>192,860</td>
</tr>
<tr>
<td>Employment</td>
<td>35,820</td>
<td>56,745</td>
<td>71,310</td>
</tr>
</tbody>
</table>

#### 3.1.2. Existing Land Use

The Town of Whitby Official Plan designates the lands within the study area as predominantly residential. Existing land uses include built-up residential on both sides of the Garden Street corridor, and commercial retail/office uses at Meadowglen Avenue and Taunton Road intersections. The lands surrounding the study area are comprised of residential, institutional open space, and commercial retail uses as illustrated in Figure 0-1.

![Figure 0-1 General Land Use Designations](image-url)
3.1.3. Residential Uses

The residential uses immediately adjacent to Garden Street are comprised of mainly two-storey single family detached and semi-detached houses. The local and collector road network have residential frontage and have a pattern of crescents and cul-de-sacs, typical of a suburban development. Collector roads lead to Garden Street, serving as the main thoroughfare for the neighbourhood providing the most direct north-south access from residential areas to commercial areas. Pedestrians can access Garden Street by sidewalks from streets parallel and adjoining to the corridor. Residential houses face both window frontage and reverse frontage to Garden Street, however no direct driveway access is provided, instead they are setback with a parallel local road. The approximate number of detached and semi-detached houses with window frontage, reverse frontage and side to Garden Street are presented in the following Table 0.2.

<table>
<thead>
<tr>
<th>Link</th>
<th>West Side</th>
<th>East Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryden Boulevard to Willowbrook Drive</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Willowbrook Drive to Meadowglen Drive</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Meadowglen Drive to Cork Drive</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Cork Drive to Taunton Road</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

3.1.4. Commercial Uses

Major commercial retail/office use is concentrated in the southeast quadrant at the intersection of Garden Street-Taunton Road; and neighbourhood-oriented retail is located in the northwest quadrant of the intersection at Garden Street/Meadowglen Drive. The built form is primarily comprised of ground-level retail/office in strip plaza formats to serve local needs. The north side of Taunton Road is primarily larger format big box retail attracting regional traffic.

3.1.5. Institutional Uses

A number of institutional uses are identified to the east and west of the study area including schools (Fallingbrook Public School, Ormiston Public School and St. Bernard Catholic School) as well as Whitby, Fire and Emergency Services, Durham Regional Police Station and the Durham District School Board located on Taunton Road.

3.1.6. Open Space Uses

There is no designated open space along the corridor within the study area.

3.1.7. Built Form

The built environment of the study area is characterized by automobile-oriented, low-density and single land use developments. Single family detached dwellings represent the dominant land use in the area. Currently, the study area is well-populated and suburban in character. Garden Street is a straight arterial road whereas local and
Collector roads are curvilinear which tends to lower traffic speeds and volumes. The public realm generally lacks a sense-of-place given no distinctive landmarks, sameness of houses, long street blocks and repetitive residential properties and visually imposing fencing. There are wide grass boulevards planted with trees between the sidewalk and roadway.

Previous geotechnical investigations completed within the project limits have been reviewed. Based on the borehole information associated with these geotechnical investigations, the subgrade soil conditions generally consist of sandy silt fill material. Shallow groundwater was not encountered during the time of investigation. As the area is primarily urban subdivisions, no water well was found along the corridor which would be impacted by the proposed road widening. With the limited extent of excavation anticipated for the widening of Garden Street, additional geotechnical investigation work has not been conducted as part of this EA study.

In terms of drainage infrastructure, the existing storm sewer system on Garden Street was sized to control the five year storm and the major system is conveyed following a south-easterly direction. The minor system flow is collected by the existing storm sewers on Garden Street connected to Jason Drive, where it outlets to nearby pond.

There is minimal opportunity for new building development within the corridor study area, but physical improvements to the environment such as streetscaping and amenities may prove beneficial. The corridor design and cross-section will play a prime role in determining a higher level of pedestrian activity and other community uses. In encouraging public transit use, providing for a safe and convenient pedestrian environment are recognized as key factors. Transit stops are largely disconnected to surrounding land uses as most stops do not have a sidewalk connection and/or concrete pad.

**3.1.8. Designated Land Uses**

The lands immediately adjacent to Garden Street, between Taunton Road and Dryden Boulevard, are designated for residential use; specifically for single family detached dwellings. The building heights are generally limited to 2 stories. Based on Town's record, no property within the study limits is designated as a potential contaminated site requiring soil remediation.

To the north, lands at the intersection of Garden Street/Taunton Road are designated as major commercial and institutional, comprised mainly of large format big box retail, offices and public services. The north side of Taunton Road forms part of the Brock/Taunton Major Central Secondary Plan Area. The northwest quadrant includes a building eligible for heritage designation and the northeast quadrant is prescribed as a public square. Medium to high density is indicated for lands to the immediate north.

To the south, lands designated south of Dryden Boulevard, are intended to comprise of major commercial, commercial node and institutional uses.
3.2. Archaeology and Cultural Heritage

3.2.1. Archaeology

Archaeological Services Inc. (ASI) was contracted to conduct a Stage 1 Background Research and Property Inspection for the widening of Garden Street. The Stage 1 background research determined that two archaeological sites have been registered within 1 km of the Garden Street study area and the context of the study area suggests that it has potential for the identification of Aboriginal and Euro-Canadian archaeological resources.

However, based on the results of the property inspection, it was determined that Garden Street study area has been heavily disturbed by road construction, utility installation and residential development and therefore does not retain potential for archaeological potential.

In light of these results, ASI makes the following conclusions and recommendations:

- The Garden Street study area does not retain archaeological potential due to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. Additional archaeological assessment is not required; and
- Should the proposed Garden Street improvements require new lands beyond the assessed study area, then additional Stage 1 archaeological assessment should be carried out.

Further details can be found in the Stage 1 Archaeological Assessment report, provided in Appendix D.

3.2.2. Cultural Heritage

No residences were identified or classified as built heritage features along Garden Street within the Study Area.

3.3. Natural Environment

The study area has limited natural heritage features. There is no watercourse identified within the project limits or designated hazard/environ mentally sensitive areas within the project limits. There are approximately 330 existing street trees and 110 small trees or saplings located within the boulevards along both sides of Garden Street between Taunton Road and Dryden Boulevard, all of which are lower quality or recently planted streetscaping trees. A full tree inventory was carried out for the corridor and is provided in Appendix E.

3.4. Utilities and Other Services
Several utilities are located within the study area. These include Enbridge Gas, Bell, Rogers Cable, and Whitby Hydro and Town of Whitby Street Lights. A summary of the key utility infrastructure within the study area is provided below.

**Hydro**

An existing pole line is located within the east boulevard of Garden Street generally immediately west of the existing sidewalk. The location and treatment of the utilities will be reviewed during detailed design and the design will follow the Town’s normal standards and practices.

**Gas**

An existing buried gas line is located along the east Right-of-Way on Garden Street between Meadowglen Drive and Willowbrook Drive. There are also two locations where the gas line crosses Garden Street one crossing occurs at Meadowglen Drive and the other occurs at Willowbrook Drive. The location and treatment of the utilities will be reviewed during detailed design and the design will follow the Town’s normal standards and practices.

**Bell and Cable**

An existing buried Bell conduit is located along the west boulevard of Garden Street with periodic Bell boxes or distribution panels located along the conduit.

An existing aerial cable line is located on the east side of Garden Street throughout the study limits. The aerial cable line is located on the hydro poles, with localized areas of underground cable road crossings.

**4.0 Existing Transportation Analysis**

**4.1. Current Transportation System**

**4.1.1. Road**

The existing road network and lane configuration in the study area is illustrated in Figure 4-1 and described below.

**Garden Street** is currently a Type C arterial road extending from north of Taunton Road to Consumers Drive. Generally, Garden Street has a 4-lane cross section with turn lanes at intersections. Between Dryden Boulevard and Taunton Road, Garden Street has a 2-lane cross section with left-turn lanes at the unsignalized intersections. Garden Street has a posted speed limit of 50 km/h. As noted, the 2010 Whitby TMP recommends that Garden Street be classified as a Type B arterial road.

The role and function of a Type B arterial road is described in the OP:
“8.1.3.3 (ii) **Type B** arterial roads are designed to move moderate volumes of traffic at moderate speeds from one part of the Region to another. Such roads provide an average level of service relative to other types of arterial roads and occasionally extend beyond the Municipal boundaries. These roads generally intersect with other arterial and collector roads.”

**Taunton Road** is a Type A arterial road under the jurisdiction of Durham Region. It has a 4-lane cross section with signals and turning lanes at major intersections. The posted speed is 60 km/h.

**Cork Drive** is a residential, 2-lane local road. Cork Drive is stop controlled at the intersection with Garden Street. There is no posted speed sign on Cork Drive, hence is regulated at 50 km/h.

**Meadowglen Drive** is a residential, 2-lane local road. Meadowglen Drive is stop controlled at the intersection with Garden Street. With no posted speed limit, the speed is regulated at 50 km/h.

**Willowbrook Drive** is a residential, 2-lane collector road. Willowbrook Drive is stop controlled at the intersection with Garden Street. Further west along Willowbrook Drive (at Forest Heights Street) are pedestrian crosswalks and school zone with a posted 40 km/h speed limit.

**Dryden Boulevard** is a Type C arterial road. To the west of Garden Street, Dryden Boulevard has a 4-lane cross section and posted speed of 60 km/h. To the east of Garden Street, Dryden Boulevard narrows to a 2-lane cross section with median left-turn lanes and a 50 km/h posted speed.
Figure 0-1 Existing Road Network and Lane Configuration
4.1.2. Transit

The Garden Street corridor is served by 2 transit routes – Route 303 and Route 318 as shown in Figure 0-2. Route 303 provides weekday service along Garden Street with a terminus at the Whitby GO Rail Station. Route 318 provides one-way (northbound) weekday evening and weekend service along Garden Street. Except for the 3 bus stops at the north end near Taunton Road, the remaining bus stops in the study area consist of a bus stop sign located in the landscaped boulevard without a paved pad or connection to the sidewalk.

Bus stops are located at the following locations:

**Northbound**
- South of Dryden Boulevard (adjacent to Hemingford Place)
- North of Willowbrook Drive (adjacent to Parnell Crescent)
- Adjacent to Patrick Drive
- South of Cork Drive
- Adjacent to Clune Place (paved pad)
- North of Taunton Road (paved pad)

**Southbound**
- North of Taunton Road (paved pad)
- Opposite Cork Drive
- North of Meadowglen Drive
- North of Willowbrook Drive
- North of Dryden Boulevard
4.1.3. Pedestrian and Cycling

Within the study area, the Garden Street corridor has sidewalks on both sides of the road. Sidewalks are set back approximately 5 to 7.5 metres from the roadway. Controlled crossings of Garden Street are limited to the Dryden Boulevard and Taunton Road signalized intersections. There are a number of pedestrian connections from the neighbourhoods to the Garden Street sidewalks located at:

- Bellfield Court
- Opposite Willowbrook Drive
- Millstone Crescent / Parnell Crescent
- Greenbush Place / Patrick Drive
- Meadowglen Drive
- Yorkshire Crescent
- Cork Drive
- Clune Place

There are no existing cycling facilities within the study area. However, the Whitby Cycling and Leisure Trails Plan identifies the corridor for a proposed boulevard multi-use path. A boulevard multi-use path exists on Garden Street south of the study area between Dundas Street East and Burns Street on the west side of the roadway.
4.2. Existing Travel Conditions

4.2.1. Traffic Demand

Traffic volumes for the corridor were provided by the Town of Whitby as summarized in Table 0.1.

<table>
<thead>
<tr>
<th>Location</th>
<th>Count Date</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden Street / Taunton Road</td>
<td>May 19, 2009 (data was factored to 2010)</td>
<td>Whitby</td>
</tr>
<tr>
<td>Garden Street / Cork Drive</td>
<td>November 11, 2010</td>
<td>Whitby</td>
</tr>
<tr>
<td>Garden Street / Meadowglen Drive</td>
<td>November 10, 2010</td>
<td>Whitby</td>
</tr>
<tr>
<td>Garden Street / Willowbrook Drive</td>
<td>November 9, 2010</td>
<td>Whitby</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard</td>
<td>November 2, 2010</td>
<td>Whitby</td>
</tr>
</tbody>
</table>

Traffic volumes on Garden Street are currently moderate. Peak hour peak direction volumes are approximately 450 to 650 veh/hr. Daily two-way traffic volumes along Garden Street within the study area reaches about 12,700 vehicles per day, at the north end adjacent to the commercial properties at Taunton Road, which is the typical flow characteristic of a minor arterial. High turning movement activity (i.e. more than one turn per minute) has been documented at each of the unsignalized intersections with most being right turn movements. However, 102 northbound left-turn movements have been observed at the Meadowglen Drive intersection during the PM peak hour.

4.2.2. Traffic Level of Service

The capacity of an arterial road is typically determined through an assessment of the capacity of the road link between intersections relative to the volumes on the road links and the operation of the intersections (or other constraints). Conditions are evaluated during peak hours, the highest weekday commuter hour in the morning and evening.

Peak hour link capacity is a function of the “saturation flow” determined by the spacing of vehicles (typically 2 seconds per vehicle) and the ability of the road link to feed traffic and process traffic. Typically, link capacity assumptions are in the order of 900 vehicles per hour per link. This reflects a saturation flow rate of approximately 1,800 vehicles per hour per lane (2 seconds per vehicle) and an ability of the road link to process traffic 50% of the time (i.e. reflecting an assumption of 50% of signal green time allocated per direction). For some corridors capacity can exceed 900 vehicles per hour per lane in the peak direction, however, based on information from the Town of Whitby from the Transportation Model and Whitby TMP, a link capacity of 900 vehicles per hour per lane is applied for Garden Street.

Comparing the current PM peak hour volumes on Garden Street (about 650 vehicles per hour in the peak direction) to 900 vehicles per hour capacity indicates that there is existing reserve capacity in the corridor. The existing link capacity on Garden Street by segment is summarized in Table 0.2.
**Table 0.2 – Existing Link Level of Service**

<table>
<thead>
<tr>
<th>Segment</th>
<th>Existing Traffic Conditions</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>max volume (veh/h)</td>
<td>max capacity (veh/h)</td>
<td>v/c</td>
</tr>
<tr>
<td>Garden Street Taunton Road to Cork Drive*</td>
<td>576-703</td>
<td>900+</td>
<td>0.64-0.78</td>
</tr>
<tr>
<td>Garden Street Cork Drive to Meadowglen Drive</td>
<td>513</td>
<td>900</td>
<td>0.57</td>
</tr>
<tr>
<td>Garden Street Meadowglen Drive to Willowbrook Drive</td>
<td>515</td>
<td>900</td>
<td>0.57</td>
</tr>
<tr>
<td>Garden Street Willowbrook Drive to Dryden Boulevard</td>
<td>553</td>
<td>900</td>
<td>0.61</td>
</tr>
</tbody>
</table>

* Garden Street widens to 4 lanes north of Cork Street; a commercial access is located on this segment.

For intersections, two separate measures of performance are generally considered for intersection operations:

- The overall volume to capacity (v/c) ratio for each intersection
- The level of service (LOS) for the intersection which is based on the average control delay per vehicle

**Table 0.3 and Table 0.4** summarize the intersection levels of service and volume to capacity ratios for the signalized and unsignalized intersections, respectively. Detailed level of service calculations are provided in Appendix F.

**Table 0.3 – Existing Intersection Operations – Signalized**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing Traffic Conditions</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
</tr>
<tr>
<td>Garden Street / Taunton Road (signalized)</td>
<td>0.99 (0.82)*</td>
<td>D (C)*</td>
<td>1.13 (1.06)*</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard (signalized)</td>
<td>0.34</td>
<td>B</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Table 0.3 – Existing Intersection Operations – Signalized**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing Traffic Conditions</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
</tr>
<tr>
<td>Garden Street / Taunton Road (signalized)</td>
<td>0.99 (0.82)*</td>
<td>D (C)*</td>
<td>1.13 (1.06)*</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard (signalized)</td>
<td>0.34</td>
<td>B</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Table 0.3 – Existing Intersection Operations – Signalized**

- LOS – Level of Service
- v/c – Volume to Capacity
- Note: Over capacity = V/C > 1.00, approaching capacity = V/C > 0.90
- (*) - Indicates conditions with optimized signal timing
Table 0.4 – Existing Intersection Operations – Unsignalized

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Key Movements</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
</tr>
<tr>
<td>Garden Street / Cork Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB left-right</td>
<td>0.40</td>
<td>C</td>
<td>0.20</td>
</tr>
<tr>
<td>NB through-right</td>
<td>0.33</td>
<td>A</td>
<td>0.34</td>
</tr>
<tr>
<td>SB left</td>
<td>0.03</td>
<td>A</td>
<td>0.08</td>
</tr>
<tr>
<td>SB through</td>
<td>0.27</td>
<td>A</td>
<td>0.27</td>
</tr>
<tr>
<td>Garden Street / Meadowglen Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.34</td>
<td>C</td>
<td>0.31</td>
</tr>
<tr>
<td>NB left</td>
<td>0.02</td>
<td>A</td>
<td>0.11</td>
</tr>
<tr>
<td>NB through</td>
<td>0.30</td>
<td>A</td>
<td>0.32</td>
</tr>
<tr>
<td>SB through-right</td>
<td>0.30</td>
<td>A</td>
<td>0.29</td>
</tr>
<tr>
<td>Garden Street / Willowbrook Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.42</td>
<td>C</td>
<td>0.28</td>
</tr>
<tr>
<td>NB left</td>
<td>0.08</td>
<td>A</td>
<td>0.07</td>
</tr>
<tr>
<td>NB through</td>
<td>0.24</td>
<td>A</td>
<td>0.37</td>
</tr>
<tr>
<td>SB through-right</td>
<td>0.28</td>
<td>A</td>
<td>0.30</td>
</tr>
</tbody>
</table>

LOS – Level of Service
v/c – Volume to Capacity
Note: Over capacity = V/C > 1.00, approaching capacity = V/C > 0.90

Level of service of D or better is generally considered adequate for operations during the peak period. The intersection analysis suggests that existing intersections are operating with sufficient capacity and adequate levels of service except for the intersection of Garden Street / Taunton Road. We note that the existing AM operations at Garden Street / Taunton Road could be improved with optimized signal timings. A v/c ratio of 0.82 with LOS C could be achieved in the AM peak hour. For the PM peak hour, delay can be reduced to LOS D by providing more green time to the left-turn advance movements.

4.3. Pedestrian Demand

Pedestrian volumes were collected at existing intersections during peak hours. Pedestrian demand within the corridor is modest with the observed crossings of Garden Street of 7 pedestrians at Meadowglen Drive based on 2010 data. Along Garden Street, up to 21 pedestrian crossings during peak hour were observed based on 2009 data. It is recognized that higher crossing volumes may be occurring in midblock sections of Garden Street as well as pedestrian activity occurring during off-peak hours not captured in peak hour assessments.

Two high schools, Sinclair Secondary School and Father Leo J Austin Catholic Secondary School, are located east of the study corridor. Sinclair SS is located on Taunton Road at Anderson Street and Father Leo J Austin CSS is located on Dryden Boulevard at Anderson Street. Students are potentially crossing Garden Street mid-block on their way to and from school, or during lunch activities.
4.4. Safety Performance

4.4.1. Collision History

A summary of the 3-year collision data at intersections and segments is provided in Table 0.5. Generally, there is a low incidence of collisions in the study corridor.

<table>
<thead>
<tr>
<th>Location</th>
<th>Collisions by Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
<td>2009</td>
</tr>
<tr>
<td>Intersections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden Street / Cork Drive</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Garden Street / Meadowglen Drive</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Garden Street / Willowbrook Drive</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Garden Street Segments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taunton Road to Cork Drive</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cork Drive to Meadowglen Drive</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Meadowglen Drive to Willowbrook Drive</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Willowbrook Drive to Dryden Boulevard</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

A detailed break-down of the collision types and conditions for the Garden Street intersections are provided in Table 0.6, Table 0.7, Table 0.8 and Table 0.9. Given the low collision occurrences, the summaries do not indicate a strong collision pattern.
### Table 0.6 – Collision Summary - Garden Street / Cork Drive Intersection

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Total Direction of Travel</th>
<th>Total</th>
<th>Classification (Severity) of Accident</th>
<th>Total Environment Condition</th>
<th>Total Road Condition</th>
<th>Total Light</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>SB/NB</td>
<td>1</td>
<td>Non-fatal Injury</td>
<td>Clear</td>
<td>Dry</td>
<td>Daylight</td>
<td>1</td>
</tr>
<tr>
<td>Rear end</td>
<td></td>
<td>1</td>
<td>Property Damage Only</td>
<td>Rain</td>
<td>Wet</td>
<td>Dark</td>
<td>-</td>
</tr>
<tr>
<td>Sideswipe</td>
<td></td>
<td></td>
<td>Snow</td>
<td>Loose snow</td>
<td></td>
<td>Dusk</td>
<td>-</td>
</tr>
<tr>
<td>Turning movement</td>
<td></td>
<td>1</td>
<td></td>
<td>Ice</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>SMV Other</td>
<td></td>
<td></td>
<td></td>
<td>n/a</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

### Table 0.7 – Collision Summary - Garden Street / Meadowglen Drive Intersection

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Total Direction of Travel</th>
<th>Total</th>
<th>Classification (Severity) of Accident</th>
<th>Total Environment Condition</th>
<th>Total Road Condition</th>
<th>Total Light</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>NB</td>
<td>1</td>
<td>Non-fatal Injury</td>
<td>Clear</td>
<td>Dry</td>
<td>Daylight</td>
<td>-</td>
</tr>
<tr>
<td>Rear end</td>
<td></td>
<td>1</td>
<td>Property Damage Only</td>
<td>Rain</td>
<td>Wet</td>
<td>Dark</td>
<td>1</td>
</tr>
<tr>
<td>Sideswipe</td>
<td></td>
<td></td>
<td>Snow</td>
<td>Loose snow</td>
<td></td>
<td>Dusk</td>
<td>-</td>
</tr>
<tr>
<td>Turning movement</td>
<td></td>
<td></td>
<td></td>
<td>Ice</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>SMV Other</td>
<td>1</td>
<td></td>
<td></td>
<td>n/a</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>
Table 0.8 – Collision Summary - Garden Street / Willowbrook Drive Intersection

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Total</th>
<th>Direction of Travel</th>
<th>Classification (Severity) of Accident</th>
<th>Total</th>
<th>Environment Condition</th>
<th>Total</th>
<th>Road Condition</th>
<th>Total</th>
<th>Light</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>1</td>
<td>EB/EB</td>
<td>Non-fatal Injury</td>
<td>-</td>
<td>Clear</td>
<td>-</td>
<td>Dry</td>
<td>-</td>
<td>Daylight</td>
<td>1</td>
</tr>
<tr>
<td>Rear end</td>
<td>-</td>
<td>EB/SB</td>
<td>Property Damage Only</td>
<td>2</td>
<td>Rain</td>
<td>-</td>
<td>Wet</td>
<td>-</td>
<td>Dark</td>
<td>-</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>1</td>
<td></td>
<td>Snow</td>
<td>2</td>
<td>Loose snow</td>
<td>1</td>
<td>Dusk</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turning movement</td>
<td>-</td>
<td></td>
<td>Ice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMV Other</td>
<td>-</td>
<td></td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>2</strong></td>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

Table 0.9 – Collision Summary - Garden Street / Dryden Boulevard Intersection

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Total</th>
<th>Direction of Travel</th>
<th>Classification (Severity) of Accident</th>
<th>Total</th>
<th>Environment Condition</th>
<th>Total</th>
<th>Road Condition</th>
<th>Total</th>
<th>Light</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>-</td>
<td>SB/SB</td>
<td>Non-fatal Injury</td>
<td>3</td>
<td>Clear</td>
<td>5</td>
<td>Dry</td>
<td>5</td>
<td>Daylight</td>
<td>5</td>
</tr>
<tr>
<td>Rear end</td>
<td>5</td>
<td>NB/SB</td>
<td>Property Damage Only</td>
<td>4</td>
<td>Rain</td>
<td>1</td>
<td>Wet</td>
<td>1</td>
<td>Dark</td>
<td>2</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>1</td>
<td>NB/NB</td>
<td>Snow</td>
<td>1</td>
<td>Loose snow</td>
<td>-</td>
<td>Dusk</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turning movement</td>
<td>1</td>
<td>EB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMV Other</td>
<td>-</td>
<td>EB/EB</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>7</strong></td>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

4.5. Access Management

The corridor has reverse frontage or window frontage streets. There are only two direct roadway accesses within the corridor.

A commercial access is located approximately 40 metres south of the Taunton Road intersection. The access is currently configured for inbound right turns only and outbound left and right turns. Existing southbound left turns are not currently permitted
and “No Left Turn” signage is posted at the access for southbound traffic on Garden Street.

A commercial access is situated approximately 45 metres north of Meadowglen Drive. There are no intersection or link collision trends associated with this section of Garden Street.

4.6. Transit Operations

The Garden Street corridor has a straight alignment with few intersections, traffic control or geometric features to temper traffic speeds. The two lane configuration in conjunction with transit stops currently results in vehicles pass of stopped buses on occasion. Although no transit related collisions have been noted, these manoeuvres are undesirable from a traffic operation and safety point-of-view.

4.7. Existing Improvement Needs

Based on the existing traffic volumes and operations on the Garden Street corridor, there is not an immediate need to improve Garden Street between Taunton Road and Dryden Boulevard.

5.0. Future Transportation Conditions

5.1. Traffic Growth Rate

To determine the future need for Garden Street improvements and lane requirements, travel demand forecasts were prepared for this study for the 2021 and 2031 horizons. To identify an appropriate growth rate for the corridor, available population / employment and traffic forecast data were reviewed and compared.

5.1.1. Population and Employment

The 2010 Whitby Transportation Master Plan (TMP) provides population and employment growth as well as traffic growth. Table 0.1 summarizes the population and employment forecasts from the TMP. It is noted that there are two versions of the forecasts, one that was used in the travel demand model and one that is consistent with the Regional OPA 128 (Growing Durham Plan). For the forecasts that are used in the travel demand model, the 2021 forecasts are from the Region's 2003 DC study. A significant portion of the population growth in the Town is planned for west Whitby and northwest Brooklin. Employment growth is planned for areas adjacent to the Highway 407 East Transportation Corridor and the West Durham Link.

The town-wide combined population and employment growth in Whitby is, on average, 2.3% per annum. With the ROPA 128 forecasts, population growth is a consistent 2.1% per annum up to 2031.
Table 0.1 – Population and Employment Growth in Whitby

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2021</th>
<th>2031</th>
<th>Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2006-2021</td>
</tr>
<tr>
<td>Population - TMP model</td>
<td>115,600</td>
<td>164,612</td>
<td>197,536</td>
<td>2.4%</td>
</tr>
<tr>
<td>Population – ROPA 128</td>
<td>115,600</td>
<td>156,915</td>
<td>192,860</td>
<td>2.1%</td>
</tr>
<tr>
<td>Employment - TMP model</td>
<td>35,820</td>
<td>64,062</td>
<td>71,749</td>
<td>4.0%</td>
</tr>
<tr>
<td>Employment - ROPA 128</td>
<td>35,820</td>
<td>56,745</td>
<td>71,310</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

5.1.2. TMP Traffic Forecasts

The model forecasting exercise in the TMP was premised on a number of planned and committed Regional and Provincial proposals being built by 2021 as shown in Exhibit 4.2 of the TMP. The committed improvements include:

**Provincial**
- Highway 407 East Extension (4 lanes) and West Durham Link (4 lanes).
- Highway 407 interchanges at Lake Ridge Road, Baldwin Street and Thickson Road.
- Highway 7 / Winchester Road widening to 4 lanes from Brock Road to Brock Street.
- Highway 401 widening to 12 lanes west of West Durham Link and 10 lanes east of West Durham Link.
- Highway 401 interchange at Lake Ridge Road and replacement/new interchange at Brock Street.

**Regional**
- Brock Street widening to 4/5 lanes from Rossland Road northerly to south of Hwy 407.
- Thickson Road widening to 4/5 lanes from Rossland Road northerly to Columbus Road.
- Taunton Road widening to 6/7 lanes from Ajax to Brock Street.

With respect to traffic growth, the TMP provides screenline traffic volumes for the PM peak hour in the vicinity of the study area. The screenlines include all major north-south corridors from Lake Ridge Road to Garrard Road. Screenline traffic forecasts are summarized in Table 0.2.
Table 0.2 – Screenline Traffic Forecasts

<table>
<thead>
<tr>
<th>Year</th>
<th>Direction</th>
<th>Screenline Volume</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>South of Taunton Road</td>
<td>North of Rossland Road</td>
<td>South of Rossland Road</td>
</tr>
<tr>
<td>2006</td>
<td>NB</td>
<td>3,120</td>
<td>-</td>
<td>4,986</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>3,189</td>
<td>-</td>
<td>2,895</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,309</td>
<td>7,987</td>
<td>7,881</td>
</tr>
<tr>
<td>2021</td>
<td>NB</td>
<td>9,143</td>
<td>7,313</td>
<td>8,945</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>10,668</td>
<td>-</td>
<td>6,786</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>19,811</td>
<td>15,300</td>
<td>15,731</td>
</tr>
<tr>
<td>2031</td>
<td>NB</td>
<td>10,215</td>
<td>-</td>
<td>9,838</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>11,827</td>
<td>-</td>
<td>7,353</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>22,042</td>
<td>-</td>
<td>17,191</td>
</tr>
<tr>
<td></td>
<td>Annual Growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006-2021</td>
<td>Total</td>
<td>7.9%</td>
<td>-</td>
<td>4.7%</td>
</tr>
<tr>
<td>2021-2031</td>
<td>Total</td>
<td>1.1%</td>
<td>-</td>
<td>0.9%</td>
</tr>
<tr>
<td>2006-2031</td>
<td>Total</td>
<td>5.1%</td>
<td>-</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

For the South of Taunton screenline, the traffic forecasts indicate a high level of annual growth in the 2006 to 2021 time period and a noticeably lower growth rate after 2021. On the South of Rossland screenline, the growth rates are much lower. It is significant to note that during the 2006 to 2021 time period there are capacity increases on the South of Taunton screenline – i.e. widenings of Brock Street and Thickson Road with connections to Highway 407 on each corridor. These Regional road widenings would attract the majority of the traffic growth across the South of Taunton screenline. For the South of Rossland Screenline, where demand is less skewed by the increases in capacity, traffic growth is more moderate. The South of Rossland screenline may be more representative of traffic growth on the Garden Street corridor.

Recognizing that the traffic model is based on the Region’s 2003 DC forecasts and that newer ROPA 128 land use forecasts show a more consistent growth trend (i.e. population growth is 2.1% per annum before and after 2021), one consistent traffic growth rate for the full forecast period for Garden Street was applied.

Traffic volumes on the Garden Street corridor do not show a strong peak directional flow. Even in the travel demand model, the peak direction changes from southbound on the South of Taunton screenline to northbound on the South of Rossland screenline. Therefore, for the study corridor, the suggested growth rate for determining future travel on Garden Street is 3.2% per annum, which is the average of the northbound and southbound growth on the South of Rossland screenline.
5.2. Future Level of Service

5.2.1. Link Operations

Using the growth rates discussed above, traffic volumes were forecasted for Garden Street. Link volume forecasts and level of service analyses are summarized in Table 0.3 and Table 0.4 for 2021 and 2031, respectively.

Table 0.3 – 2021 Link Level of Service

<table>
<thead>
<tr>
<th>Segment</th>
<th>2021 Traffic Conditions</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
<th>v/c</th>
<th>v/c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max volume (veh/h)</td>
<td>Max capacity (veh/h)</td>
<td>v/c</td>
<td>Max volume (veh/h)</td>
<td>Max capacity (veh/h)</td>
</tr>
<tr>
<td>Garden Street – Taunton Road to Cork Drive*</td>
<td>812</td>
<td>900+</td>
<td>0.90</td>
<td>767</td>
<td>900+</td>
</tr>
<tr>
<td>Garden Street – Cork Drive to Meadowglen Drive</td>
<td>723</td>
<td>900</td>
<td>0.80</td>
<td>753</td>
<td>900</td>
</tr>
<tr>
<td>Garden Street – Meadowglen Drive to Willowbrook Drive</td>
<td>726</td>
<td>900</td>
<td>0.81</td>
<td>857</td>
<td>900</td>
</tr>
<tr>
<td>Garden Street – Willowbrook Drive to Dryden Boulevard</td>
<td>779</td>
<td>900</td>
<td>0.87</td>
<td>918</td>
<td>900</td>
</tr>
</tbody>
</table>

* Traffic volumes measured immediately north of Cork Drive.

Table 0.4 – 2031 Link Level of Service

<table>
<thead>
<tr>
<th>Segment</th>
<th>2031 Traffic Conditions</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
<th>v/c</th>
<th>v/c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max volume (veh/h)</td>
<td>Max capacity (veh/h)</td>
<td>v/c</td>
<td>Max volume (veh/h)</td>
<td>Max capacity (veh/h)</td>
</tr>
<tr>
<td>Garden Street – Taunton to Cork Drive *</td>
<td>1109</td>
<td>900+</td>
<td>1.23</td>
<td>1047</td>
<td>900+</td>
</tr>
<tr>
<td>Garden Street – Cork Drive to Meadowglen Drive</td>
<td>988</td>
<td>900</td>
<td>1.10</td>
<td>1028</td>
<td>900</td>
</tr>
<tr>
<td>Garden Street – Meadowglen Drive to Willowbrook Drive</td>
<td>992</td>
<td>900</td>
<td>1.10</td>
<td>1171</td>
<td>900</td>
</tr>
<tr>
<td>Garden Street – Willowbrook Drive to Dryden Boulevard</td>
<td>1065</td>
<td>900</td>
<td>1.18</td>
<td>1253</td>
<td>900</td>
</tr>
</tbody>
</table>

* Traffic volumes measured immediately north of Cork Drive.

The TMP states the following:

“For this TMP, a v/c ratio of 0.90 was considered to represent "practical capacity" and usually represents unstable flow. The planning and design of new facilities to relieve the v/c constraints should be completed well in advance of, often many years prior to, practical capacities being reached.”
The link analysis indicates that practical capacity (v/c=0.90) is reached between 2016 and 2022 for the individual segments of Garden Street within the study area. This confirms the anticipated timing, which was recommended in the TMP, of widening Garden Street in the 2017-2021 timeframe.

We note that a request has been made to the MTO to consider new Highway 401 ramps at the south end of Garden Street. This does not appear to be included in the TMP model nor are the ramps formally approved. Should direct access to Highway 401 be provided in the future, there may be an increase in traffic volumes on Garden Street.

**Sensitivity Analysis**

It is our understanding that a capacity of 700 veh/hr was used for Garden Street in the Whitby TMP analysis. For comparison, a sensitivity using the lower capacity was completed. With a total capacity of only 700 veh/hr per lane, the practical capacity (i.e. when v/c ratio of 0.90 is reached) has already been reached under existing conditions for the segment between Dryden Boulevard and Willowbrook Drive. Practical capacity will be met for all segments of the study corridor by 2014. This lower capacity assumption would indicate an immediate need for capacity improvements.

However, intersection operations analysis of existing conditions (see Section 4.2.2) indicates capacity is still available, with the exception of the Taunton Road intersection. Given the spacing of intersections and the uninterrupted flow of traffic on Garden Street between the two signalized intersections, it is more reasonable to utilize a capacity of at least 900 veh/hr per lane for the assessment of traffic needs.

### 5.2.2. Intersection Operations

Intersection analyses for the study corridor are summarized in Table 0.5, Table 0.6, Table 0.7 and Table 0.8. Detailed level of service calculations are provided in Appendix F.

The intersection analysis indicates that the Garden Street / Taunton Road intersection exceeds capacity in both the AM and PM peak hours mainly due to the high east-west traffic volumes. (It is noted that the intersection was already at capacity under existing conditions.) The traffic forecasts have assumed that traffic on Taunton Road will continue to grow at a constant rate. It should be noted that with the planned extension of Highway 407 easterly, a portion of the Taunton Road traffic may divert and traffic patterns will change.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2021 Traffic Conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
<td>PM Peak Hour</td>
</tr>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td>Garden Street / Taunton Road (signalized)</td>
<td>1.18</td>
<td>F</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard (signalized)</td>
<td>0.50</td>
<td>B</td>
</tr>
</tbody>
</table>

LOS – Level of Service
**v/c** – Volume to Capacity
Note: Over capacity = V/C > 1.00, approaching capacity = V/C > 0.90

### Table 0.6 – 2021 Intersection Operations – Unsignalized

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2021 Traffic Conditions</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
<td>PM Peak Hour</td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td>Garden Street / Cork Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB left-right</td>
<td>1.15</td>
<td>F</td>
<td>0.55</td>
<td>E</td>
</tr>
<tr>
<td>NB through-right</td>
<td>0.46</td>
<td>A</td>
<td>0.48</td>
<td>A</td>
</tr>
<tr>
<td>SB left</td>
<td>0.05</td>
<td>A</td>
<td>0.14</td>
<td>B</td>
</tr>
<tr>
<td>SB through</td>
<td>0.38</td>
<td>A</td>
<td>0.39</td>
<td>A</td>
</tr>
<tr>
<td>Garden Street / Meadowglen Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.78</td>
<td>F</td>
<td>0.83</td>
<td>F</td>
</tr>
<tr>
<td>NB left</td>
<td>0.04</td>
<td>A</td>
<td>0.18</td>
<td>B</td>
</tr>
<tr>
<td>NB through</td>
<td>0.42</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
</tr>
<tr>
<td>SB through-right</td>
<td>0.42</td>
<td>A</td>
<td>0.40</td>
<td>A</td>
</tr>
<tr>
<td>Garden Street / Willowbrook Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.98</td>
<td>F</td>
<td>0.74</td>
<td>F</td>
</tr>
<tr>
<td>NB left</td>
<td>0.13</td>
<td>A</td>
<td>0.12</td>
<td>A</td>
</tr>
<tr>
<td>NB through</td>
<td>0.34</td>
<td>A</td>
<td>0.52</td>
<td>A</td>
</tr>
<tr>
<td>SB through-right</td>
<td>0.39</td>
<td>A</td>
<td>0.43</td>
<td>A</td>
</tr>
</tbody>
</table>

**LOS** – Level of Service

For the unsignalized intersections, the minor street movements will approach or exceed theoretical capacity and experience higher delays as traffic continues to grow on Garden Street. By 2021, the intersection operations are at capacity for the minor street movements at Cork Drive and at Willowbrook Drive and high delays are experienced by the outbound movement on to Garden Street.

### Table 0.7 – 2031 Intersection Operations – Signalized

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2031 Traffic Conditions</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
<td>PM Peak Hour</td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td>Garden Street / Taunton Road (signalized)</td>
<td>1.64</td>
<td>F</td>
<td>2.00</td>
<td>F</td>
</tr>
<tr>
<td>Garden Street / Dryden Boulevard (signalized)</td>
<td>0.84</td>
<td>C</td>
<td>0.57</td>
<td>B</td>
</tr>
</tbody>
</table>
Table 0.8 – 2031 Intersection Operations – Unsignalized

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c LOS</td>
<td>v/c LOS</td>
</tr>
<tr>
<td>Garden Street / Cork Drive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB left-right</td>
<td>5.67 F</td>
<td>2.50 F</td>
</tr>
<tr>
<td>NB through-right</td>
<td>0.63 A</td>
<td>0.65 A</td>
</tr>
<tr>
<td>SB left</td>
<td>0.08 B</td>
<td>0.25 B</td>
</tr>
<tr>
<td>SB through</td>
<td>0.52 A</td>
<td>0.53 A</td>
</tr>
<tr>
<td>Garden Street / Meadowglen Drive</td>
<td>2.05 F</td>
<td>2.99 F</td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.06 B</td>
<td>0.30 B</td>
</tr>
<tr>
<td>NB left</td>
<td>0.57 A</td>
<td>0.62 A</td>
</tr>
<tr>
<td>NB through</td>
<td>0.58 A</td>
<td>0.55 A</td>
</tr>
<tr>
<td>SB through-right</td>
<td>2.78 F</td>
<td>2.53 F</td>
</tr>
<tr>
<td>Garden Street / Willowbrook Drive</td>
<td>0.23 B</td>
<td>0.21 B</td>
</tr>
<tr>
<td>EB left-right</td>
<td>0.47 A</td>
<td>0.72 A</td>
</tr>
<tr>
<td>NB left</td>
<td>0.53 A</td>
<td>0.58 A</td>
</tr>
</tbody>
</table>

LOS – Level of Service  
v/c – Volume to Capacity  
Note: Over capacity = V/C > 1.00, approaching capacity = V/C > 0.90

By 2031, all minor street movement significantly exceed capacity although capacity for the north-south movements is sufficient.

5.3. Recommended Improvements

By 2021, the forecasted traffic volumes will be at or beyond the practical capacity of the existing 2-lane Garden Street. Practical capacity will be reached between 2016 and 2022 for the individual segments of Garden Street. Additional capacity, operational improvements or demand management should be provided. It is also noted that as traffic growth continues on Taunton Road, east-west capacity improvements will be needed on Taunton Road including the intersection of Garden Street / Taunton Road.

By 2031, the forecasted traffic volumes will significantly exceed the capacity of a typical 2-lane arterial. With a 4-lane widening and appropriate turn lanes at the intersections, there will be sufficient capacity to accommodate the forecasted traffic volumes beyond 2031. The forecast traffic volumes do not meet the thresholds to warrant traffic signals, however minor street volumes are expected to experience delays. As a result, traffic may select other routes such as Forest Heights Street or Fallingbrook Street; conditions, including pedestrian movements, at the intersections should be monitored by the Town of Whitby.

6.0 Needs and Opportunities

CEG has assessed the mid-term and long-term need for improvement on the Garden Street corridor to determine the lane requirements based on 2021 and 2031 planning horizons. The following is a summary of the findings.
6.1. Roadway Environment

The signalized intersection of Garden Street / Taunton Road requires capacity and/or operational improvement in the short-term to accommodate existing demand.

The practical capacity of a 2-lane cross section will be reached between 2016 and 2022. Additional capacity, operational improvements or demand management is needed.

By 2031, the forecasted traffic volumes will significantly exceed the practical capacity of a 2-lane cross section. A 4-lane widening of Garden Street, with appropriate turn-lanes at the intersections, will be sufficient to accommodate forecasted volumes of the 2031 horizon. The minor street traffic volumes are expected to experience delays at the intersections; however the forecast traffic volumes do not meet the thresholds to warrant traffic signals.

6.2. Pedestrian Accommodation

Sidewalks are provided on both sides of the corridor, however controlled pedestrian crossing opportunities of Garden Street are limited to the signalized intersections of Taunton Road and Dryden Boulevard which are 1.3 km apart. The Town is currently monitoring the pedestrian volumes crossing Garden Street in consideration of future mid-block pedestrian signalized crossing(s).

6.3. Cycling Accommodation

Currently, there are no designated cycling facilities within the corridor. Garden Street is designated for a boulevard multi-use path which would ultimately connect to the existing multi-use path south of Dundas Street.

6.4. Problem and Opportunity Statement

In acknowledging future transportation demand and the need to accommodate development growth in the Town of Whitby, there is a need to identify long-term opportunities to improve Garden Street, between Dryden Boulevard and Taunton Road. As well, to address the TMP recommendation for widening from 2 lands to 4 lanes in the 2017 to 2021 timeframe with a re-classification of the Garden Street corridor from Type C arterial to Type B arterial.

The problem and opportunity statement will support the Town of Whitby transportation vision:

“To move people and goods within and across the municipality: safely, conveniently, and reliably by providing an integrated, accessible, and financially sustainable transportation system. This system will have a balanced range of mobility options and choice for all users which crosses and links into Regional and Provincial transportation infrastructure, connects all borders of Whitby including integration with the waterfront,
and safeguards the natural environment, protects residents and the social community fabric, and enables economic prosperity.”

The identified problem is the current 2-lane road is inadequate to accommodate future traffic demand generated by the anticipated growth and planned transportation network. Opportunities exist to improve Garden Street with the objectives to support long-term development/growth, address future traffic demand, enhance safety (pedestrian crossing, transit), promote cycling and improve transit services.

7.0 Evaluation of Alternative Solutions

7.1. Development of Alternative Solutions

The Class Environmental Assessment process prescribes the examination of all reasonable alternatives, including alternatives to the undertaking, referred to as planning alternatives, in addressing the problem and opportunity statement. An evaluation methodology is used to ensure that the process is traceable and reproducible; considering technical, economic, social and environmental impacts. The following section provides details on the development and evaluation of planning alternatives.

7.1.1. Identification of Alternative Solutions

In reviewing the preliminary recommendations and the problem and opportunity statement, the following planning solutions for undertaking were considered:

- Alternative 1: Do Nothing – This alternative serves as a benchmark for other alternatives to be compared. No specific improvements are considered to the Garden Street Corridor; however those in the Town of Whitby Transportation Master Plan are included.

- Alternative 2: Travel Demand Management - Initiatives are implemented to shift demand to public transit, carpooling and alternative modes (walking and cycling). Action items include promotion of increasing bus ridership, sustainable transportation education and incentives.

- Alternative 3: Improve Pedestrian/Cycling Facilities - Addition of a multi-use path to one side of Garden Street for the use of pedestrian and cyclists and improvement of pedestrian crossing opportunities. Infrastructure includes pedestrian refuge islands, signage and markings.

- Alternative 4: Traffic Operations / Systems Management Improvements – Minor geometric or physical improvements that may include adding lanes at intersections, signal timing modifications, improved signage and pavement markings.

- Alternative 5: Widen Garden Street - Widening of Garden Street from the current two (2) lanes to four (4) lane cross-section with additional turning lanes, as necessary.
Alternative 6: Combination of Alternatives – The combination of the widening of Garden Streets to a four (4) lane cross-section, addition of a multi-use path of Garden Street and improvement to pedestrian crossing opportunities.

7.1.2. Alternative Solutions Evaluation Criteria

In evaluating the suitability of alternative planning solutions, a number of criteria were identified that will address the problem, while minimizing impacts to the environment. An assessment was completed based on criteria based on the following considerations:

Transportation/Engineering:
- Transportation Master Plan Objectives and Goals
- Corridor Efficiency and Level of Service
- Traffic Safety
- Transit Operations
- Accommodations of Pedestrians and Cyclists
- Emergency Services Response Times

Socio-Economic and Cultural:
- Archaeological/Cultural Heritage Resources
- Natural Heritage Resources
- Business Impacts
- Residential Impacts
- Official and Secondary Plan Policies
- Visual/Aesthetics and Streetscape
- Noise Impacts
- Air Quality

Natural Environment:
- Surface Water, Ground Water Impacts
- Terrestrial Impacts
- Vegetation Impacts

Financial:
- Utilities Relocation
- Capital Costs
- Operation and Maintenance Costs
- Property Acquisition Costs
7.1.3. Evaluation of Alternative Solutions

Alternative solutions were evaluated based on the addressing the problem and opportunity statement in comparison to the criteria listed in the previous section, including transportation and engineering, the natural environment, socio-economic and cultural heritage and financial aspects. The overall evaluation was conducted with input from the project team, project stakeholders and the public.

Following the evaluation process, a recommendation of the planning alternatives was made which would be carried forward to the next phase as part of the preferred solution. The evaluation and results of the alternative solutions are presented in Table 7.1.

7.1.4. Preferred Alternative Solution

While it is recognized that there on-going efforts by the Town and Region of Durham toward travel demand management and traffic operation / system management improvements, these initiatives are not sufficient to meet the needs of the future corridor transportation capacity requirements. Similarly, the better accommodation of cyclists and pedestrians within the corridor is a recommended component of the preferred solution; however active transportation initiatives alone will not meet the transportation needs.

The preferred solution is a combination of a widening of Garden Street to a 5-lane cross-section and the introduction of a multi-use path with future pedestrian crossing connections (Intersection Pedestrian Signals).
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measured</th>
<th>Alternative 1: Do Nothing (to Garden Street, other improvements planned by Region and Town are in place)</th>
<th>Alternative 2: Travel Demand Management</th>
<th>Alternative 3: Improve Pedestrian/Cycling Facilities</th>
<th>Alternative 4: Traffic Operations/Systems Management Improvements</th>
<th>Alternative 5: Widen Garden Street</th>
<th>Alternative 6: Combination of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>A principle or standard by which something may be judged or decided.</td>
<td>Dimensions, quantity, or capacity as ascertained by comparison with a standard.</td>
<td>• Continue existing conditions • No change to study corridor, but includes Transportation Master Plan proposed changes i.e. Brock Street, Thickson Road, Anderson Street widening</td>
<td>• Shift demand to transit, carpooling, alternative modes</td>
<td>• Add multi-use path to one side of Garden Street • Improve pedestrian crossing opportunities</td>
<td>• Minor geometric/physical improvements • May include adding lanes at intersections, signal timing changes, improved signage and pavement markings</td>
<td>• Widen Garden Street to 4 travel lanes</td>
<td>• Widen Garden Street to 4 travel lanes</td>
</tr>
<tr>
<td>Socio-Economic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archaeological/Cultural Heritage Resources</td>
<td>Minimizes number of heritage features affected and provides opportunities for their protection or enhancement.</td>
<td>• No impacts</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
</tr>
<tr>
<td>Natural Heritage Resources</td>
<td>Minimizes number of natural heritage features affected and provides opportunities to enhance built heritage and cultural features.</td>
<td>• No impacts</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
<td>• No impacts since no identified features and existing disturbance to study area</td>
</tr>
<tr>
<td>Business Impacts</td>
<td>Minimizes adverse physical effects on local businesses</td>
<td>• Potential for increased traffic issues that will adversely affect local businesses</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Opportunity to address all traffic issues adversely affecting local business</td>
<td>• Opportunity to address all traffic issues adversely affecting local business</td>
</tr>
<tr>
<td>Residential Impacts</td>
<td>Minimizes adverse physical effects on local residents</td>
<td>• Potential for increased traffic issues that will adversely affect local residents</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Potential for increased traffic issues still exist as additional capacity is not provided</td>
<td>• Opportunity to address all traffic issues adversely affecting local residents</td>
<td>• Opportunity to address all traffic issues adversely affecting local residents</td>
</tr>
<tr>
<td>Visual/Aesthetics and Streetscape</td>
<td>Minimizes physical impacts on visual/aesthetic and streetscape</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• Potential improvement with urban design on boulevard landscape design to accommodate Multi-use Path</td>
<td>• Potential impact on existing boulevard trees for turn lanes.</td>
<td>• Potential impact on existing boulevard trees for road widening.</td>
<td>• Allow for a comprehensive streetscape design for the entire corridor.</td>
</tr>
<tr>
<td>Noise Impacts</td>
<td>Minimizes adverse effects of noise as a result of roadway functions</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
<td>• Noise impacts of less than 5db (insignificant to noticeable)</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Minimizes adverse effects on air quality and potential vehicle exhaust emissions</td>
<td>• Increased congestion and related emissions</td>
<td>• Increased congestion and related emissions</td>
<td>• Increased congestion and related emissions</td>
<td>• Increased congestion and related emissions</td>
<td>• Reduced congestion related emissions</td>
<td>• Reduced congestion related emissions</td>
</tr>
</tbody>
</table>

Table 0.1 – Evaluation of Alternative Solutions
### Table 7.1 - Evaluation of Alternative Solutions (Continued)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measures</th>
<th>Alternative 1: Do Nothing (to Garden Street, other improvements planned by Region and Town are in place)</th>
<th>Alternative 2: Travel Demand Management</th>
<th>Alternative 3: Improve Pedestrian/Cycling Facilities</th>
<th>Alternative 4: Traffic Operations/Systems Management Improvements</th>
<th>Alternative 5: Widen Garden Street</th>
<th>Alternative 6: Combination of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Operations</td>
<td>Maximizes ability to accommodate transit accessibility and operations</td>
<td>• Potential for increased traffic issues may adversely affect transit operations</td>
<td>• Enhanced transit operations</td>
<td>• Potential for improved pedestrian access to transit</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• Potential for improved transit facilities and operations</td>
<td>• Potential for improved pedestrian access to transit</td>
</tr>
<tr>
<td>Traffic Safety</td>
<td>Maxesizes opportunities for safety measures to reduce collisions and potential conflicts between vehicles, pedestrians and cyclists</td>
<td>• Potential for increased safety issues associated with traffic growth</td>
<td>• Potential for increased safety issues associated with traffic growth</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• Potential for improved transit facilities and operations</td>
<td>• Potential for improved pedestrian access to transit</td>
</tr>
<tr>
<td>Corridor Efficiency and Level of Service</td>
<td>Minimizes travel delay while maximizes the efficiency of movement for people and goods within the corridor</td>
<td>• Potential traffic congestion due to traffic growth insufficient capacity to meet future demand</td>
<td>• Potential traffic congestion due to traffic growth, and no change in vehicle capacity to meet future demand (even with modal shifts)</td>
<td>• Potential traffic congestion due to traffic growth, and insufficient capacity to meet future demand (even with traffic operations/system improvements)</td>
<td>• Additional 2 travel lanes provide sufficient capacity to meet future demand</td>
<td>• Additional 2 travel lanes provide sufficient capacity to meet future demand</td>
<td>• Opportunities to improve active transportation and pedestrian movements</td>
</tr>
<tr>
<td>Accommodation of Pedestrians &amp; Cyclists</td>
<td>Sustains or improves the safety, accessibility, mobility, and efficiency of active transportation modes</td>
<td>• Potential for pedestrian and cyclist issues associated with traffic growth</td>
<td>• Potential for increased safety issues associated with traffic growth</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• No cyclist accommodation provided.</td>
<td>• No cyclist accommodation provided.</td>
<td>• Promotes active transportation.</td>
</tr>
<tr>
<td>Emergency Services Response Times</td>
<td>Maximizes ability to use the roadway in response to emergency situations</td>
<td>• Potential traffic congestion may extend response times</td>
<td>• Potential traffic congestion may extend response times</td>
<td>• Potential traffic congestion may extend response times.</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• Potential for increased safety issues associated with traffic growth.</td>
<td>• Potential for improved response times</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>Minimizes adverse effects on local surface and ground water</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
</tr>
<tr>
<td>Surface Water, Ground Water Impacts</td>
<td>Minimizes adverse effects on local terrestrial areas</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• No impacts</td>
</tr>
<tr>
<td>Terrestrial Impacts</td>
<td>Minimizes adverse effects on local vegetation</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• Minor impacts to existing street trees.</td>
<td>• Minor impacts</td>
<td>• Moderate impacts to existing street trees.</td>
<td>• Moderate impacts to existing street trees</td>
</tr>
<tr>
<td>Vegetation Impacts</td>
<td>Minimizes adverse effects on local vegetation</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>• An Advanced Tree Planting/Transplant program will be</td>
<td>• An Advanced Tree Planting/Transplant</td>
<td>• An Advanced Tree Planting/Transplant</td>
<td>• An Advanced Tree Planting/Transplant</td>
</tr>
<tr>
<td>implemented to offset impacts</td>
<td>program will be implemented to offset impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
</tr>
</tbody>
</table>

implemented to offset impacts

program will be implemented to offset impacts.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measures</th>
<th>Alternative 1: Do Nothing (to Garden Street, other improvements planned by Region and Town are in place)</th>
<th>Alternative 2: Travel Demand Management</th>
<th>Alternative 3: Improve Pedestrian / Cycling Facilities</th>
<th>Alternative 4: Traffic Operations/Systems Management Improvements</th>
<th>Alternative 5: Widen Garden Street</th>
<th>Alternative 6: Combination of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td></td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>Potential for minor utility relocation</td>
<td>Potential for minor utility relocation</td>
<td>Potential for moderate utility relocation</td>
<td>Potential for moderate utility relocation</td>
</tr>
<tr>
<td>Utility Relocation</td>
<td>Minimizes need for utility relocation</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>Potential for minor utility relocation</td>
<td>Potential for moderate utility relocation</td>
<td>Potential for moderate utility relocation</td>
<td>Potential for moderate utility relocation</td>
</tr>
<tr>
<td>Property Acquisition</td>
<td>Minimizes need for property acquisition</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>Potential for minor utility relocation</td>
<td>Potential for moderate utility relocation</td>
<td>Potential for moderate utility relocation</td>
<td>Potential for moderate utility relocation</td>
</tr>
<tr>
<td>Accommodation of Future Municipal Services</td>
<td>Maximizes opportunities for accommodation of future municipal services i.e. watermain, sanitary services</td>
<td>• No impacts.</td>
<td>• No impacts</td>
<td>No impacts</td>
<td>No impacts.</td>
<td>Opportunity to incorporate municipal services proposed for Garden Street corridor</td>
<td>Opportunity to incorporate services proposed for Garden Street corridor</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>Minimizes capital costs</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>Construction costs:</td>
<td>Construction costs:</td>
<td>Construction costs:</td>
<td>Construction costs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.3 km (approx.) of new multi-use path</td>
<td>Additional turn lanes at intersections</td>
<td>1.3 km (approx.) additional 2 lanes of roadway</td>
<td>1.3 km (approx.) of additional 2 lanes of roadway</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Addition of signage and/or pavement markings</td>
<td>Addition of signage and/or pavement markings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation and Maintenance Costs</td>
<td>Minimizes operation and maintenance costs</td>
<td>• No impacts</td>
<td>• No impacts</td>
<td>Increase in maintenance costs is insignificant.</td>
<td>Increase in maintenance costs for additional 2 lanes of roadway</td>
<td>Increase in maintenance costs for additional 2 lanes of roadway</td>
<td>Increase in maintenance costs for additional 2 lanes of roadway and multi-use path</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7.1 – Evaluation of Alternative Solutions (Continued)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Alternative 1: Do Nothing (to Garden Street, other improvements planned by Region and Town are in place)</th>
<th>Alternative 2: Travel Demand Management</th>
<th>Alternative 3: Improve Pedestrian/Cycling Facilities</th>
<th>Alternative 4: Traffic Operations/Systems Management Improvements</th>
<th>Alternative 5: Widen Garden Street</th>
<th>Alternative 6: Combination of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-Economic</td>
<td>❌</td>
<td>✅</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>✅</td>
</tr>
<tr>
<td>Transportation</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>❌</td>
</tr>
<tr>
<td>Engineering</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Cost</td>
<td>No capital cost</td>
<td>No capital cost</td>
<td>Low capital cost</td>
<td>Low capital cost</td>
<td>Modest capital cost</td>
<td>Premium capital cost</td>
</tr>
<tr>
<td>Recommendation</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

**Legend:**
- Least Preferred
- Most Preferred
7.2. Design Decisions

The existing Garden Street corridor has different characteristics throughout the 1.3 km study section, including different lane uses, boulevard grading, roadway cross-sections (auxiliary lanes), and right-of-way (presence of window streets). To address these various characteristics and other traffic issues raised by the public during the course of the study, the development and evaluation of the following design decisions were required:

- Garden Street Multi-use path Location.
- Pedestrian Crossing Opportunities.
- Cork Drive Traffic Issues.

7.2.1. Garden Street Multi-use Path Location

The need for a multi-use path on Garden Street has been identified in the Town of Whitby Cycling and Leisure Trails Plan study completed in 2010. Multi-use paths are asphalt paved paths within the boulevard and are parallel to the road. These paths are generally separated from the road by grassed or landscaped buffers. These paths are intended for use by pedestrians, cyclists and also to accommodate other non-motorized vehicles. Within the study area, the multi-use path can be provided along either the east or the west side boulevard on Garden Street.

The standard width of a multi-use path is 3.0m based on current Town Standards. However, the Project Team has found that a significant reduction of impacts to existing small trees (approx. 40) along the corridor could be achieved through the implementation of a 2.5m wide path at some locations. This reduction in impacts to existing trees along the corridor was found to be significant enough to justify the deviation from the 3.0m town standard width.

The option to locate the multi-use path on the east side of Garden Street was not feasible because of the conflict with existing utility poles along the east side of the corridor. Also, locating the multi-use path on the east side was not consistent with the location of multi-use paths on Garden Street to the south of the project limit. Due to the inability to maintain minimum width at some sections and the significant impacts on existing hydro poles, it was concluded that the multi-use path within the study area will be located on the west side boulevard on Garden Street.

7.2.2. Pedestrian Crossing Opportunities

It was noted from the public that many pedestrians conducted mid-block crossings on Garden Street within the study area. This perhaps was due to the fact that the two existing controlled pedestrian crossings at both ends of the study area (i.e. at Dryden Boulevard and at Taunton Road) are 1.3 km apart. As such, consideration was given to provide Pedestrian Refuge Median Island and/or Intersection Pedestrian Signal for pedestrian crossing opportunities.
Pedestrian Refuge Median Island

Based on on-site reviews, it was noted that the majority of ‘mid-block’ crossings were occurring between Meadowglen Drive and Willowbrook Drive. This perhaps was due to the trips to and from the commercial plaza at Meadowglen Drive generated by the students from a local high school on the east side of Garden Street. As such, the Project Team has proposed a centre median refuge island between Meadowglen Drive and Willowbrook Drive. This centre median was incorporated in Design concepts #1, #2 and #3 (see Section 7.3).

Intersection Pedestrian Signal

As the two existing controlled pedestrian crossings are 1.3 km apart, the Town has been continuously monitoring the pedestrian movements on Garden Street within the study area. Based on the Project Team’s review and analysis, an intersection pedestrian signal at the Garden Street/Meadowglen Drive intersection was proposed. This location is the mid-point between the two existing controlled pedestrian crossings and is connected to a transit stop leading to the commercial plaza located at the northwest corner of this intersection.

During the development of different widening concepts for Garden Street, the Project Team has developed Design concept #4 and #5 (see Section 7.3) in an effort to minimize impacts to existing trees along the corridor by eliminating the proposed median island and installing the intersection pedestrian signal.

7.2.3. Cork Drive Traffic Issues

During the public consultation phase of this Study, residents on Cork Drive raised concerns regarding vehicle travel speed and U-turns on Cork Drive. As such, the Town retained an engineering consultant (Paradigm Transportation Solutions Limited) to conduct an independent Traffic Operations Review Study (TORS) to examine traffic issues on Cork Drive, and to develop potential mitigating measures.

Public consultation is a key component of the TORS. Two (2) Public Open Houses were held for local residents to provide input regarding the traffic issues on Cork Drive, and to provide opportunities to discuss these issues with the project team.

Public Open House No. 1 was held on November 4, 2015 to introduce the study and to obtain input from local residents regarding the traffic issues. Approximately 30 residents attended this Public Open House. Public Open House No. 2 was held on April 20, 2016 to summarize the traffic issues identified by the residents, and to present potential solutions to address their traffic issues. Based on input from the residents, preferred solutions were selected. Approximately 17 residents attended the Public Open House No. 2.
A project report (i.e. Appendix L in this report) was prepared by Paradigm Transportation Solutions Limited to document the entire TORS process including the followings:

- Background of the study.
- Existing traffic conditions (i.e. traffic volumes, vehicle speeds, U-turns, collision history).
- Public consultation and traffic issues identified.
- Development and assessment of different options to address the traffic issues.
- Conclusions of the study.

Based on the recommendations from the TORS, the Town will implement the following to address the traffic issues on Cork Drive:

- Education – The Town will prepare educational materials and distribute to local residents within the study area to encourage drivers to be more aware of the environment and respectful of all road users.
- Enforcement – The Town will discuss with Durham Regional Police Service to explore ways to address rapid accelerations and to enhance enforcement. A radar trailer will be considered to bring drivers’ attention to their speed.
- Traffic Signal Timing Review – The Town will request the Region of Durham to review the existing traffic signal timings at surrounding intersections which could potentially affect (i.e. reduce) the traffic volumes on Cork Drive.
- Patterned Crosswalks – The Town will install patterned crosswalks on Cork Drive (i.e. at Garden Street and at Fallingbrook Street) to address acceleration and U-turn issues by drawing drivers’ attention to the presence of pedestrian crossings.
- Curb Extensions with Lateral Shift – The Town is planning to construct curb extensions on Cork Drive to narrow the traffic lanes and to provide a lateral shift in order to reduce the operating speed of vehicles on Cork Drive.

### 7.3. Garden Street Widening – Design Concepts

#### 7.3.1. Design Concepts

Five Design Concepts were identified and assessed to widen Garden Street to a 4-lane road plus auxiliary lanes as per the Preferred Alternative Solution described in Section 7.1.4. The Design Concepts are described as follows:

**Design Concept #1 – Widen About the Centreline**

This Design Concept is to widen Garden Street symmetrically to the east and west about the existing centreline to accommodate 4 travel lanes (2 per direction) plus auxiliary lanes. Both the existing east and west curbs will be reconstructed and the future left-turn lanes will be developed along the centreline of the road.
Design Concept #2 – Widen to the East

This Design Concept is to keep the existing west curb on Garden Street and to widen the east curb to the east side to accommodate 4 travel lanes (2 per direction) plus auxiliary lanes. As such, only the existing east curb will be reconstructed. The future left-turn lanes will be developed on the east side of the centreline of road.

Design Concept #3 – Widen to the West

This Design Concept is to keep the existing east curb on Garden Street and to widen the existing west curb to the west side to accommodate 4 travel lanes (2 per direction) plus auxiliary lanes. As such, only the existing west curb will be reconstructed. The future left-turn lanes will be developed on the west side of the centreline of road.

Design Concept #4 – Widen About the Centreline (Modified) - Minimize Tree Impacts

As the above three Design Concepts have significant impact to the existing boulevard trees, the Project Team has developed Design Concept #4 with the intention to minimize these impacts.

Similar to Design Concept #1, this Design Concept is to widen Garden Street symmetrically to the east and west about the existing centreline to accommodate 4 travel lanes (2 per direction). As such, both the existing east and west curbs will be reconstructed. However, the future left-turn lanes will be developed either on the east or west side of the centreline to reduce the number of boulevard trees impacted. The features of this Design Concept are further described as follows:

a) Reduce the width of pavement by reducing the auxiliary lanes width to 3.3m (i.e. minimum design standard);

b) Eliminate the 1.8m wide raised centre median on Garden Street between Willowbrook Drive and Meadowglen Drive to reduce the future pavement width. However, the Town will continuously monitor the pedestrian movements along the Garden Street corridor to determine if an additional intersection pedestrian signal shall be provided at Willowbrook Drive to facilitate pedestrian crossing on Garden Street. Also, the civil provision for this intersection pedestrian signal will be considered in the detailed design stage;

c) Locate the future northbound left-turn lane to Willowbrook Drive on the west side of the Garden Street centreline to reduce the number of boulevard trees impacted;

d) Locate the future southbound left-turn lane to Cork Drive on the east side of the Garden Street centreline to reduce the number of boulevard trees impacted.

As the Project Team was considering options to mitigate the impacts on the existing boulevard trees, the idea of implementing an Advance Tree Planting program was reviewed and accepted. This program is to plant boulevard trees a few years in
advance of the actual road widening so as to mitigate the impact of substantial tree removal when the actual road widening takes place.

The evaluation of the above four Design Concepts was based on the list of criteria provided in Section 7.3.2, and presented to the public at the Public Information Centre (PIC) No. 2 on January 29, 2013.

**Design Concept #5 – Widen About the Centreline – Minimize Tree Impacts**

Comments received at PIC No.2 indicated that in general the local residents were pleased with the Design Concept #4 and the effort to mitigate the impact on existing boulevard trees and the implementation of an Advanced Tree Planting Program. However, the residents were also concerned about the unbalanced impacts (i.e. noise, air, etc.) being generated by shifting the left-turn lanes to either the east or west side of the Garden Street centreline (i.e. features (c) and (d) of the above Design Concept #4). Their comments are documented in Appendix B.

To address these concerns, the Project Team has further developed Design Concept #5 which is the same as Design Concept #4 but with the features (c) and (d) eliminated. As such, all the future left-turn lanes will be developed along the centreline of Garden Street.

The schematics of these Design Concepts are documented in Appendix G.

### 7.3.2. Evaluation of Design Concepts

In summary, the following five Design Concepts have been developed:

- Design Concept #1 – Widen About the Centreline
- Design Concept #2 – Widen to the East
- Design Concept #3 – Widen to the West
- Design Concept #4 – Widen About the Centreline (Modified) - Minimum Tree Impacts
- Design Concept #5 – Widen About the Centreline – Minimum Tree Impacts

The evaluation of these five Design Concepts was based on the following criteria:

**Transportation/Engineering:**

- Accommodation of Future Travel Demand
- Traffic Operations
- Ability to Meet Design Guidelines

**Socio-Economic and Cultural:**

- Residential Impacts (Noise / Air)
- Visual Aesthetics (Streetscape)

**Natural Environment:**
- Vegetation Impacts

**Financial:**
- Operation Costs
- Capital Costs
- Property Acquisition
- Utility Relocation

The evaluation of the five Design Concepts is presented in Table 0.2. Based on the summary of evaluation, Design Concept #5 is the Preferred Design Concept.
Table 0.2 – Evaluation of Design Concepts

<table>
<thead>
<tr>
<th>Factor</th>
<th>Design Concept #1</th>
<th>Design Concept #2</th>
<th>Design Concept #3</th>
<th>Design Concept #4</th>
<th>Design Concept #5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Widen About The Centreline</td>
<td>Widen To The East (Hold Existing West Curb Line)</td>
<td>Widen To The West (Hold Existing East Curb Line)</td>
<td>Widen About the Centreline (Modified) - Minimize Tree Impacts</td>
<td>Widen About the Centreline –Minimize Tree Impacts</td>
</tr>
<tr>
<td>Transportation Service / Engineering</td>
<td>No difference between design concepts in terms of capacity.</td>
<td>No difference between design concepts in terms of capacity.</td>
<td>No difference between design concepts in terms of capacity.</td>
<td>No difference between design concepts in terms of capacity.</td>
<td>No difference between design concepts in terms of capacity.</td>
</tr>
<tr>
<td>Accommodation of Future Travel Demand</td>
<td>Left turn lanes are evenly distributed about centreline resulting in smaller deflections of through traffic for both northbound and southbound directions.</td>
<td>Left turn lanes are developed exclusively on the east side of the road centreline resulting in adverse deflections for northbound traffic throughout the corridor and no shift for southbound traffic.</td>
<td>Left turn lanes are developed exclusively on the west side of the road centreline resulting in adverse deflections for southbound traffic throughout the corridor and no shift for northbound traffic.</td>
<td>Left turn lanes are developed on the east side, west side and about the road centreline resulting in adverse deflections for southbound and northbound traffic.</td>
<td>Left turn lanes are evenly distributed about centreline resulting in smaller deflections of through traffic for both northbound and southbound directions.</td>
</tr>
<tr>
<td>Traffic Operations;</td>
<td>Boulevard slopes become steeper in west boulevard and may exceed Town maximum gradient of 8%. Possible need for retaining walls. Separations of the roadway from sidewalk and multi-use path are unbalanced. 3.5m wide auxiliary lanes. 1.8m centre median for pedestrian refuges.</td>
<td>Boulevard slopes become steeper in east boulevard and may exceed Town maximum gradient of 8%. Possible need for retaining walls. Separations of the roadway from sidewalk and multi-use path are unbalanced. 3.5m wide auxiliary lanes. 1.8m centre median for pedestrian refuges.</td>
<td>Boulevard slopes become steeper in west boulevard and may exceed Town maximum gradient of 8%. Possible need for retaining walls. Separations of the roadway from sidewalk and multi-use path are unbalanced. 3.5m wide auxiliary lanes. 1.8m centre median for pedestrian refuges.</td>
<td>Separations of the roadway from sidewalk and multi-use path are balanced except at the locations of left-turn lanes. 3.3m wide auxiliary lanes (meet minimum design standard). No centre median but the Town will continuously monitor the pedestrian movements on Garden Street to determine if an additional intersection pedestrian signal shall be provided at Willowbrook Drive to facilitate pedestrian crossing.</td>
<td>Separations of the roadway from sidewalk and multi-use path are balanced. 3.3m wide auxiliary lanes (meet minimum design standard). No centre median but the Town will continuously monitor the pedestrian movements on Garden Street to determine if an additional intersection pedestrian signal shall be provided at Willowbrook Drive to facilitate pedestrian crossing.</td>
</tr>
<tr>
<td>Ability to Meet Design Guidelines</td>
<td>Equal distribution of new roadway limits on both sides of the corridor.</td>
<td>Unbalanced roadway limits after widening leading to greater impacts on residences on the east side of the corridor.</td>
<td>Unbalanced roadway limits after widening leading to greater impacts on residences on the west side of the corridor.</td>
<td>Unbalanced roadway limits after widening leading to greater impacts on residences on either the east or west side of the corridor depending on the left-turn lane locations.</td>
<td>Equal distribution of new roadway limits on both sides of the corridor.</td>
</tr>
<tr>
<td>Social, Economic and Cultural Impacts</td>
<td>Roadway boulevard widths and streetscape opportunities (vegetation, trees, etc.) will be balanced on both sides of the corridor.</td>
<td>Roadway boulevard widths and streetscape opportunities (vegetation, trees, etc.) will be unbalanced since vegetation opportunities will be reduced on the east side of Garden Street as a result of the reduced boulevard width.</td>
<td>Roadway boulevard widths and streetscape opportunities (vegetation, trees, etc.) will be unbalanced since vegetation opportunities will be reduced on the west side of Garden Street as a result of the reduced boulevard width.</td>
<td>Roadway boulevard widths and streetscape opportunities (vegetation, trees, etc.) will be balanced except at locations of left-turn lanes.</td>
<td>Roadway boulevard widths and streetscape opportunities (vegetation, trees, etc.) will be balanced on both sides of the corridor.</td>
</tr>
</tbody>
</table>
### Table 7.2 – Evaluation of Design Concepts (Continued)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Design Concept #1</th>
<th>Design Concept #2</th>
<th>Design Concept #3</th>
<th>Design Concept #4</th>
<th>Design Concept #5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Widen About The Centreline</td>
<td>Widen To The East</td>
<td>Widen To The West</td>
<td>Widen About the Centreline (Modified)</td>
<td>Widen About the Centreline – Minimize Tree Impacts</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>Balanced impacts to boulevard trees including saplings (i.e. approx. 140 trees) on both sides of Garden Street. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.</td>
<td>Unbalanced impacts to boulevard trees including saplings mostly on the east side of Garden Street. Quantity of trees impacted is anticipated to be similar to Design Concept #1. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.</td>
<td>Unbalanced impacts to boulevard trees including saplings mostly on the west side of Garden Street.</td>
<td>Except at locations of left-turn lanes, impacts to boulevard trees including saplings (i.e. less than 100) on both sides of Garden Street. Minimum numbers of trees impacted. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.</td>
<td>Balanced impacts to boulevard trees including saplings on both sides of Garden Street. Quantity of trees impacted is anticipated to be reduced relative to Design Concept #1, #2 and #3 (i.e. reduced pavement width) but slightly more than Design Concept #4. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.</td>
</tr>
<tr>
<td>Vegetable Impact</td>
<td>(Balanced impacts to boulevard trees including saplings on both sides of Garden Street. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.)</td>
<td>(Unbalanced impacts to boulevard trees including saplings mostly on the east side of Garden Street. Quantity of trees impacted is anticipated to be similar to Design Concept #1. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.)</td>
<td>(Unbalanced impacts to boulevard trees including saplings mostly on the west side of Garden Street.)</td>
<td>(Except at locations of left-turn lanes, impacts to boulevard trees including saplings (i.e. less than 100) on both sides of Garden Street. Minimum numbers of trees impacted. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.)</td>
<td>(Balanced impacts to boulevard trees including saplings on both sides of Garden Street. Quantity of trees impacted is anticipated to be reduced relative to Design Concept #1, #2 and #3 (i.e. reduced pavement width) but slightly more than Design Concept #4. Tree impacts have been qualitatively assessed based on the information available during the study and will require confirmation based on grading review at the detailed design stage.)</td>
</tr>
<tr>
<td>Financial</td>
<td>Operating costs are anticipated to be similar for all design concepts.</td>
<td>Operating costs are anticipated to be similar for all design concepts.</td>
<td>Operating costs are anticipated to be similar for all design concepts.</td>
<td>Operating costs are anticipated to be similar for all design concepts.</td>
<td>Operating costs are anticipated to be similar for all design concepts.</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>Capital costs will be slightly higher than Design Concepts #2 and #3 due to reconstruction on both sides of the road.</td>
<td>Capital costs will be slightly reduced due to widening to one side.</td>
<td>Capital costs will be slightly reduced due to widening to one side.</td>
<td>Capital costs will be slightly higher than Design Concepts #2 and #3 due to reconstruction on both sides of the road but it will be slightly lower than Design Concept #1 due to reduced pavement width and no median.</td>
<td>Capital costs will be slightly higher than Design Concept #2 and #3 due to full width reconstruction but slightly lower than Design Concept #1 due to reduced pavement width and no median.</td>
</tr>
<tr>
<td>Property Acquisition</td>
<td>No property acquisition is anticipated.</td>
<td>No property acquisition is anticipated.</td>
<td>No property acquisition is anticipated.</td>
<td>No property acquisition is anticipated.</td>
<td>No property acquisition is anticipated.</td>
</tr>
<tr>
<td>Utility Relocation</td>
<td>Impacts to existing catch basins and storm leads on the east and west sides of Garden Street. Relatively minor impacts to hydro poles on the east side of Garden Street. Impacts to two Hydro guy anchors. Impacts to one Rogers terminal and two Bell terminals due to the addition of a multi-use path.</td>
<td>Impacts to existing catch basins and storm leads on the east side of Garden Street. Potential impacts to hydro poles on the east side of Garden Street due to more significant grading on the east side throughout the corridor. Impacts to two Hydro guy anchors. Impacts to one Rogers terminal and two Bell terminals due to the addition of a multi-use path.</td>
<td>Impacts to existing catch basins and storm leads on the west side of Garden Street. Relatively minor impacts to hydro poles on the east side of Garden Street due to widening to the west. Impacts to one Hydro guy anchor. Impacts to one Rogers terminal and two Bell terminals due to the addition of a multi-use path.</td>
<td>Impacts to existing catch basins and storm leads on the east and west sides of Garden Street. Relatively minor impacts to hydro poles on the east and west sides of Garden Street. Impacts to two Hydro guy anchors. Impacts to one Rogers terminal and two Bell terminals due to the addition of a multi-use path.</td>
<td>Impacts to existing catch basins and storm leads on the east and west sides of Garden Street. Relatively minor impacts to hydro poles on the east side of Garden Street. Impacts to two Hydro guy anchors. Impacts to one Rogers terminal and two Bell terminals due to the addition of a multi-use path.</td>
</tr>
<tr>
<td>Factor</td>
<td>Design Concept #1</td>
<td>Design Concept #2</td>
<td>Design Concept #3</td>
<td>Design Concept #4</td>
<td>Design Concept #5</td>
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<tr>
<td></td>
<td>Widen About The Centreline</td>
<td>Widen To The East (Hold Existing West Curb Line)</td>
<td>Widen To The West (Hold Existing East Curb Line)</td>
<td>Widen About the Centreline (Modified) - Minimize Tree Impacts</td>
<td>Widen About the Centreline – Minimize Tree Impacts</td>
</tr>
<tr>
<td>SUMMARY</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Balanced impacts along Garden Street.</td>
<td>More impacts to the residences on the east side of Garden Street.</td>
<td>Increased vegetation opportunities on the west side of Garden Street.</td>
<td>Requires a shift to the existing road alignment.</td>
<td>Unbalanced impacts along Garden Street.</td>
</tr>
<tr>
<td></td>
<td>Maintains the existing straight road alignment.</td>
<td>Requires a shift to the existing road alignment.</td>
<td>Requires a shift to the existing road alignment.</td>
<td>Unbalanced deflection to northbound through traffic where auxiliary lanes are present.</td>
<td>Balanced impacts to both the east and west sides of Garden Street except at locations of left-turn lanes.</td>
</tr>
<tr>
<td></td>
<td>Balanced deflection to through traffic where auxiliary lanes are present.</td>
<td>Potential for more significant utility impacts.</td>
<td>Unbalanced deflection to southbound through traffic where auxiliary lanes are present.</td>
<td>Improved visual esthetics except at locations of left-turn lanes.</td>
<td>Balanced impacts to both the east and west sides of Garden Street.</td>
</tr>
<tr>
<td></td>
<td>Improved visual esthetics.</td>
<td>Reduced visual esthetics.</td>
<td>Unbalanced deflection to northbound through traffic where auxiliary lanes are present.</td>
<td>Reduced visual esthetics.</td>
<td>Minimum tree impacts.</td>
</tr>
<tr>
<td>Transportation Service / Engineering</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Social, Economic and Cultural Impacts</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Natural Environment</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>OVERALL</td>
<td>Not Preferred</td>
<td>Not Preferred</td>
<td>Not Preferred</td>
<td>Not Preferred</td>
<td>Preferred</td>
</tr>
</tbody>
</table>

The following criteria were also considered, however no significant differences were found between these Design Concepts:

**Social, Economic and Cultural Impacts**
- Commercial / Industrial Impacts
- Institutional Impacts
- Archaeological & Heritage Resources
- Adjacent Local Roads (Potential for Traffic Infiltration)
- Support of Existing Land Use, Policies and

**Natural Environment**
- Aquatic Habitat
- Stormwater
- Ground Water
- Erosion and Land Forms
- Sustainability

**Transportation Service**
- Transit Operations and Accessibility
- Accommodation of Pedestrians and Cyclists (on-road)
- Access for Emergency Vehicles
- Ability to Accommodate Municipal Services
Development Plans

- Wildlife, Habitat
  - Wildlife
7.4. Public Consultation

The public consultation process during the Problem Statement and Alternative Solutions and Alternative Design phases are summarized in this section of the report. Additional public consultation materials are provided in Appendix B.

The public consultation process involved the following activities:

- Notice of Study Commencement and PIC #1 - June 6, 2011
- Public Information Centre #1 - June 29, 2011
- Notice of Public Information Centre #2 - January 14, 2013
- Public Information Centre #2 - January 29, 2013
- Notice of Study Completion – February 23, 2017
- Notice of Study Completion – March 3, 2017

Advertisements informing the public of the Notice of Commencement / PIC#1 and PIC #2 appeared on the Town website, in the local newspaper and were mailed out property owners, businesses, review/environmental agencies, First Nations and utility companies. Notification letters were mailed out and delivered to property owners and tenants fronting, backing or siding onto Garden Street including residences within the adjacent subdivisions.

7.4.1. PIC #1 – Alternative Solutions

The first Public Information Centre (PIC) for the Garden Street Class Environmental Assessment (Taunton Road to Dryden Boulevard) was held on June 29, 2011 at the Town of Whitby Municipal Building, 575 Rossland Road East. Attendees were presented with background information, project data, problem and opportunity statement, proposed evaluation and alternatives and next steps. Display panels were exhibited in an open house format where attendees were encouraged to ask questions and provide comments to the project team.

Attendees were asked to sign-in and were invited to fill in comment forms at their convenience within a 2-week time frame. Approximately 15 members of the public attended the PIC. Representatives from the Town of Whitby and Cole Engineering were in attendance to answer questions and provide information to the public. All comments received at PIC #1 are documented in Appendix B.

7.4.2. PIC #2 – Alternative Designs

The second PIC for the Garden Street Class Environmental Assessment (Taunton Road to Dryden Boulevard) was held on January 29, 2013 at the Town of Whitby Municipal Building, 575 Rossland Road East. Attendees were presented with a summary of comments from PIC #1 and responses, Design Concepts, Design Concept evaluations,
and a summary of impacts and mitigation measures. Display panels were exhibited in an open house format and the consultant team recorded issues raised by the public and provided clarification of the recommendations.

Attendees were asked to sign-in and were invited to fill in comment forms at their convenience within a 2-week time frame. Approximately 20 members of the public attended the PIC. Representatives from the Town of Whitby and Cole Engineering were in attendance to answer questions and provide information to the public. All comments received at PIC #2 are documented in Appendix B.

7.4.3. Consultation with First Nations

Each of the four First Nations and two Metis communities identified by the Ministry of Aboriginal Affairs were contacted through invitations to participate in PIC#1, PIC #2 and to provide comments. Direct notification letters, including the Notice of Commencement / PIC#1, and Notice of PIC#2 were distributed to the First Nations and Metis communities.

The Curve Lake First Nation has indicated through consultation that they are interested in the relevant archeological findings and wish to be provided a copy of the proposed works for consultation. As such, the Town is committed to provide updates to the Curve Lake First Nation on the project details in advance and during the Detail Design Stage for consultation.

Correspondence with the First Nations is provided in Appendix C.

8.0 Recommended Design

8.1. Design Elements

8.1.1. Agency Comments

Agencies provided input to the development of the preferred solution and Design Concept through their comments. A summary of agency comments is documented in Appendix H. The agencies providing comment are as follows:

- Ministry of Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture and Sport
- Durham Region
- Durham Region – Traffic
- Durham Region Transit
- Curve Lake First Nation
8.1.2. Stormwater Management

The proposed widening of Garden Street will result in increased imperviousness and peak flows. The Stormwater Management Report (See Appendix I) has summarized that the increased minor system flow of 0.25 m³/s can be controlled by the existing storm sewers. The major system flow increased by 3.23 m³/s and can still be contained in the road right of way. This will allow the stormwater to be distributed and managed in the same manner as the existing conditions. Water quality control could be provided through the use of a Stormceptor Model STC 9000 OGS if it is determined the SWM pond cannot provide the required water quality treatment. As part of detailed design, a detailed assessment of receiving pipe capacity is recommended.

8.1.3. Noise Impacts

S.S. Wilson conducted a noise impact assessment associated with the widening of Garden Street (See Appendix J). The study listed the predicted future (horizon years 2021 and 2031) projected sound levels due to vehicular traffic movements on the widened Garden Street within the study area. The future projected sound levels are predicted to be in the range of Leq (16h) 52 dBA to 62 dBA by 2021 and 53 dBA to 63 dBA by 2031.

Mitigation is warranted, according to the MOE/MTO Noise Protocol, if the excess above the ambient is greater than 5 decibels. For the Garden Street widening, the excesses of the future with the undertaking sound levels over the corresponding ambient levels are predicted to not exceed 5 dBA. According to the MOE/MTO Protocol, noise controls are not warranted based on the change in noise levels.

However, when one examines the resulting “absolute” sound levels at the homes without sound barriers, the existing and future levels are predicted to be over Leq 60 dBA. In the absence of a specific traffic noise policy, it is recommended that the noise levels be re-investigated within the context of the best management practices of other municipalities.

Noise controls are recommended during construction. Measures should be consistent with Town of Whitby by-laws and incorporated into the tender document.

8.1.4. Natural Features

The widening of Garden Street requires removal of existing ornamental landscape trees and / or relocation of small trees and saplings. The number of trees impacted will require further investigation through detail design and incorporate the effects of road widening, provision of the path and grading.

It is recommended that the Town of Whitby implement an Advanced Tree Planting program in an effort to offset removals of existing Ornamental and Street Trees within
the existing boulevards of Garden Street as a result of the widening and construction of the multi-use path.

8.2. Refinement of Design Concept

8.2.1. Design Criteria

The design of Garden Street should reflect accepted engineering practice as identified in the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC) and Town of Whitby and Region of Durham design standards and practices. The following principals are derived from these references:

- Design speed that reflects the role and function of the roadway (TAC 1.3.4.3)
- Consistency of design and design speed (TAC 1.2.3.7)
- A design speed that accommodates most drivers (TAC 1.2.3.3)
- Consistent with Durham transit, pedestrian and cycling plans
- No super-elevation; maximum reverse crown of 2-3%

Garden Street is defined as an Type ‘C’ arterial, but planned to be a Type ‘B’ arterial road. A design speed of 60 kph with posted speeds of 50 kph (TAC). Posted speeds are typically 10 to 20 kph above the design speed. The design criteria, established with Town staff, are summarized in Appendix K.

8.2.2. Design Plans

Based on evaluation of alternative design concepts, the preliminary Preferred Alternative design is to widen Garden Street from 2-lanes to 4-lanes about the centreline with left-turn lanes at unsignalized intersections and reduced lane widths to minimize impacts to properties and streetscape features. A schematic Design Layout is provided in Appendix A.

8.2.3. Preliminary Cost Estimate

The preliminary estimated construction cost for the recommended improvements to Garden Street, is approximately $2.2 million, including design fees and administrative costs. The fees do not include utility relocations, or property costs which will be confirmed during detail design.

It has also been identified by the Town of Whitby that elements specifically related to Durham Region Transit including the proposed concrete pads included in the preferred alternative may be subject to cost sharing with Durham Region. The potential for cost sharing of Transit related improvements should be addressed in the Detail Design phase of the project.
8.3. Implementation

8.3.1. Timing of Improvements

Based on operational analysis and strategic needs as identified through the Transportation Master Plan and traffic forecasts, by 2021, the forecasted traffic volumes will be at or beyond the practical capacity of the existing 2-lane Garden Street. Practical capacity will be reached between 2016 and 2022 for the individual segments of Garden Street.

8.3.2. Permits and Approvals

The following permits/approvals may be required and should be confirmed in the Detail Design Stage of the project:

- Environmental Compliance Approval (ECA) for the design, construction and operation of the storm sewer system.

- Depending on the underground water condition and the extent of excavation required, if water taking is required during construction, the activity must be registered in the Environmental Activity and Sector Registry (EASR). The registered water taking activity must comply with the operational requirements set out in O. Reg. 63/16 including obtaining the required water taking plan and discharge plan where applicable.

- No permits/approvals are required from MNRF, CLOCA and DFO during the design and construction phase of this project. For example permit to Take Water will not be required due to the limited extent of excavation anticipated for the widening of Garden Street.

On March 19, 2018, the Minister of Environmental and Climate Change has issued decision letters to the Town and the Part II Order requesters. The letters indicate that the Town has planned and developed this project in accordance with the Municipal Class Environmental Assessment, and an individual environmental assessment is not required. However, the Minister has imposed the following conditions on this project:

1. Prior to proceeding to construction, an updated traffic analysis must be completed by the Town to confirm the need for additional lanes to be built.

2. Following the completion of construction of the project, the Town must validate the noise assessment results based on actual field measurements. If the noise level in any areas exceed 60 decibels, per Durham Region Noise Guideline/Policy, the Town must replace or provide noise barriers.

3. The Town shall consider dedicated cycle lanes as part of the final design, where feasible and safe to implement.
(4) The Town shall ensure that the Project’s detailed design storm water flow capacity analysis includes severe storm events.

The Town shall provide a written summary to the Director, Environmental Assessment and Permissions Branch, indicating how it has satisfied the above conditions 1 to 4.

All correspondence including the Part II Order requests and the decision letter issued by the Minister of Environment and Climate Change are included in Appendix N of this report.

8.3.3. Recommended Mitigation

Inherent in the consideration of potential changes to existing conditions associated with a road widening project, is the significance of any impacts and the extent to which these impacts may be mitigated. Significance is related to importance in a local, regional, provincial or national context, and importance, relative to other identified sensitive areas and issues. This section examines the anticipated environmental effects and mitigation measures for the relevant components of the natural, socio-economic and cultural environments for the preferred Design Concept. A summary of the anticipated impacts and proposed mitigation measures is included in Table 0.1.

8.3.4. Construction Staging

The Garden Street corridor is a key arterial through the Town of Whitby. As such, the construction staging must focus on minimizing traffic disruption. It is the objective to maintain existing traffic on Garden Street, minimize impacts on side streets and accesses, and minimize the duration of construction. However, given the scope of the required work, traffic disruption and delays cannot entirely be avoided.

To minimize the impacts of construction operations, the following measures are recommended:

- Full closure to traffic will only be permitted during off-peak periods. This will include adequate signage, trained flagmen on site to direct traffic, and established procedures are followed.
- Access to properties will be maintained at all times. Where reconstruction of individual driveways is necessary, the work will be undertaken to minimize impacts on the affected property.
- Provide all signage, barriers, pavement markings, delineations, together with experienced flagmen (whenever necessary), to safeguard the interests of pedestrians, motorists and construction workers.

Construction staging and detour plans are to be confirmed and prepared at detail design.
8.3.5. Monitoring

During construction, the on-site Contract Administrator will ensure that all mitigation measures as described in Table 8.1 are in place including all commitments as stated in this Project File Report.

The effectiveness of the environmental mitigating measures will be measured and/or assessed to ensure that they are providing the expected control and/or protection. If additional measures are required to mitigate any unanticipated environmental problems, they will be developed during construction in accordance with the applicable guidelines and policies. The appropriate agencies and regulatory bodies will be contacted to provide further input as needed.

Under the supervision of the on-site Contract Administrator, if the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contract Administrator will instruct the contractor to change the method of operation or to modify the construction activities to reduce those impacts.

Post-construction monitoring will include the assessment of planted vegetation as part of the Advanced Tree Planting Program to confirm the effectiveness on aesthetics, and to assess the status and health of vegetation. The provision of additional planting or re-planting could also be considered based on the monitoring results. In addition, the monitoring of traffic operations including traffic volumes, level of services, turning movement counts and accident counts will also be conducted to assess the overall traffic system performance. Mitigation measures such as traffic signal timing adjustments and pavement marking modifications will be examined by the Town as needed. The Town will also monitor the performance of the drainage system including flooding records and ponding depths at low points to determine if any modifications to determine if modifications to the drainage system are required.
### Table 0.1 – Summary of Anticipated Impacts and Proposed Mitigation Measures

<table>
<thead>
<tr>
<th>Factor</th>
<th>Anticipated Impact</th>
<th>Proposed Mitigation</th>
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<tbody>
<tr>
<td>Natural Environment</td>
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<tr>
<td>General</td>
<td>✫ Potential spill</td>
<td>✫ In the event of a spill, the MOECC’s Spills Action Centre must be contacted.</td>
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<tr>
<td>Vegetation and Vegetation Communities</td>
<td>☆ Garden Street: requires removal of existing ornamental landscape trees and/or relocation of small trees and saplings.</td>
<td>Minimize the extent of grading limits and the amount of grading work that will result in the need to remove existing vegetation. All disturbed area must be stabilized as quickly as possible. Trees to be transplanted or retained will be clearly identified in the field. Care will be used when transplanting. Where feasible, a tree/shrub protection barrier will be used around trees to be maintained. The movement and storage of heavy equipment, and storage of materials will be confined to a predetermined area. Materials and equipment will not be stored/placed over root systems of any existing trees to remain. Ornamental tree plantings will be established to improve the urban landscape and will be included in the detail design phase. During detail design, the exact number of street trees to be removed and/or relocated on Garden Street will be determined and a suitable compensation will be implemented. In an effort to compensate for the loss of vegetation, a landscaping and refurbishing plan is recommended for implementation at the post-construction stage. Should any trees be damaged as a result of construction, tree replacement of similar species and size will be provided. It is recommended the Town of Whitby implement an Advanced Tree Planting program to offset the impacts of the proposed improvements on existing Ornamental and Street Trees within the corridor. The program should take into consideration planting coniferous vegetation adjacent to the sensitive receptors to act as a year round barrier.</td>
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<tr>
<td>Surface Water</td>
<td>✫ Increase in quantity of runoff and amount of pollutants draining to the receiving watercourses, as a result of increase in the existing pavement area. Possible reduction of surface water infiltration.</td>
<td>Review opportunities to improve the water quality in the study area to improve Total Suspended Solids (TSS) treatment and other contaminant in detailed design in accordance with MOECC’s Stormwater Management Planning and Design Manual (2003). During construction, on-site sedimentation controls will be necessary and a sediment and erosion control plan will be developed as part of the detailed design stage. The proposed storm water management system will address any pollutant and contaminant loadings associated with the operation of the widened roadway.</td>
</tr>
<tr>
<td>Ground Water</td>
<td>✫ Alteration to the groundwater regime as a result of the proposed works is expected to be negligible post-construction.</td>
<td>Construction dewatering may be required for this project depending on the proposed construction methods and timing. Depending on the underground water condition and the extent of excavation required, if water taking is required during construction, the activity must be registered in the Environmental Activity and Sector Registry (EASR). The registered water taking activity must comply with the operational requirements set out in O. Reg. 63/16 including obtaining the required water taking plan and discharge plan where applicable.</td>
</tr>
<tr>
<td>Soil Removal and Contaminants</td>
<td>✫ Potential for removal of contaminated soils</td>
<td>All waste generated during construction must be disposed of in accordance with MOECC requirements. Any soils that are removed during construction should be tested for contaminants that may have been used or dumped along the corridor limits. If soils are contaminated they will require disposal in accordance with Part XV.1 of the Environmental Protection Act (EPA) and Ontario Regulation 153/04, Records of Site Condition, detailing the new requirements related to site assessment and clean up. The Town will notify the MOECC’s York-Durham Office and have a contingency plan for how and where the soils will be disposed. For soil generating, moving and storing during construction, all activities will be carried out in accordance with the MOECC’s current guidance document titled “Management of Excess Soil – A Guide for Best Management Practices (2014)”.</td>
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**Note:** The table above summarizes anticipated impacts and proposed mitigation measures for various environmental factors. The general anticipation is that certain activities (e.g., soil removal and contamination) may require specific mitigation strategies to protect natural and wildlife habitats, as well as manage water quality and quantity impacts. The table includes specific measures for each impact category, with a focus on minimizing adverse effects and enhancing environmental outcomes through targeted interventions.
Construction of the

dust generation.

Proposed Intersection
Streetscaping / Urban Design
Safety
Air Quality
Resources
Archaeology, Heritage and Cultural
Noise
Property Requirements

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<tr>
<th>Factor</th>
<th>Anticipated Impact</th>
<th>Proposed Mitigation</th>
</tr>
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<tbody>
<tr>
<td>Land Use and Socio-Economic Impacts</td>
<td>Temporary impacts to one existing private access point and three local public roads while construction is taking place. It is noted that all access points have alternative access available.</td>
<td>Access is to be maintained or appropriate detours will be implemented to ensure access to individual driveways and side streets during construction. Timing of construction activities can be coordinated to mitigate many of these impacts. Construction activities should not have significant impacts on regular business, resident, and institution operations throughout the corridor. Work hours in the corridor can be restricted, as appropriate.</td>
</tr>
<tr>
<td>Property Requirements</td>
<td>No requirement for additional property are anticipated</td>
<td>None</td>
</tr>
<tr>
<td>Noise</td>
<td>The proposed road works on Garden Street including widening: and potential change in profile will result in decreased separation distance to the roadway and increased traffic volumes for adjacent receptor locations. In specific locations current noise levels exceed the 55dBA threshold and are anticipated in the future. The improvements and traffic volumes are not anticipated to result in an increase of 5dBA change in noise levels along the corridor. The proposed road works on Garden Street will result in temporary increase in noise levels in the area.</td>
<td>Timing of construction activities can be coordinated to mitigate noise levels during the construction of the improvements. Construction activities should not have significant impacts on regular business, resident, and institution operations throughout the corridor. Work hours in the corridor can be restricted, as appropriate to minimize noise impacts to adjacent businesses, residents and institutions. Noise controls are recommended during construction. Measures should be in conformance with Town of Whitby by-laws and incorporated into the tender document. Vibration monitoring for construction activities may be required at close proximity to the roadway to ensure any established allowable thresholds are not exceeded.</td>
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<tr>
<td>Archaeology, Heritage and Cultural Resources</td>
<td>No impacts are anticipated.</td>
<td>In the event that deeply buried archaeological remains are encountered, the Heritage Operations Unit of the Ontario Ministry of Culture should be notified immediately. In the event that human remains are encountered during construction, both the Ministry of Culture, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch should be contacted immediately. No heritage features are expected to be impacted as a result of the proposed widening of Garden Street.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Reduced air quality during construction.</td>
<td>To minimize reduced air quality due to dust, apply water and calcium chloride during construction. Non-chloride dust suppressants are recommended by MOECC. On-site vehicle and equipment idling will be discouraged where practical. Tracking of earth or soil from the site on trucks will be minimized. Vehicles hauling soil, aggregates or other dusty materials will be covered to minimize dust generation. Construction activities will be scheduled to limit areas of exposed soil and dust generation. For a comprehensive list of fugitive dust prevention and control measures, &quot;Best Practices for the Reduction of Air Emissions from Construction and demolition Activities&quot; prepared by Cheminfo Services Inc. should be referred.</td>
</tr>
<tr>
<td>Safety</td>
<td>Safety for pedestrian, cyclists, and motorists.</td>
<td>A multi-use path (i.e. pedestrians and cyclists) is proposed on the west side of Garden Street throughout the study corridor. With the additional roadway width, pedestrians will have wider intersections to cross. Proposed Intersection Pedestrian Signals (IPS) at the Garden Street / Meadowglen Drive intersection may be considered to improve pedestrian safety.</td>
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<tr>
<td>Streetscaping / Urban Design</td>
<td>Reduced aesthetics.</td>
<td>Existing streetscaping on Garden Street can be partially maintained. New streetscaping can be provided on the east and west sides of Garden Street to relocate or replace impacted streetscape elements. Streetscaping details will be determined during design detail.</td>
</tr>
<tr>
<td>Utilities</td>
<td>Relocation of existing utilities.</td>
<td>Existing utilities will need to be relocated. Formal definition of impacts on utilities, specifically Bell Canada, Enbridge Gas Distribution, Whitby Hydro, and Rogers Cable Systems will be determined during detail design.</td>
</tr>
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</table>

Table 8.1 – Summary of Anticipated Impacts and Proposed Mitigation Measures. (Continued)