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SUBMITTED TO:

MUNICIPALITY OF CLARINGTON

PROJECT NUMBER:

60264232

DECEMBER 2016



CTMP | Clarington Transportation Master Plan

CLARINGTON TRANSPORTATION MASTER PLAN



December 6, 2016

Ron Albright
Manager, Infrastructure and Capital Works
Municipality of Clarington
40 Temperance Street
Bowmanville ON L1C 3A6

Dear Mr. Albright:

Project No: 60264232

Regarding: Clarington Transportation Master Plan

We are pleased to provide you with this final version of the Transportation Master Plan report.

If there are any questions, please contact the undersigned and we can arrange a meeting as necessary.

Sincerely,

AECOM Canada Ltd.



Sheri Harmsworth, P.Eng
Senior Project Manager, Transportation
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cc: Diana Addley, AECOM
Owen McGaughey, AECOM

2016-12-06-Ctmp-60264232

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Revision Log

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Sheri Harmsworth, P.Eng.
Senior Project Manager and
Transportation Engineer

Executive Summary

Introduction and Study Approach

The Clarington Transportation Master Plan (CTMP) is a planning document that provides a comprehensive assessment of the long-term transportation system infrastructure and policy needs across all modes of transportation in the Municipality of Clarington (also referred to as Municipality or Clarington). The purpose of the CTMP is to provide a coordinated and integrated implementation strategy for the transportation system that will guide decision-making within the Municipality over the next 20 years.

The CTMP was prepared following the Master Planning process (i.e., Phases 1 and 2) of the *Municipal Class Environmental Assessment* process, and provides the context for the implementation of proposed transportation improvements within Clarington. Subsequent phases of the Class EA process (i.e., Phases 3 and 4) will be required for projects / studies with the potential for impacts to the environment. More detailed investigation and further consultation will be required to implement specific projects recommended in the CTMP.

An extensive consultation program was carried out as part of the CTMP to provide information to stakeholders on all components of the study and facilitate a full spectrum of community and agency input. The consultation program included:

- Establishment of a study website;
- Notification of consultation events via mail, email and information screens at the Municipal Administrative Centre;
- Steering committee and stakeholder meetings; and
- Two formal Public Information Centres (PICs).

The feedback received from the public and other stakeholders during the course of the study generally indicated a strong desire for improvements to: active transportation infrastructure and associated policies; transit integration, service and accessibility; and selected areas of the road network.

Problem Statement

Clarington's population and employment is expected to grow by 50,000 people and 15,000 new jobs by 2031, respectively. This increase will put pressure on the existing transportation system and drive requirements for new infrastructure and programs. The key network deficiencies and transportation problems and opportunities that Clarington is expected to face by 2031 can be summarized as follows:

Congestion on Bowmanville Creek Crossing Roads

Increased pressure on Longworth Avenue and Concession Road 3 in the vicinity of Bowmanville Creek is due to the dramatic population growth in northern Bowmanville. The creek acts as a natural barrier to travel with Baseline Road, King Street / Regional Highway 2, and Longworth Avenue as the only existing crossing within the urban area. The widening of Longworth Avenue to a four-lane cross-section between Scugog Street and Regional Road 57 (including the existing crossing which is designed to accommodate a four-lane cross-section), an extension of Longworth Avenue to the west, and the extension of Nash Road across Bowmanville Creek have been identified as alternatives that have the potential to address this need.

Congestion on roads leading to Highway 401 interchanges

- Courtice Road and Liberty Street north and south of Highway 401
- Waverley Road at Highway 401
- Analysis of the roads used to access Highway 401 revealed the need for at least one additional lane of traffic (in each direction) to accommodate the expected congestion.
- Most trips accessing Highway 401 through the Bowmanville interchanges originate in central Bowmanville or north of Bowmanville.
- Since the approach to the Liberty Street/Highway 401 interchange will be challenging to upgrade due to existing residential and commercial property constraints, a new Highway 401 interchange at Lambs Road, and/or network improvements to encourage increased usage of the Holt Road interchange (already planned to be improved to a new full access interchange) may be able to address

this need. The introduction of an interchange at Lambs Road would result in the partial or full removal of the Liberty Street and Bennett Road interchanges.

Capacity issues within Urban Areas of Bowmanville and Courtice

The 2031 base forecasts revealed three isolated congestion hot spots primarily in the vicinity of downtown Bowmanville and Courtice, including:

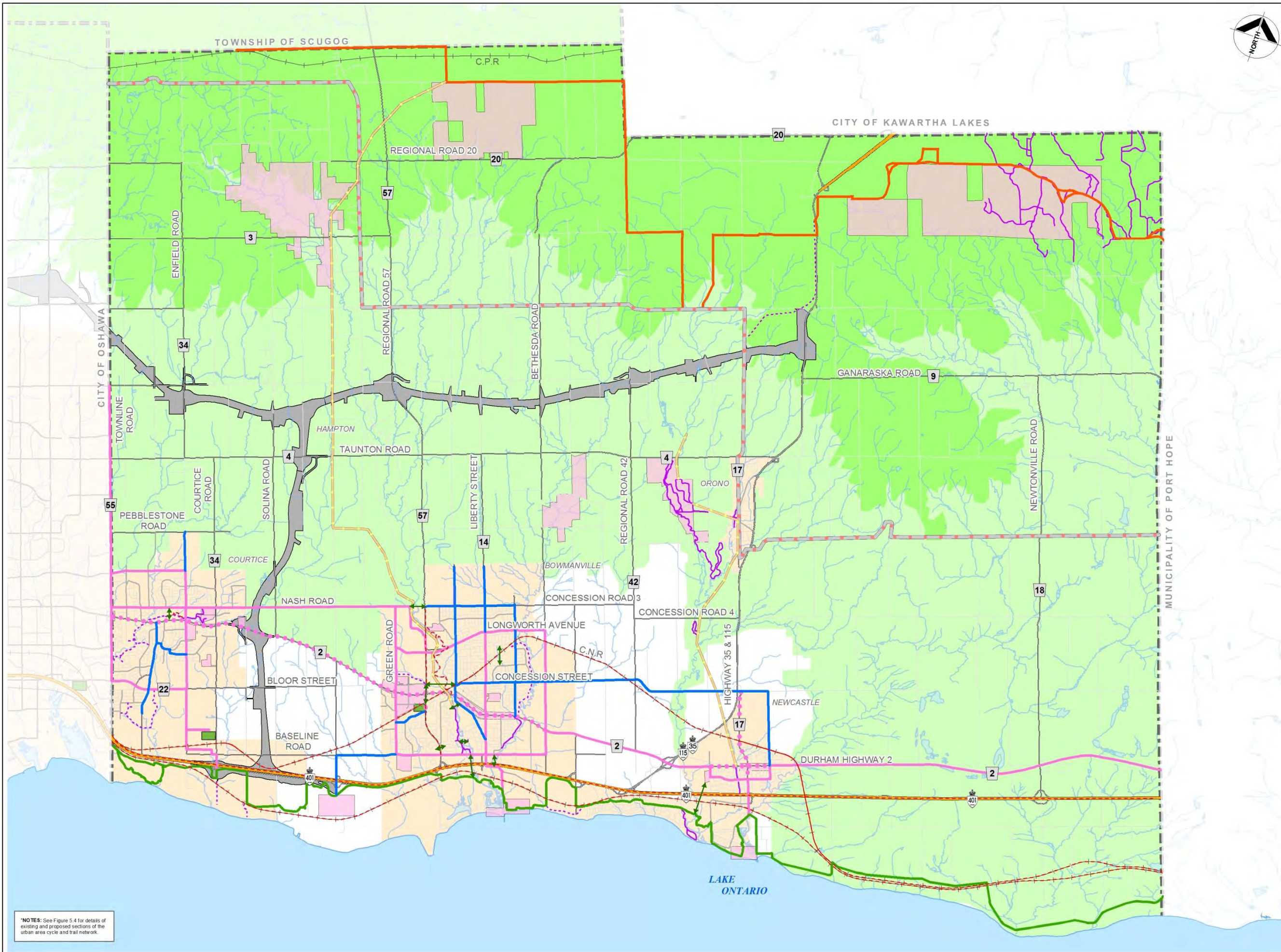
- Prestonvale Road South of Regional Highway 2 (Courtice)
- Scugog Street North of King Street / Regional Highway 2 (Bowmanville)
- Concession Road 3 east of Regional Road 57 (Bowmanville)

Active Transportation

Public feedback received through the CTMP study process consistently demonstrated a desire for improvements to active transportation infrastructure, including modifications to existing routes, provision of new routes and development of policy approaches. It is recognized that recreational cycling and cycle tourism are important to maintaining a healthy and liveability community and Clarington will continue to work with cycling groups to promote and encourage the use of Clarington's off-road trail and on-road cycling infrastructure for recreational purposes.

In order to support an increased role for active transportation in Clarington, an Active Transportation System consisting of interconnected on-road facilities and off-road trails is recommended. **Figure ES-1** (see the following page) presents the active transportation network at the overall municipal level and includes both on-road facilities and off-road trails. **Figure ES-2** illustrates the on-road facility treatment types within Courtice, Bowmanville, Newcastle, and Orono, and identifies "Key Trails" that serve as important active transportation links that can be used for commuting purposes.

Supporting policy measures were also developed to increase the attractiveness, awareness, and visibility of active transportation in Clarington. Policy recommendations include marketing strategies to promote use of Clarington's active transportation facilities and the development of an Active Transportation Plan. The development of a recommended active transportation program could be overseen by a new Active Transportation Advisory Committee who would assist with the development of an Active



Primary Cycling Network (Spines)

- Clarington Initiative
- Regional Cycling Plan Network

Secondary Cycling Network*

- Clarington Cycle Lane and Shared Routes

Trail Network

- Waterfront Trail
- Potential Regional Trail Connections
- Greenbelt Cycle Route
- Oak Ridge Moraine Trail
- Existing Trail
- Proposed Trail

Destinations, Barriers and Links

- Key Linkage
- Pedestrian/Cyclist Barrier
- Key Active Transportation Destination
- Future GO Station

Other Features

- Freeway
- Arterial Road
- Collector Road
- Local Road
- Railway
- Municipal Boundary
- Watercourse
- Highway 407 Corridor
- Waterbody
- Oak Ridges Moraine
- Urban Area
- Greenbelt

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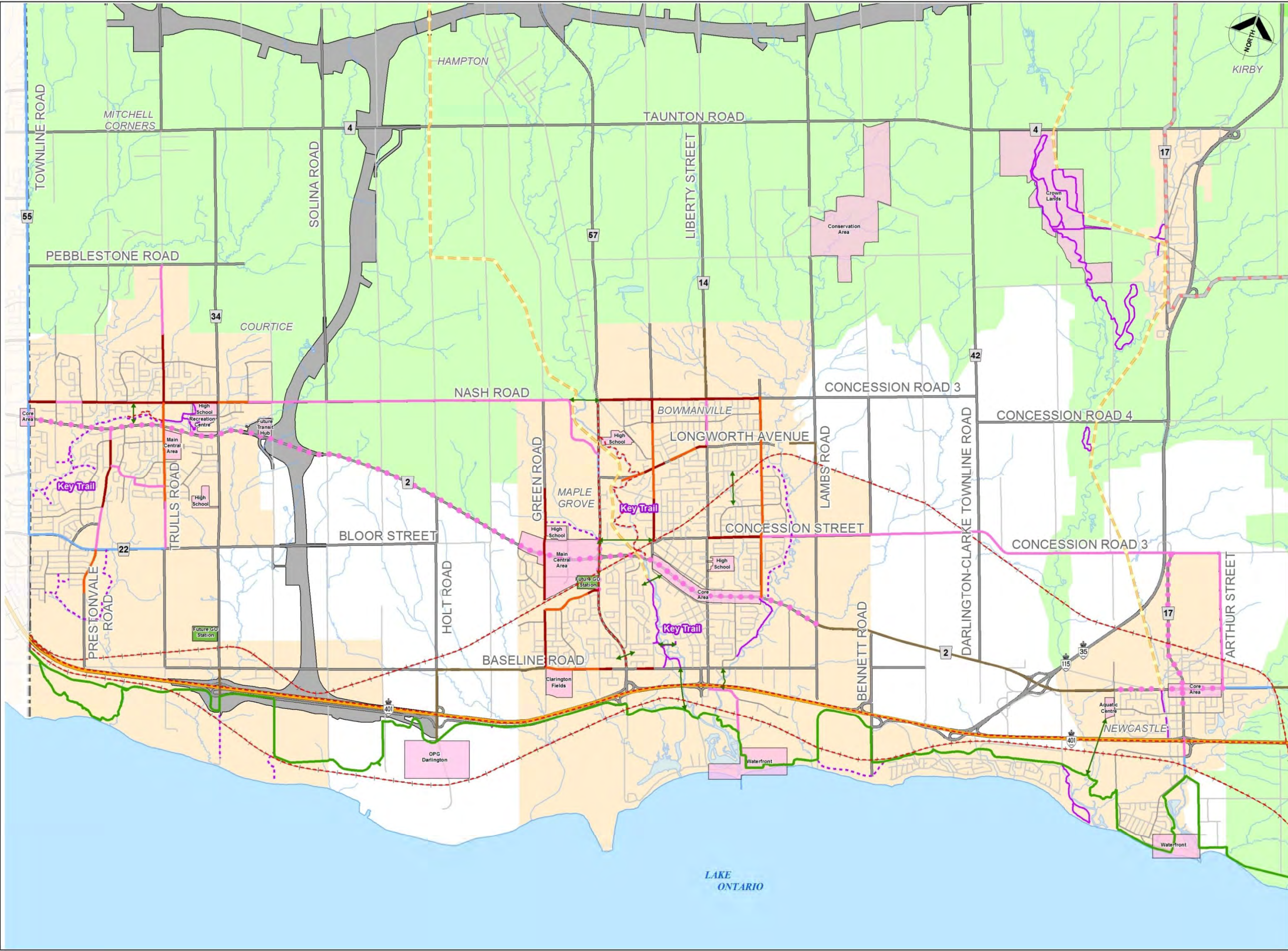
PROJECT:

CTMP | Clarington Transportation Master Plan

DRAWING:
ACTIVE TRANSPORTATION (MUNICIPAL)

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DESIGNED BY: M. TRACEY	APPROVED BY: S. HARMSWORTH	FIGURE: ES-1
SCALE: 1: 100,000	DATE: JUNE 2014	

*NOTES: See Figure 5.4 for details of existing and proposed sections of the urban area cycle and trail network.



Proposed Cycle and Trail Network

- Cycle Lane
- Multi Use Path
- Paved Shoulder
- Signed / Shared Lanes
- Proposed Trails
- Greenbelt Cycle Route

Trail Network

- Existing Cycle Lane / Shared Route
- Clarington Initiative
- Waterfront Trail
- Potential Regional Trail Connections
- Existing Trail

Destination, Barriers and Links

- Pedestrian/Cyclist Barrier
- Key Linkage
- Key Active Transportation Destination
- Future GO Station

Other Features

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DRAWING:

ACTIVE TRANSPORTATION (LOCAL)

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—	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	ES-2
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Transportation Master Plan, which is intended to further develop and prioritize a funding mechanism for the policies and programs that support and encourage use of active transportation.

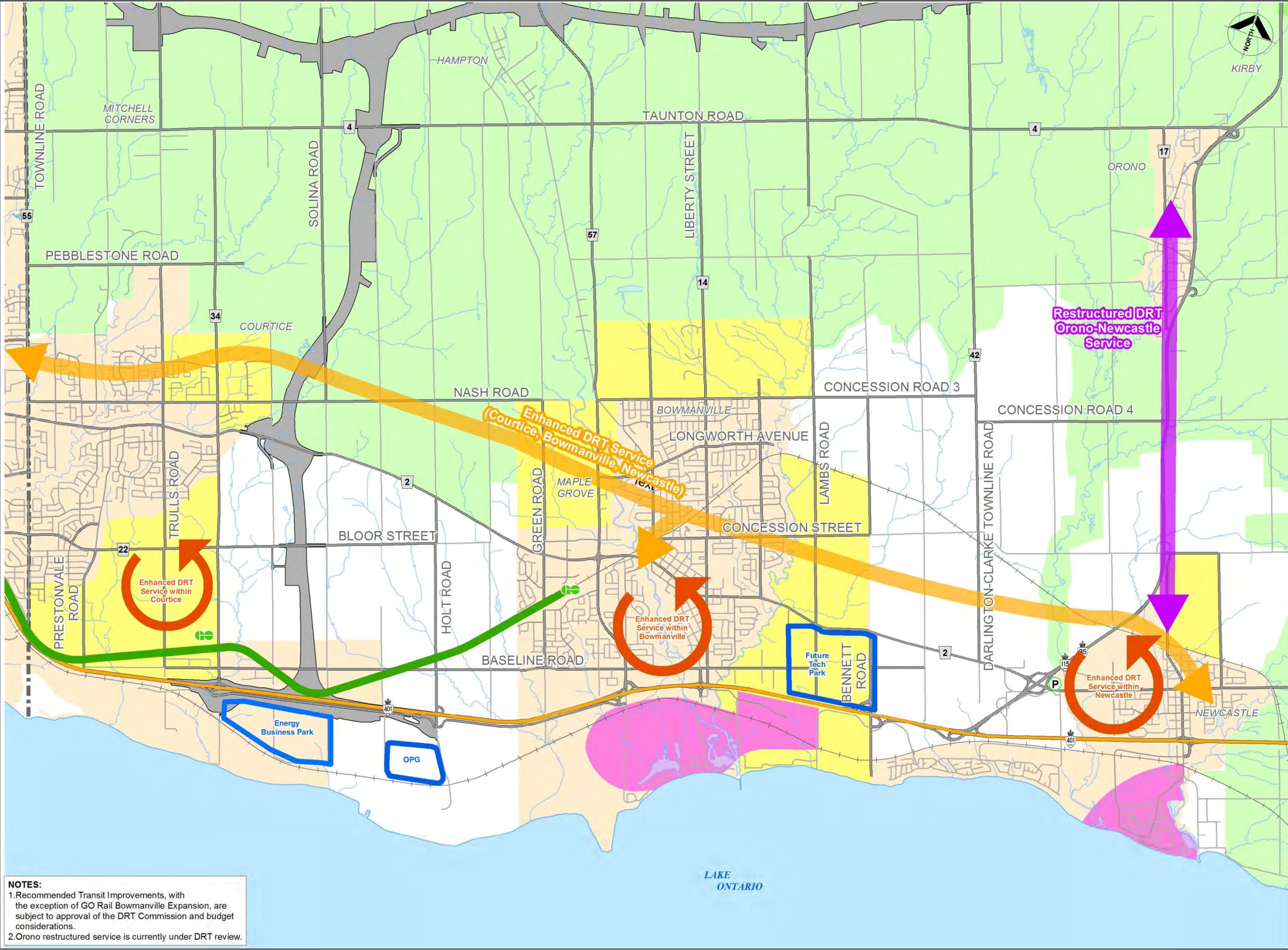
A Complete Streets Policy is also recommended to support new development areas and for implementation along identified active transportation corridors. Capital funding is required to support the implementation of the proposed Active Transportation System. It is also recommended that a fixed annual budget be allocated to support non-network infrastructure related initiatives.

Transit Services

The need for improved transit services within Clarington was noted by members of the public during the course of this study. While not a direct provider of transit service within the municipality, Clarington will work with Durham Region and Metrolinx to review and support the implementation of existing initiatives, as well as these recommended services as part of DRT and GO Transit:

- GO Rail Bowmanville Extension and encourage the extension of service to urban areas of Courtice and Bowmanville
- Higher-Order Transit on Regional Highway 2 to Courtice and an extension of higher-order transit service along Regional Highway 2 through to the Bowmanville GO Rail station
- 407 Transitway bus service (not higher order transit)
- Enhanced Service on Regional Highway 2 from Courtice to Newcastle
- Restructured Service to Orono
- Expanded Service in Courtice and Bowmanville
- Expanded Service to Areas with Existing Service Gaps
- Expanded Service in Growth Areas

It is further recommended that Clarington assume a strong support role through a number of recommended measures to facilitate transit use (please refer to **Figure ES-3** – on the following page). It should be noted that all of the recommendations, with the exception of GO Transit services (both rail and bus), are subject to the approval of the DRT Commission and Regional budget considerations.



DRT Enhancements

- DRT Service
- Restructured DRT Service
- Expand Service to Growth Areas
- Existing Service Gaps

GO Transit

Lakeshore East Rail Extension

- Future GO Station
- Future GO Rail Service

Other Features

- Carpool Lot
- Freeway
- Arterial Road
- Collector Road
- Local Road
- Railway
- Highway 407 Corridor
- Municipal Boundary
- Urban
- Oak Ridges Moraine
- Greenbelt
- Waterbody
- Watercourse

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PROPOSED TRANSIT ROUTES AND FACILITIES

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NOTES:
1. Recommended Transit Improvements, with the exception of GO Rail Bowmanville Expansion, are subject to approval of the DRT Commission and budget considerations.
2. Orono restructured service is currently under DRT review.

Transportation Demand Management

The core goal of TDM is to reduce the number of motor vehicles (particularly single-occupancy autos) on the road during peak periods of congestion by encouraging people to shift travel modes, use rideshares / carpools, shift times of travel, and shift trip making patterns. The focus of TDM is on optimizing the movement of people rather than the movement of motor vehicles and making more effective use of existing infrastructure. A number of initiatives were included as part of the recommended TDM strategy to encourage use of alternative transportation modes within the community:

- Work closely with Metrolinx and the Region of Durham to support Smart Commute Durham, promote TDM and monitor implementation and the benefits of TDM measures throughout Clarington.
- Co-host special events with Smart Commute Durham
- Take a lead role in supporting the Municipality's large employers in implementing trip reduction
- Encourage the Region and Smart Commute Durham to develop and implement school-based TDM programs at both the elementary and high school
- Lead by example through establishing a visionary TDM program for the Municipality of Clarington
- Develop a parking strategy for Bowmanville
- Promote existing carpool lots and support the development of new lots
- Require TDM Plans for major developments

Long Term Road Network

Through the CTMP it was demonstrated that the public is interested in improvement safety, whether through reducing speeds or providing wider shoulders on roadways, as well as improving the existing road network, including rural roads, and providing for added connectivity through new connections.

To address the need for new connections, a number of road network alternatives were developed based on the expected capacity deficiencies, and were evaluated against a broad range of criteria to compare their respective advantages and disadvantages using both quantitative and qualitative measures. The identified improvements were

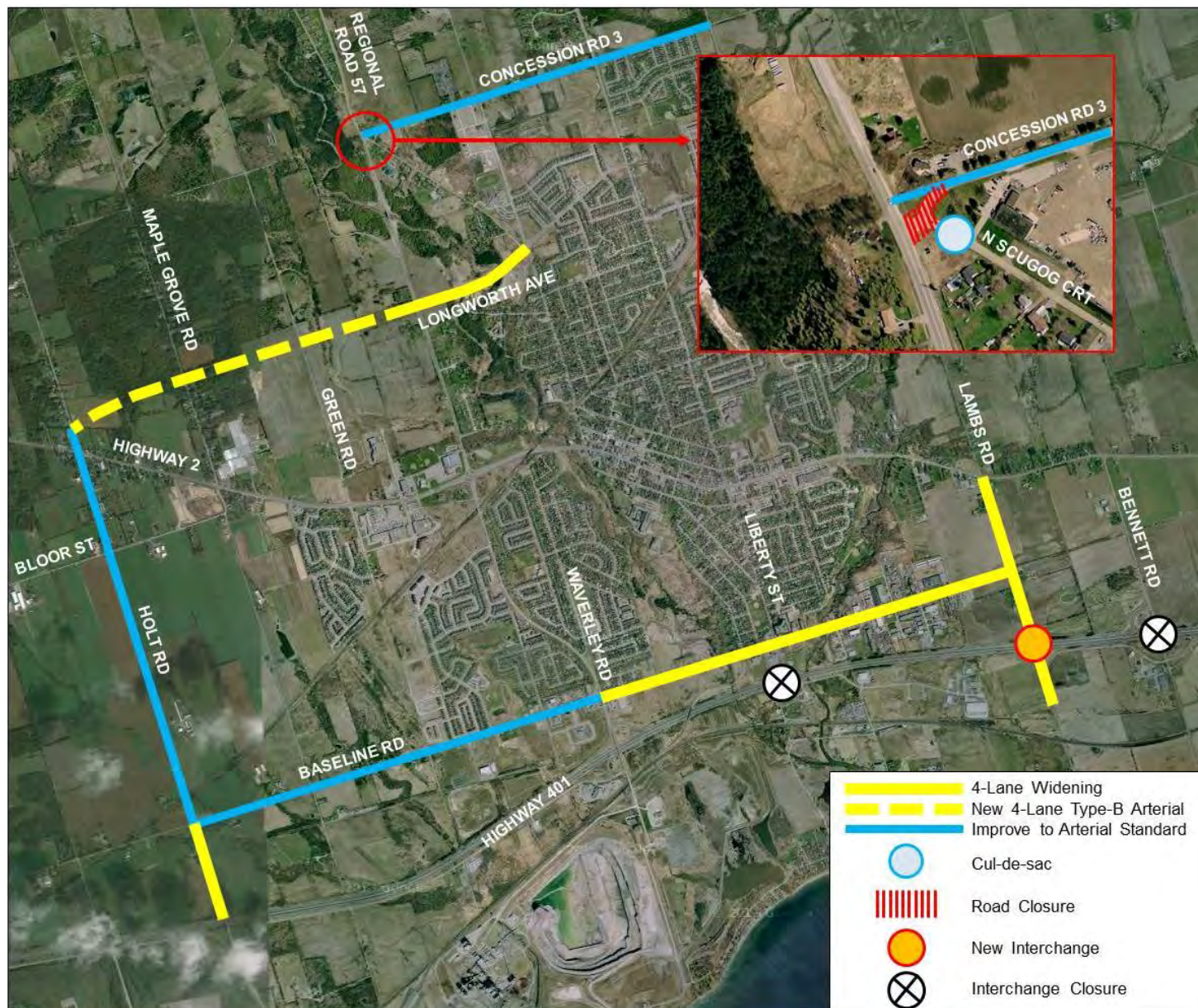
packaged into three network alternatives and carried forward for further evaluation against the “Do Nothing” scenario.

- **Alternative A** – A 4-lane extension of Longworth Avenue from Regional Road 57 to Holt Road, and 4-lane widening of Longworth Avenue from Scugog Street to Regional Road 57. Baseline Road and Holt Road improvements are also included.
- **Alternative B** – A 4-lane extension of Longworth Avenue from Regional Road 57 to Maple Grove Road, 4-lane widening of Longworth Avenue from Scugog Street to Regional Road 57, road upgrade / 4-lane widening of Maple Grove Road from the new extension to Bloor Street, and road upgrade / 4-lane widening of Bloor Street from Maple Grove Road to Holt Road. Baseline Road and Holt Road improvements are also included.
- **Alternative C** – similar to Alternative A, in addition to the implementation for a new full Highway 401 interchange at Lambs Road. With the introduction of an interchange at Lambs Road, this alternative identifies the removal of the Liberty Street and Bennett Road interchanges.

For comparison purposes, the “Do Nothing” alternative was included as part of the evaluation of network alternatives. Each of the alternatives were assessed using the refined Durham Region Travel Demand model to determine how well the improvements addressed the capacity deficiency and improved the operation of the transportation network. Based on the results of the evaluation of alternatives, **Alternative C** (please refer to **Figure ES-4**) was identified as the recommended alternative, based on the following rationale:

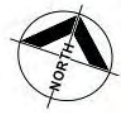
- Addresses capacity deficiencies on Longworth Avenue and Concession Road 3 to the east of the Bowmanville Creek, resulting in a v/c ratio reduction from 1.02 (congested) to 0.65 (free-flow traffic).
- Addresses capacity deficiencies on Liberty Street adjacent to Highway 401
- Improves network performance in Bowmanville by shifting commuter “through” traffic away from the Liberty Street through the downtown core and onto the Holt Road/Highway 401 interchange, resulting in a 29% reduction in traffic along Liberty Street.

Figure ES-4: Alternative C – Recommended Alternative Network



- Supports planned population and employment growth by providing accessibility to growing areas
- Improves east-west movement within Bowmanville due to Longworth Avenue improvements and extension, as well as the Baseline Road improvements.
- Although Alternative C includes the full Longworth Extension through to Regional Highway 2 near Holt Road, it is recommended that both the full extension (Alternative C-1 on **Figure ES-5** with improved / widened Holt Road) and the shortened extension through to Maple Grove Road (Alternative C-2 on **Figure ES-5** with improvement to Maple Grove Road and Bloor Street) be carried forward for further study as part of the EA process. The full extension performs marginally better from a technical point of view by providing a more direct route to Holt Road and its Highway 401 interchange, but the full extension crosses through a known PSW. Both the full extension and the shortened extension also have the potential issues with property impacts. Future phases of the EA process will evaluate the benefits, impacts, and potential mitigation measures (e.g. route alternatives) in more detail.¹

¹ The individual Environmental Assessment (EA) will confirm the number of lanes, which may be reduced to two lanes west of Green Road.



- ### Road Network Improvements
- Potential Ramp Closure
 - Potential New Interchange
 - Future Corridor Protection (Beyond 2031)
 - Future Collector Road
 - New Connection
 - Geometric/Operational Upgrades
 - Road Widening
 - Future/Upgraded Arterial Grade Separation

- ### MTO Projects and Studies
- Highway 401 Corridor Improvements & Studies
- Holt Road Interchange Improvements
 - Corridor Study: Courtice Road to East Townline
 - Corridor Study: Brock Street to Courtice Road
 - Overpass Improvements
- Future Highway 407
- Crossing
 - Freeway Interchange
 - Interchange
- Highway 407 - Phases by Completion Date
- Phase 2A - 2017
 - Phase 2B - 2020

- ### Other Features
- Freeway
 - Arterial Road
 - Collector Road
 - Local Road
 - Municipal Boundary
 - Watercourse
 - Waterbody
 - Existing Arterial Grade Separation
 - Oak Ridges Moraine
 - Urban Area
 - Greenbelt

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EXISTING ROAD NETWORK & RECOMMENDED IMPROVEMENTS

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Intersection Operations

Growth in traffic also triggers the need for modifications to intersection control and / or road geometry at selected locations. The below noted modifications at the following intersections are recommended to address the future (i.e., Horizon Year 2031) capacity issues identified through the CTMP assessment process:

Regional Highway 2 / Prestonvale Road - Westbound left-turn phase becomes permissive+protected

Regional Highway 2 / Scugog Street

- Eastbound and northbound left-turn phases become permissive+protected.
- Southbound shared thru/right configuration modified to separate through and right-turn lanes.

The intersection of Regional Road 57 / Concession Road 3 is proposed to be reconfigured which would result in North Scugog Court being converted into a cul-de-sac and Concession Road 3 connecting directly with Regional Road 57. The current road configuration has the potential to create blockages for traffic attempting to turn left onto Concession Road 3 from Regional Road 57 as westbound traffic on North Scugog Court queues. No further modifications are required at this intersection and stop sign control is suggested to be retained, with the intersection monitored to determine when signals would be required.

Implementation Strategy

Figure ES-5 depicts the existing road network and the recommended network improvements. The key recommendations of the CTMP are intended to be implemented through a series of strategic policies and specific infrastructure optimization / improvements. The capital funding requirements for the proposed road network improvements recommended as part of this CTMP for short term (2015 to approximately 2021) and medium term (approximately 2021 to horizon year 2031) time horizons are summarized in **Table: ES-1**.

Table ES-1: Short and Medium Term Road Network Improvements

Community	Road	Location	Type of Improvement	Source	EA Schedule	Estimated Length (km)	Cost (\$2014)
Short Term (2015 to approximately 2021) Road Improvements							
Bowmanville	Regional Highway 2 / King St	at Scugog St	Operational Improvement (Roadworks)	CTMP	A+	0.02	\$93,000
Bowmanville	Baseline Rd	Mearns Ave/Court to Holt Rd	Upgrade Standards/Bridge Construction	CTMP/COP	C	5.79	\$21,355,000
Bowmanville	Concession Rd 3	Mearns Ave to 90 m west of Jollow Dr	Upgrade Standards	CTMP/COP	B	-	\$1,454,000
Subtotal Cost (2015 to approximately 2021)							\$22,902,000
Medium Term (approximately 2021 to horizon year 2031) Road Improvements							
Bowmanville	Longworth Ave	West of Bowmanville Creek to Regional Rd 57	Widening to 4 lanes	CTMP/COP	C	0.36	\$1,668,000
Bowmanville	Longworth Ave Extension (a and b)	Regional Rd 57 to Bowmanville West Urban Boundary	New Arterial 4 lanes	CTMP/COP	C	1.26	\$2,174,000
Bowmanville	Longworth Ave Extension (a) ⁶	Bowmanville West Urban Boundary to Holt Road	New Arterial 4 lanes	CTMP	C	1.33	\$2,295,000
Bowmanville	Longworth Ave Extension (b) ⁶	Bowmanville West Urban Boundary to Maple Grove Road	New Arterial 4 lanes	CTMP	C	0.47	\$810,000
Bowmanville	Holt Rd ¹	Longworth Ave Extension (a) to Regional Highway 2	Widening to 4 lanes	CTMP	C	0.24	\$1,112,000
Bowmanville	Holt Rd ¹	Regional Highway 2 to Bloor St	Upgrade Standards	CTMP	B	0.71	\$2,294,000
Bowmanville	Holt Rd	Bloor St to Baseline Rd	Upgrade Standards	CTMP/COP	B	1.94	\$6,267,000
Bowmanville	Holt Rd ⁵	Baseline Rd to north limit of Holt Road interchange	Widening to 4 lanes	CTMP/COP	C	1.00	\$2,432,000
Bowmanville	Maple Grove Rd ²	Longworth Ave Extension (b) to Bloor St	Widening to 4 lanes	CTMP	C	1.12	\$5,189,000
Bowmanville	Bloor St ²	Maple Grove Rd to Holt Rd	Upgrade Standards	CTMP	B	0.82	\$2,672,000
Bowmanville	Baseline Rd ³	Lambs Rd to Waverley St	Widening to 4 lanes	CTMP/COP	C	2.90	\$13,437,000
Bowmanville	Lambs Rd ³	Regional Highway 2 to Baseline Rd	Widening to 4 lanes	CTMP/COP	C	0.67	\$3,104,000
Subtotal Cost (approximately 2021 to horizon year 2031) -- Longworth Avenue Extension (a)							\$39,693,000
Subtotal Cost (approximately 2021 to horizon year 2031) -- Longworth Avenue Extension (b)							\$41,788,000
Total Cost -- Longworth Ave Extension (a) in place⁴							\$62,595,000
Total Cost -- Longworth Ave Extension (b) in place⁴							\$64,690,000

Notes:

- 1) Only required if Longworth Ave Extension (a) is built
- 2) Only required if Longworth Ave Extension (b) is built
- 3) Only required if Lambs Road / Highway 401 interchange is built

4) Property costs are excluded from these calculations

5) Upgrades to the Holt Road/Highway 401 interchange are not included in cost estimates

6) Longworth Avenue Extension (a) and Longworth Avenue Extension (b) projects are exclusive; only one of these projects will go forward, not both

The long term (beyond horizon year 2031) transportation improvements for the Clarington road network are listed in **Table ES-2**. The 2031 future traffic forecasts did not reveal the need for these improvements in the short or medium term, but it is recommended that the municipality protect for these corridors beyond 2031.

Table ES-2: Long Term Road Network Improvements

Road	Location	Jurisdiction
Baseline Road Extension and upgrades	Bennet Road to Kurve Inn Road / Regional Highway 2	Clarington
Bloor Street / Baseline Road connection	Bloor Street / Solina Road to Baseline Road west of Maple Grove Road	Clarington
Concession Road 3 Realign to Concession Road 4	Darlington-Clarke Townline	Clarington
Concession Road 9 Connection/Realignment	Enfield Road to Concession Road 9	Clarington
Courtice Road/Enfield Road Connection	Courtice Road/Taunton Road to Enfield Road (South of Proposed Highway 407)	Durham Region
Lambs Road Extension	Lambs Road/Concession Road 4 to Bethesda Road	Clarington
Longworth Avenue Extension	Mearns Road to Providence Road	Clarington
Nash Road Extension	New bridge crossing over Bowmanville Creek, connecting at Concession Road 3	Clarington
New Type C Arterial Road	South of Concession Road 4, Regional Road 57 to Lambs Road	Clarington
New Highway 401 Interchange	Prestonvale Road / Highway 401	MTO
Pebblestone Road	Courtice Road to Solina Road	Clarington
Townline Road Connection	Concession Road 6 to Regional Road 3	Clarington/Oshawa
Townline Road Extension	Southport Drive to Prestonvale Road	Durham Region

As identified in **Table ES-1**, several of the recommended projects are classified as Schedule C. According to the Class Municipal EA process, additional studies (i.e., environmental assessments) are required to obtain approval to proceed with project

implementation. The six identified Schedule C projects, all located within or adjacent to Bowmanville, are as follows:

1. Baseline Road from Mearns Avenue to Holt Road – Upgrade Standards/Bridge Construction
2. Baseline Road from Lambs Road to Waverly Street – Widening to 4 lanes
3. Longworth Avenue Extension (A):
 - Longworth Avenue Extension (a and b) from Regional Road 57 to Bowmanville West Urban Boundary – Widening to 4 lanes
 - Longworth Avenue Extension (a) from Bowmanville West Urban Boundary to Holt Road – New Arterial 4 lanes
 - Holt Road from Longworth Avenue Extension (a) to Highway 2 – Widening to 4 lanes

Longworth Avenue Extension (B):

- Longworth Avenue Extension (a and b) from Regional Road 57 to Bowmanville West Urban Boundary – Widening to 4 lanes
 - Longworth Avenue Extension (b) from Bowmanville West Urban Boundary to Maple Grove Road – New Arterial 4 lanes
 - Maple Grove Road from Longworth Avenue Extension (b) to Bloor Street – Widening to 4 lanes
4. Holt Road from Baseline Road to north limit of Highway 401 interchange – Widening to 4 lanes
 5. Lambs Road from Regional Highway 2 to Baseline Road – Widening to 4 lanes
 6. Lambs Road Interchange

Note that Longworth Avenue Extension (A) and Longworth Avenue Extension (B) are alternate road network options that are to be assessed in the same Schedule C Class EA project.

Table of Contents

	page
1. Introduction and Study Approach	1
1.1 Purpose of the Transportation Master Plan	1
1.2 Municipal Class Environmental Assessment Process	2
1.3 Project Direction	4
1.4 Vision	6
1.4.1 Sustainable Transportation Planning Vision	6
1.4.2 Local Context	7
1.5 Objectives and Strategic Goals	8
1.6 Study Approach	10
1.6.1 Step 1: Establish a Study Foundation	11
1.6.2 Step 2: Assess Transportation Impacts in Conjunction with Associated Growth Management Strategies	11
1.6.3 Step 3: Develop Alternative Transportation Strategies	11
1.6.4 Step 4: Create the Transportation Master Plan	12
1.7 Public Consultation	12
1.7.1 Study Notification	13
1.7.2 Steering Committee	13
1.7.3 Stakeholder Meetings	14
1.7.4 Public Information Centres	14
1.7.5 Incorporating Public Feedback into the TMP	17
1.8 List of Acronyms	17
2. Planning Context	20
2.1 Background	20
2.2 Policy Review	23
2.2.1 Provincial Policy Statement (PPS)	23
2.2.2 Places to Grow Act and Growth Plan for the Greater Golden Horseshoe (Growth Plan)	24
2.2.3 Greenbelt Plan	24
2.2.4 Durham Growth Plan Implementation Study and Regional Official Plan Amendment No. 128 (ROPA 128)	25
2.2.5 Region of Durham Long-Term Transit Strategy	25
2.2.6 Municipality of Clarington Strategic Plan	26
2.2.7 Municipality of Clarington Official Plan Review (COP)	27

3.	Existing and Planned Multi-Modal Transportation System	29
3.1	Active Transportation	29
3.1.1	Existing Infrastructure	29
3.1.2	Planned Infrastructure	32
3.2	Transit	35
3.2.1	Existing Transit Services and Carpool Parking Lot Facilities	35
3.2.2	Planned Services	38
3.3	Roads	41
3.3.1	Existing Road Network	41
3.3.2	Proposed Road Network	47
4.	Future Transportation Network Needs	50
4.1	Future Growth Forecasts – Population and Employment	50
4.1.1	Demographic Trends	50
4.1.2	Baseline Forecasts: Population and Employment	52
4.1.3	Economic Diversity in Clarington	55
4.2	Forecasting Future Transportation Deficiencies	56
4.2.1	Travel Demand Model Overview	56
4.2.2	2031 Base Model Results	66
4.3	Problem and Opportunity Statement	71
4.3.1	Darlington Nuclear Generating Station Refurbishment Sensitivity Test	75
5.	Transportation Master Plan Strategy Areas	78
5.1	Active Transportation	79
5.1.1	Background	79
5.1.2	Active Transportation in Other Communities	82
5.1.3	Active Transportation Policy Alternatives and Recommendations	86
5.2	Transit Services	97
5.3	Transportation Demand Management (TDM)	105
5.3.1	Background	105
5.3.2	Smart Commute Durham	107
5.3.3	TDM Policy Alternatives and Recommendations	108
5.4	Long Term Road Network	113
5.4.1	Future Alternatives	114
5.4.2	Model Results for Alternatives	121

5.4.3	Alternatives Evaluation Summary	125
5.4.4	Assessment of Clarington DC Projects	130
5.4.5	Road Network Policy Alternatives and Recommendations	131
5.5	Intersection Operational Analysis	134
5.5.1	Study Methodology and Analysis Periods	136
5.5.2	Existing Conditions	136
5.5.3	Future Conditions	141
5.5.4	Summary and Conclusions	148
5.6	Grade Separations (Rail Crossings)	149
6.	Implementation Strategy	152
6.1	Active Transportation	153
6.2	Transit	160
6.3	Transportation Demand Management (TDM)	162
6.4	Road Network Infrastructure Priorities and Costing	163
6.5	Additional Studies	170
6.6	Official Plan Amendment	171
6.7	CTMP Monitoring and Updates	174
6.8	A Sustainable Clarington Transportation Master Plan	176

List of Figures

	page
Figure 1.1: Municipal Class EA Planning and Design Process	3
Figure 2.1: Municipality of Clarington Area Map	21
Figure 3.1: Existing Cycle Lanes and Trails	31
Figure 3.2: Durham Regional Trail Network (2015)	34
Figure 3.3: Existing Transit Routes and Facilities	36
Figure 3.4: Metrolinx GO Transit GTAH Planned Improvements	38
Figure 3.5: Existing Road	42
Figure 4.1: Projected Population Growth in Clarington	53
Figure 4.2: Projected Employment Growth in Clarington	54
Figure 4.3: 2011 Model Simulated Traffic vs. Observed Traffic [AM Peak Hour]	59
Figure 4.4: 2011 Refined Base Network (Updated Durham Region Model)	61
Figure 4.5: 2031 Base Network (Updated Durham Region Model)	65
Figure 4.6: 2031 Base PM Peak Hour Screenline Deficiencies	69
Figure 4.7: 2031 Base Network PM Peak Hour Volume / Capacity Ratios	70
Figure 4.8: Bowmanville 2031 Base Network – PM Peak Hour V/C Ratios on Concession Road 3 and Longworth Avenue at Bowmanville Creek	72
Figure 4.9: Clarington 2031 Base Network – Select Link Assessment	74
Figure 4.10: 2011 & 2031 PM Peak Hour V/C Ratios (Downtown Courtice and Bowmanville)	75
Figure 4.11: 2031 PM Peak Hour Additional Trips	77
Figure 5.1: Covered Bicycle Racks at Milton GO Station	81
Figure 5.2: Hierarchy of Cycling Facilities	83
Figure 5.3: Active Transportation (Municipal)	89
Figure 5.4: Active Transportation (Local)	90
Figure 5.5: Active Transportation Policy Alternatives and Recommendations	95
Figure 5.6: Proposed Transit Routes and Facilities	103
Figure 5.7: Transit Policy Alternatives and Recommendations	104
Figure 5.8: TDM Primary Goals	106
Figure 5.9: TDM Policy Alternatives and Recommendations	112

Figure 5.10: Alternative A – “Longworth Avenue Extension to Holt Road”	118
Figure 5.11: Alternative B – “Longworth Avenue Extension to Maple Grove Road”	119
Figure 5.12: Alternative C – New Lambs Road Interchange	121
Figure 5.13: 2031 PM Peak Hour Alternative A Model Results (V/C Ratios)	122
Figure 5.14: 2031 PM Peak Hour Alternative B Model Results (V/C Ratios)	123
Figure 5.15: 2031 PM Peak Hour Alternative C Model Results (V/C Ratios)	124
Figure 5.16: Existing Road Network and Recommended Improvements	129
Figure 5.17: Road Network Policy Alternatives and Recommendations (Optimization and Safety)	132
Figure 5.18: Road Network Policy Alternatives and Recommendations (Design Standards and Trucks)	132
Figure 5.19: Road Network Policy Alternatives and Recommendations (Traffic Calming and Network Integration)	133
Figure 5.20: Regional Highway 2 / Prestonvale Road (Courtice)	135
Figure 5.21: Regional Highway 2 / Scugog Street (Bowmanville)	135
Figure 5.22: Regional Road 57 / Concession Road 3 (Bowmanville)	135
Figure 5.23: Regional Highway 2 / Prestonvale Road Existing Volumes (2012)	137
Figure 5.24: Regional Highway 2 / Scugog Street Existing Volumes (2013)	137
Figure 5.25: Regional Road 57 / Concession Road 3 Existing Volumes (2013)	137
Figure 5.26: Regional Highway 2 / Prestonvale Road Existing Lane Configuration	138
Figure 5.27: Regional Highway 2 / Scugog Street Existing Lane Configuration	138
Figure 5.28: Regional Road 57 / Concession Road 3 Existing Lane Configuration	138
Figure 5.29: Regional Highway 2 / Prestonvale Road Future Traffic Volumes (2031)	141
Figure 5.30: Regional Highway 2 / Scugog Street Future Traffic Volumes (2031)	141
Figure 5.31: Regional Road 57 / Concession Road 3 Future Traffic Volumes (2031)	142

List of Tables

	page
Table 1.1: Principles for Sustainable Transportation Planning	7
Table 2.1: Population and Employment Growth in Clarington	20
Table 3.1: Durham Region Transit Routes in Courtice – Approximate Headways	35
Table 3.2: Durham Region Transit Routes in Clarington – Approximate Headways	37
Table 3.3: Place of Work for Persons Residing in Clarington (2006)	44
Table 3.4: Place of Residence for Persons working in Clarington (2006)	46
Table 4.1: Population Growth (1996–2006)	50
Table 4.2: Comparison of Median Age and Annual Growth (1996–2006)	51
Table 4.3: Clarington Population by Community	52
Table 4.4: Percentage of Total Municipal Population	53
Table 4.5: Clarington Employment by Community	54
Table 4.6: 2031 Base Road Network Assumptions	63
Table 4.7: Clarington Screenline descriptions (screenlines with lanes deficiencies highlighted)	67
Table 5.1: Cycling Policies in Other Jurisdictions in Southern Ontario	84
Table 5.2: Incorporating Public Feedback on Active Transportation	96
Table 5.3: 2011 AM Peak Period Transit Mode Split (Clarington Origins)	97
Table 5.4: 2028 AM Peak Period Transit Mode Split – Durham Model Forecast (Clarington Origins)	98
Table 5.5: Incorporating Public Feedback on Transit Service	104
Table 5.6: Incorporating Public Feedback on TDM	113
Table 5.7: Evaluation Criteria	114
Table 5.8: Preferred Road Network Alternatives – Assumed Improvements	117
Table 5.9: Evaluation Summary for Clarington Road Network Alternatives	127
Table 5.10: Clarington DC Road Widening and New Road Construction Projects	130
Table 5.11: Incorporating Public Feedback on the Road Network	133
Table 5.12: Existing Traffic Peak Hour Operations	140

Table 5.13:	Future Traffic Peak Hour Operations	143
Table 5.14:	Future Traffic Peak Hour Operations - Improvements	146
Table 5.15:	Future Grade Separation Warrants	150
Table 6.1:	Budget Cost Estimates for Proposed Cycling Facilities	154
Table 6.2:	Budget Cost Estimates for Proposed Off Road Trails	159
Table 6.3:	Road Network Improvement Plan & Priorities	166
Table 6.4:	Long Term Road Network Improvements (COP Projects Beyond 2031)	169

Appendices

Appendix A. Public Consultation

- Notice of Assessment
- Public Information Centres
- Agency Comments
- Stakeholder Meeting

Appendix B. Durham Region Travel Demand Model Calibration

Appendix C. Horizon Year 2031 Base and Preferred Alternatives Model Results (AM and PM Peak)

Appendix D. Total Volume and Volume to Capacity Ratio Network Plots

Appendix E. Intersection Analysis

- TMC Data
- Synchro and Sim Traffic Reports
- Screenline Growth Rates
- Signal Warrant Analysis

Appendix F. Road Network Cost Tables

1. Introduction and Study Approach

The Clarington Transportation Master Plan (CTMP) is a planning document that provides a comprehensive assessment of the long-term transportation system infrastructure and policy needs across all modes of transportation in the Municipality of Clarington (Clarington). The CTMP includes recommendations for new or improved infrastructure (e.g. roads, transit, cycling, walking) and for the implementation of supporting transportation policies. The CTMP complies with the Municipal Class Environmental Assessment Master Planning process and has generally been completed in coordination with the Clarington Official Plan (COP) Review process.

Note that as much as possible this document was formatted to meet AODA requirements; where this was not possible, a full size image, table, or graphic can be made available in alternative format upon request to the Municipality of Clarington.

1.1 Purpose of the Transportation Master Plan

The purpose of the CTMP is to provide a coordinated and integrated implementation strategy for the transportation system, and it will guide related decision-making processes within the Municipality to the 2031 planning horizon and beyond. The transportation system recommended by the CTMP integrates the transportation infrastructure requirements of existing and future land use with the community planning vision and objectives of the COP to support affordable growth management, public safety, economic vitality and quality of life for the citizens it represents.

The CTMP is intended to:

- identify transportation infrastructure needs
- identify improvements to transportation policies and standards
- develop an implementation plan to prioritize transportation infrastructure planning
- integrate with the requirements of the Municipal Class Environmental Assessment
- undergo regular review

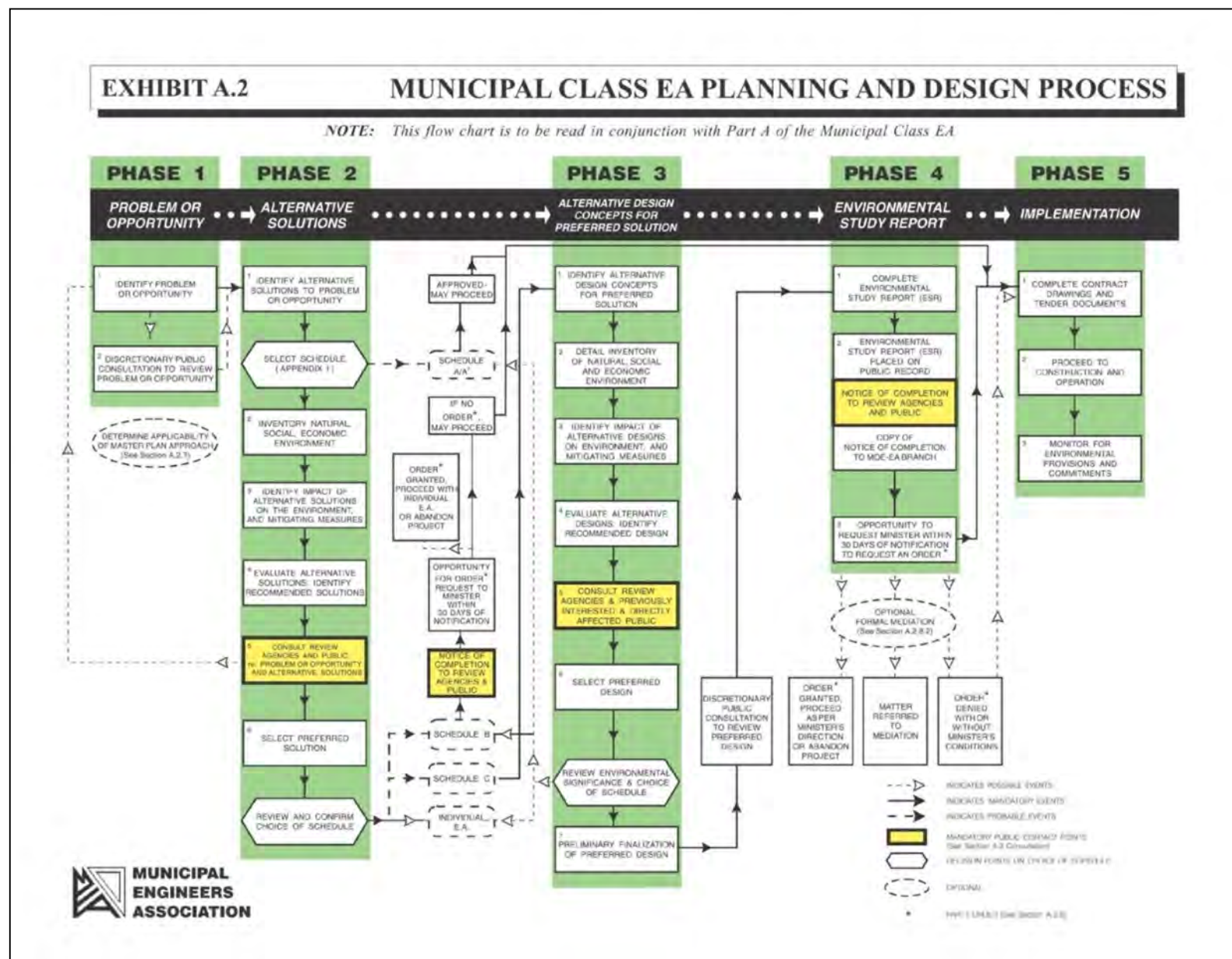
1.2 Municipal Class Environmental Assessment Process

The Municipal Engineers Association Municipal Class Environmental Assessment (Class EA) dated October 2000, as amended in 2007 & 2011, is an approved Class EA under the Ontario Environmental Assessment Act. The Class EA recognizes that it is sometimes advisable to plan municipal infrastructure as part of an overall system (Master Plan) rather than as a specific project, such as a roadway improvement project. The planning provisions of the Class EA describe the scope of a master plan as being broad and comprehensive, usually including analysis of an entire system such as a municipal transportation system, in order to develop a framework for future works and development.

The CTMP has been prepared in conformance to Approach #1 of the Municipal Class EA master planning process which addresses Phases 1 and 2 of the Class EA (see **Figure 1.1**). This accepted process applies to long-range transportation plans that integrate municipal infrastructure, including roads, public transit systems, bikeways, pedestrian systems and the parts of air, marine and rail systems that involve municipal responsibility.

The CTMP broadly establishes the needs and opportunities associated with the Municipality's transportation system to horizon year 2031 to select a preferred transportation planning solution that will address these needs and opportunities. Once approved by the Municipality, the CTMP will provide the context for the implementation of proposed works / improvements that will be classified according to the magnitude of their potential impacts. Subsequent Class EA projects / studies will be required for specific projects with some potential for environmental impact (Schedule 'B'), such as intersection improvements, and major (Schedule 'C') transportation infrastructure projects such as road widenings and new roadways or extensions. Other projects that have only minimal potential for environmental effects can be categorized as Schedule A or A+ projects (i.e., routine maintenance or minor operational improvements). Routine measures are typically utilized to mitigate any effects for these types of projects and they are either pre-approved under the Environmental Assessment Act or require a less rigorous environmental screening and documentation process. Please refer to **Section 6** for more details on the Class EA schedule associated with each improvement recommended as part of the CTMP.

Figure 1.1: Municipal Class EA Planning and Design Process



More detailed investigation will be required to implement specific Schedule ‘B’ and ‘C’ projects recommended in the CTMP. Additionally, Schedule ‘B’ projects will require the filing of a project file for public review and Schedule ‘C’ projects will have to fulfill Phases 3 and 4 of the Class EA process prior to filing an Environmental Study Report (ESR) for public review. Subsequent phases of the Class EA process examine design alternatives for the recommended project and include additional public consultation to allow for input on the design alternatives and development of the preferred design and measures to address or mitigate impacts associated with specific projects. In both cases, the public review period includes a Part II Order appeal mechanism where an individual can make a written request to the Minister of the Environment to extend the project to a higher level of EA investigation.

Note: A request for an order to comply with Part II of the EA Act (Part II Order) cannot be made on the CTMP itself, but may be made on specific Schedule ‘B’ or ‘C’ projects identified in the CTMP that are subject to a Municipal Class EA.

1.3 Project Direction

The technical direction for the preparation of the CTMP was provided by the following members of the Project Team:

Project Team		
Ron Albright	Manager, Infrastructure and Capital Works	Municipality of Clarington
Nicole Granzotto	Planner II	Municipality of Clarington
Sheri Harmsworth	Senior Project Manager and Transportation Engineer	AECOM Canada Ltd.
Nicholas Day	Team Leader - Modelling	AECOM Canada Ltd.
Jamshaid Muzaffar	Transportation Engineer – Modelling	AECOM Canada Ltd.
Diana Addley	Environmental Planner/Public Consultation	AECOM Canada Ltd.
Owen McGaughey	Transportation Planner – Active Transportation, Transit, and TDM	AECOM Canada Ltd.
Justin Chin	Transportation Engineer – Intersection Analysis	AECOM Canada Ltd.
Khawar Ashraf	Transportation Planner – Active Transportation and Transit	AECOM Canada Ltd.

Strategic direction on development of the CTMP was provided to the Project Team by the project's Steering Committee, which was comprised of the following municipal, regional and community representatives:

Steering Committee		
David Crome	Director of Planning Services	Municipality of Clarington
Nancy Taylor	Director of Finance	Municipality of Clarington
Doug Robertson	Project Manager, Transportation Infrastructure	Regional Municipality of Durham
Chris Leitch	Senior Planner, Transportation Planning	Regional Municipality of Durham
David Gooding	Manager, Transit	Durham Region Transit
Michael Sit	Head (Acting) – Highway Engineering, Toronto and Durham	Ministry of Transportation – Central Region
Lewis Lee	Senior Project Engineer, Highway Engineering	Ministry of Transportation – Central Region
Charles Petro	Senior Project Manager, Corridor Management	Ministry of Transportation – Central Region
Louis Bitonti	Senior Planner - Community Planning & Development	Ministry of Municipal Affairs and Housing
Leslie Woo	Vice President, Policy, Planning & Innovation	Metrolinx
Becca Nagorsky	Senior Advisor, Strategic Planning and Systems Planning	Metrolinx
Chris Darling	Director, Development Review & Regulation	Central Lake Ontario Conservation Authority
Warren Coulter	Environmental Engineering Analyst	Central Lake Ontario Conservation Authority
Greg Wells	Manager Planning & Regulations	Ganaraska Region Conservation Authority
Jennifer Knox	Community Communications	Ontario Power Generation
Robin Granger	Manager, Construction – Nuclear Refurbishment Execution	Ontario Power Generation

1.4 Vision

1.4.1 Sustainable Transportation Planning Vision

Transportation, the movement of goods and people, is one of the most integral activities undertaken in modern society. We are all dependent on the transportation systems we have put in place and rely on them to support nearly every aspect of our lives. Making the transportation system work safely and efficiently for all users, and not just for this generation but for many generations to follow, is the ultimate goal of the TMP. To do this, and to assist local levels of government in unifying and fulfilling their future transportation needs and responsibilities, the province of Ontario has created an overall vision for future growth in the province. This vision has been documented in the 2014 Provincial Policy Statement and the 2006 Growth Plan for the Greater Golden Horseshoe (Growth Plan). Both documents explicitly recognize the interconnected nature of land use and transportation planning decisions, outlining the vision for a land use pattern, density, and mixture of uses that minimizes the number of vehicle trips and promotes the use of alternative modes of transportation.

The CTMP has been designed to encompass this vision through the policies and the intent of the 2014 Provincial Policy Statement (PPS) and the 2006 Growth Plan for the Greater Golden Horseshoe (Growth Plan). Closer regional direction is provided through the Region of Durham Official Plan (ROP), which has been brought into conformity with the Growth Plan based on the Region of Durham Growth Plan Implementation Study (Growing Durham Study) and Regional Official Plan Amendment (ROPA) 128.

The themes and principles of sustainable transportation planning inherent in these documents have been succinctly captured in the Transportation Association of Canada (TAC) briefing titled: *Strategies for Sustainable Transportation Planning*, which provides a good functional framework for the CTMP. This framework is briefly summarized in **Table 1.1**.

Based on these principles, the CTMP will provide the template needed to responsibly implement the Municipality of Clarington's future transportation network.

Table 1.1: Principles for Sustainable Transportation Planning

Transportation and Community Sustainability	Transportation System Perspective	The Way Ahead
Principle 1 Integrate transportation & land use planning	Principle 5 Take a strategic approach	Principle 9 Provide implementation guidance
Principle 2 Protect environmental health	Principle 6 Consider all modes	Principle 10 Provide financial guidance
Principle 3 Incorporate social objectives	Principle 7 Manage transportation demand	Principle 11 Measure performance
Principle 4 Support economic development	Principle 8 Manage transportation supply	Principle 12 Create a living plan with public involvement

Source: Transportation Association of Canada briefing: Strategies for Sustainable Transportation Planning, May 2007

1.4.2 Local Context

The Municipality of Clarington holds a unique position within the Growth Plan policy area, exhibiting a diverse and complex mix of both urban and rural characteristics. Clarington possesses vast agricultural resources, manages a range of natural and heritage resources and is host to several of southern Ontario's key industries. With four core urban centres (Courtice, Bowmanville, Newcastle, and Orono) and numerous villages and hamlets, Clarington is also home to a sizeable residential population and employment base. In many ways, Clarington represents a transition community between the highly urbanized regions to the west and the more fully agrarian and rural counties to the east. Clarington is not an urban centre, though it contains urban centres, and to name Clarington as a fully rural municipality would be an oversimplification of its true nature and position in the wider context of the Greater Toronto and Hamilton Area (GTHA) and southern Ontario. A discussion paper on rural planning policy prepared by the Ontario Professional Planners Institute (OPPI)² identifies the unique attributes of Clarington and other similarly positioned communities that are often simply defined as being rural in nature.

Rural Ontario is not homogeneous. Communities may be near-urban and influenced by commuter-sheds and the range of services available in a

2. A Discussion Paper on Rural Policy, Ontario Professional Planners Institute, October 18, 2012

large centre; or urban-distant with a greater need for self-sufficiency; or exurban where a large number of former city dwellers have moved to the countryside and hamlets; or tourist-based where outsiders value local scenery or historical qualities; or agricultural where farming operations dominate the landscape. Each of these types of communities, and more, require specialized considerations in planning tailored to their unique settings and needs.

In these terms, the planning solutions that must be considered in the CTMP also cannot be homogenous or over-simplified. The study must consider Clarington's full nature and the diversity of its unique settings and needs in order to provide a realistic, sustainable and functional transportation network for coming generations.

1.5 Objectives and Strategic Goals

Using today's transportation system as a starting point, the CTMP will guide the Municipality in creating tomorrow's pathways – a travel network comprised of complete streets³ that will provide healthy, safe and convenient travel choices for the efficient movement of people and goods, and support a transportation system that is coordinated, integrated, realistic and accessible.

One of the primary objectives and strategic goals of the CTMP is to create a future transportation system in the Municipality of Clarington that reduces the existing high-level of reliance on the private automobile by promoting an increased role for pedestrian, cycling, and transit modes and transportation demand management (TDM) measures in servicing future transportation needs.

In broad terms, the CTMP will develop transportation system and supporting policy recommendations that:

- provide balance between the demands of growth and the needs of the environment
- provide a multi-modal vision that reduces the reliance on the single occupant automobile

3. A "Complete Street" is defined by the Toronto Centre for Active Transportation (TCAT) as "designed for all ages, abilities, and modes of Travel". TCAT goes on to say "On Complete Streets, safe and comfortable access for pedestrian, bicycles, transit users and the mobility-impaired is not an afterthought, but an integral planning feature". Similarly, Transport Canada says that in concept "...complete streets are designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age."

- meet the Municipality's vision statement
- integrate with the Clarington Official Plan review
- establish cost-effective solutions that efficiently use existing and planned infrastructure
- position the Municipality to capitalize on and be ready for planned growth

To achieve these objectives, the CTMP will: identify existing and future travel demands within the Municipality; provide strategies, policies and tools to support and improve existing Municipal facilities and services; and work to create a more balanced and sustainable transportation network over the next twenty years and beyond. Some of the more prominent issues, challenges and concerns that will be addressed in the process include the following:

1. **Significant growth in the Municipality's Urban Population by 2031.** In accordance with the Durham Region Official Plan, the population of the Municipality is expected to grow by over 50,000 people (over 60% increase) between 2011 and 2031. The vast majority of this growth is to be directed to the communities of Courtice, Bowmanville, and Newcastle. This growth will continue to increase pressure on transportation infrastructure in these southern communities.
2. **Integration with larger regional transportation and land use initiatives.** Key initiatives and their proponents are listed below. Each of these initiatives is discussed in more detail in subsequent sections of this report.

Region of Durham

- Durham Region Official Plan and ROPA 128
- Durham Transportation Master Plan
- Regional Cycling Plan
- Regional Trail Network
- Bus Rapid Transit (BRT) in Durham
- Long-Term Transit Strategy (LTTS)

Ministry of Transportation (MTO)

- Highway 401 Improvements from Brock Road to Courtice Road
- Extension of Highway 407 easterly to Highway 35/115 and Highway 401 East Durham Link

Metrolinx

- Big Move projects and Big Move “Next Wave” projects including the extension of GO Rail services to Courtice and Bowmanville

Ontario Power Generation (OPG)

- Holt Road Interchange Improvements
- Darlington Nuclear Generating Station (DNGS) Refurbishment

3. **Co-ordination with Official Plan Review.** The CTMP has been developed to be in compliance with and complementary to the outputs of the COP Review exercise. The study team has reviewed background reports and available information related to the Official Plan Review and has provided input to the Review as required.
4. **Transit Improvement Needs.** Although the Municipality is not an operator of local or regional transit, it is recognized that transit will need to play an increased role in the future in order to accommodate planned growth in the community. The CTMP will examine the role of key regional transit projects such as the GO Rail extension to Courtice and Bowmanville together with the required Durham Region Transit local transit improvements to ensure that the Municipality’s residents have access to a range of transportation choices.
5. **Role of Active Transportation.** The CTMP will holistically encourage and promote balanced planning that will allow healthier, more active and sustainable modes of transportation to be made available in the future. Through its policy recommendations, the CTMP will assist in advocating for educational programming and legislative reform, where required, to support these initiatives in Clarington. This includes a review of pedestrian and on-road cycling route requirements and their interconnection with off-road trail systems to ensure that existing network gaps are addressed.

1.6 Study Approach

The following four-step process was designed to comply with the requirements of the Municipal Class EA process, guide development of the CTMP, and address key study objectives. This process is described in the following sections.

1.6.1 Step 1: Establish a Study Foundation

Strengths and deficiencies in the existing transportation network were identified and the progress made to date toward implementing current recommendations was reviewed. A strategic-level transportation model was developed for the Municipality to assess transportation impacts and benefits associated with proposed changes in land use, transportation choices and new infrastructure alternatives.

A public and agency steering committee workshop was held during this stage to solicit relevant input from the public, interested agencies and stakeholders regarding transportation issues and opportunities that may arise from the COP review and Growth Plan policy direction, and to gain a sense of the kind of communities and transportation systems that are being envisioned by the public.

1.6.2 Step 2: Assess Transportation Impacts in Conjunction with Associated Growth Management Strategies

A transportation system is affected by total growth in population and employment within an area, as well as the manner in which this growth evolves. Growth Plan legislation, which affects land use and growth planning for the Greater Golden Horseshoe, is the basis of the Growing Durham Study that defines changes in land use planning and policy for Durham Region as well as its constituent municipalities.

Population and employment projections for the Municipality of Clarington were considered in conjunction with relevant policies arising from the COP review and the Growing Durham Study to build a transportation model capable of forecasting future transportation patterns based on land use and growth scenarios developed during the COP review. Results from this model were used to provide insight for potential transportation improvements.

1.6.3 Step 3: Develop Alternative Transportation Strategies

Based on Clarington's preferred growth scenario, potential transportation improvements arising from Step 2 were consolidated to develop and assess alternative transportation strategies. This phase of the project undertook a review of current programs / policies and infrastructure within the Municipality of Clarington and assessed the role of walking and cycling, transit, TDM, and road improvements in serving current travel needs. Research on best practises in implementing alternative transportation strategies was

undertaken and combined with public input solicited at the initial public and agency workshop.

Each strategy was assessed in terms of its general effectiveness, implementation issues and opportunities, and alignment with the strategic goals of the Municipality.

A second public and agency consultation in the form of a Public Information Centre (PIC) was held during this phase of the study to present recommendations of the study and to obtain feedback from the community, interested agencies and other stakeholders. Input received was incorporated where appropriate and where it was possible to address public concerns.

1.6.4 Step 4: Create the Transportation Master Plan

This final stage of the project combined input received from the public with the results of the technical work program to develop infrastructure and policy recommendations that will guide the Municipality as it continues to grow to horizon year 2031 and beyond. An implementation strategy was developed to prioritize improvements and guide the implementation of necessary transportation policies. Additional studies or projects required to implement recommendations were identified and prioritized, and cost estimates associated with the recommended projects were developed to support the process.

1.7 Public Consultation

An extensive public consultation program was carried out as part of this CTMP to provide information to stakeholders on all components of the study and facilitate a full spectrum of community and agency input. As such, the following activities were carried out to achieve these objectives:

- Establishment and maintenance of a study mailing list, including agencies, stakeholders and members of the public who had expressed an interest in the study;
- Direct mailing of notices to those indicated on the study mailing list;
- Posting project milestones on the Municipality of Clarington's website and information screens;

- Publication of notices of study milestones within the Clarington This Week newspaper;
- Holding and/or attending meetings with key stakeholders; and
- Holding two Public Information Centres (PICs) to engage and obtain input from the public, review agencies and stakeholders.

1.7.1 Study Notification

1.7.1.1 Notice of Study Commencement

The Notice of Study Commencement was mailed to agencies, Aboriginal peoples and other stakeholders at the onset of the study. In addition, the notice was posted in the Clarington This Week on November 14 and 21, 2012, as well as on the CTMP website on November 7, 2012. The Notice was also posted on the Municipality of Clarington's information screens. A copy of the Notice is provided in **Appendix A** of this CTMP.

1.7.1.2 Study Website and Information Screens

A study website was established through Municipality of Clarington's website at the initiation of the study (<http://www.clarington.net/ctmp/>). The website provided links to other related studies and initiatives in the area and provided an opportunity for members of the public to review study information and provide comments online. Notices of study events, PIC display material and comment forms were also posted on the study website.

Information screens were also available for public viewing within the main lobby of the Municipality of Clarington's Administrative Centre. Notices of PICs 1 and 2 were posted on the information screens in advance of each event.

1.7.2 Steering Committee

A Steering Committee was formed at the initiation of the CTMP study which included representatives from OPG, the Ganaraska Region and Central Lake Ontario Conservation Authorities (GRCA and CLOCA), Regional Municipality of Durham staff (including transit representatives), the MTO, Metrolinx and the Municipality of Clarington. Steering Committee members met twice during the study to share information on the CTMP, as well as other projects and/or initiatives in the area.

1.7.3 Stakeholder Meetings

1.7.3.1 Cycling Stakeholder Engagement and Input Meeting

A meeting with local cycling organizations was held on December 5, 2012, to present the study and solicit feedback related to the existing cycling network and the types of facilities, conditions and/or modifications desired by the organization members. Representatives from the Beech Street Spinners Cycle Club, the Oshawa Cycling Club, the Clarington Bike Friendly Coalition and the Hamptons B&B were present at the meeting. A copy of the meeting minutes, as well as the material presented by the study team as part of the meeting, are included in **Appendix A** of this report.

1.7.3.2 Clarington Agricultural Advisory Committee

Members of the study team attended a Clarington Agricultural Advisory Committee meeting on December 13, 2012 to present the CTMP study and gather input related to the potential effects of transportation planning on agricultural operations in Clarington. A copy of the meeting minutes, as well as the material presented by the study team as part of the meeting, are included in **Appendix A** of this report.

1.7.4 Public Information Centres

1.7.4.1 Public Information Centre 1

The purpose of the first PIC, held in February 2013, was to introduce the public and other stakeholders to the Transportation Master Plan process, the factors affecting the study and the work to be completed as part the CTMP. The Notice of PIC 1 was issued in the Clarington This Week Newspaper on January 23 and 30, 2013. In addition, the Notice was posted on the CTMP study website from January 18 through February 8, 2013, as well as on the Municipality of Clarington's information screens. The PIC was held at three different locations on three different days in order to provide central locations for each area of the Municipality. Each PIC 1 event was held from 6:00 pm to 8:00 pm and as follows:

- Monday, February 4, 2013, at the Newcastle Community Hall (Newcastle);
- Wednesday, February 6, 2013, at the Municipal Council Chambers (Bowmanville);
- Thursday, February 7, 2013, at the Courtice Community Complex (Courtice).

In total, PIC 1 was attended by 30 stakeholders (i.e., nine attendees at the Newcastle event, seven attendees at the Bowmanville event and 14 attendees at the Courtice event). A comment sheet was prepared as part of the PIC 1 events and was made available at the PIC and on the CTMP website following the PIC. The comment form offered an opportunity to rate a series of transportation policy approaches and posed a series of questions to respondents to solicit feedback on the following:

- What do you see as the most important transportation issues facing Clarington over the next 20 years?
- What are the most important transportation improvements that should be considered as part of the CTMP to address the needs over the next 20 years?
- What improvements do you feel are needed to change your driving habits and get you walking, cycling or using public transit more often?

The detailed comment form responses are included in **Appendix A** and are summarized as follows:

Cycling Infrastructure	Transit Service	Roads
<ul style="list-style-type: none"> • Provide dedicated and separated cycling lanes • Provide more off-road cycling paths • Improve cyclist safety • Provide more “Share the Road” signs • Provide a cycling route along Nash Road from Courtice to Bowmanville • Provide pavement markings to delineate cycling routes 	<ul style="list-style-type: none"> • Include service in both directions (for loop routes) • Integrate transit in Clarington with service to the GTA • Improve service between urban centres • Improve service to Durham College / University of Ontario Institute of Technology (UOIT) • Improve accessibility and frequency of service • Expedite GO train service to Bowmanville • Make transit a desired service to encourage use 	<ul style="list-style-type: none"> • East-west routes need to be developed, especially through Newcastle • Improve existing roadways • Consider long-distance commuters • Improve country roads • Implement stoplights at key intersections to improve traffic flow • Add wider shoulders • Improve maintenance/cleanliness of roadway shoulders • Provide more/permanent flashing speed signs along roadways • Improve connectivity

A dotmocracy activity was also included as part of the PIC events, the purpose of which was to provide a general indication of the level of support from attendees for the alternatives being presented. As such, PIC attendees were provided with dot stickers which were to be placed on the maps and display panels in relation to specific options. The results of the dotmocracy activity indicated that the majority of respondents preferred the use of an aggressive approach to improving active transportation and local transit services within Clarington. In addition, a more aggressive approach to roadway network optimization, safety and traffic calming measures was preferred. However, in consideration of improvements to transportation demand management and parking management, a passive approach was favoured by the majority of attendees. A summary of PIC 1 and the associated dotmocracy activity is included in **Appendix A**.

1.7.4.2 Public Information Centre #2

The purpose of PIC 2 was to present a summary of the feedback received/considered in association with PIC 1, the evaluation of the long term network improvements and transportation policies, as well as the draft CTMP study recommendations. PIC 2 was held at the Municipality of Clarington Council Chambers on Tuesday, May 6, 2014, from 6:30 pm to 8:30 pm. The Notice of PIC 2 was issued in the Clarington This Week newspaper on April 22 and April 29, 2014. In addition, the notice was posted on the CTMP study website from April 22 through May 6, 2014, as well as on the Municipality of Clarington's information screens. In total, PIC 2 was attended by eight stakeholders.

Attendees generally agreed with the recommendations presented as part of the PIC. A comment form was available to respondents at the PIC, as well as on the study website until May 20, 2014. The comment form offered questions that were intended to collect input related to the recommended long term road network improvements. The questions posed on the comment sheet consisted of the following:

1. Do you agree with the Recommended Transportation Improvements identified?
2. Do you agree with the active transportation improvements (for walking, cycling, etc.) being recommended? Are there other improvements you would like to see considered?
3. Do you agree with the recommended transportation policy approaches presented?
4. Do you have any additional comments?

One comment sheet was received at the time of PIC 2 and one was received by the requested submission date of May 20, 2014. The responses generally supported the recommended transportation improvements and/or policy approaches and recommended that active transportation and transit use be encouraged. Other comments received from respondents can be summarized as follows:

- Pave boulevard along Regional Highway 2 / King Street, between Bowmanville Creek bridge and Durham Road 57, to provide a safe and defined route for active transportation users;
- Encourage use of local trails and provide routes through green space; and
- Establish car pool parking lots at access points to Highway 401 (e.g., Courtice Road).

1.7.5 Incorporating Public Feedback into the TMP

For each of the key network discussion areas including active transportation, transit, and the road network, **Section 5** outlines the feedback received from the public during the course of this study and how this feedback was considered in the formation of both network and policy recommendations.

1.8 List of Acronyms

The following is a compilation of acronyms used throughout this document, given in alphabetical order, listed by acronym first, followed by the full-name of each acronym:

AADT – Average Annual Daily Traffic

ATV – All-Terrain Vehicle

BRT – Bus Rapid Transit

CLOCA – Central Lake Ontario Conservation Authority

CMA – Central Main Area (Section 3.3.1 – possibly being revised)

COP – Clarington Official Plan

CN – Canadian National CP – Canadian Pacific

CPR – Canadian Pacific Railway

CTMP – Clarington Transportation Master Plan

DC – Development Charges

DNGS – Darlington Nuclear Generating Station

DRT – Durham Region Transit

EA – Environmental Assessment

ESR – Environmental Study Report

GRCA – Ganaraska Region Conservation Authority

GMS – Growth Management Study

GTA – Greater Toronto Area

GTHA – Greater Toronto and Hamilton Area

HOV – High Occupancy Vehicle

LOS – Level of Service

LRT – Light Rail Transit

LTTS – Long-Term Transit Strategy

MTO – Ministry of Transportation Ontario

NAICS – North American Industry Classification System

OMB – Ontario Municipal Board

OP – Official Plan

OPG – Ontario Power Generation

OPPI – Ontario Professional Planners Institute

PHF – Peak Hour Factor

PIC – Public Information Centre

PPS – Provincial Policy Statement

PSW – Provincially Significant Wetland

QEW – Queen Elizabeth Way

ROP – Regional Official Plan

ROPA – Regional Official Plan Amendment

RTP – Regional Transportation Plan

TDM – Transportation Demand Management

TMA – Transportation Management Association

TMC – Turning Movement Count

TMP – Transportation Master Plan

TAC – Transportation Association of Canada

UOIT – University of Ontario Institute of Technology

V/C – Volume to Capacity

Cardinal Directions are sometimes shortened to the first letter of the direction: N = North; S = South; E = East W = West;

Street Names are sometimes shortened as follows: Rd = Road; St = Street; Av = Avenue; Cr = Crescent; Conc = Concession

Dimensions are represented as follows: m = meter; km = kilometer

2. Planning Context

2.1 Background

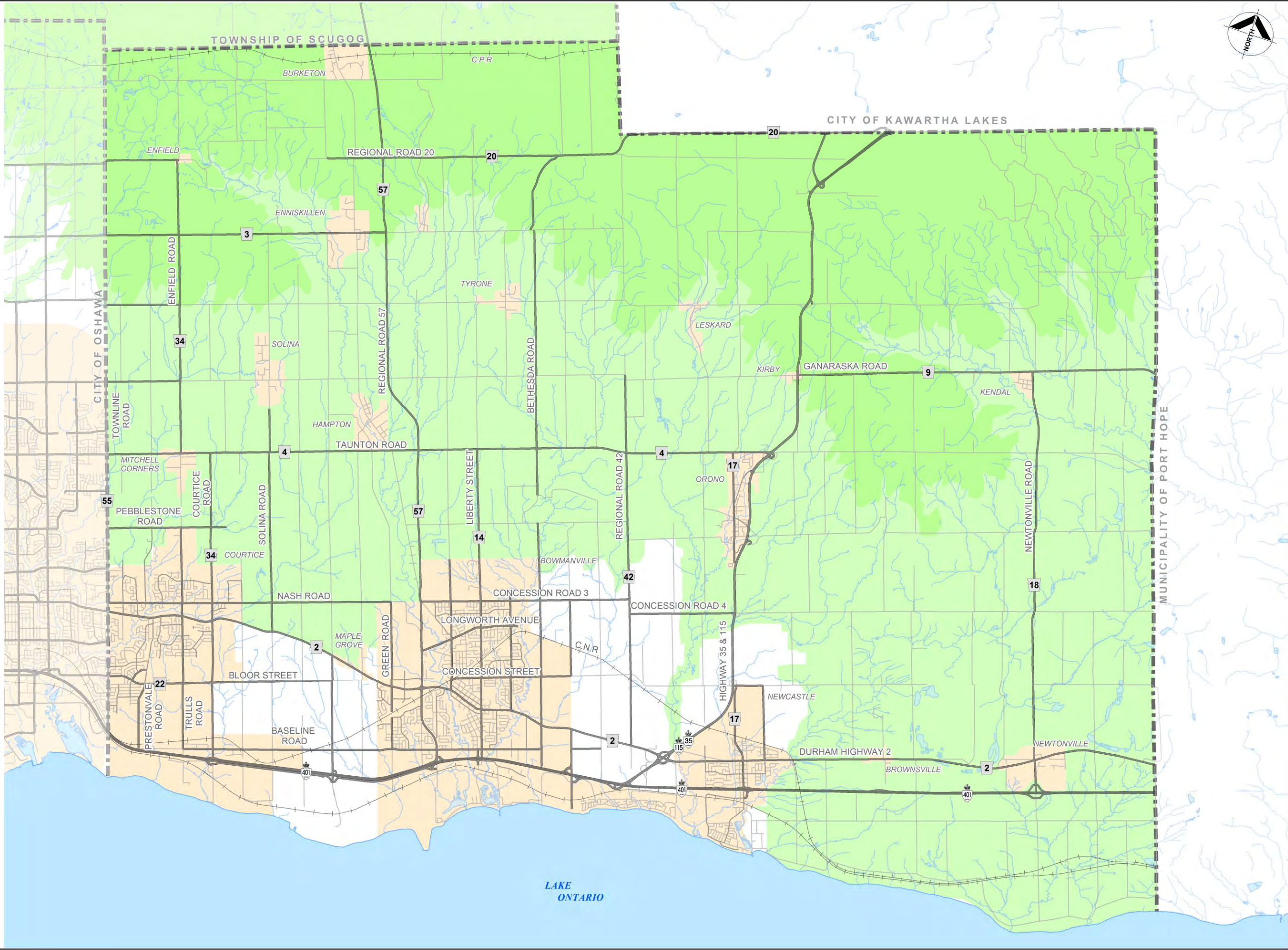
The Municipality of Clarington has emerged as a key growth area at the eastern edge of the GTHA. For reference, an area map of the Municipality is shown in **Figure 2.1**. Clarington is located in the south-east part of Durham Region, and is bound by Township of Scugog and City of Kawartha Lakes to the north, Lake Ontario to the south, the City of Oshawa to the west, and the Municipality of Port Hope to the east. Clarington's transportation system consists of a roadway system as well as a transit network and a pedestrian and cycling (active transportation) network.

It is expected that Clarington's 2011 population will increase by 54,031 from 86,400 to 140,431 by the year 2031. Employment trends for the same period have predicted 14,835 new, permanent jobs, increasing the existing job base from 20,095 to 34,930. These numbers are approximately consistent with Region of Durham employment forecasts for Clarington that predict an increase from approximately 22,500 jobs in 2011 to 38,500 in 2031⁴. Please refer to **Section 4.1.1** for more details on recent demographic trends and population and employment forecasts for the Municipality. **Table 2.1** below presents growth in population and employment expected within Clarington from 2011 to 2031. The forecasts from 2011 to 2026 are consistent with the Durham Region Development Charges (DC) Study Update (2013) and the 2031 forecasts are consistent with the Clarington Official Plan Review.

Table 2.1: Population and Employment Growth in Clarington

Clarington (total)	2011	2016	2021	2026	2031
Population	86,400	95,150	107,535	122,045	140,431
Employment	20,095	23,685	28,900	32,935	34,930

4. Region of Durham Official Plan Amendment No. 128, May 19, 2009.



Existing Road Network

- Freeway
- Arterial Road
- Collector Road
- Local Road

Other

Boundaries and Policy Areas

- Municipal Boundary
- Urban Area
- Oak Ridges Moraine
- Greenbelt

Other Features

- Watercourse
- Waterbody
- Railway

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CLIENT:

Clarington
Leading the Way

PROJECT:

CTMP | Clarington Transportation Master Plan

DRAWING:

MUNICIPALITY OF CLARINGTON AREA MAP

PREPARED BY:	CHECKED BY:	PROJECT No.:
—	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	2.1
SCALE:	DATE:	
1 : 100,000	JUNE 2014	

As previously noted, Clarington is characterized by both rural and urban communities with associated agricultural lands that straddle both sides of the Greenbelt boundary, employment lands, and a varied collection of natural and heritage resources. There is room for growth in Clarington, with lands set aside for both residential and commercial development. Future employment lands have been planned in the Clarington Energy Business Park southwest of Courtice and the Clarington Science and Technology Park near Bowmanville to promote the area's growing energy sector. Further employment lands have also been planned to take advantage of expected population and employment growth in the Courtice area and to leverage GO Transit's plans to extend its GO Rail service to Courtice and Bowmanville.

Plans for the Highway 407 easterly extension through Clarington, including the Highway 418 (East-Durham Link) connection with Highway 401 east of Courtice, and GO Transit's easterly rail extension through Courtice and Bowmanville will create some interesting challenges and offer potential local opportunities. Planning of Clarington's future transportation infrastructure warrants a comprehensive investigation of both the positive and the negative impacts that these projects may have on surrounding communities and on the surrounding transportation network.

Providing adequate transportation infrastructure to support future predicted population and employment estimates will become an increasing challenge for Clarington in the coming years but will also provide the Municipality with the opportunity to fully embrace fundamental policy changes related to implementation of the Provincial Policy Statement, the Growth Plan, and to some extent the 2005 Greenbelt Plan which governs parkland, open space and trails within the Oak Ridges Moraine boundary. These changes will see the development of urban communities that support alternative and active modes of transportation, including transit, cycling and walking; enhance economic and social activities in rural communities; and protect and support existing agricultural lands, employment lands and natural heritage lands, as well as our precious natural resources, all in the interest of promoting economic prosperity and providing a quality, sustainable environment that will work to support all ages and abilities and coming generations.

Future direction for transportation infrastructure planning and development in the Municipality of Clarington will come from these and other related planning documents, and will follow the guidelines, recommendations, and policies arising from the COP review and the Growing Durham Study. A brief synopsis of relevant policy from each supporting planning document is provided below.

2.2 Policy Review

2.2.1 Provincial Policy Statement (PPS)

The Planning Act requires that all planning decisions shall be consistent with the PPS, which provides further detail and policy direction on matters of provincial interest that relate to land use planning and development, such as growth management and environmental protection.

The PPS took effect in 2005 and was updated in 2014. It provides for enhanced protection of the environment by identifying the significance of the natural heritage system and water resources, including natural hazards and water quality, air quality and energy use. The PPS ensures that transportation systems are provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.

The PPS contains a section regarding “Infrastructure and Public Service Facilities”, and requires all municipalities to:

- Integrate transportation and land use considerations through all stages of the planning process;
- Maintain connectivity within and among transportation systems and modes as part of a multimodal system;
- Protect corridors and rights-of way for transportation infrastructure and transit to meet current and project needs;
- Protect corridors for the long term;
- Consider significant resources (e.g., natural heritage features), when planning for significant transportation corridors and rights-of-way
- Use existing and planned infrastructure (including transportation infrastructure) efficiently; and
- Provide a transportation system that is safe, energy efficient, facilitates goods and people movement, and has sufficient capacity for projected needs⁵.

5. *Provincial Policy Statement, 2014, Ministry of Municipal Affairs and Housing*

2.2.2 Places to Grow Act and Growth Plan for the Greater Golden Horseshoe (Growth Plan)

The Growth Plan is a strategic Provincial vision for long-term growth in the Greater Golden Horseshoe and surrounding areas. The Growth Plan guides municipalities to optimize the use of existing and new infrastructure to support growth, and to coordinate infrastructure planning, land use planning and infrastructure investment. The Growth Plan mirrors policies found in the PPS with respect to transportation corridors.

Many policies in the Growth Plan deal with planning for transportation infrastructure, with an emphasis on encouraging municipalities to plan for transportation systems that are adequate for the level of anticipated growth, offer multi-modal access to destinations, provide safety for users, and are interconnected and planned for in a coordinated manner. The Growth Plan also focuses heavily on planning for greater density in urban areas that can support higher transit service levels and increase the modal share of transit. Further, municipalities are directed to integrate pedestrian and bicycle networks into transportation planning for both existing and new communities.

2.2.3 Greenbelt Plan

The Greenbelt Plan is designed to protect the rural landscape (countryside) and associated resources. The intent of the Plan is to:

- protect against the loss and fragmentation of the agricultural land base and support agriculture as the predominant land use;
- give permanent protection to the natural heritage and water resource systems that sustain ecological and human health and that form the environmental framework around which major urbanization in south-central Ontario will be organized; and
- provide for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation, and resource uses.

Within the context of the Municipality of Clarington, the Greenbelt Plan provides policy direction related to parkland, open space, and trails that intersect with the Oak Ridges Moraine. These lands are included as part of the protected countryside and are subject to Greenbelt Plan policies; however, all other lands defined as the Oak Ridges Moraine are governed under the *Oak Ridges Moraine Conservation Act*.

2.2.4 Durham Growth Plan Implementation Study and Regional Official Plan Amendment No. 128 (ROPA 128)

The Growing Durham Study prepared recommended regional responses to bring the Regional Official Plan (ROP) into conformity with the Province's Growth Plan. The Growing Durham Study involved public, municipal, and agency consultation and resulted in the adoption of Regional Official Plan Amendment 128 (ROPA 128) by Regional Council in June 2009. Following adoption by Council, the amendment was forwarded to the Province for final approval. The Province's decision in October 2010 generated modifications to the policies that Durham Region and a number of other parties subsequently appealed to the Ontario Municipal Board (OMB). The Municipality of Clarington was one of 32 individual parties that appealed the Province's final decision. ROPA 128 was approved by the Ontario Municipal Board on January 9, 2013, save and except several policy or site-specific appeals still active at that time. The Approved Regional Official Plan allocated population, housing, and employment targets for the Municipality of Clarington and provides Regional policy and direction to the area municipalities for implementation of the Provincial Growth Plan. The population and employment forecasts for the Municipality of Clarington developed as part of the Clarington Official Plan Review were designed to be in compliance with the Durham Official Plan.

2.2.5 Region of Durham Long-Term Transit Strategy

The purpose of the Long-Term Transit Strategy (LTTS) is to develop a long-term regional transit strategy that considers multi-modal transportation alternatives as they relate to, and impact, transit. This includes looking at rapid transit as a component of sustainable transportation options that will help the Region address anticipated transportation demands to 2031 and beyond. The LTTS is intended to provide specific directions regarding the role that rapid transit will take in the years to come, including identification of a preferred long-term transit strategy, and identification of specific transit corridors to support the preferred alternative strategy. The LTTS preferred alternative provides the best long-term, environmentally-sustainable solution to help manage the Region's future growth and transportation needs, and is a comprehensive transit solution consisting of conventional bus service, enhanced bus service, bus rapid transit (BRT), and light rail transit (LRT) throughout the Region. Additional details on the LTTS are discussed in **Section 3.2.2 – Planned Services**.

2.2.6 Municipality of Clarington Strategic Plan

At the broadest level, Clarington's Strategic Plan has defined six strategic priorities for the Municipality. Under each strategic priority, action items associated with various objectives are identified. Appropriately, these action items include development of a comprehensive transportation master plan that reviews all modes of transportation on our roads, sidewalks, and trails (i.e. vehicular, cycling, pedestrian), and implementation of the TMP when complete.

Several action items that are directly or indirectly relevant to the CTMP are listed in the Strategic Plan under strategic priority number five – Invest in Infrastructure – and are provided here as follows:

- Improve traffic management by updating and expanding traffic data;
- Promote Provincial investment in Hwy 407 extension;
- Promote Provincial investment in GO Rail extension;
- Promote Provincial investment in Hwy 401 corridor interchange improvements;
- Advocate for further Provincial & Federal infrastructure funding and gas tax funding;
- Promote Regional investment in roads, sanitary sewer, and municipal water infrastructure;
- Build West Beach Park;
- Develop comprehensive strategy for park implementation, including funding of new parks;
- Develop conceptual plans with public participation;
- Build Bond Head park expansion; and
- Pursue Public/Private Partnership (P3) and/or senior government funding opportunities for waterfront park development.

The Strategic Plan also supports exploration of opportunities for boulevard/median beautification and work with community partners, the creation of gateways for each urban area and improvement of the road-side environment through by-law enforcement.

Related Studies

Several transportation and planning studies undertaken in the Municipality of Clarington have set out policy and guidelines for locations where there is significant potential for growth. These studies include:

1. Highway to Main Street: Courtice Regional Highway 2 Corridor and Main Central Area Study (June 2001)
2. Transportation Implementation Study: Phase 1 – Bowmanville (August 1999)
3. Urban Design Plan for the West Bowmanville Gateway: Traffic Component Draft Report (December 1998)
4. Bowmanville King Street East Corridor Study Final Report (September 2003)
5. Port Darlington Neighbourhood Transportation Review – Appendix B of Highway 401 Interchanges in Clarington—Strategic Transportation Overview (May 2005)

2.2.7 Municipality of Clarington Official Plan Review (COP)

Concurrent with the TMP study, the Municipality has been undertaking a comprehensive Official Plan Review in order to bring the Municipality's Official Plan into conformance with ROPA 128, the Greenbelt Plan, and the Province's Growth Plan. The concurrent COP Review and TMP development process has explicitly recognized the interconnected nature of land use and transportation planning policy decisions. In particular, the distribution and intensity of planned population and employment growth in the Municipality has a direct impact on future transportation system needs and opportunities. Furthermore, land use planning decisions and policies (e.g. increased density and transit oriented development) can serve to encourage more sustainable transportation choices such as walking, cycling, and public transit. To this end, both the COP and this TMP recognize that sustainable transportation improvements are needed in order to reduce the reliance on the usage of private automobiles.

As part of the COP's land budgeting analysis, forecasted population and employment growth to 2031 was allocated to specific greenfield / new growth areas and intensification areas within the Municipality. Most growth is directed to the urban communities of Courtice, Bowmanville, and Newcastle, with intensification being focused in the following strategic places that are capable of absorbing future development: Courtice Main Street, Courtice Town Centre, Bowmanville East Town

Centre, and Bowmanville West Town Centre. Intensification areas are recognized by the COP as areas where there are unique opportunities to develop compact, transit supportive⁶, mixed use developments, while greenfield areas will provide opportunities for walkable, transit supportive residential development. The COP's updated population and employment totals were used as a direct input to the transportation needs analysis that was conducted as part of this TMP. Please refer to **Section 4** of this report for more details on the updated growth totals by urban area and the subsequent transportation needs analysis.

Lastly, it should be noted that the TMP study team co-ordinated with the COP Review team and provided input to the required updates to Section 19 "Transportation" of Clarington's existing OP. The updates were developed to be consistent with the recommendations of this TMP. Please refer to **Section 5** of this report for more details.

6. *The Bowmanville West Town Centre is expected to be a principal transit hub that is anchored around the future GO Rail station. Both the future Bowmanville and Courtice GO Rail stations are expected to be catalysts for long term intensification and represent the Municipality's best opportunities for achieving the Provincial Growth Plan's targets and directions.*

3. Existing and Planned Multi-Modal Transportation System

3.1 Active Transportation



3.1.1 Existing Infrastructure

The Municipality of Clarington currently owns or manages a wide range of dedicated active transportation network infrastructure. According to the *Parks, Open Space, and Trails Discussion Paper (April, 2013)* that was developed as part of the on-going Official Plan Review, the Municipality owns or manages 19.5 km of off-road recreation trails with both granular and asphalt surfaces. In addition there are 5 km of trails located on OPG lands through the Darlington Nuclear Generating Station site that are accessible to the public. The Municipality is also home to a number of other off-road trails that are owned or managed by others. The list below describes existing major off-road trails that are located within the Municipality:

- **Waterfront Trail:** The Waterfront Trail runs the length of Clarington's 37 km waterfront from the border with Oshawa to the west to Northumberland County in the east; connecting to the larger Waterfront Trail system that follows the Lake Ontario shoreline from Niagara-on-the-Lake to Quebec. The trail has a mixture of paved on- and off-road segments and is generally aligned along Lakeshore Road and South Service Road. There are parts of the trail located on sections of Lakeshore Road that do not have shoulders and have a high speed rural cross-section.
- **Oak Ridges Trail:** The Oak Ridges Trail is located within the Oak Ridges Moraine, which stretches from the Niagara Escarpment in Caledon to the Trent River watershed east of Peterborough. Within Clarington, the trail runs along the northern border of the Municipality, generally to the north of Concession Roads 8 and 10. This remote trail, which is shared with motorized vehicles (ATV's and snowmobiles), is primarily recreational in nature and provides off-road biking and hiking opportunities.
- **Bowmanville and Soper Valley Trails:** The Bowmanville Valley Trail travels through the west half of Bowmanville (1.8 km in length), while the Soper Trail (1 km in length) follows the Soper Creek on the eastern side of Bowmanville. Both are paved trails.

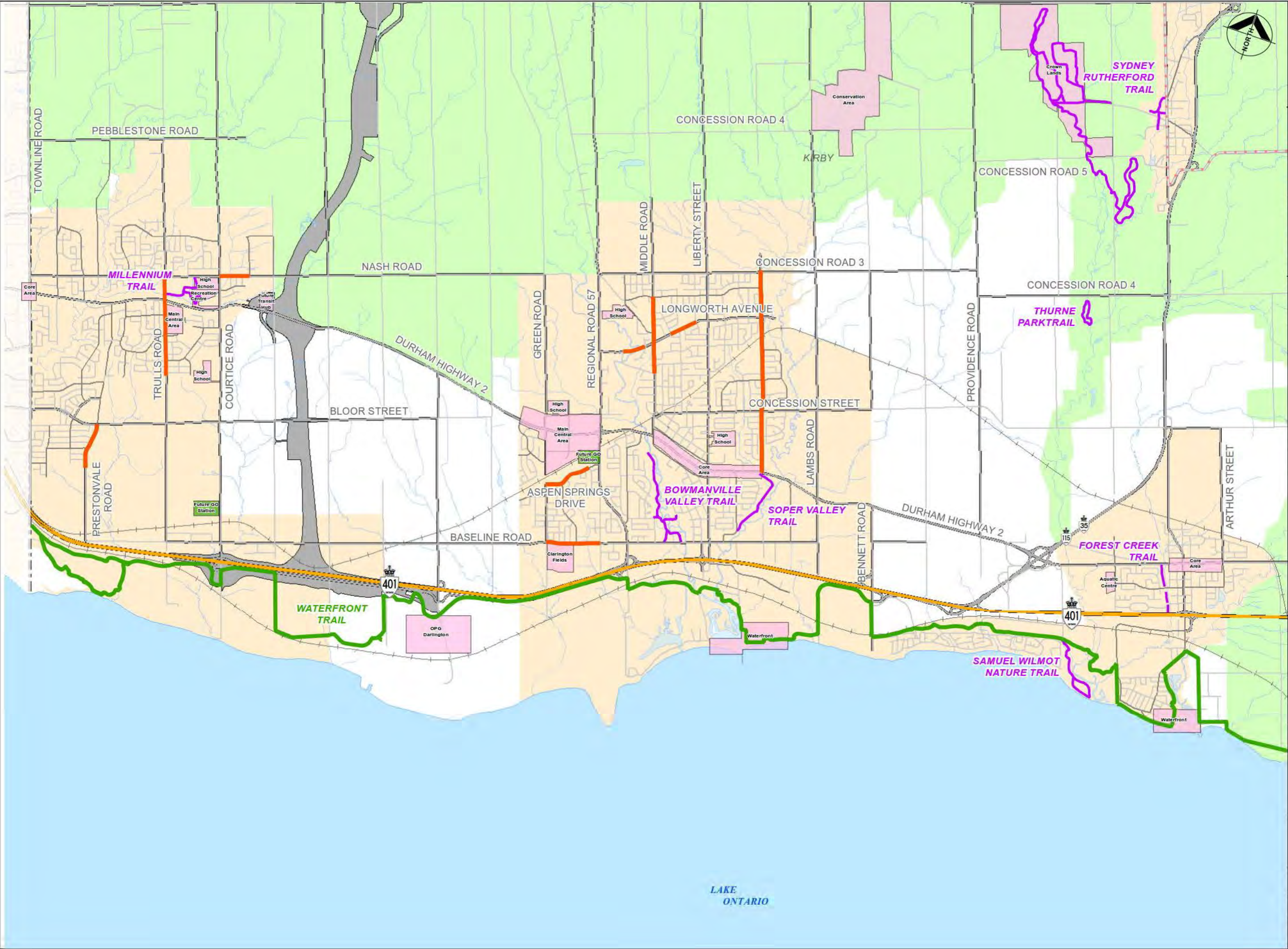
- **Courtice Millennium Trail:** The Millennium Trail is located west of the Courtice Community Complex, weaving its way through woodlands, meadows and across the Black Creek (1.5 km in length). The trail has a limestone surface.
- **Sidney Rutherford Trail:** The Sidney Rutherford Trail is a 1 km limestone trail running along the Wilmot Creek within the Village of Orono.

The Waterfront Trail, Bowmanville and Soper Valley Trails, and the Courtice Millennium Trail are identified in **Figure 3.1**, and the Oak Ridges Trail is shown in **Figure 3.2**.

Public recreational trails are also present at Conservation Areas, Darlington Provincial Park, Kendal Crown Lands, and Ganaraska Forest, and the Orono Crown Lands Trust.

Cyclists are also present throughout the Municipality as part of the roadway environment, sharing space with vehicles.⁷ As shown in **Figure 3.1**, in 2013 the Municipality implemented 16 km of exclusive bike lanes within the communities of Bowmanville and Courtice on two lane roads with wide lane widths and lower traffic volumes.

7. Under the Highway Traffic Act, bicycles are permitted road users, regardless of whether there is any special provision for them.



Road Network

- Freeway
- Arterial Road
- Collector Road
- Local Road

Cycle and Trail Network

- Cycle Lanes/Shared Route
- Waterfront Trail
- Trail

Destinations

- Key Transportation
- Future GO Station

Other Boundaries and Policy Areas

- Municipal Boundary
- Highway 407 Corridor
- Oak Ridges Moraine
- Urban Area
- Greenbelt

Other Features

- Railway
- Watercourse
- Waterbody

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CLIENT:

Leading the Way

PROJECT:

Clarington Transportation Master Plan

DRAWING:

CYCLE LANES AND TRAILS

PREPARED BY:	CHECKED BY:	PROJECT No.:
	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	
SCALE:	DATE:	
1 : 35,000	JUNE 2014	

3.1

In 2012, Clarington Tourism published a cycling map with suggested cycling routes of varying difficulty (Easy, Moderate, Challenging) that begin and end at municipal facilities that provide free parking and public washrooms during operating hours. The routes are primarily recreational in nature and follow picturesque/scenic routes. The routes take advantage of quieter rural roads that are generally suitable for cyclists with road riding experience.



The current Clarington Official Plan requires sidewalks on both sides of arterial and collector roads and encourages sidewalks on both sides of local roads. The historic Downtowns of Bowmanville, Newcastle, and Orono are recognized as existing highly-walkable pedestrian friendly zones within the Municipality.

3.1.2 Planned Infrastructure

The Region of Durham previously completed the *Regional Cycling Plan* in 2012, which developed a recommended region-wide cycling network and implementation strategy, including network phasing, costs, and funding strategies.



Directions for a communications strategy were also defined in order to highlight the education, promotion, and enforcement programs that are required to foster an educated and safe cycling community.

The Regional Council approved cycling network includes new multi-use boulevard paths, paved shoulders, on-road cycling lanes, and buffered cycling lanes (over 200 km of proposed new facilities in total). A hierarchy of facilities were identified in the plan:

- **Primary Cycling Network (Spines)** – Routes that connect major centres, inter-modal facilities and key destinations that are typically located within arterial road corridors. These routes are the focus of the Regional Cycling Plan and include roads under Region and area municipal jurisdiction. Both short-term and longer-term phasing horizons are identified with implementation generally to be coordinated with planned road rehabilitation and expansion work.
- **Regional Trail Network (Trails)** – Regional scale multi-use routes typically located off-road and used for recreational purposes. Defined in the Durham Region Trail Network.

- **Secondary Cycling Network (Local Routes)** – Routes that connect neighbourhoods enable shorter-distance trips, and provide access from neighbourhoods to the Primary Cycling Network. These are a mixture of on- and off-road facilities and primarily located within municipal rights of way and local trail systems. These routes are defined in Municipal Cycling Plans.

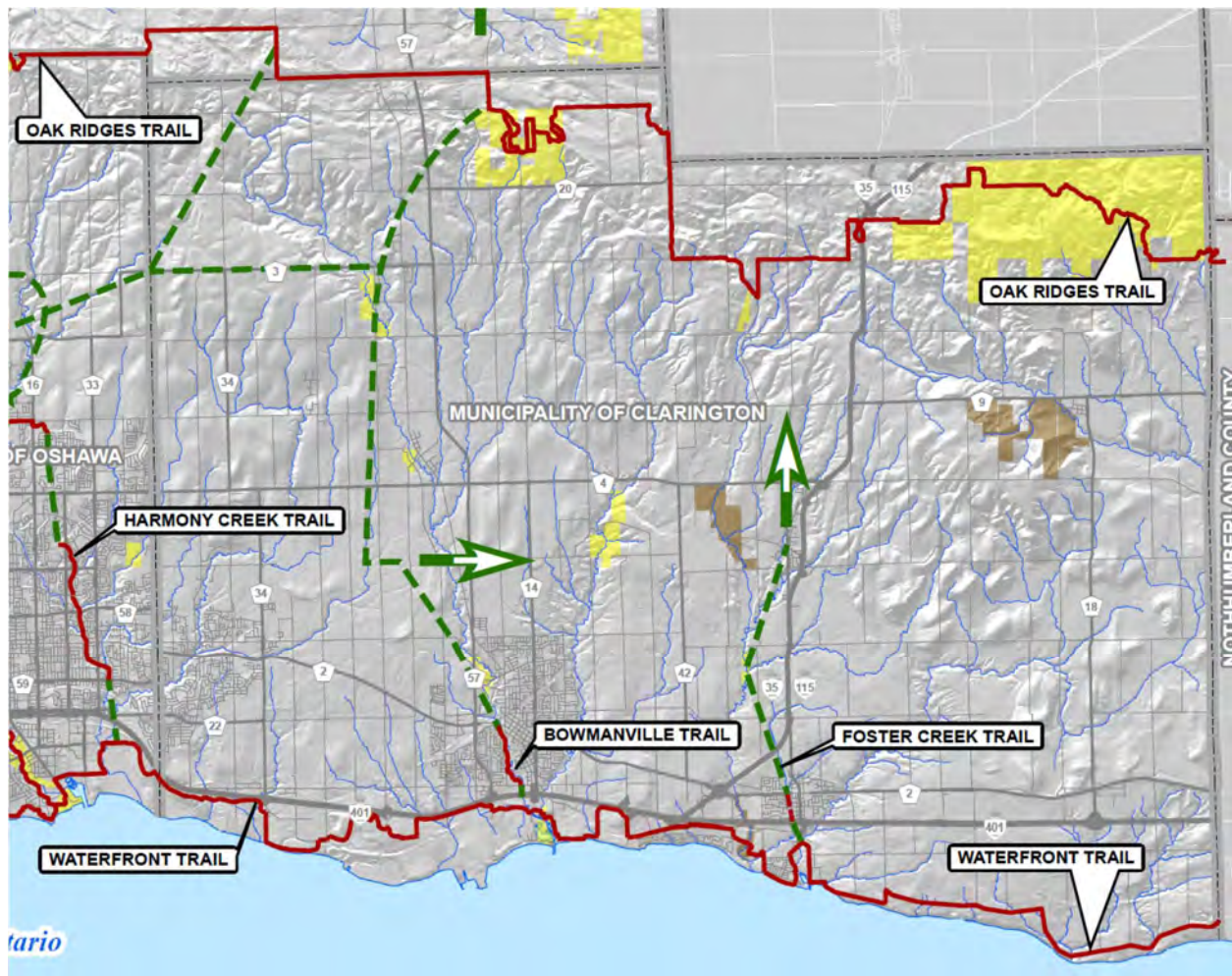
The bulleted list below summarizes the key components of the *Regional Cycling Plan* that are directly relevant to the Municipality of Clarington and this Transportation Master Plan:

- **Network** - The Proposed Primary Cycling Network proposes key connections between Courtice, Bowmanville, and Newcastle in southern Clarington, including both Regional and Municipal roadways. Potential connections to the proposed GO Stations in Courtice and Bowmanville are also identified.
- **Funding** - Municipalities are to be responsible for the maintenance and repair of multi-use paths on Regional roads (Region to provide platform for the paths, including land acquisition, utility relocation, grading, and customized bridge structures). Region to fund all capital and maintenance costs of on-road cycling facilities and paved shoulders on Regional roads.
- **Waterfront Trail** - The Plan recognizes the Waterfront Trail as a critical component of the Regional Trails Network and the Region notes that it will consider partnering with other funding agencies and local municipalities to eliminate gaps in the Waterfront Trail.

The proposed Primary Cycling Network within Clarington consists of approximately 52.7 km of facilities. 18.6 km (35.3%) of the proposed facilities are located on Regional Roads and 34.1 km (64.7%) of the facilities are located on local (Clarington) roadways. Additionally, 8.3 of the 18.6 km of the Primary Cycling Network located on Regional roads consist of multi-use pathway-type facilities, which Clarington will be partially responsible for financing. In this regard, the majority of the responsibility for implementing and financing the Primary Cycling Network within Clarington rests with the local municipality.

The Greenbelt Route, which is a project that is being championed by the Waterfront Regeneration Trust, is a new proposed 600km signed cycling route connecting Northumberland to Niagara that is intended to serve as a destination for recreational cyclists and cycle tourists. Within Clarington, the Greenbelt Route follows a primarily east-west alignment and makes use of on-road routes in the northern part of the Municipality that are of a rural cross-section (e.g. Concession Road 10, Concession Road 7, and Concession Road 5).

Figure 3.2: Durham Regional Trail Network (2015)



Finally, and shown in **Figure 3.2** above, Durham Region's Approved Regional Trail Network (2015) includes proposed linkages that extend the Bowmanville Creek Trail to the north through to Solina, Enniskillen and the Oak Ridges Trail, a new trail following the Highway 407 corridor, and an extension of the Lions Trail in Newcastle to the north through Orono and up to the 407 corridor.

Note: Stakeholder input by local cycling groups has expressed the belief that Clarington's rural road network is already a popular destination for cycling tourists and has great potential to increase this demand if access to the network and associated Clarington tourist destinations such as the Waterfront Trail System, Ontario Lakeshore communities, harbour front areas, and conservation areas are fully supported.

3.2 Transit



3.2.1 Existing Transit Services and Carpool Parking Lot Facilities

The Municipality of Clarington is currently served by Durham Region Transit (DRT) and GO Transit (bus and indirectly rail with many residents travelling to Oshawa and points west to use the rail service). Transit service is focused on the southern communities of Courtice, Bowmanville, and Newcastle with connections to Oshawa and the rest of the GTA to the west, and Peterborough to the north. **Figure 3.3** shows the Existing Transit Routes.⁸

DRT provides three existing routes connecting Courtice to downtown Oshawa and the Oshawa GO Station. The approximate headways for these routes are shown in **Table 3.1**; note that “headway” refers to the time between arrivals of successive buses, so a 60-minute headway would mean one bus arrives every 60 minutes for the noted duration (i.e., weekday, weekday evening, Saturday, etc.).

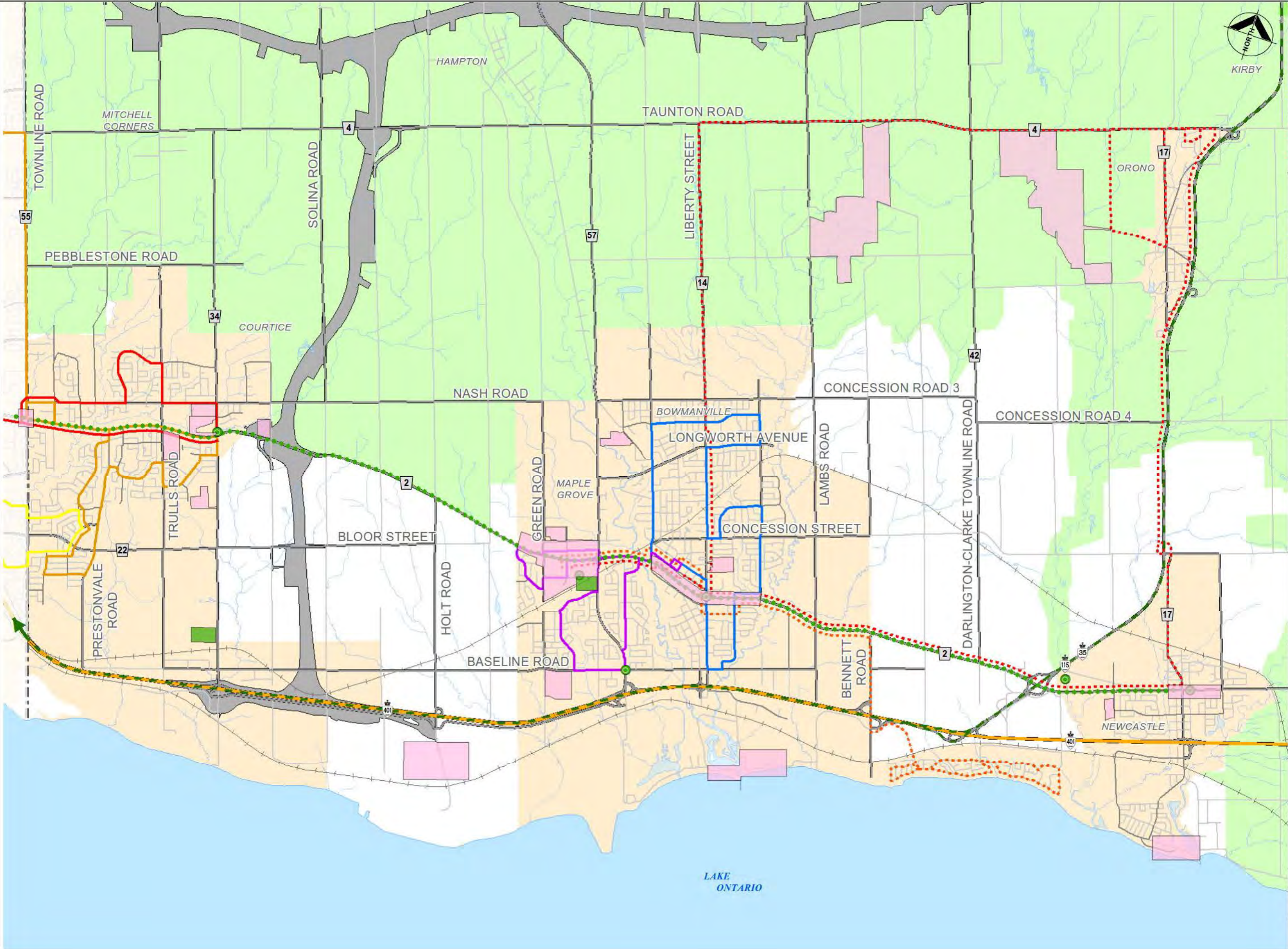
Table 3.1⁹: Durham Region Transit Routes in Courtice – Approximate Headways

Route	Days Operating	Weekday	Weekday Evening	Saturday	Sunday / Holiday
402 King	All	30 min	30 min	30 min day 60 min evening	60 min
421 Townline	Monday-Friday	60 min	60 min (ends at 9 PM)	None	None
922 Bloor / Victoria	Monday-Friday	20-25 min (peak period only)	None	None	None

Note: Span of service (start and end time) varies for each route.

8. Durham Region Transit services were revised subsequent to this analysis. Please refer to the footnotes related to Tables 3.1 and 3.2 for additional information on the revised routes.

9. Durham Region Transit services were revised subsequent to this analysis. Please note the revised service as of September 2015 is as follows:
 - Route 402 King: the 60-minute Saturday evening service was revised to a 30-minute service all day Saturday
 - New Routes 411 Grandview Courtice and 412 Adelaide Courtice were added. These routes operate all days of the week with 30-minute service weekdays, weekday evenings, and Saturdays, and 60-minute service on Sundays
 - Route 922 Bloor / Victoria and Route 421 Townline were combined as Route 922 Bloor/Victoria/Townline. This route operates with a 30-minute weekday peak service only to Bloor/Victoria, and a 30-minute weekdays and weekday evenings service on Townline.



Durham Region Transit Bus Routes

- 402 - King
- 421 - Townline
- 501 - Aspen Springs
- 502 - Liberty
- 922 - Bloor Victoria

Select Weekday Routes

- 503 - Wilmot Creek
- 504 - Orono Newcastle

Go Transit - Bus Routes

- Major GO Transit Bus Stop
- 88 - Oshawa - Peterborough
- 90 - Lakeshore East / 91 - Lakeshore East Express

Destinations

- Key Transportation Destination
- Future GO Station

Other Features

- Freeway
- Arterial Road
- Collector Road
- Local Road
- Railway
- Municipal Boundary
- Watercourse
- Highway 407 Corridor
- Waterbody
- Oak Ridges Moraine
- Urban Area
- Greenbelt

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EXISTING TRANSIT ROUTES AND FACILITIES

PREPARED BY:	CHECKED BY:	PROJECT No.:
-	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	3.3
SCALE:	DATE:	
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DRT also provides four routes in the rest of Clarington: two routes loop within Bowmanville, one route connects Bowmanville to Wilmot Creek, and one route connects Bowmanville and Orono. The approximate headways for these routes are shown in **Table 3.2**.

Table 3.2¹⁰: Durham Region Transit Routes in Clarington – Approximate Headways

Route	Days Operating	Weekday	Weekday Evening	Saturday	Sunday / Holiday
501 Aspen Springs	All	30-60 min	None	30-60 min	60 min
502 Liberty	All	30-60 min	None	30-60 min	60 min
503 Wilmot Creek	Monday, Wednesday, Friday	2 trips per direction per day	None	None	None
504 Orono / Newcastle	Tuesday, Thursday	1 trip per direction per day	None	None	None

Note: Span of service (start and end time) varies for each route.

No existing DRT route provides service between Bowmanville and Courtice or Oshawa.

GO Transit provides rail service along the Lakeshore East Line from Union Station in Toronto to Oshawa GO Station. Clarington residents may access the Oshawa GO Station via park-and-ride, DRT bus (from Courtice), or GO Bus (primarily from Courtice, Bowmanville, and Newcastle). GO Bus routes in Clarington generally provide service to downtown Oshawa and the Oshawa GO Station via the Regional Highway 2 and 401 corridors, connecting Oshawa, Courtice, Bowmanville, and Newcastle, and via Highway 35 / 115, connecting to Peterborough and Trent University. As of 2014, the GO Bus has 30-minute service along the Regional Highway 2 corridor from Newcastle to Oshawa.

GO Transit provides three carpool lots in Clarington, including:

- Clarington North – 42 spaces located near the interchange of Highway 35 and Highway 115
- Newcastle Carpool Lot – 53 spaces located at the intersection of Regional Highway 2 and Highway 35 / 115

10. Durham Region Transit services were revised subsequent to this analysis. Please note the revised service as of September 2015 is as follows:
 - Route 501 Aspen Springs and 502 Liberty: the weekday, weekday evening, and Saturday service was revised to a 30-minute service for each.
 - Route 503 Wilmot Creek and Route 504 Orono / Newcastle were combined as Route 506 Wilmot Creek/Newcastle/Orono. This route operates weekdays with 2 trips per direction per day on weekdays.

- Bowmanville Carpool Lot – 85 spaces near the intersection of Regional Highway 2 and Martin Road

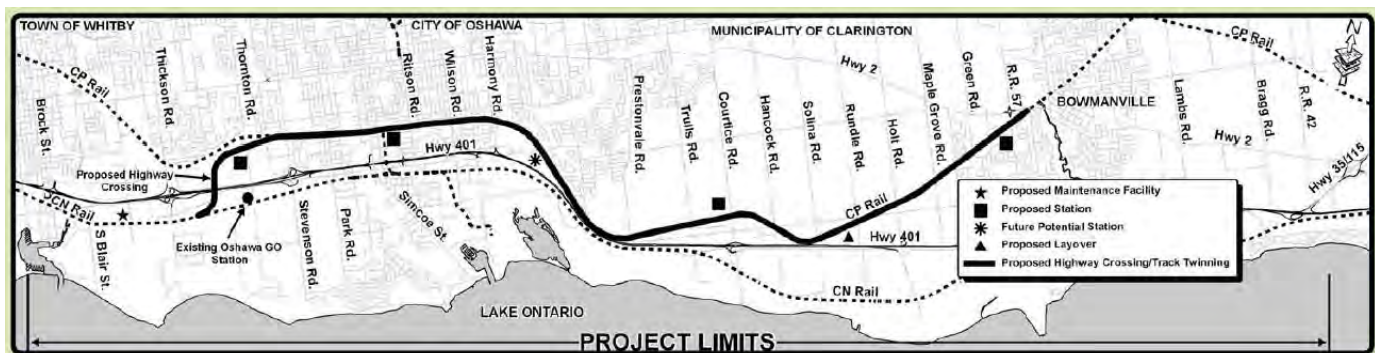
MTO provides a carpool lot at the interchange of Highway 401 and Newtonville Road with 26 spaces and no transit service.

3.2.2 Planned Services

Metrolinx's "Big Move" Regional Transportation Plan (RTP) guides the long term planning for transportation across the GTHA through to 2031. The plan identifies a number of transit improvements across the GTHA and the following improvements that are relevant to the Municipality of Clarington in particular:

- GO Lakeshore East Rail Extension: Extension of the Lakeshore East line to Bowmanville (providing regular rush-hour service). The recently completed EA for the extension supported an alignment following the CP Belleville subdivision and new stations located in Bowmanville and Courtice. **Figure 3.4** presents the EA-approved alignment for the extension, along with the new station locations.

Figure 3.4: Metrolinx GO Transit GTAH Planned Improvements



- 407 Transitway: In February 2013, Metrolinx amended the Big Move RTP to reflect recent priorities, which included the removal of the planned Highway 407 BRT service between Simcoe Street in Oshawa and Highway 35/115. The amendment indicated that GO Transit intends to operate GO bus services along Highway 407 through Clarington but the services are not planned to be at a BRT level. A full review of the RTP will be completed by 2016 and it is likely that this review will further clarify the timing and scope of planned services along Highway 407.
- Durham Bus Rapid Transit (BRT): New BRT service is planned to connect Oshawa's downtown with Scarborough Town Centre in Toronto via the Regional Highway 2

corridor. The first phase of the service (branded PULSE) was introduced by DRT in June 2013, replacing the previous local GO bus service along Regional Highway 2. Construction is on-going for the section of the BRT through Ajax and Pickering, based on the preferred design identified in the completed EA (curbside bus only lanes with on-road buffered bicycle lanes). Other studies have suggested further extending this corridor into Clarington (see paragraph about Durham Region Long Term Transit Strategy below for more details).

The GO Lakeshore East Rail Extension and the Durham BRT are currently included in Metrolinx's list of "Next Wave" projects to be implemented by 2031 (to be funded through the Metrolinx Investment Strategy). Subsequent to the release of the Metrolinx Investment Strategy in May 2013, a Transit Investment Strategy Advisory Panel was formed to further investigate potential funding mechanisms and priorities. In December 2013, the Panel's final report suggested that the GO Lakeshore extensions, including the extension to Bowmanville, not be included in the first phase of next wave projects included in the proposed funding model. Most recently, the 2014 Ontario Budget indicated that "The Province will work with Metrolinx and municipalities on how best to prioritize transit investments through the use of rigorous business-case analyses. These analyses will help prioritize Next Wave projects that could be accommodated within the Province's dedicated fund for the GTHA ..." In July 2014 the Ontario provincial budget was passed by the Legislative Assembly after re-election of the Liberal Party in June. The budget includes \$29 billion for public transit, roads, highways and bridges, with \$15 billion allocated for the Greater Toronto and Hamilton Area, and \$14 billion for the remainder of the province.

Durham Region also completed a *Long Term Transit Strategy* (2010), which presented a strategic vision of what the DRT network would look like in 2031 and beyond. The strategy was focused on identifying higher-order transit corridors, including LRT, BRT, and enhanced conventional bus. Three LRT corridors (Regional Highway 2, Simcoe Street, and Taunton Road) were ultimately identified in the preferred strategy to form the backbone of a significantly expanded Regional transit network. Key proposed investments in Clarington include:

- Regional Highway 2 LRT to Courtice Road;
- Enhanced Conventional Service (10-minute peak service with priority);

- Along Regional Highway 2 from Courtice Road to Newcastle (including a protection for future rapid transit between Courtice and Bowmanville West Centre / GO Station)
- Along Courtice Road from Rossland Road to the Courtice GO Station and on to the OPG lands via Baseline Road and Holt Road
- Along future Rossland Road Extension from Townline Road to Courtice Road
- Along Bloor Street from the new Oshawa East GO Station to Courtice Road and the Courtice GO Station (including a protection for future rapid transit)

The Durham Region TMP Update began in August 2014 and is in progress, with completion expected in mid- to late-2016. The Region's existing 2005 TMP pre-dates the LTTS and the Metrolinx Big Move RTP, and it is expected that the recommended transit improvements from the LTTS will be further evaluated and refined together with associated roadway network improvements as part of the TMP update project.

Finally, the recently completed *Five Year Transit Service Plan for Durham Region Transit* (2013) presented a program of recommended service changes between 2013 and 2018 to accommodate growth in the Region. The recommendations include a Base Service Plan and Enhanced Service Plan, which serves to further increase ridership by encouraging the use of transit in the Region. The base plan proposes to restructure the network in Oshawa and Courtice to operate primarily along arterial roads and form a new grid structure that improves connectivity to east-west services such as PULSE; the plan results in enhanced connectivity between Courtice and downtown Oshawa and the Oshawa GO Station. The route connecting Bowmanville, Newcastle, and Orono is also restructured to provide a more direct connection between the three communities (eliminates long loop along Taunton Road). In the enhanced plan, the Regional Highway 2 PULSE service is extended from Downtown Oshawa to Townline Road in Courtice and the services within Bowmanville are restructured to expand coverage to future growth areas and reduce the size of existing one-way loop routes. This plan will be updated on a regular basis; the Municipality should continue to provide recommendations through the CTMP process.

3.3 Roads



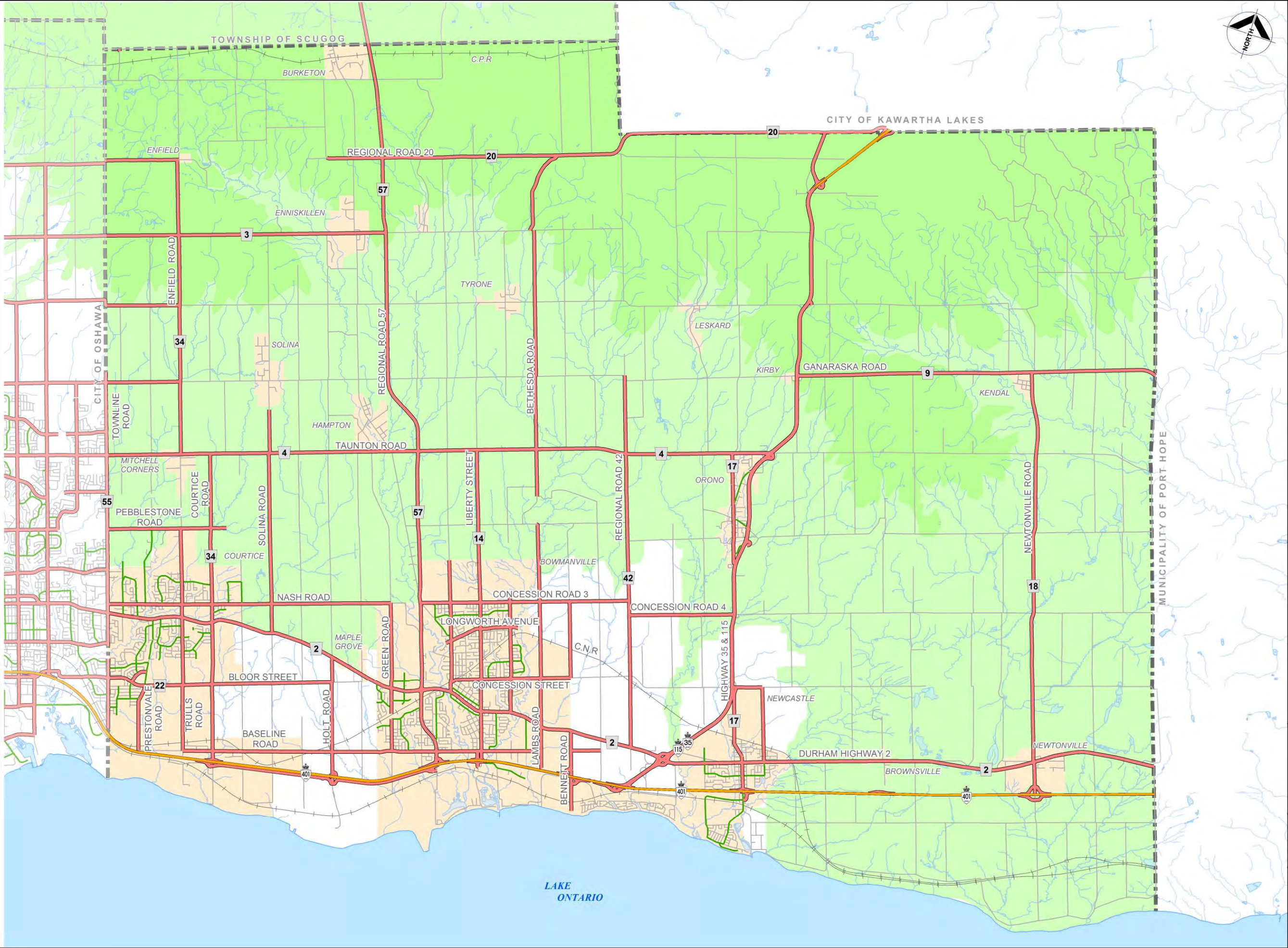
3.3.1 Existing Road Network

The development of Clarington's existing transportation system has followed traditional North American patterns of rapid growth, available land, investment in road infrastructure, and economical and convenient transportation by personal vehicles. A general belief that the availability of land and resources was essentially unlimited produced land use policies that contributed to today's high resource consumption and prevalent urban sprawl. The following is a description of Clarington's existing roadway network.

The roadway system serving Clarington is an interconnected system of rural and urban roadways including Provincial highways and freeways, arterials, collector and local roadways. Clarington is responsible for collector and local roadways, while much of the arterial network is owned and maintained by Durham Region. **Figure 3.5** illustrates the existing hierarchical road network of roads serving the Municipality. Bowmanville, Courtice, Newcastle, and Orono are the four largest communities in Clarington. In rural areas (i.e. outside the urbanized areas / communities) of Clarington, the majority of roadways are undivided two-lane, two-way roadways.

The Provincial highways in the Municipality of Clarington include Highway 401 and Highway 35 / 115 which are under the jurisdiction of MTO. Highway 401 is a divided freeway with three travel lanes in each direction and uninterrupted traffic flow running east-west on the south side of the Municipality, with with interchanges to access the communities of Courtice, Bowmanville, Newcastle, and Newtonville. Highway 35 / 115 is a divided highway with two travel lanes per direction running north-south in the centre of the Municipality through the communities of Orono and Newcastle. Highway 35 / 115 is a fully access-controlled highway with multiple interchanges including full interchange at its south end with all-directional access to and from Highway 401.

Arterial roadways form block grids and function as the main thoroughfares connecting to the Provincial highways and intersecting with other arterial and collector roadways. Major arterial roadways such as Regional Highway 2, Taunton Road (Regional Road 4), and Regional Road 57 are continuous throughout the urbanized areas and are intended



Existing Road Network

- Freeway
- Arterial Road
- Collector Road
- Local Road

Other

Boundaries and Policy Areas

- Municipal Boundary
- Highway 407 Corridor
- Urban Area
- Oak Ridges Moraine
- Greenbelt

Other Features

- Watercourse
- Waterbody
- Railway

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EXISTING ROAD NETWORK

PREPARED BY:	CHECKED BY:	PROJECT No.:
—	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	3.5
SCALE:	DATE:	
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to provide general mobility within the Municipality and provide connections to Regional Centers outside the Municipality. Other examples of arterial roadways include Bloor Street (Regional Road 22) and Courtice Road (Regional Road 34) in Courtice, Liberty Street (Regional Road 14) and Darlington-Clarke Townline Road (Regional Road 42) in Bowmanville, Mill Street (Regional Road 17) in Newcastle, and Newtonville Road (Regional Road 18) in Newtonville.

The Municipality's collector roadways provide connections between local roads within the residential / commercial areas and the arterial road system. Compared to arterial roadways, they generally carry lower traffic volumes and have lower speed limits. Examples of Clarington's collector roadways are Varcoe Road and Robert Adams Drive in Courtice, Waverley Road and Simpson Avenue in Bowmanville, Edward Street in Newcastle, and Mill Street in Orono.

Local roadways are for local circulation and access. "They typically carry low volumes of traffic connect to the collector roadways and provide travel options within the neighborhoods". They also provide access to individual properties in residential and commercial areas. .

The assessment of future road network needs begins with the identification of the existing road network, as outlined in this section. The following Sections 3.3.1.1 and 3.3.1.2 discuss the existing travel patterns on the road network and the type, or mode, of trip that is being made (i.e., personal vehicle, transit, or walking / cycling) between the origin and destination points. The travel patterns and trip modes are used to determine the travel demand on the existing transportation network, which can then be further assessed to determine the future transportation needs (i.e., what is the required future transportation network "supply" to meet the projected future transportation network "demand").

3.3.1.1 Existing Origin and Destination Travel Patterns

Information on the travel demand and travel patterns has been gathered largely from the Transportation Tomorrow Survey (TTS) and Statistics Canada census data compiled by EDP Consulting in their background report to the Clarington Growth Management Study (GMS) Working Group titled *Overview of Clarington Economic Base Analysis: Background Information for Discussion* (August 27, 2009). The North American Industry Classification System (NAICS) is used by business and government to classify and measure economic activity in Canada. NAICS data for Clarington, the

Region of Durham and Ontario for 2001 and 2006 indicates that logical assumptions in terms of origin and destination patterns for Clarington are largely met.

Based on EDP's report, 2006 census data indicates a jobs-to-labour-force shortfall in Clarington when compared to Oshawa's Census Metropolitan Area (CMA) and Durham Region as a whole. In Clarington, the ratio of jobs at fixed places of employment to labour force is 0.43, which means that the municipality has jobs for less than half of the labour force residing within its boundaries. The Oshawa CMA and Durham Region have significantly higher jobs-to-labour-force ratios at 0.69 and 0.65 respectively. With only 24.5% of the Clarington labour force working in Clarington it is clear that Clarington functions as part of a larger regional economy rather than a separate local economy and that the majority of its labour force commutes to places of employment outside of the Clarington municipal boundary.

The largest employment draw for Clarington's labour force exists west of Clarington in Oshawa where 28.3% of the Clarington labour force finds employment. Toronto and Whitby account for another 12.0% and 11.8 %, respectively. Pickering and Ajax follow with 5.0% and 3.9%, and Markham with 1.7%. Together, these westerly communities employ better than 60% of Clarington's labour force and account for the vast majority of commuting traffic with a Clarington origin. Employment communities to the north and east of Clarington include Scugog, Peterborough, Port Hope and Cobourg, which account for only 2.1% of Clarington's commuting labour force. **Table 3.3** lists all the places of work for persons residing in Clarington.

Table 3.3: Place of Work for Persons Residing in Clarington (2006)

Place of Work	Jobs	%
Oshawa	10,320	28.3
Clarington	8,925	24.5
Toronto	4,365	12.0
Whitby	4,290	11.8
Pickering	1,830	5.0
Ajax	1,425	3.9
Markham	630	1.7
Mississauga	270	0.7
Scugog	210	0.6
Peterborough	205	0.6

Place of Work	Jobs	%
Vaughan	195	0.5
Port Hope	180	0.5
Cobourg	145	0.4
Brampton	140	0.4
Richmond Hill	120	0.3
Kawartha Lakes	95	0.3
Uxbridge	80	0.2
Mississauga of Scugog Island	50	0.1
Newmarket	45	0.1
Havelock-Belmont-Methuen	40	0.1
Cavan Monaghan	35	0.1
London	30	0.1
Whitchurch-Stouffville	30	0.1
Quinte West	25	0.1
Cramahe	25	0.1
Oakville	20	0.1
Other locations	2,700	7.4
Total	36,425	100.0

Source: Statistics Canada; EDP Consulting

Clarington is also an employment destination for many residents of neighbouring regions with 51.5% of all persons working in Clarington residing outside of the Municipality. Of this, the largest segments come from Oshawa and Whitby at 12.8% and 5.1% respectively. Commuters living farther west in communities like Toronto, Pickering and Ajax, Markham, and Mississauga account for another 4.5%. Communities to the north and east of Clarington feed more workers into Clarington than they draw out and account for roughly 12%. **Table 3.4** lists all the places of residence for people who work in Clarington.

By far, the heaviest use of Clarington's transportation network exists in the western portions of the Municipality. Commuting traffic originating in Oshawa, Courtice and Bowmanville depends on Regional Highway 2, Nash Road, Baseline Road and South Service Road to access many employment locations associated with these communities. Traffic originating in and destined for locations farther afield, such as Toronto, Markham, Ajax, Pickering and Whitby, as well as communities east of

Clarington, depend largely on Highway 401, and to some extent Highway 407, for access. Residents of Peterborough and Kawartha Lakes depend on Highway 35/115 as well as many of the concession roads that run in an east-west direction between Highway 35/115 and the communities of Bowmanville and Courtice.

Table 3.4: Place of Residence for Persons working in Clarington (2006)

Place of Residence	Jobs	%
Clarington	8,925	48.5
Oshawa	2,355	12.8
Whitby	945	5.1
Kawartha Lakes	630	2.9
Port Hope	455	2.5
Peterborough	360	2.0
Toronto	300	1.6
Ajax	285	1.5
Hamilton	240	1.3
Cobourg	230	1.2
Scugog	225	1.2
Pickering	160	0.9
Cavan Monaghan	135	0.7
Alnwick/Haldimand	90	0.5
Cramahe	85	0.5
Otonabee - South Monaghan	50	0.3
Mississauga	50	0.3
Markham	40	0.2
Selwyn	35	0.2
Brighton	35	0.2
Quinte West	30	0.2
Richmond Hill	25	0.1
Kingston	25	0.1
Vaughan	20	0.1
Uxbridge	20	0.1
Other Areas	2,765	15.0
Total	18,415	100.0

Source: Statistics Canada; EDP Consulting

3.3.1.2 Existing Municipal Travel Characteristics

In terms of the movement of people, alternate modes of ground transportation have grown in a defined relationship with the Clarington road network, which was ultimately founded upon the predominant use of the automobile as described in the preceding section. These alternate modes of personal transportation include:

- VIA and GO Train service;
- GO Transit and Durham Region Transit bus service;
- cycling paths, lanes and routes to serve bicycle traffic; and
- a network of sidewalks and pedestrian paths to serve pedestrian traffic

In the past, each of these modes evolved largely to fill in transportation gaps where the automobile has not traditionally been a good fit and where the assumption remained that continued expansion of the supporting road network was the best available option to accommodate growing transportation needs. The intrinsic holistic value of these alternate modes of transportation as a means of accommodating growing transportation needs was not fully considered and applied.

Currently, cultural values surrounding conservation and limited resources are strengthening and have led to increasing political awareness that has been reflected in recent national, provincial, and municipal land use and transportation policy changes. The intent of many of these policy changes is to shift reliance on the automobile to alternate modes of transportation that have been proven to be less costly and more environmentally responsible in the long term.

3.3.2 Proposed Road Network

The existing COP transportation schedules and 2010 Clarington Development Charges (DC) report outline multiple road infrastructure projects that are intended to serve the Municipality's long-term roadway network needs through to 2031 and beyond. The projects are designed to address both long-term capacity deficiencies, provide additional points of access, and improve overall network connectivity. The CTMP will confirm the need for these projects from both a network capacity point of view (by 2031) and from an overall connectivity point of view. Since these projects are assessed within the CTMP, they are not assumed to be part of the 2031 Base Road Network for capacity deficiency analysis purposes (discussed further in **Section 4.2.1.4**).

The COP infrastructure projects include:

1. Longworth Avenue Extension (Regional Road 57 to Holt Road)
2. Longworth Avenue Extension (Mearns Avenue to Lambs Road)
3. Nash Road: Improve to Arterial Standard
4. Concession Road 3: Improve to Arterial Standard
5. Baseline Road: Improve to Arterial Standard
6. Holt Road: Improve to Arterial Standard
7. Bowmanville Creek Crossing: New bridge crossing connecting Concession Road 3 and Nash Road
8. Highway 401 new interchange with Lambs Road
9. Highway 401 new interchange at proposed Townline Road extension
10. Highway 401 interchange improvements
11. Bloor Street/Baseline Road Type A Arterial Connection
12. Twelve proposed road-rail grade separations, including crossings at:
 - Prestonvale Road
 - Trulls Road
 - Baseline Road
 - Holt Road
 - Proposed Bloor Street / Baseline Road Connection (11 above)
 - Scugog Street
 - Mearns Avenue
 - Lambs Road
 - Bennett Road
 - Darlington Clarke Townline
 - Arthur Street

The Clarington Capital Works Program/DC Road Widening and New Road Construction Projects include:

1. Baseline Road (Lambs Road to Bennett Road): Improve to arterial standard
2. Green Road (Baseline Road to Regional Highway 2): Widening

3. Queen Street (St. George Street South to Frank Street): Improve to arterial standard
4. Simpson Avenue (Simpson Avenue to Baseline Road): Realignment of the Soper Creek Crossing
5. Simpson Avenue (King Street to the Future Church Street): Improved to arterial standard
6. Rudell Road (from Grady Drive to the CPR tracks): Improve to arterial standard
7. Regional Highway 2/King Street: Operational Improvement (Signal Improvements)
8. Baseline Road (Lambs Road to Mearns Avenue): Improve to arterial standard
9. Concession Road 3 (Regional Road 57 to Middle Road): Improve to Arterial Standard
10. Concession Road 3 (Middle Road to Liberty Street): Improve to arterial standards
11. Concession Road 3 (Liberty Street to 90 m west of Jollow Drive): Improve to arterial standard
12. Longworth Avenue (Scugog Street to Regional Road 57): Road Oversizing.¹¹

¹¹ "Road Oversizing" is a term that references developer responsibility. All roads internal to a development are a direct developer responsibility under Section 59 of the Development Charge (DC) Act as a local service built to a width up to and including ten metres. The cost for roads constructed to a greater width are included in the road oversizing portion of the DC calculations, excluding property costs.

4. Future Transportation Network Needs

4.1 Future Growth Forecasts – Population and Employment

Growth in population and employment will have an impact on the traffic conditions within Clarington, specifically in the urbanized areas where new growth is directed. These increases in the total residents and jobs within the Municipality will lead to the generation of more traffic which will put pressure on the existing transportation network, and will drive the requirements for new infrastructure and programs. The following sections present recent population and employment growth trends in the Municipality and forecasts to the year 2031. The forecasts for 2031 were developed in collaboration with the Clarington Planning Department and are consistent with the land budgeting analysis conducted as part of the Official Plan Review.

4.1.1 Demographic Trends

2006 census data indicates accelerated population growth for Clarington from 1996–2006 when compared to the Region of Durham, the Province of Ontario and Canada as a whole. **Table 4.1** compares these growth trends from a local to a national level within standard Canada Census age brackets.

Table 4.1: Population Growth (1996–2006)

Age	Clarington (%)	Durham (%)	Ontario (%)	Canada (%)
0–4	-15.9	-13.3	-8.6	-11.9
5–9	24.7	11.7	4.1	-2.4
10–14				
15–19	67.5	41.5	20.9	9.3
20–24	39.8	32.5	13.3	9.6
25–29	21.3	16.3	9.2	5.6
30–34				
35–39				
40–44				
45–49				
50–54				
55–59	76.6	86.3	44.3	47.6
60–64				

Age	Clarington (%)	Durham (%)	Ontario (%)	Canada (%)
65–69	29.7	27.2	9.4	11.0
70–74				
75–79	76.6	74.9	44.5	39.6
80–84				
85+				
Total	28.4	22.4	13.1	9.6

Source: Statistics Canada. 2007. *Clarington, Ontario (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007*

Clarington's population has been growing at a slightly faster pace than the Region of Durham overall with the exception of the 55–64 age bracket where Clarington trails Durham Region. A national trend of declining growth exists in the 0–4 age bracket. For both Durham Region and the Municipality of Clarington, the 55–64 and the 75+ age brackets are experiencing accelerated growth when compared to remaining age brackets, with the exception of the 15–19 age bracket where Clarington is experiencing significantly higher growth than Regional, Provincial and National categories. In general, growth in the 55 and above range is moving at a faster pace than growth in the 54 and below range, suggesting that Clarington's population is becoming an increasingly aging population.

As noted in **Table 4.2**, below, the median age of Clarington's population during the same period is slightly lower than that of Durham Region and the Province of Ontario as a whole; however, annual population growth for Clarington has been significantly higher, suggesting that while Clarington's population is generally younger than Durham Region on average, there is potential for Clarington's population to close the gap in median age with Durham Region if current population trends continue unimpeded. As a result, the age demographics of Clarington and the Region of Durham can be considered to be relatively comparable.

Table 4.2: Comparison of Median Age and Annual Growth (1996–2006)

Demographic Area	Median Age	Average Growth per Annum (%)
Clarington	37	2.84
Region of Durham	37.5	2.25
Province of Ontario	39	1.30

It should be noted that the Average Growth Per Annum in this table was derived from Census Canada figures and does not include census under-coverage. In the following section, data that was tabulated in collaboration with the Municipality of Clarington's Planning Department, has been adjusted to include census under-coverage. The figures in **Table 4.2** have been provided for comparison purposes only.

4.1.2 Baseline Forecasts: Population and Employment

Population and Employment forecasts for 2031 have been prepared in collaboration with the Municipality of Clarington Planning Department to maintain consistency with the Clarington Official Plan Review and the Regional Official Plan. Population forecast at the neighbourhood level were disaggregated to the traffic zone level for input into the transportation demand modelling undertaken as part of this study (see **Section 4.2** below for more details). Employment forecasts, on the other hand, were provided to the study team at the traffic zone level.

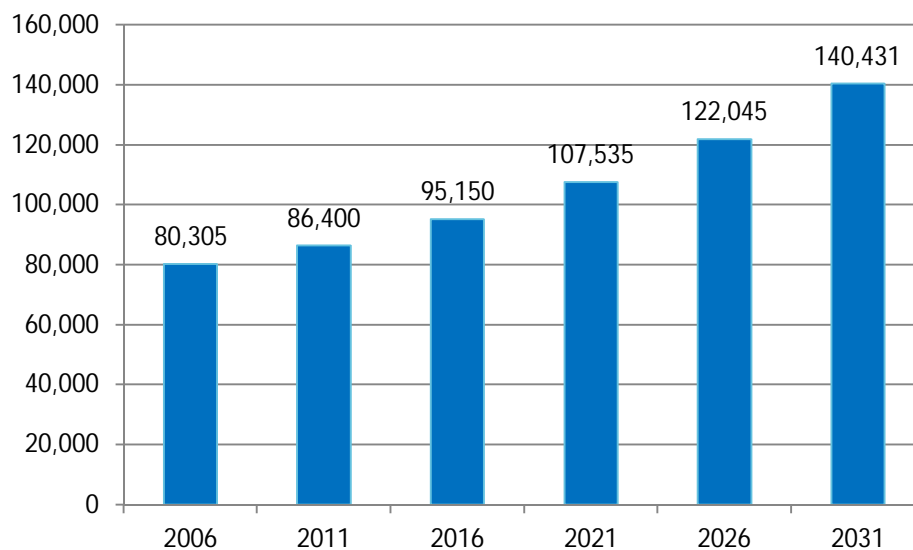
The method for population forecasting is based on the distribution of housing units by market share across the Region as a whole. A total housing unit forecast is prepared and then distributed to the local municipalities. Average household sizes, based on a GTHA-wide analysis and local historic trends in Durham and Clarington, are then applied to each unit type. The population forecast is prepared by applying household size factors by unit type to the household forecast, resulting in a forecast of population in new units by community. **Table 4.3** below summarizes the population forecasts by community. The population forecasts for 2011 to 2026 are consistent with the figures presented in the Durham Region Development Charges (DC) Study Update completed in 2013, and the forecasts for 2031 are consistent with the Clarington Official Plan Review.

Table 4.3: Clarington Population by Community

Community	2011	2016	2021	2026	2031
Clarington (total)	86,400	95,150	107,535	122,045	140,431
<i>Courtice</i>	22,810	23,415	25,605	28,845	36,441
<i>Bowmanville</i>	35,315	42,270	48,495	57,090	67,704
<i>Newcastle</i>	7,095	7,370	10,875	13,275	16,037
<i>Rural / Rest of Clarington</i>	21,180	22,095	22,560	22,835	20,249

Based on the above, it is expected that population in Clarington will grow steadily to the year 2031 with the vast majority of growth occurring in the communities of Bowmanville, Newcastle and Courtice. The overall population growth trends for Clarington are further illustrated in **Figure 4.1** below.

Figure 4.1: Projected Population Growth in Clarington



In terms of percentage growth, Newcastle will see the greatest rate of population growth with a 126% increase over the community's 2011 population of 7,095. Bowmanville will see a 92% increase over its 2011 population of 35,315. Between 2011 and 2031, Newcastle's share of the total Municipal population is expected to grow from 8 to 11% and Bowmanville's from 41 to 48%. Courtice's share of the total Municipal population will remain constant at 26% and the rural share will exhibit the greatest comparative loss from 25 to 14%. These values are rounded to the nearest whole number and are shown in **Table 4.4** below.

Table 4.4: Percentage of Total Municipal Population

Year	Bowmanville	Courtice	Newcastle	Rural
2011	41	26	8	25
2031	48	26	11	14

Employment in the Municipality of Clarington is anticipated to grow steadily and with a pattern that reflects overall population growth. **Figure 4.2** below illustrates the expected steady growth in employment from 2011 to 2031.

Figure 4.2: Projected Employment Growth in Clarington

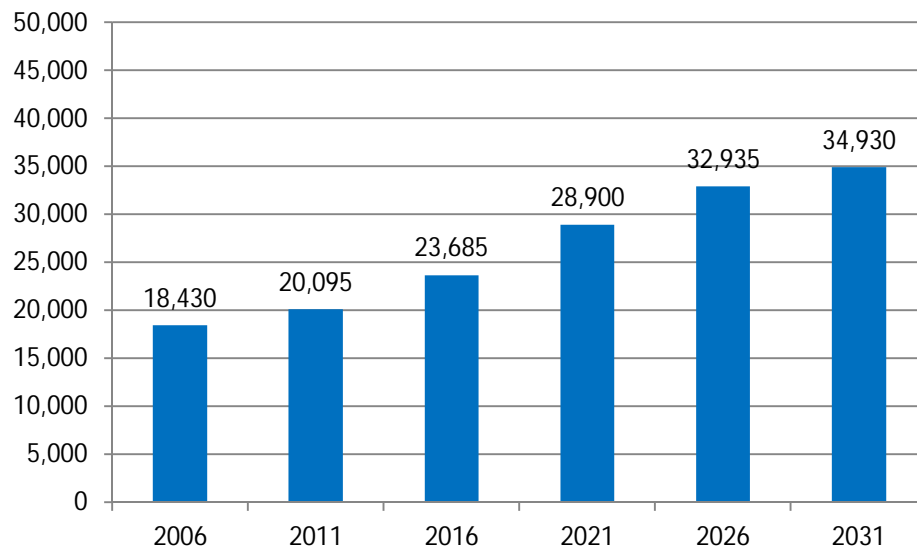


Table 4.5 offers a summary of the projected employment in Clarington by community. It should be noted that the employment forecasts do not include “no fixed place of work” employees. As with the population forecasts, the value for 2011 to 2026 are consistent with the figures presented in the DC Study Update (2013), and the forecasts for 2031 are consistent with the COP Review.

Table 4.5: Clarington Employment by Community

Community	2011	2016	2021	2026	2031
Clarington (total)	20,095	23,685	28,900	32,935	34,930
<i>Courtice</i>	4,090	6,035	8,945	10,920	13,320
<i>Bowmanville</i>	8,490	9,900	11,565	13,180	13,205
<i>Newcastle</i>	765	885	1,420	1,765	1,545
<i>Rural / Rest of Clarington</i>	6,750	6,865	6,970	7,070	6,860

The total growth in employment for Clarington from 2011 to 2031 is predicted at 14,835 jobs, representing a 74% increase in projected employment from 2011 to 2031. This fits with the total population growth for this period, which is projected at 63%.

4.1.3 Economic Diversity in Clarington

Clarington enjoys a healthy and diverse economy that is based largely on the following employment sectors,¹² listed by percentage of overall employment, in descending order.

1. Sales and service occupations
2. Trades, transport and equipment operators
3. Business, finance and administration
4. Processing, manufacturing and utilities
5. Management occupations
6. Social science, education, government services and religion
7. Natural and Applied Sciences
8. Health occupations
9. Occupations unique to primary industry
10. Art, culture, recreation and sport

Of these, the top three employment sectors account for better than half of all employment within Clarington's borders. The large special uses mentioned earlier (St. Mary's Cement and Ontario Power Generation, Darlington site) account for approximately 30% of all employment within Clarington's borders.

At the same time, 75.5% of Clarington's workforce is employed outside the Municipal boundary.

12. Municipality of Clarington, Planning Services Department. *Official Plan review: An Introductory Discussion Paper*. April 28, 2009 (p. 19).

4.2 Forecasting Future Transportation Deficiencies

Forecasts of future travel demands were undertaken using the Durham Region Travel Demand Model, which was developed for the Durham LTTS, and most recently updated in 2013 for the DC Study Update. The model was designed to provide AM peak hour forecasts of future volumes within Durham Region under forecasted land use growth and transportation network improvement scenarios.

Since the Durham Region Travel Demand Model was designed as a forecasting tool for Region-wide traffic, the model was refined and re-calibrated within Clarington prior to being utilized for assessing transportation deficiencies for the Municipality as part of this project. A methodology was also developed to generate PM peak hour forecasts. An overview of the Durham Region Travel Demand Model transportation model and the Clarington level validation and re-adjustments that were conducted as part of this study is provided below. Please refer to **Appendix B** for a more detailed discussion of the model and the updates that were applied as part of this study.

4.2.1 Travel Demand Model Overview

The Durham Region Travel Demand Model is a macro-level regional travel demand model built using the EMME modelling platform. The model includes a detailed representation of the transportation network with information on travel speeds, distances, and capacities. Forecasts are generated by taking population and employment estimates as an input, while also considering the impact of road network congestion on travel times, routing decisions, and mode choices.

4.2.1.1 Durham Region Model Calibration

Prior to proceeding with the assessment of capacity deficiencies as part of this study, AECOM examined the ability of the Durham Region Model to reproduce existing traffic count data within Clarington. Once the simulated base year traffic from the model was found to correlate with observed traffic to an acceptable level, the model was deemed as a useful tool for forecasting and assessing future traffic. In particular, the Durham Region Model was calibrated and validated at the screenline level using observed 2011

Cordon Count¹³ data and traffic count data obtained from the Municipality of Clarington, Durham Region, and MTO (count dates ranging between 2009 and 2012).

Being a regional model, the Durham Region Model (as designed for the Region's DC Study) was calibrated using Cordon Count screenlines which cover a broad range of roads. While the model adequately simulates region wide traffic, comparisons to observed count data within Clarington revealed that the base model does not adequately simulate localized municipal-level travel patterns within Clarington. Thus, local-level updates to the model were undertaken as part of this study to calibrate the model for the purposes of capturing Clarington traffic patterns. The bulleted list below summarizes the key updates that were applied to the model during the calibration process:

- Several road network attributes for roads within Clarington were adjusted to better reflect existing conditions, including refinements to speed and lane capacity assumptions, and adjustments to the lane arrangements to be consistent with existing lane configurations.
- The traffic zone connectors, which are used to represent local and access roads in the model, were refined to better reflect how traffic loads onto the Clarington road network. The refinements included shifting zone connectors from intersections to mid-block access points and adding new connectors to encourage more realistic traffic distribution patterns.
- Many roads that were not already included in the regional model were added to the Clarington road network, including local collector roads and several rural roads.
- The model was found to under represent demands originating from external areas to the east of Clarington (Northumberland County, Trenton, etc.), which are beyond the TTS¹⁴ coverage area. These external demands were determined using Census Places of Work Data and were added to the base year traffic demands in the model.
- Even after the application of the above refinements, the travel demands forecasted within Clarington were found to be low in comparison to observed data. To account for this, the standard practise Demand Adjustment module in the EMME modelling

13. Cordon Counts are traffic counts from the Greater Toronto Area which are undertaken by Regional Governments and the Province of Ontario. Cordon Counts are conducted every 2 to 5 years.

14. The TTS is one of the primary datasets that was used to develop the core components of the Durham Region Model.

suite was applied to adjust base traffic demands to more closely match observed data.

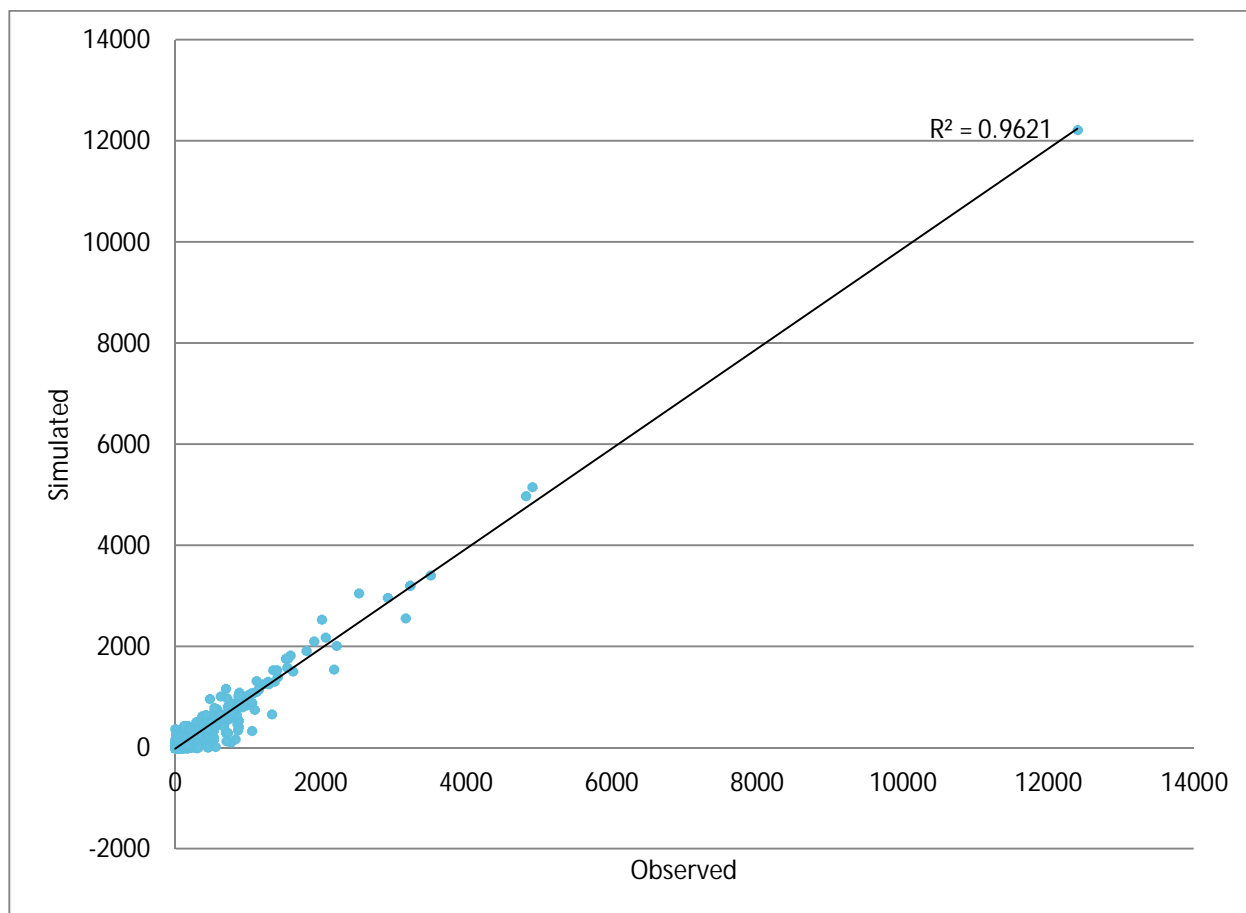
As shown in the comparison of simulated and observed volumes in **Figure 4.3**, including the calibration refinements detailed above, the overall correlation between modelled and count volumes was found to be acceptable, with an R^2 value of 0.96.¹⁵

It should be noted that the refinements listed above were also applied to all future year scenarios in order to maintain consistency and to ensure that the noted issues continue to be addressed as part of the forecasting.

The Durham Region Travel Demand model is an AM Peak Hour model. In order to capture a complete profile of future traffic for Clarington, PM Peak Hour demands were developed as part of this study. The PM demands were determined by first assuming that the traffic patterns for the PM peak would be opposite to the AM peak, thereby representing the commuter traffic from the morning returning home after work. Recognizing that PM traffic is generally higher than AM traffic due to increased discretionary travel, the demands were then factored up using AM to PM growth rates calculated from traffic count data. The factored demands were then refined using the Demand Adjustment module to adjust the PM demands to more closely match observed data.

15. R^2 is a measure of the level of fit to observed data. A value of 1.0 indicates that the simulated forecasts exactly match the observed data.

Figure 4.3: 2011 Model Simulated Traffic vs. Observed Traffic [AM Peak Hour]



The PM peak hour demands were validated against PM count volumes and were also found to be acceptable, with an R^2 value of 0.96.

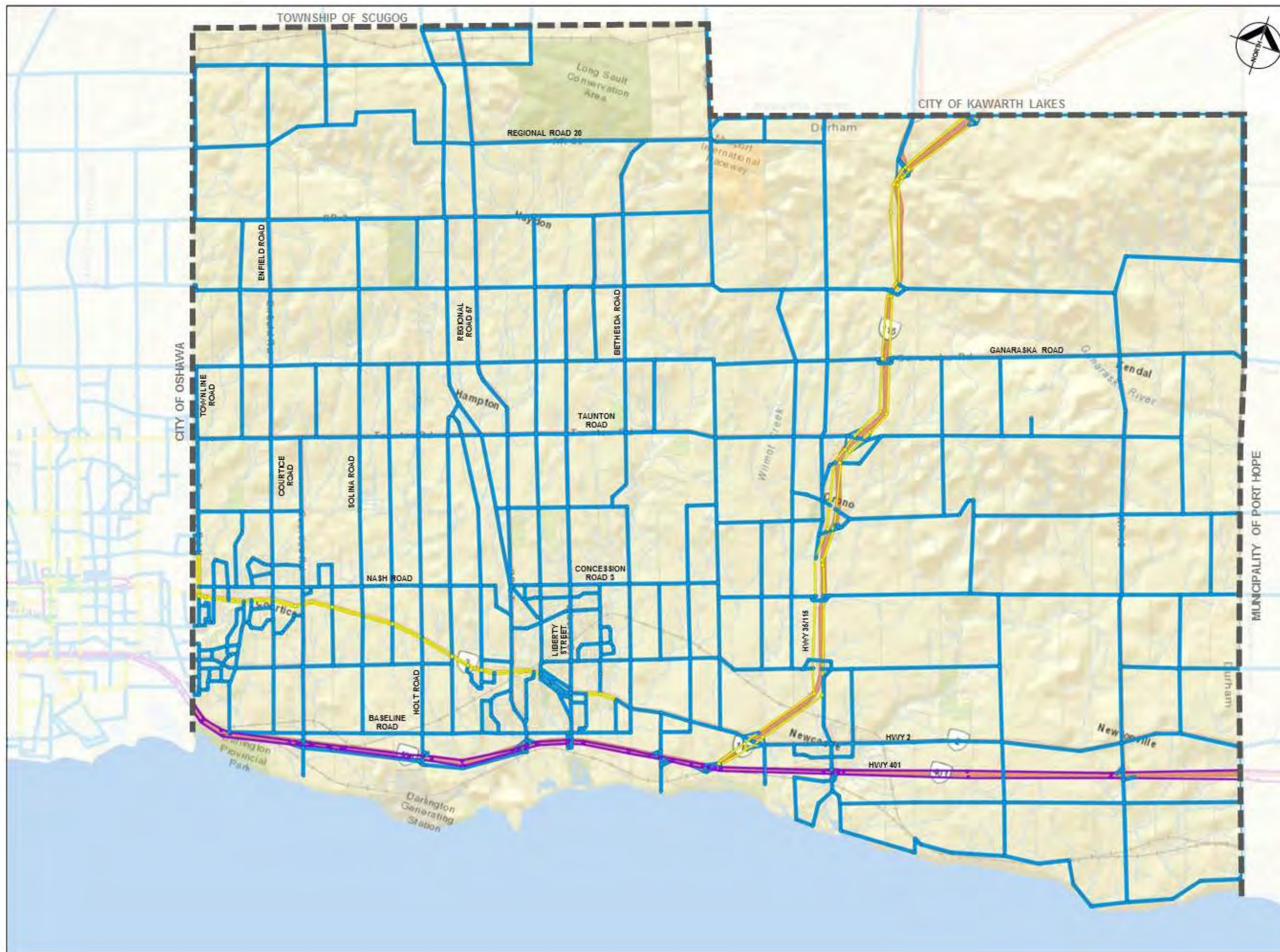
A full detailed description of the Durham Region Travel Demand Model calibration process can be found in **Appendix B**. The final 2011 base network that resulted from the calibration effort is shown in **Figure 4.4**.

4.2.1.2 Development of Future Travel Demands

The Durham Region Model forecasts future demands for the 2028 horizon year, which is consistent with the horizon year used for the 2013 Durham Region DC Update. However, a 2031 horizon year is to be used as part of this TMP study in order to be consistent with the forecasts of future population and employment growth that were presented in **Section 4.1**. As a result, the future year travel demands within the model required further adjustment to reflect the additional growth between 2028 and 2031.

The 2031 future travel demands were developed by factoring up the 2028 demands from the Durham model by using the standard practise “Fratar”¹⁶ matrix adjustment process. Population and Employment forecasts for 2031 (see **Section 4.1** for more details) were used to develop growth rates between 2028 and 2031, which were then applied to the 2028 travel demands. For AM demands, the population growth rates were applied to trip origins and employment growth applied to trip destinations (assuming morning trip productions are driven by where people live, and trip attractions are driven by where people work). The Fratar process was then applied to adjust the 2028 origin/destination trips up to match the growth totals for 2031. The future 2031 demands were also adjusted to take into account the travel demand adjustments made to the 2011 base demands during the model calibration process (see **Section 4.2.1.1** for more details on the calibration process and adjustments).

16. An iterative matrix balancing process where demands are adjusted until the origin and destination sums match the forecasted origin and destination totals.



Model Road Network

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

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DRAWING

UPDATED DURHAM REGION MODEL
2011 REFINED BASE NETWORK

PREPARED BY: —	CHECKED BY: N. DAY	PROJECT No: 60264232
DESIGNED BY: M. TRACEY	APPROVED BY: S. HARMESWORTH	FIGURE: 4.4
SCALE: 1" = 100,000	DATE: JUNE 2014	

4.2.1.3 Future Transit Assumptions in Model

The Durham Model assumes the following transit improvements for the 2028 horizon year, in accordance with the 2013 Durham Region DC Update:

- GO Bowmanville Rail Extension with stations in Courtice and Bowmanville (CP Bellville Subdivision alignment);
- GO Bus Service on Highway 407 East-Durham Link¹⁷;
- DRT Regional Highway 2 BRT (Scarborough to Oshawa Centre / Simcoe Street);
- DRT Regional Highway 2 Conventional Service (Oshawa Centre to Courtice Road).

With the above transit service improvements in place, the Durham Region Model forecasts an overall transit mode share of 8.8% for Clarington in 2028 AM peak. According to the 2011 TTS survey data, the overall transit mode share currently achieved in Clarington is 4.4%. The study team considers an 8.8% mode split to be an aggressive and more aspirational target that requires significant investments in transit within Clarington (over and above the improvements listed above). However, due to the extension of the GO Line to Bowmanville and improved local transit to service the new GO stations in Courtice and Bowmanville, a moderate increase in transit mode share in Clarington is to be expected. As a result, for the purposes of forecasting future transportation deficiencies, a conservative **5%** transit mode share was assumed within the model. Please refer to **Section 5.2** for a more detailed discussion of the transit policy context, transit network recommendations, and the rationale behind the proposed 5.5% transit mode share target.

4.2.1.4 2031 Base Road Network

The 2031 Base Network in the updated Durham Region Model includes all road improvements outlined in the Durham Region DC Study update, as well as the Conlin Road widening as recommended in the Conlin Road EA Study. A number of major road network improvements are already planned to be in place by 2031 by Durham Region and MTO, including the widening of Highway 401, upgraded Highway 401 interchange, and the new Highway 407 East corridor.

17. Although future demands were modelled with GO Transit bus services on the East-Durham Link (future Highway 418), at the time of writing Metrolinx confirmed that there are no current plans for service on this highway segment.

In order to assess the overall road network deficiencies within Clarington, the 2031 Base Network does not include the projects that are currently included in the 2010 Clarington Development Charges (DC) Background Study. This approach allows for a fairer assessment of the overall road network needs and potential improvements within Clarington through to 2031. Furthermore, many of the proposed improvements are for more minor collector roads that primarily serve a network connectivity or neighborhood access functions and are not designed to address Municipal level screenline deficiencies (which is the focus of the modelling exercise). The Clarington DC roadway improvements are further discussed further in **Section 5.4.5**.

It should be noted that the “Highway 401 Improvements from Courtice Road to East Townline Road” Transportation Environmental Study Report (TESR) recommends widening Highway 401 to 10 lanes from Courtice Road to Liberty Street, and 8 lanes from Liberty Street to Highway 35/115. However for this study, the Highway 401 assumptions made in the 2031 Durham Region DC study were carried forward, which includes widening to an 8-lane cross-section on Highway 401 between the East and West Durham Links.

Table 4.6 lists the major network improvements included in the 2031 Base Network:

Table 4.6: 2031 Base Road Network Assumptions

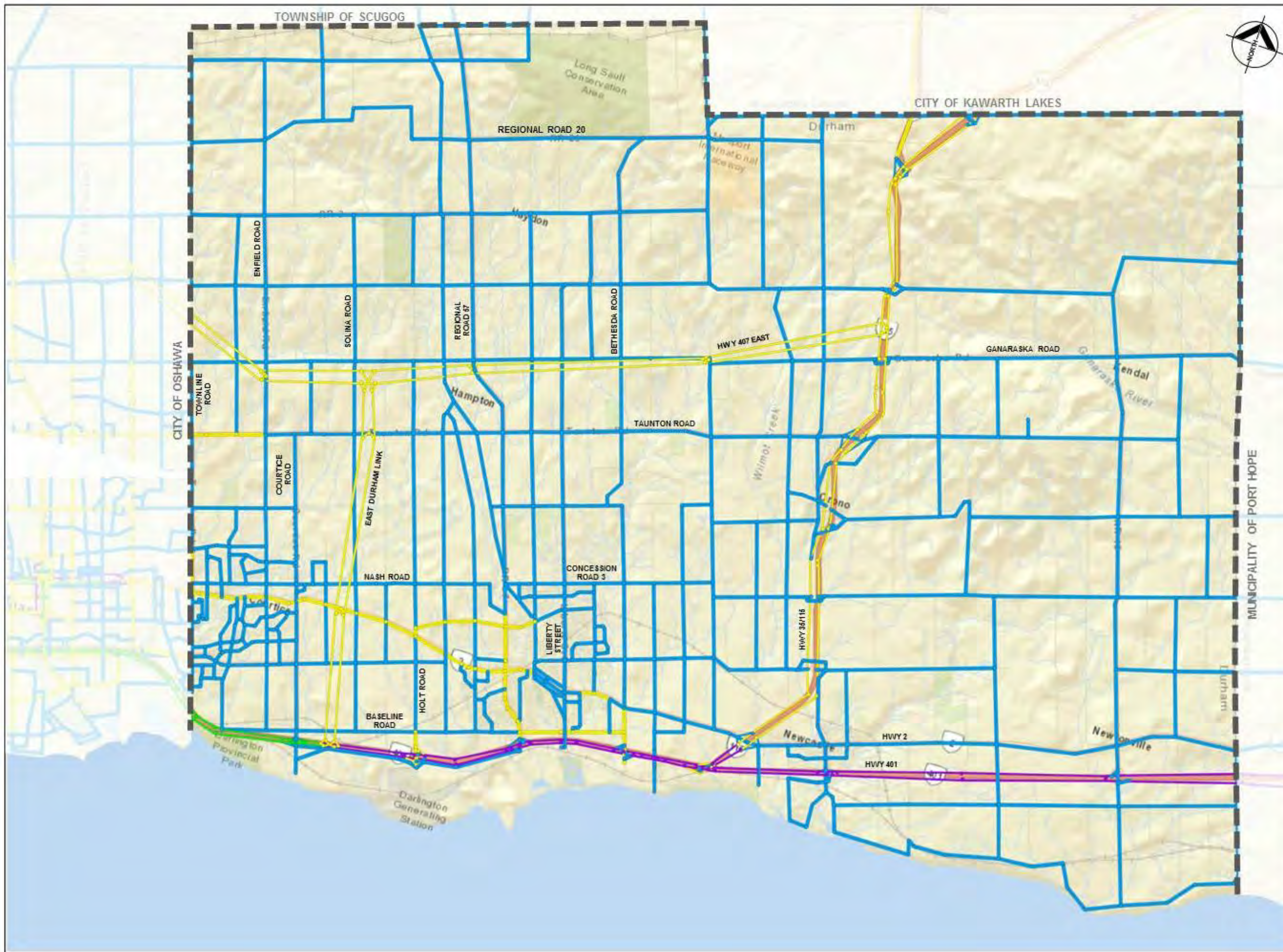
Road	Limits	Improvement
PROVINCIAL HIGHWAYS		
Highway 401	Salem Road to West Durham Link West Durham Link to East Durham Link Lake Ridge Road/Highway 401 Simcoe Street/Highway 401 Holt Road/Highway 401	Widen to 10 lanes Widen to 8 lanes New Full Interchange New Full Interchange New Full Interchange
Highway 407	Brock Road to West Durham Link West Durham Link to Highway 35/115 West Durham Link East Durham Link Whites Road extension/Highway 407	New extension, 6 lanes New extension, 4 lanes New highway, 4 lanes New highway, 4 lanes New Full Interchange
Highway 7	York-Durham Line to Baldwin Street	Widen to 4 lanes
Highway 12	Highway 48 to Regional Highway 48	Widen to 4 lanes
Highway 35	Highway 115 to Durham/Kawartha Lakes Boundary	Widen to 4 lanes
Highway 48	Lake Ridge Road (Durham/York Boundary) to Highway 12	Widen to 4 lanes

Road	Limits	Improvement
ROADS/ARTERIALS		
Bloor Street	Harmony Road to Grandview Street	New alignment, 4 lanes
Waverly Road/Martin Road	Baseline Road to King Street / Regional Highway 2	Widen from 2 to 4 lanes
	King Street / Regional Highway 2 to Nash Road	Widen from 2 to 4 lanes
Adelaide Avenue	Townline Road to Trulls Road	New bridge over Farewell Creek, 3 lanes
Rossland Road	Harmony Road to Townline Road	New connection
Taunton Road	Townline Road to Enfield Road	Widen from 2 to 4 lanes ¹⁸
Meadowglade Road	Granville Drive to Courtice Road	New 2-lane municipal road
Farmington Drive	Avondale Drive to Bloor Street	New 2-lane municipal road
Sandringham Drive	Connection from Granary Lane to Avondale Drive	New 2-lane municipal road
Townline Road ¹⁹	Connection from Cherrydown Drive to Olive Avenue	New 2-lane municipal road
Green Road	Connection from Boswell Drive to Aspen Springs Drive	New 2-lane municipal road

The 2031 Base road network is shown in **Figure 4.5**.

¹⁸ Table 4.6 and Figure 4.5 were initially prepared based on the Durham Region 2008 Development Charges Background Study network recommendations. The widening of Taunton Road to four lanes between Townline Road and Enfield Road was removed from the Durham Region 2013 Development Charges Study. This improvement should have been removed from the model, but in discussion with Durham Region it was determined that no further revision was required in order to conclude the Transportation Master Plan study. Durham Region confirmed that in lieu of widening, intersection improvements have been made at both the Taunton Road / Trulls Road / Enfield Road intersection and at the Taunton Road / Townline Road intersection, adding some operational capacity within this roadway section.

¹⁹ The 2031 Base Network includes road network improvements implemented in the Durham Region Travel Demand Model, which was most recently updated to support the 2013 Durham Region Development Charge (DC) Study Update. The network included the proposed Townline Road connection between Cheerydown Drive and Olive Avenue, which is no longer included in the Region's DC road program. As a result, the study team performed a sensitivity test that assessed the impact of the removal of the Townline Road connection on capacity deficiencies in Courtice. The sensitivity test results suggest that the roadway link's removal would have a negligible impact on Clarington road network deficiencies and needs through to 2031; the removal results in minor increase in traffic congestion along Highway 2 to the east of Townline Road with no new capacity deficiencies.



- Model Road Network**
- 2 Lanes (2-way)
 - 4 Lanes (2-way)
 - 6 Lanes (2-way)
 - 8 Lanes (2-way)
 - 10 Lanes (2-way)

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DRAWING:

UPDATED DURHAM REGION MODEL
2031 BASE NETWORK

PREPARED BY: N. DAY PROJECT No.: 60264232

DESIGNED BY: M. TRACEY APPROVED BY: S. HARMISWORTH FIGURE:

SCALE: 1 : 100,000 DATE: JUNE 2014

4.5

4.2.2 2031 Base Model Results

The 2031 Base Network traffic forecasts were completed for the AM and PM Peak Hours. The PM Peak Hour travel demands were found to be over 20% higher than the AM Peak Hour demands, thereby representing the worst case scenario for traffic within Clarington. As a result, the PM model results were used for the purposes of identifying road network deficiencies and assessing potential improvement alternatives. Please refer to **Appendix C** for the complete set of model results for the AM and PM peak hours.

In order to identify future transportation needs beyond the 2031 base year improvements, the 2031 base network forecasts were evaluated through screenline level analysis on the Clarington road network. A screenline is an imaginary boundary that spans over a series of roads where crossing traffic can be analyzed with respect to the available road capacity over the screenline. The screenline analysis determines the level of congestion over the network, and if road network deficiencies will exist in the future. The locations of the screenlines were determined using Clarington community boundaries, environmental constraints, and major roads. The screenlines are consistent with those used during the re-calibration of the model (please refer to **Appendix B** for details on the calibration process).

The screenline locations and descriptions are summarized on **Table 4.7** and **Figure 4.6**. Most screenlines do not show future congestion issues, with the exception of screenline 241 (east of Regional Road 57 in North Bowmanville) where a single lane deficiency is observed in the PM Peak Hour for both screenlines. Please refer to **Appendix C** for complete screenline deficiency tables for the 2031 base PM Peak Hour traffic forecasts.

The 2031 base traffic forecasts were also assessed using volume-to-capacity (v/c) ratios to isolate key bottlenecks and areas of congestions over the Clarington road network. V/C ratios indicate the level of congestion on a road, where a v/c ratio of 1.00 means that the traffic on a road segment is equal to the vehicle capacity of the road segments. A 0.9 v/c ratio is typically used to identify capacity deficiencies that may need to be addressed through network improvements (v/c of 0.9 or higher is generally indication of stop and go traffic conditions). **Figure 4.7** highlights the network deficiencies forecasted using the updated Durham Region Travel Demand model for the

2031 base horizon, illustrated using v/c ratios. In the model plot, the routes are colour coded by v/c ratio:

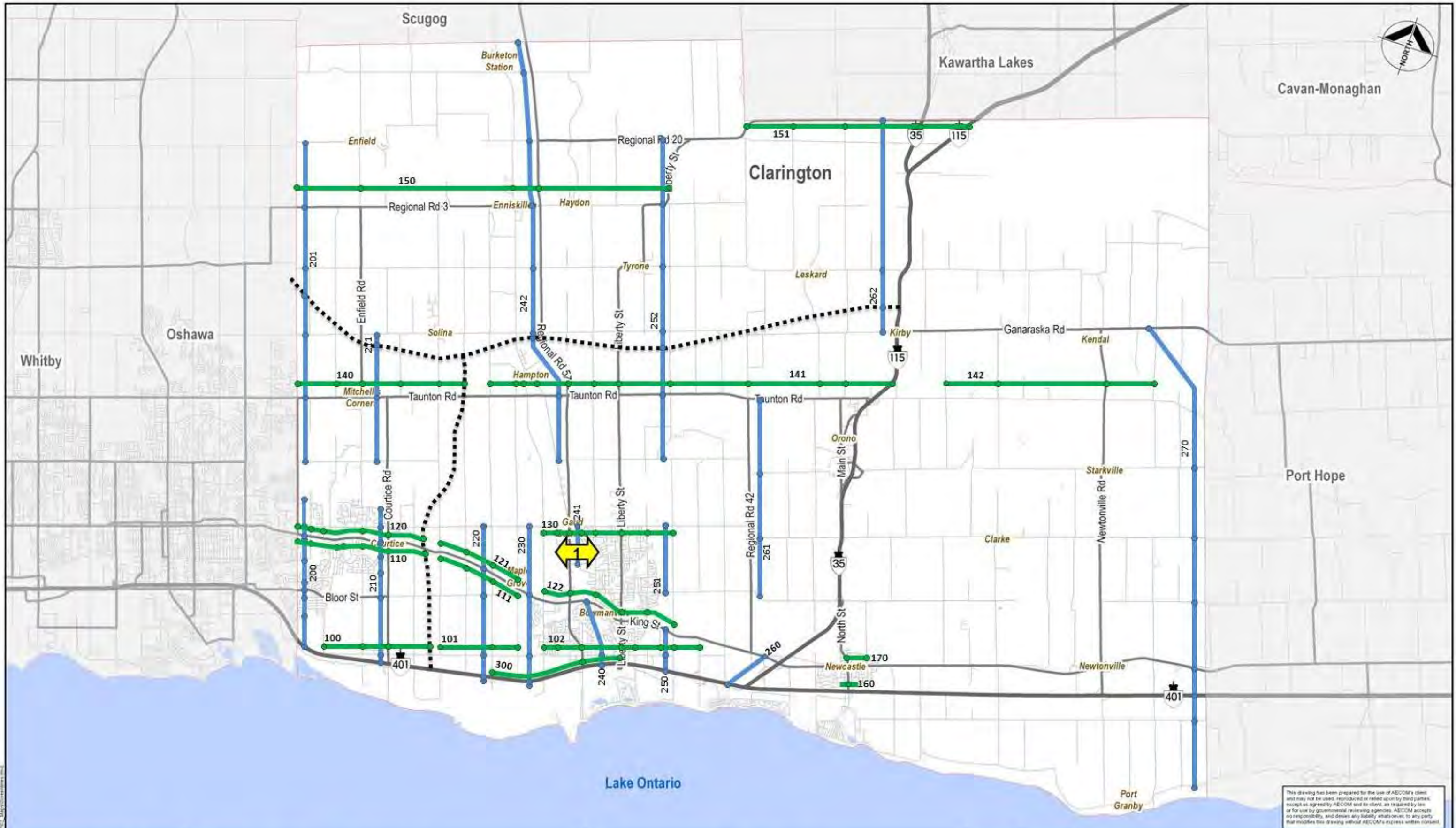
- **Red:** At capacity / highly congested conditions ($v/c > 0.9$);
- **Orange:** Approaching capacity and congested conditions ($0.8 < v/c < 0.9$); and
- **Grey:** Operating well ($v/c < 0.8$).

Appendix D includes the total volume and v/c ratio network plots.

Table 4.7: Clarington Screenline descriptions (screenlines with lanes deficiencies highlighted)

Screenline #	Screenline/Description	V/C Ratio
Northbound/Southbound Screenlines		
100	North of Baseline Road (Prestonvale Road to East Durham Link)	0.29
101	North of Baseline Road (Solina Road to Maple Grove Road)	0.20
102	North of Baseline Road (Green Road to Bennett Road)	0.60
110	South of Regional Highway 2 (Townline Road to Hancock Road)	0.30
111	South of Regional Highway 2 (Solina Road to Maple Grove Road)	0.23
120	North of Regional Highway 2 (Townline Road to East Durham Link)	0.25
121	North of Regional Highway 2 (Solina Road to Maple Grove Road)	0.10
122	North of Regional Highway 2 (Green Road to Lambs Road)	0.79
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	0.15
140	North of Taunton Road (Townline Road to East Durham Link)	0.11
141	North of Taunton Road (Holt Road to Highway 35/115)	0.15
142	North of Taunton Road (Jewel Road to Shiloh Road)	0.00
150	North of Regional Road 3 (Townline Road to Liberty Street)	0.08
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	0.19
160	South of Regional Highway 2 (Mill Street)	0.74
170	North of Regional Highway 2 (Manvers Road to Arthur Street)	0.26
300	North of Highway 401 (Holt Road to Lambs Road)	0.79
Eastbound/Westbound Screenlines		
200	East of Clarington West Border (Highway 401 to Lawson Road)	0.62
201	East of Clarington West Border (Pebblestone Road to Concession 9)	0.27
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	0.51

Screenline #	Screenline/Description	V/C Ratio
211	West of Courtice Road/East of Enfield Road (Pebblestone Road to Concession 6)	0.30
220	West of Holt Road (South Service Road to Nash Road)	0.65
230	East of Maple Grove Road (South Service Road to Nash Road)	0.72
240	Bowmanville Creek (Highway 401 to Regional Highway 2)	0.78
241	East of Regional Road 57 (Longworth Avenue to Concession 3) – 1 ADDITIONAL LANE REQUIRED (in each direction)	1.02
242	West of Regional Road 57 (Concession 4 to Boundary Road)	0.20
250	West of Lambs Road (Highway 401 to Regional Highway 2)	0.63
251	West of Lambs Road (Concession Street to Concession 3)	0.14
252	West of Bethesda Road (Concession 4 to Regional Road 20)	0.13
260	West of Highway 35/115 (Highway 401 to Regional Highway 2)	0.60
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	0.14
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	0.09
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	0.11



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- LEGEND:**
- Municipal Boundary
 - Highway
 - Arterial Road
 - Local Road
 - Water
 - East/West Screenlines
 - North/South Screenlines
 - Lane deficiencies/Number of lanes required



PREPARED BY: M. Tacey	CHECKED BY: J. Muzaffar	PROJECT: Clarington TMP	PROJECT NO.: 60264232
DESIGNED BY: M. Tacey	APPROVED BY: J. Muzaffar	DRAWING: 2031 Base PM Peak Hour Screenline Deficiencies	MAP: 4.6
SCALE: 1"=1/4"	DATE: MAY 2019		



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LEGEND

- Under capacity/free flow ($V/C < 0.8$)
- Approaching capacity ($V/C = 0.80 - 0.90$)
- At capacity/congested ($V/C > 0.90$)
- Key areas of congestion

CLIENT:

Clarington
Leading the Way

PROJECT:

Clarington TMP

PLOT:

2031 Base Network
PM Peak Hour Volume/Capacity Ratios

PROJECT No.:

60264232

MAP:

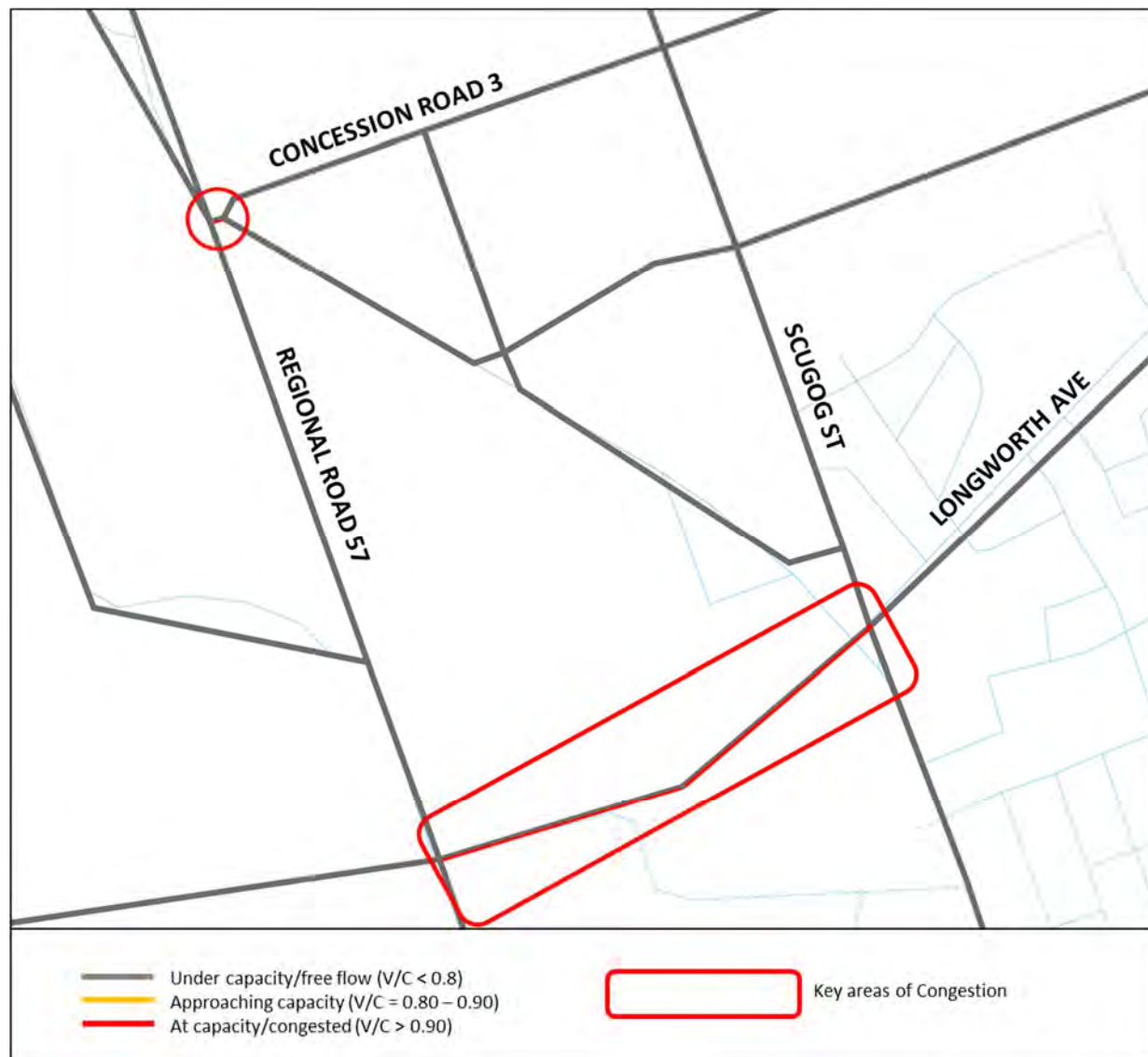
4.7

4.3 Problem and Opportunity Statement

Clarington's population and employment is expected to grow by 50,000 people and 15,000 new jobs by 2031, respectively. This increase will put pressure on the existing transportation system and drive requirements for new infrastructure and programs. The key network deficiencies and transportation problems and opportunities that Clarington is expected to face by 2031 can be summarized as follows:

- ***Congestion on Bowmanville Creek Crossing Roads*** – Longworth Avenue and Concession Road 3 in the vicinity of Bowmanville Creek are both forecast to operate over capacity in 2031. Increased pressure on these roadways is to be expected due to the significant population growth in northern Bowmanville. Furthermore, the creek acts as a natural barrier to travel with Baseline Road, King Street / Regional Highway 2, and Longworth Avenue as the only existing crossing within the urban area. **Figure 4.8** presents the forecasted performance of Concession Road 3 and Longworth Avenue in the 2031 PM peak hour. The widening of Longworth Avenue to a four-lane cross-section between Scugog Street and Regional Road 57 (including the existing crossing which is designed to accommodate a four-lane cross-section), an extension of Longworth Avenue to the west (as a four-lane cross section), and the extension of Nash Road across Bowmanville Creek have been identified as alternatives that have the potential to address this need.

Figure 4.8: Bowmanville 2031 Base Network – PM Peak Hour V/C Ratios on Concession Road 3 and Longworth Avenue at Bowmanville Creek



- Congestion on roads leading to Highway 401 interchanges** – Courtice Road and Liberty Street north and south of Highway 401 are forecast to be congested in 2031. Furthermore, Waverley Road is forecast to approach capacity at Highway 401. Link level v/c ratio analysis of the roads used to access Highway 401 revealed the need for at least one additional lane of traffic (in each direction) to accommodate the expected congestion. The trip making patterns for vehicles that travel on Holt Road, Waverley Road, and Liberty Street were further investigated using the Select Link

Analysis module in the EMME demand model, where all trips that utilize a certain road segment are isolated. **Figure 4.9** shows model plots of the select link assessment. The trip profiles reveal that most trips accessing Highway 401 through the Bowmanville interchanges originate in central Bowmanville or north of Bowmanville. Since the approach to the Liberty Street/Highway 401 interchange will be challenging to upgrade due to existing residential and commercial property constraints, a new Highway 401 interchange at Lambs Road, and/or network improvements to encourage increased usage of the Holt Road interchange (already planned to be upgraded to a new full access interchange) may be able to address this need. The introduction of an interchange at Lambs Road would result in the partial or full removal of the Liberty Street and Bennet Road interchanges.

The alternatives to address each of the identified network deficiencies and transportation issues are evaluated in **Section 5.4**.

- **Capacity issues in Urban Areas of Bowmanville and Courtice** – The 2031 base forecasts revealed three isolated congestion hot spots primarily in the vicinity of downtown Bowmanville and Courtice, listed below:
 - Prestonvale Road South of Regional Highway 2 (Courtice)
 - Scugog Street North of King Street / Regional Highway 2 (Bowmanville)
 - Concession Road 3 east of Regional Road 57 (Bowmanville)

For the intersections of Regional Highway 2/Prestonvale Road and King Street/Scugog Street, congestion in 2031 is to be expected since the base year simulation and observed data revealed PM Peak Hour congestion at the link level with v/c ratios greater than 1.0 in the peak direction even in present day, as illustrated in **Figure 4.10**.

These three urban intersections were selected for more detailed operational analysis; intersection needs including cycle lengths, signal optimization, phasing, and auxiliary lane requirements are examined in **Section 5.5**.

Figure 4.9: Clarington 2031 Base Network – Select Link Assessment

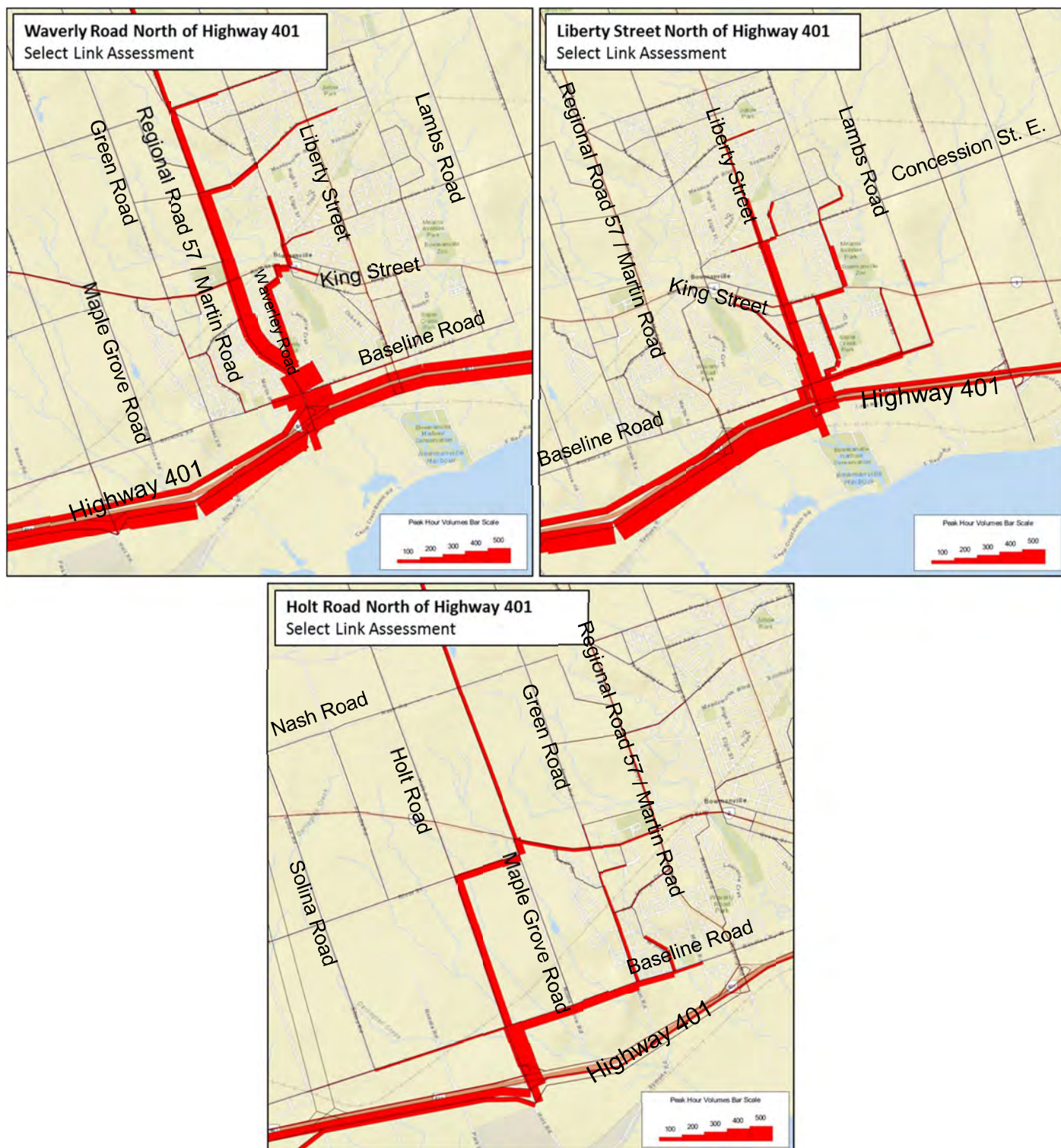
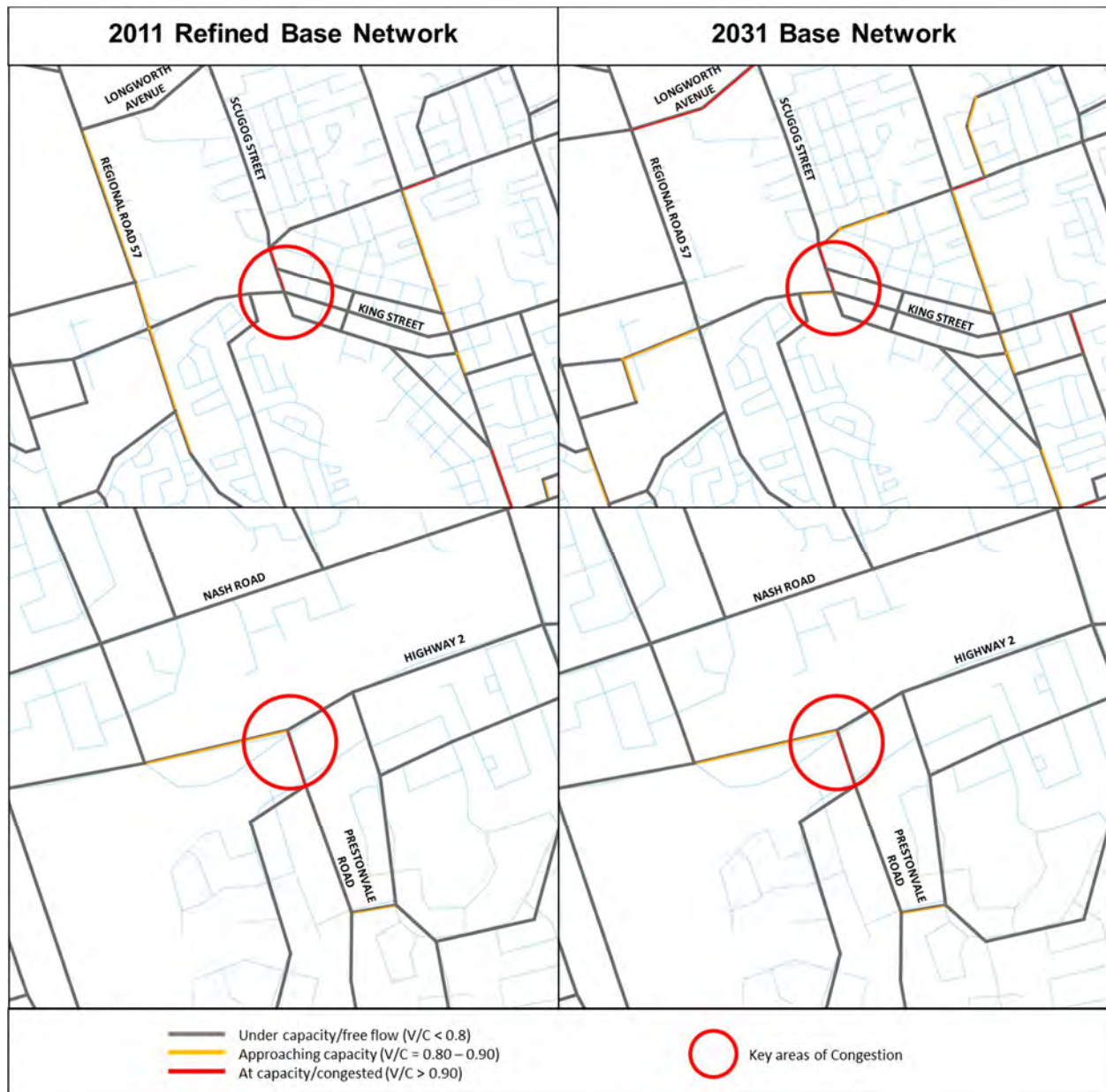


Figure 4.10: 2011 & 2031 PM Peak Hour V/C Ratios (Downtown Courtice and Bowmanville)



4.3.1 Darlington Nuclear Generating Station Refurbishment Sensitivity Test

The Darlington Nuclear Generating Station (DNGS) Refurbishment project is expected to increase trip making to the DNGS site, and thus increase future traffic on the surrounding road network. The DNGS Refurbishment is expected to peak from 2018 to

2021. According to “Additional Traffic Assessment Report: No New Nuclear – Darlington Scenario DNGS Refurbishment and Continued Operation Project” (*Additional Traffic Assessment Report*), the DNGS Refurbishment work force is expected to produce 853 AM Peak Hour trips and 780 PM Peak Hour trips at the peak of the project. The AM trips are forecasted as 80% inbound and 20% outbound, and the PM trips are forecasted as 30% inbound and 70% outbound. The trips are assumed to access the DNGS site through the Highway 401 interchanges at Courtice Road, Holt Road and Waverly Road, as well as on Courtice Road, Holt Road, Waverly Road, Baseline Road, Bloor Street and Regional Highway 2 through South Service Rd/Energy Drive.

The 2031 future travel demands account for the traffic generated by DNGS operation staff as this represents the OPG work force. However, the additional traffic generated by the DNGS Refurbishment work force during the time span of the project is not included in the demands (since these trips will not exist in 2031). Although the DNGS Refurbishment will be completed prior to 2031, it is important to determine if the additional traffic through the lifespan of the project would require improvements to the adjacent roads.

Using the trip generation and distribution forecasted in the *Additional Traffic Assessment Report* for the DNGS Refurbishment, the additional workforce trips were layered onto the existing 2031 demands. Assessing the DNGS traffic with the 2031 demands represents a “worst case scenario”, and is used to identify whether any additional road network needs are required (over and above those identified in the previous sections). The distribution of the additional trips (as developed by the *Additional Traffic Assessment Report*) is illustrated in **Figure 4.11** below.

Figure 4.11: 2031 PM Peak Hour Additional Trips



Applying the additional DNGS Refurbishment workforce trips to the 2031 PM Peak Hour base simulation did not reveal any additional capacity deficiencies. Since surrounding non-DNGS Refurbishment related traffic levels between 2018 and 2021 (during the peak of the DNGS Refurbishment) can be expected to be lower than the 2031 forecasts, no additional link level widening improvements are anticipated to support the Refurbishment traffic in Clarington. However, the operational improvements in the vicinity of the DNGS site that are proposed in the *Additional Traffic Assessment Report* will still be required.

The sensitivity analysis described in this section did not reveal any additional transportation network problems and therefore no additions or changes to the Problem and Opportunity Statement are required.

5. Transportation Master Plan Strategy Areas

The Municipality of Clarington's population is forecasted to grow by almost 60% by 2031, representing an addition of over 50,000 new residents. Similarly, over 15,000 new jobs are to be created in the Municipality by 2031. Serving the mobility needs of new residents and employees will require measures that encourage:

- more efficient use of existing infrastructure,
- use of more sustainable modes of transportation,
- investment to improve the existing multi-modal transportation system.

There are significant mobility challenges in the Municipality for individuals that do not have access to a vehicle and for individuals that would like to choose a more sustainable mode of transportation. Existing auto-centric communities and the lack of interconnected, attractive, and reliable active transportation and transit systems creates a dependency on the single occupant automobile. The Municipality's existing active transportation network is discontinuous with many barriers, including creeks and valleys, busy highways and regional roads, and rail lines, that discourage commuters from considering walking and cycling as viable modes of transportation. The Municipality's transit network, on the other hand, is largely focused on inter-regional peak period travel to the rest of the GTA (particularly to Toronto and Oshawa) via GO Bus. Service within the Municipality itself has key gaps, includes circuitous looping routes, and generally low service levels. The rural nature of much of the Municipality outside of the southern communities of Courtice, Bowmanville, and Newcastle is difficult to service with transit and makes it challenging for travelers to walk and cycle for non-recreational purposes.

The planned GO Rail extension to Bowmanville and Courtice and Durham Region's potential implementation of higher order transit (Bus Rapid Transit or Light Rail Transit) along Regional Highway 2 into Courtice are significant opportunities for the Municipality to develop healthy and complete communities that support and encourage the usage of transit, walking, and cycling modes.

Smart Commute Durham, which is funded by Metrolinx and Durham Region, is an existing non-profit transportation management association that works with employers and commuters to change their travel behavior with the objective of reducing peak period auto vehicle trips. Smart Commute offers a number of free services, which are open to Durham-area businesses with 50 employees or more. Large employers such

as OPG can be encouraged to implement Smart Commute supported transportation demand management (TDM) programs, including flexible work hours and telecommuting, carpool ride matching, and education about multi-modal transportation options. Furthermore, Provincial investments in carpool parking lots and the aforementioned investments in transit could further support these efforts.

The majority of the Clarington roadway network is forecast to operate well in 2031. Of the forecasted congestion, most is focused in the southern urban areas of Courtice and Bowmanville and the north/south roads leading to Highway 401 interchanges. This is to be expected since these are the areas where the bulk of the growth within the Municipality is to occur through to 2031.

The lack of widespread or more extensive capacity deficiencies is also expected since the 2031 base network includes several regional road improvements and provincial highway improvements which were recommended as part of the Durham Region 2013 DC Update (see **Table 4.6** above for more details). These DC improvements were designed to accommodate growth to the 2028 horizon year on the regional and provincial roadway networks, and thus, the additional bottlenecks/areas of congestion identified as part of this study in **Section 4.3** are more localized in nature.

The following sections of the TMP report summarize the key recommendations of the TMP for the active transportation, transit, and road networks, along with the associated policy recommendations.

5.1 Active Transportation



5.1.1 Background

The promotion of cycling and walking is steadily gaining prominence in regional and municipal transportation plans as an important measure that increases the well-being and sustainability of a community. Active transportation can play a role as both a utilitarian mode of transportation, reducing the reliance on the car by serving as an alternate mode for shorter to medium distance commuting and as a means to access transit connections, and as a form of recreation for local residents and visitors (e.g., bike tourism and cycling clubs). The Growth Management Discussion Paper developed as part of the Municipality of Clarington's ongoing Official Plan Review recognizes the

importance of providing residents with the ability to live, work, and find recreation within transit, walking, or biking distance.

According to 2011 TTS data, walking and cycling account for only 6% of AM peak period trips that originate from the Municipality of Clarington. This is consistent with peer municipalities such as Caledon (4%), Milton (6%), and Halton Hills (6%). Bowmanville, with its historic downtown, is the most walkable community in the Municipality with an AM peak period walk/cycle mode split of over 9%, followed by Courtice with a mode split of almost 7%. The rest of Clarington, including Newcastle, Orono, and the surrounding rural areas have a walk / cycle mode split of between 2% and 4%. The current statistics represent an opportunity to increase trips by walking and cycling in Clarington, especially for short trips (i.e., trips less than 5 km). This is especially true for the urban development areas in Courtice, Bowmanville, and Newcastle.

When planning for the promotion of increased active transportation usage in the Municipality, it is important to take into account the following key considerations:

- **Network Connectivity** – The provided network of on-road and off-road routes should connect and link key communities and destinations that are likely to be used for active transportation (e.g., population areas to schools, parks and recreation areas, and commercial / shopping areas such as grocery stores). Opportunities to provide cross-connectivity to existing / planned trails and on-road routes should also be taken advantage of. Signage also plays a role in supporting wayfinding, educating users about the available connection options, and demonstrating to other users that active transportation is a viable option.
- **Travel Time** – The directness of route and travel time are also important considerations for active transportation. The lower average speeds for walking and cycling, compared to driving, increases the overall sensitivity toward detours, indirect routings, and other increases to trip length. Some users, such as risk-tolerant cyclists, may choose to cycle on a busier road with faster motor vehicles, even without extensive bicycle infrastructure, rather than choose a longer, circuitous route on roads with less traffic or lower vehicle speeds. People who do not feel comfortable riding along these busier roads without exclusive and/or separated infrastructure may choose to not cycle at all if alternate, more comfortable routes add too much distance or time to the trip.

- **Cost / Affordability** – Both the capital construction and ongoing maintenance costs of active transportation facilities should be considered. To reduce costs, on-road facilities should be maintained together with “normal” roadway maintenance activities. Active transportation improvements can be coordinated with planned road rehabilitation and expansion work.
- **Maintenance** – The regular maintenance of shoulders, surface pavement, pot holes and road grates will be required to ensure a high-quality riding surface. Winter maintenance is also an important consideration; certain key pieces of active transportation will need to be maintained all-year-round (i.e., plowing, sanding, and salting) if they are to be promoted as viable alternatives.
- **Safety** – The provision of a safe environment for motorists and active transportation users is of paramount importance. For shared usage facilities in particular, proper visibility, signage, and striping/markings will be required to alert drivers to the presence of cyclists. A smooth and well-maintained riding surface with gentle slopes will both improve safety and the comfort of the route.
- **Design Standards** – The use of consistent design and standards for cycling facilities will ensure that they are recognizable (to both users and motorists) and will ensure that the system offers a consistent look and feel.
- **Trip End Facilities** – The provision of convenient bicycle storage facilities and amenities (e.g., rest areas and showers at places of employment) at key destinations can play a role in further encouraging cycling. Examples of these facilities include implementing bike racks / secure storage at community buildings and promoting private sector participation and co-operation, such as that shown in **Figure 5.1**.
- **Marketing** – Public awareness and education through marketing and promotion (e.g., bicycle route maps) is essential to driving increased usage of active transportation. The active marketing of bicycle tourism can also play an economic development role.

Figure 5.1: Covered Bicycle Racks at Milton GO Station



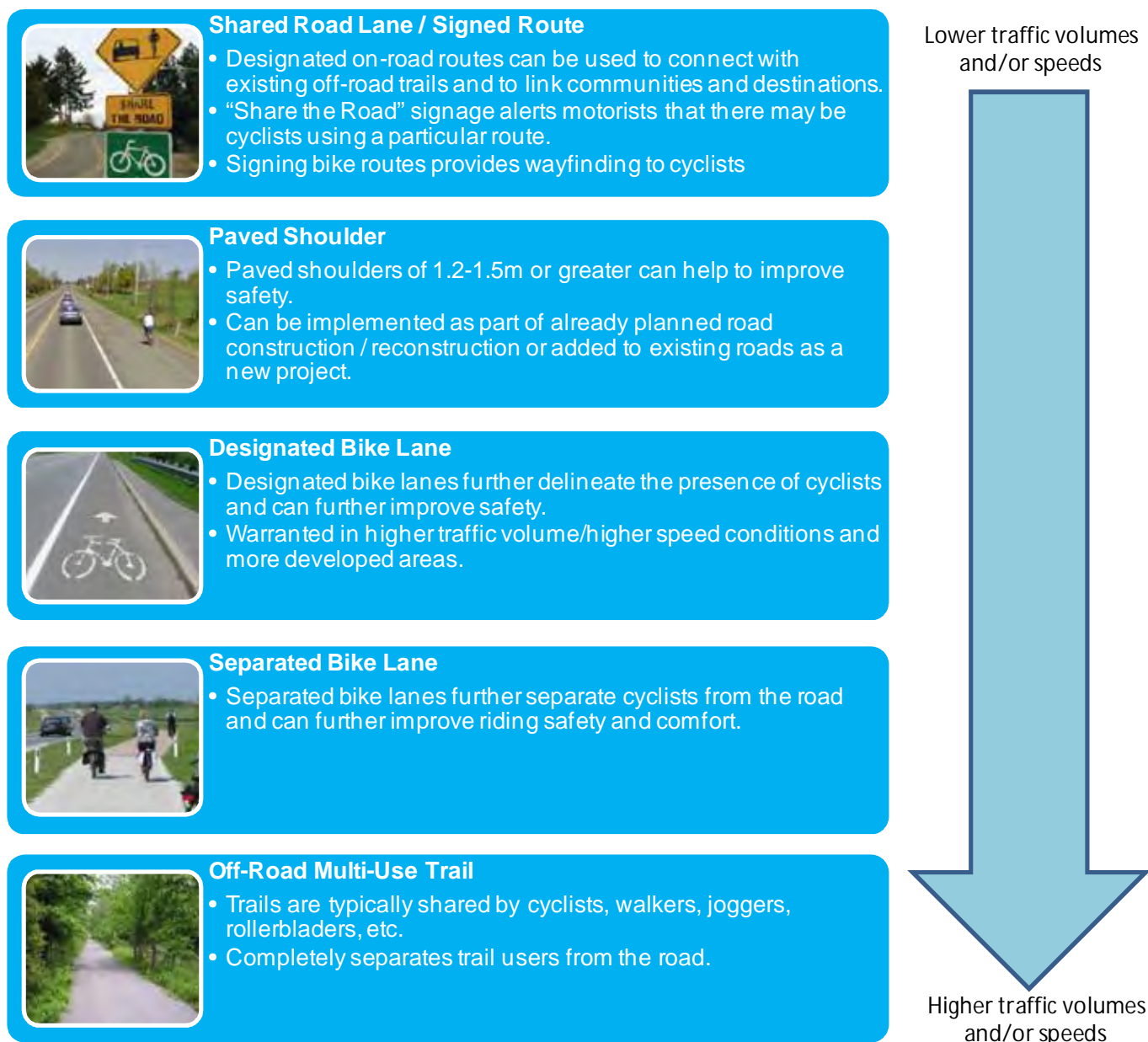
Figure 5.2 outlines the hierarchy of the types of cycling facilities that can be implemented, arranged by increasing traffic volumes and speeds.

As previously discussed in **Section 3.1**, the Municipality's existing cycling network primarily consists of off-road trails, shared road lanes, and designated bike lanes within the communities of Bowmanville and Courtice.

5.1.2 Active Transportation in Other Communities

A number of other jurisdictions in Southern Ontario have developed policies and plans to guide their decision making and investments in active transportation infrastructure. A few of the notable examples are summarized in **Table 5.1**. The examples include both primarily rural counties (similar in character to northern Clarington) and more suburban communities (similar in character to southern Clarington).

Figure 5.2: Hierarchy of Cycling Facilities²⁰



20. Figure 5.2 is not consistent with the hierarchy that is shown in Appendix B, Table 1 of the Regional Cycling Plan (RCP). The Municipality will revised the Designated Bike Lane category to include Buffered Bike Lanes, and the revised the Separated Bike Lanes category to include Cycle Tracks.

Table 5.1: Cycling Policies in Other Jurisdictions in Southern Ontario

Community	Description of Active Transportation Infrastructure & Policies
Haliburton County	<ul style="list-style-type: none"> • Network of route options • 1.2 m paved shoulders on Rural County Roads (paved shoulders included in rehabilitation of County Road 21 in 2008/2009 as a result of public comments received during the EA). • Build awareness / education • Market the County as a cycling destination • Encourage / support commuter cycling • Identify opportunities for off-road routes
City of Waterloo	<ul style="list-style-type: none"> • Network of bike lanes, signed routes, and trails • Received Silver Bicycle Friendly Communities Award in 2011 • Advisory Committee on Active Transportation provides guidance to Council on active transportation matters • Transportation Master Plan includes a Bikeways and Trails Master Plan • Official Plan requires roads to be planned as complete streets • List of current road, trail, and sidewalk closures updated on City website • Regional municipality also implementing coordinating active transportation infrastructure and policies
Northumberland County	<ul style="list-style-type: none"> • Paved shoulders included in road rehabilitation projects • On-road routes (five looped routes) established by the County • Off-road / multi-use trails through Ganaraska Forest, Northumberland Forest and conservation areas and park lands • Portions of the waterfront trail and Trans Canada Trail • Developed \$1.5 million, 10-year Cycling Master Plan (July 2012), which developed a cycling network that includes Commuter, Recreational, and Tourism Routes <ul style="list-style-type: none"> – Includes signed routes, wide curb lanes, bike lanes, bike paths, and multi-use paths – Includes planned connection to Clarington via County Road 2 – Design guidelines by roadway class and posted speed, signage and pavement marking specifications, and a promotion, awareness, and education program
Lanark County	<ul style="list-style-type: none"> • Paved shoulders on some County roads • Construct bicycle lanes in urban areas (County Road 1, Fore Street, Perth) • Incorporate off-road recreational paths and existing paved shoulders into cycling network • Develop Cycling to School and Active & Safe Routes to School programs • Work with local municipalities to provide network connectivity with bike routes on local roads.

Community	Description of Active Transportation Infrastructure & Policies
Prince Edward County	<ul style="list-style-type: none"> • Abundance of low traffic volume roads (shared use) • Highway 33 / Loyalist Parkway – paved shoulders • Millennium Trail: <ul style="list-style-type: none"> – Off-road multi-use trail on former CN railway line – Connects Carrying Place to Picton – Partially paved – 15 m wide, 49 km long • Routes mapped and promoted by cycling clubs
Town of Ajax	<ul style="list-style-type: none"> • 120 km cycling network of trails, dedicated bike lanes, and shared use lanes • Bike shelters at municipal facilities and signage throughout the Town • Developed Walkable + Bikeable Ajax Pedestrian and Bicycle Master Plan <ul style="list-style-type: none"> – Includes active transportation network with new sidewalks, trails, bike lanes, marked shared lanes, barrier crossings (e.g. freeway), and pedestrian corridors – Signage, wayfinding, and on-road markings to make pedestrian and cycling infrastructure visible • “Bike This Way” pilot project. Includes cycling wayfinding signage over a 3.3 km network to help cyclists navigate between Downtown Ajax and the Ajax GO Station. • Ajax Moves 3 Ways public awareness campaign focused on safe interaction between motorists, cyclists and pedestrians. Includes interactive website with safety tips, resources, and social media tools.
City of Burlington	<ul style="list-style-type: none"> • Council approved 2009 Cycling Master Plan • 49 km of bike lanes with signage and pavement markings, 31 km of bike priority streets with sharrows and route signs, 20 km of multi-use paths with wayfinding signage and motor vehicle control at all road crossings • Tourism Burlington promotes City as tourist destination for cyclists • Public art bicycle racks in the downtown and bicycle parking area in downtown parking garage • Consolidated green map with trails, pathways, and transit routes • Pilot project of enhanced bike lanes across the Fairview QEW interchange to improve visibility and safety, including a blue-coloured treatment for cycling lanes near the highway on-ramp, narrower lanes to promote slower speed and a reduction of the existing posted speed through the interchange from 60 km/h to 50 km/h.

Community	Description of Active Transportation Infrastructure & Policies
City of Markham	<ul style="list-style-type: none"> • Cycling Master Plan with 288 km cycling network throughout the City, in addition to 165 km of pathways and trails • Cycling and Pedestrian Advisory Committee on Council • Introduced pocket sized cycling map in 2012, encouraging the public to safely travel through the city on bicycles • Cycling network now spans almost 144 km, including over 27 km of bike lanes, almost 104 km of shared bike lanes, and over 12 km of active transportation pathways
City of Peterborough	<ul style="list-style-type: none"> • Commitment to supporting and encouraging cycling: <ul style="list-style-type: none"> – Hosts month-long commuter challenge each year providing incentives to cycle, walk or take transit (over 100 businesses participate) – Promotes Car Free School Days and Active and Safe Routes to School • Highly connected multi-use trail system • Transportation Master Plan (updated in 2012), includes an extensive cycling network • Wayfinding signage has been placed throughout the City and on-street bike parking and public bicycle repair stands (include tools for basic repairs and maintenance such as flat tires and brake adjustments) are available in the downtown

5.1.3 Active Transportation Policy Alternatives and Recommendations

The existing trails and off-road routes located in the Municipality of Clarington provide a framework for a Clarington-wide walking and cycling network. It should be noted that the focus of this TMP's recommendations is on facilitating increased non-recreational active transportation in order to reduce pressure on the Municipality's transportation network. It is recognized that recreational cycling and cycle tourism are important to maintaining a healthy and liveability community and the Municipality will continue to work with cycling groups to promote and encourage the use of Clarington's off-road trail and on-road cycling infrastructure for recreational purposes.

There is an opportunity for the Municipality to provide connecting cycling network infrastructure that leverages existing facilities and already planned Regional improvements (per *Regional Cycling Plan*). The CTMP supports the recommendations of the *Regional Cycling Plan*, but also proposes the following key additions in order to provide a comprehensive network that will facilitate walking and cycling for leisure, commuting, and other purposes:

- **Regional Highway 2:** The current version of the *Regional Cycling Plan* only includes segments of Regional Highway 2 between Bowmanville and Northumberland County; Nash Road is used as a shared roadway / signed route to connect Courtice and Bowmanville. It is recommended that Regional Highway 2 between Bowmanville and Courtice be included as part of the Region's Primary Cycling Network as a multi-use path or cycle lane, as appropriate by local site context. The rationale for this recommendation is discussed in more detail below:
 - It is anticipated that the Nash Road link would primarily be used by "sport" and "leisure" type riders since it is indirect and does not serve to connect any key origins and destinations. Within Courtice, however, the number of schools located along Nash Road would make it a key component of the primary network.
 - A route along Regional Highway 2, on the other hand, would provide a more direct connection between Bowmanville and Courtice and would serve to encourage "commuter" riders to use it. It is recognized that there are challenges associated with the Regional Highway 2 route, including the frequency of entrances, limited sidewalk/boulevard width for shared-use paths/sidewalks, safety concerns (sight-lines to Regional Highway 2 merging traffic), commercial vehicles, and lane widths. However, the following mitigation measures can be considered:
 - Clearly differentiated on-road cycling facilities with white line road marking or alternate coloured asphalt to draw awareness to the presence of cyclists within busier areas with many crossing intersections and entrances. An example is the buffered cycling lanes that were selected as the preferred cycling facility design through Pickering and Ajax as part of the Regional Highway 2 Transit Priority Measures EA.
 - Interconnecting links between communities with infrequent entrances/access points can utilize a combination of paved shoulders and off-road cycle paths.
- **Regional Road 17:** Regional Road 17 through the Newcastle core between Edward Street and Concession Road 3 is proposed to be a key north-south cycling route; the *Regional Cycling Plan* does not include a north-south option through this area.

Figure 5.3 and **Figure 5.4** show the active transportation network recommended by this Plan, including network components that were defined in the *Regional Cycling Plan* and additional Clarington specific initiatives. **Figure 5.3** presents the active transportation network at the overall municipal level and includes both on-road facilities and off-road

trails. **Figure 5.4**, on the other hand, focusses on the southern urban areas of Courtice, Bowmanville, Newcastle, and Orono, identifies on-road facility treatment types, and identifies “Key Trails” that serve as important active transportation links that can be used for commuting purposes.

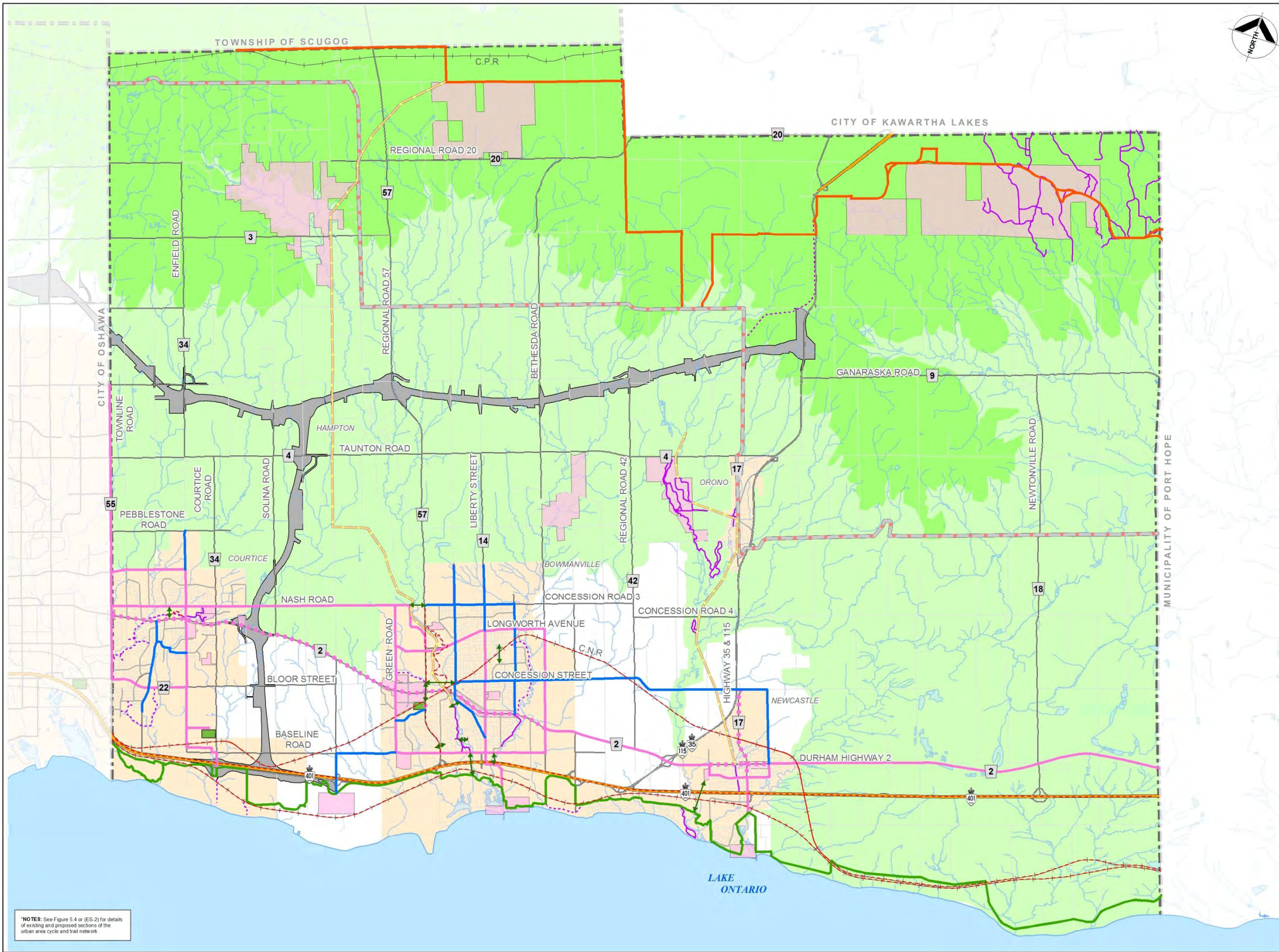
The key components of the Municipal Active Transportation Network proposed as part of the CTMP are discussed below:

Network Connections and Barrier Elimination

- Provide new connections to the Waterfront Trail and pave the entire length of the Trail.
- Provide new connections between Courtice, Bowmanville, and Newcastle (via the Clarington Regional Highway 2 cycling spine) and to the larger Region of Durham network at the Oshawa boundary.
- Include cycling provisions together with Highway 401 interchange upgrades / changes (e.g., as part of the planned improvements to the Waverly Road, Liberty Street, and Bennett Road interchanges in Bowmanville) to reduce the barrier created by the freeway. See example at the Fairview / QEW interchange in Burlington to the right.
- Improve connection between Longworth Avenue and Nash Road to serve as an alternative to busy Regional Road 57. Options are currently limited due to the lack of viable Bowmanville Creek valley crossings in this area. This connection could be provided through a short trail crossing connecting Nash Road and Concession Road 3.



Marked cycling lanes at the Fairview
QEW interchange in Burlington



Primary Cycling Network (Spines)

- Clarington Initiative
- Regional Cycling Plan Network

Secondary Cycling Network*

- Clarington Cycle Lane and Shared Routes

Trail Network

- Waterfront Trail
- Potential Regional Trail Connections
- Greenbelt Cycle Route
- Oak Ridge Moraine Trail
- Existing Trail
- Proposed Trail

Destinations, Barriers and Links

- Key Linkage
- Pedestrian/Cyclist Barrier
- Key Active Transportation Destination
- Future GO Station

Other Features

- Freeway
- Arterial Road
- Collector Road
- Local Road
- Railway
- Municipal Boundary
- Watercourse
- Highway 407 Corridor
- Waterbody
- Oak Ridges Moraine
- Urban Area
- Greenbelt

AECOM

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Clarington
Leading the Way

PROJECT:

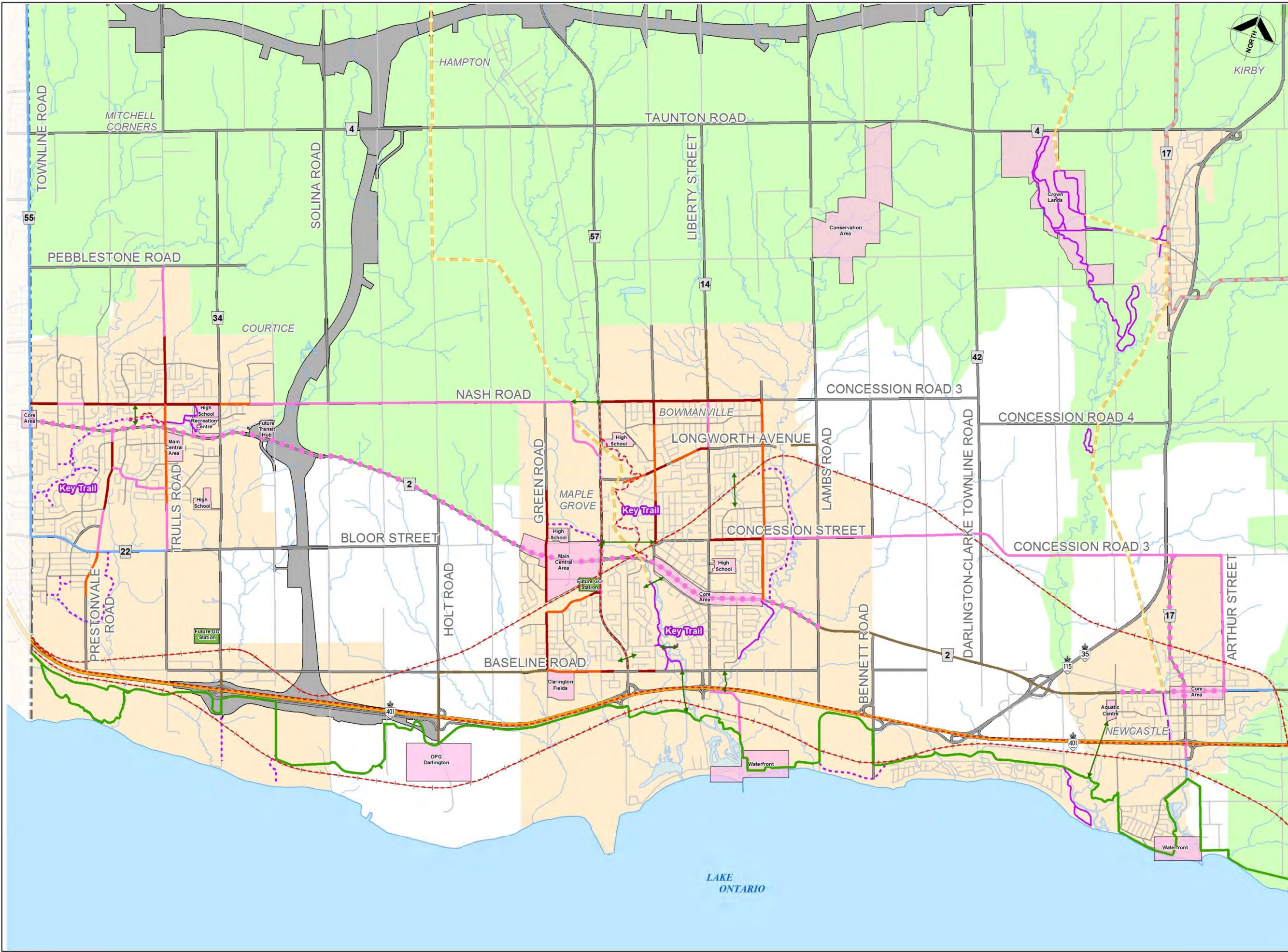
CTMP | Clarington Transportation Master Plan

DRAWING:

ACTIVE TRANSPORTATION (MUNICIPAL)

PREPARED BY:	CHECKED BY:	PROJECT No.:
-	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	5.3
SCALE:	DATE:	
1 : 100,000	JUNE 2014	

*NOTES: See Figure 5.4 or (ES-2) for details of existing and proposed sections of the urban area cycle and trail network.



Proposed Cycle and Trail Network

- Cycle Lane
- Multi Use Path
- Paved Shoulder
- Signed / Shared Lanes
- Proposed Trails
- Greenbelt Cycle Route

Trail Network

- Existing Cycle Lane / Shared Route
- Clarington Initiative
- Waterfront Trail
- Potential Regional Trail Connections
- Existing Trail

Destination, Barriers and Links

- Pedestrian/Cyclist Barrier
- Key Linkage
- Key Active Transportation Destination
- Future GO Station

Other Features

- Freeway
- Arterial Road
- Collector Road
- Local Road
- Municipal Boundary
- Watercourse
- Highway 407 Corridor
- Waterbody
- Urban Area
- Greenbelt

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ACTIVE TRANSPORTATION (LOCAL)

PREPARED BY:	CHECKED BY:	PROJECT No.:
	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	5.4
SCALE:	DATE:	
1: 100,000	JUNE 2014	

- Provide active transportation crossings of watercourses, rail lines, and other barriers so that more direct active transportation connections exist and that walking and cycling routes are shorter than driving routes. Example connections include a crossing of the CP Belleville subdivision east of Liberty Street, crossings of Highway 401 near the Liberty Street interchange, and a crossing of Black Creek west of Trulls Road.

Leverage and Compliment Regional Initiatives

- Encourage the Region of Durham to implement the *Regional Cycling Plan* and the proposed additions listed above (Regional Highway 2 and Regional Road 17).
- Focus on implementing municipal cycling network components that connect to planned improvements to Regional facilities, key destinations within the Municipality, and the future Courtice and Bowmanville GO Rail stations.
- Examine the feasibility of implementing “Share the Road” signage on suggested cycling routes recommended by Clarington Tourism and the on-road components of the *Regional Cycling Plan*. Many of these roads are already suitable for cyclists and “Share the Road” signs can be installed as a quick win project that enhances motorist awareness of the presence of cyclists.²¹
 - Clarington cycling stakeholder groups noted that a lack of motorist awareness of cyclists is a key current issue. The stakeholders noted that an initial focus on raising awareness through low-cost short-term improvements, such as line painting, sharrows, community signage, and marketing initiatives, will benefit the majority of cyclists.
- It is recommended that cycling-related improvements for on-road segments be tied to the Municipality’s overall capital program for roadway improvements (e.g. cycling-related upgrades can be integrated with the already planned improvements municipal roads).

21. Roadway upgrades, such as paved shoulders, can be considered for select segments that are not deemed to be already suitable for cyclists by the Municipal Engineering Department.

Multi-Modal Connections and Wayfinding

- Provide enhanced, clearly marked connections to the two new planned GO Stations along the GO Bowmanville extension. See an example of existing wayfinding signage in the Town of Ajax to the right.
- Enhance cycling and pedestrian connections to the existing Bowmanville GO Bus Station / Carpool lot, as these can be an immediate “quick-win” that can be further leveraged once the GO station is in place.
- Consider enhanced wayfinding signage as part of these efforts in order to make active transportation options more visible to the travelling public.



Cycling route wayfinding signage in Ajax

From a policy perspective, the following key measures are recommended in order to promote and support active transportation in the Municipality of Clarington:

Marketing and Promotion

- Include active transportation information on the Municipality’s website in order to market and promote the usage of the Municipality’s active transportation facilities. Ease of access to the following types of information will help decrease the barriers to using active transportation:
 - Cycling/walking route and trail maps and descriptions
 - Ability to download high quality maps and information
 - A feedback form that permits input on issues and concerns (e.g., obstacles, shoulder stability, pot holes, bicycle parking needs, etc.)
 - Development of a signing and wayfinding program to provide directions to key destinations by bike. The program could start with a pilot project (like the Town of Ajax example shown in the picture above) that focuses on providing wayfinding signage between Bowmanville’s historic downtown, the Waterfront Trail, the Bowmanville and Soper Valley Trails, Clarington Tourism’s recommended cycling routes, and eventually, the new GO Stations. Within Courtice, connections to the future Farewell Creek Trail and the Black Creek Crossing to Regional Highway 2 and connections to the Waterfront Trail via Courtice Road could be signed.

Similar signing initiatives could direct cyclists in Orono and Newcastle to the Waterfront Trail. A wayfinding project may be financially supported through sponsorships or fundraising. For example, in Michigan, non-profit organizations, fundraisers, and local businesses have helped provide funding for signing bicycle routes.

- Add cycling information to the existing cycling map provided by Clarington tourism. Printed copies of updated maps and cycling information can be provided at the Clarington Tourism office, municipal buildings, and at the new GO stations.
- Coordinate marketing and promotion with Smart Commute Durham²² and the Region of Durham. The Region of Durham is currently preparing a regional Cycling Communications Strategy to educate the public about the Regional Cycling Plan and its benefits. The Municipality of Clarington should participate in the development of the new Regional Communications Strategy in order to promote cycling in Clarington.

Municipality Active Transportation Master Plan

- Develop a Clarington-wide active transportation master plan that combines the recommendations of this study with the recommendations of the Parks, Trails, and Open Space Discussion Paper. The Plan should:
 - Identify/confirm vision and priorities for the active transportation network.
 - Confirm which on-road routes are to be:
 - Signed/shared roads only (promotes driver awareness to presence of cyclists)
 - Wider paved shoulders (incorporate with upcoming improvement projects)
 - Striped/marked bike lanes
 - Link implementation of the plan to the roadway maintenance and improvements program by adopting a policy to incorporate cycling improvements into capital projects for roads that are designated as components of the planned municipal cycling network.

22. See Section 5.3 for more details on Transportation Demand Management and Smart Commute.

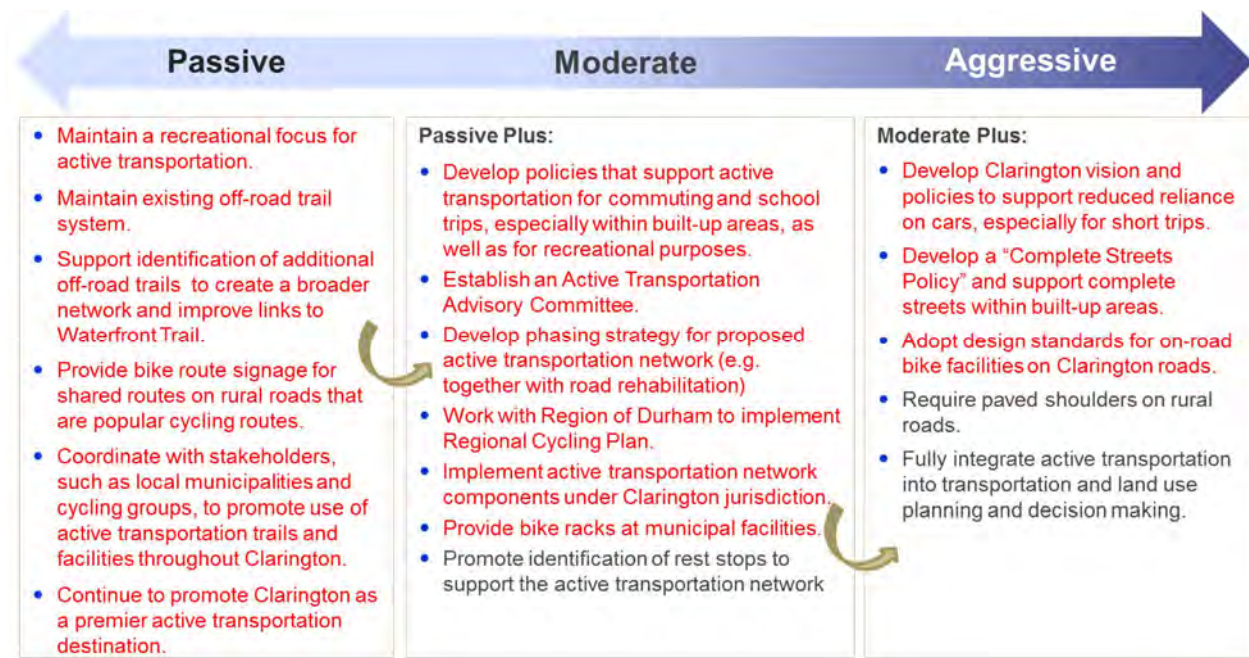
- Develop design and maintenance standards, including the identification of facilities that require all-year-round maintenance (e.g., plowing). **Figure 5.4** identified “Key Trails” where the Municipality will implement year-round maintenance. These trails are located within the urban areas of Bowmanville and Courtice and serve to connect key commuter origins and destinations. Additional “Key Trails” can be identified as part of a future more complete active transportation infrastructure classification system can help to prioritize maintenance efforts and design guidelines. Many municipalities have introduced winter maintenance on portions of their bicycle networks. For example, Toronto plows the Martin Goodman Trail along the waterfront and both Toronto and Ottawa plow their separated bicycle lanes. Montreal has designated a “Réseau Blanc” (White Network), which is a network of bicycle facilities that are maintained year-round.
- Develop a Complete Streets Policy, as part of a separate study, so that a complete streets policy approach can be implemented in Clarington, particularly within new development areas and along key existing corridors identified for cycling and pedestrian infrastructure.
- Implement an Active Transportation Advisory Committee who would assist with the development of an Active Transportation master Plan.

Updated Sidewalk Policies

- Review existing sidewalk policies with a view to ensuring that the municipal sidewalk network is more complete and that sidewalks are available on both sides of most streets, sufficiently wide (in order to meet AODA requirements), and safe and pleasant places to be.
- The existing Clarington Official Plan requires sidewalks on both sides of the street for arterial and collector roads. For local roads, the Official Plan notes that sidewalks are encouraged on both sides of local roads, where warranted. An updated Official Plan policy should elaborate on the specific conditions where sidewalks would be required on both sides of local roads (e.g., if the street is on route to a school, community park, civic facility, or a transit stop). Different policies should also be developed for more rural cross-sections, for urban areas, and around mobility hubs. There should also be an option for collector and arterial roads to have a sidewalk on one side of the road, and a multi-use path on the other side, rather than sidewalks on both sides.

Figure 5.5 outlines the range of possible policy alternatives, from passive to aggressive, that are available to support and encourage active transportation in Clarington and were considered in this study. The policies that are recommended by this study are highlighted in red.

Figure 5.5: Active Transportation Policy Alternatives and Recommendations



Members of the public that attended the PICs were generally supportive of a Moderate-to-Aggressive approach to Active Transportation (only 22% of attendees favoured a passive approach based on the dotmocracy results of PIC 1). Members of the public also noted that they supported increased bike route signage on shared roads, promotion of use of active transportation, developing an active transportation network plan, considering cycling facilities when local roads are rehabilitated, identifying roads for bike lanes, and proactively considering active transportation in land use planning and decision making. Accessibility to the Waterfront Trail was also noted as an issue, along with safe bike route options between Courtice and Bowmanville. Finally, enhanced bicycle and pedestrian connections were supported to connect Courtice and Bowmanville to the new proposed GO stations. **Table 5.2** specifically identifies comments received from the public, and identifies how each comment was addressed in the CTMP.

Table 5.2: Incorporating Public Feedback on Active Transportation

Public Comment / Feedback	How was the public feedback considered as part of the CTMP?
<ul style="list-style-type: none"> - Provide more off-road cycling paths - Provide dedicated and separated cycling lanes 	A number of proposed off-road trails have been recommended within Courtice and Bowmanville. Please refer to Section 6.1 for a complete list of the recommended improvements for on-road and off-road facilities.
<ul style="list-style-type: none"> - Provide more “Share the Road” signs 	Examining the feasibility of implementing “Share the Road” signage on selected routes has been recommended as part of this CTMP.
<ul style="list-style-type: none"> - Provide a cycling route along Nash Road from Courtice to Bowmanville 	Cycling facilities are being proposed along Nash Road, from Townline Road to Harry Gay Drive. Please refer to Section 6.1 for a complete list of the recommended improvements for on-road and off-road facilities.
<ul style="list-style-type: none"> - Provide pavement markings to delineate cycling routes - Improve cyclist safety 	The provision of a safe environment for motorists and active transportation users is of paramount importance to Clarington. For shared usage facilities in particular, recommendations to provide clearly differentiated on-road facilities to draw awareness to the presence of cyclists has been recommended as part of the CTMP.
<ul style="list-style-type: none"> - Encourage use of local trails and provide routes through green space 	It should be noted that one of the policy recommendations put forth in this CTMP include the marketing and promotion of Clarington’s active transportation information to encourage use of the municipality’s facilities. Please refer to Section 6.1 for a complete list of the recommended improvements for on-road and off-road facilities.
<ul style="list-style-type: none"> - Modifications or policy approaches that encourage active transportation 	This CTMP has taken an active approach to the recommendations for improved infrastructure and policies related to active transportation.
<ul style="list-style-type: none"> - Pave shoulder along Regional Highway 2 / King Street, between Bowmanville Creek bridge and Durham Road 57, to provide a safe and defined route for active transportation users 	The CTMP recommends that Regional Highway 2, between Bowmanville and Courtice be included as part of the Region’s Primary Cycling Network as a multi-use path or cycle lane.

5.2 Transit Services



A modal shift to transit is an important element of the Clarington TMP. This shift, together with the associated reduction in auto dependence, will require improved transit service. The 2011 TTS reveals an existing AM peak period transit mode split of 4.4% for trips originating from the Municipality of Clarington. **Table 5.3** summarizes the breakdown of transit mode splits by area within the Municipality from the 2011 TTS.

Table 5.3: 2011 AM Peak Period Transit Mode Split (Clarington Origins)

Community	Local Transit Mode Split ²³	GO Rail Mode Split ²⁴	Total Transit Mode Split
Clarington (Total)	1.4%	3.0%	4.4%
<i>Courtice</i>	1.6%	3.4%	5.1%
<i>Bowmanville</i>	1.0%	3.5%	4.5%
<i>Newcastle</i>	1.3%	2.0%	3.3%
<i>Rest of Clarington</i>	1.7%	2.1%	3.8%

As expected, the vast majority of existing AM peak period transit usage in Clarington uses GO Rail (almost 70% of all transit trips in the AM peak). Furthermore, transit mode splits are observed to be higher in the more urban communities of Courtice and Bowmanville, which are nearer to the existing GO station in Oshawa.

The Durham Region Transportation Demand Model, which was developed as part of the recent DC Update Study, predicts an 8.8% transit mode split (GO and local transit combined) for trips originating from Clarington in the 2028 AM peak period. The Durham model, as developed for the DC study, assumes that the following key transit investments in Clarington are in-place by 2028:

- GO Rail Bowmanville Extension with stations in Courtice and Bowmanville (CP Belleville Subdivision alignment);
- GO Bus Service on Highway 407 and East-Durham Link;
- DRT Regional Highway 2 BRT (Scarborough to Oshawa Centre / Simcoe Street); and
- DRT Regional Highway 2 Conventional Service (Oshawa Centre to Courtice Road)

23. Includes DRT and GO Bus.

24. Includes all GO access modes (Park and Ride, Kiss and Ride, transit, walk, cycle)

Table 5.4, below, summarizes the breakdown of the model's forecasted transit mode splits for the 2028 AM peak period by area within the Municipality. The overall mode split of 8.8% at the municipal level translates to mode splits of over 10% for the 2028 AM peak period in Courtice and Bowmanville. In addition to increases in GO Rail mode splits (approximately double their current levels), Courtice and Bowmanville are also forecasted to realize significant gains in local transit usage with mode splits that are three times higher than what is observed today.

Table 5.4: 2028 AM Peak Period Transit Mode Split – Durham Model Forecast (Clarington Origins)

Community	Local Transit Mode Split ²⁵	GO Rail Mode Split	Total Transit Mode Split
Clarington (Total)	3.2%	5.6%	8.8%
<i>Courtice</i>	<i>4.8%</i>	<i>5.4%</i>	<i>10.2%</i>
<i>Bowmanville</i>	<i>3.6%</i>	<i>6.5%</i>	<i>10.2%</i>
<i>Newcastle</i>	<i>1.8%</i>	<i>5.5%</i>	<i>7.3%</i>
<i>Rest of Clarington</i>	<i>1.1%</i>	<i>3.6%</i>	<i>4.7%</i>

The 8.8% municipal transit mode split forecasted by the Durham model is optimistic, especially if transit improvements are limited to the GO extension to Courtice and Bowmanville combined with minimal improvements to local service focused around each station. As such, it is recommended that the 8.8% mode split be considered as an aspirational target that would require a substantial additional investment in a robust local transit network with a high level of coverage and improved service frequencies that not only feeds the two new GO stations, but also connects local destinations between and within the communities of Courtice, Bowmanville, Newcastle, and Orono. With the GO Rail Bowmanville Extension in place, together with the modest local transit improvements assumed in the Durham Model, it is expected that a 5% overall municipal transit mode split target would be more realistically achievable and should thus be used as a baseline for the assessment of the infrastructure required to support growth in the Municipality to 2031.²⁶ This represents a modest increase in the overall transit mode split by approximately 0.6% over the base mode split reported in the 2011 TTS.

25. Includes DRT conventional transit, premium transit / BRT, and GO Bus.

26. The road network assessment includes a sensitivity test that evaluates the road network improvements required both under the aspirational 8.8% municipal mode split and the 5% baseline target.

More significant increases in mode splits are not anticipated due to the following factors:

- GO Rail is already highly competitive via park-and-ride for Clarington residents that are destined to areas that are in close proximity to downstream GO stations (i.e., primarily downtown Toronto in the vicinity of Union Station). The extension of the GO line to Bowmanville and Courtice will largely target the same users; however, with a closer station to many existing users, this may shift some park-and-ride users to local transit and / or walk / cycle access trips.
- A modest number of new GO users will walk, cycle, or take local transit to the new stations from the growth / intensification areas located in the vicinity of each station. This will only occur if the downstream station is located in close proximity to the trip maker's destination. In addition to Union Station in Toronto, the areas surrounding the new Oshawa station and the existing Pickering station are the only real significant attractors along the Lakeshore East line.
- The vast majority of existing trip-making by Clarington residents in the peak periods is within Clarington itself, to / from Oshawa, Whitby, and the rest of Durham. The GO rail extension is not designed to serve the majority of these destinations. Investments in high-quality regional transit infrastructure connecting the communities within Clarington to each other and to Oshawa and other communities to the west) will be required to serve these diverse trip making patterns and realize more significant gains in transit usage.
- Doubling of local Clarington mode shares will require investment in new / more frequent local service beyond the improvements included in the current Durham model.

In light of the discussion regarding municipal mode splits above, the Municipality of Clarington's recommended future transit network consists of the following key service improvements. The Municipality will work with Durham Region and Metrolinx to review and support the implementation of these recommended services as part of DRT and GO Transit to achieve a target overall transit mode share of 9% by 2031 (in-line with the forecasts of the Durham Region model). Note that all of the recommendations, except for the GO Rail Bowmanville Extension, are subject to the approval of the DRT Commission and Regional budget considerations.

- **GO Rail Bowmanville Extension:** The Municipality is in full support of GO Rail expansion to Clarington and encourages the extension of service to the urban areas of Courtice and Bowmanville as soon as possible. These growing areas will require

enhanced transit options and the extension was consistently supported by the general public as part of the development of this TMP²⁷.

- The Intensification Discussion Paper developed as part of the Municipality of Clarington's on-going Official Plan Review identifies new GO stations as critical catalysts to future long-term intensification growth, particularly for the Bowmanville West Town Centre. The Municipality will need to more than double its intensification rate to meet Regional targets and the level of intensification that is achievable will be heavily influenced by plans for the nearby GO Station.
- **Higher-Order Transit on Regional Highway 2 to Courtice:** The Municipality should support the extension of DRT higher-order transit (LRT or BRT) along Regional Highway 2 through Townline Road and into Courtice, consistent with the Durham Region LTTS. The Metrolinx "Big Move" currently identifies the Regional Highway 2 corridor as a BRT corridor running from Scarborough to Oshawa Centre. The further extension of higher-order transit will improve connections between Clarington and Oshawa and the rest of the southern municipalities of Durham. This extension will be an important driver of increased transit usage between Courtice and Oshawa and points to the west. The terminal location will require the construction of a bus loop or terminal.
- **407 Transitway:** It is recommended that the implementation of transit along the 407 be implemented, and that the system transition to a BRT service level be as a longer-term function, after the higher-order transit service is operating along the Regional Highway 2 corridor.
- **Enhanced Service on Regional Highway 2 (Courtice to Newcastle):** It is recommended that frequent conventional DRT service be provided along Regional Highway 2 between Courtice and Bowmanville and between Bowmanville and Newcastle, consistent with the Durham Region LTTS.
- **Restructured Service to Orono:** It is recommended that the existing DRT route serving Orono, currently identified by DRT for review, be considered for restructuring to provide a more direct connection to Newcastle, subject to the implementation of more frequent service along Regional Highway 2 between Courtice, Bowmanville, and Newcastle. The existing one-way "loop" service connects Orono to Newcastle

27. One comment of note raised during the course of this study is the potential impact of having diesel powered trains running from Oshawa to Bowmanville, while the remaining Lakeshore East rail line is operating with an upgraded electrified rail system. The Municipality promotes an electrified system as part of the new extension, recognizing that there are potential financial restrictions that may limit this opportunity to occur on opening date.

and Bowmanville via a circuitous combination of Liberty Street, Taunton Road, Highway 115, and Regional Road 17²⁸.

- **Expanded Service in Courtice and Bowmanville:** It is recommended that conventional DRT local transit service within Courtice and Bowmanville be expanded to provide connections between existing settlement areas and key destinations within each community. This is in addition to feeder service to the planned new GO stations in Courtice and Bowmanville. Bowmanville is the largest population centre and enhanced restricted service is required in order to make transit a viable transportation alternative. Enhanced restricted service refers to a service that is more frequent and direct than the current service, but it is restricted because it is only provided during peak times of the day.
- **Expanded Service to Areas with Existing Service Gaps:** The Municipality should encourage the extension of conventional or community DRT service to communities not currently served by transit, such as South Newcastle between Regional Highway 2 and Lake Ontario.²⁹
- **Expanded Service in Growth Areas:** Another point of importance is to focus on increasing the transit modal share and ridership in new development areas. As such, it is recommended that new and / or improved DRT transit service be implemented as early as possible to serve newly developing areas, so that new travel patterns can be formed in the presence of high quality transit. This is especially true in the priority areas for intensification that were identified in the Growth Management Discussion Paper of the Official Plan Review: Courtice Main Street, Courtice Town Centre, Bowmanville West Centre, Courtice Road Corridor, and Bloor Street Corridor. The DRT Five-Year Transit Service Plan includes the introduction of a new route in North Bowmanville.

The transit network improvements listed above are consistent with the recommendations of the Region of Durham LTTS and the Metrolinx “Big Move.” Based on existing travel trends, the forecasts of the Durham model, and the project team’s experience, it is expected that without the majority of these improvements in place, the Municipality of Clarington will be able to achieve between 5-6% transit mode split in the

28. As of September 2015, the Route 503 Wilmot Creek and Route 504 Orono / Newcastle services were combined as Route 506 Wilmot Creek/Newcastle/Orono. This route operates weekdays with 2 trips per direction per day on weekdays. In one direction, the route begins at the Peters & Taunton stop in Orono, and then travels to Newcastle (2 stops) and Wilmot Creek (1 stop) to Bowmanville (3 stops); the opposing direction travels from Bowmanville (2 stops; King/Liberty stop not included in this direction) through Wilmot Creek (1 stop) and Newcastle (3 stops) to Orono (1 stop). Route details are available on the following Durham Region website link (accessed March 8, 2016): http://www.durhamregiontransit.com/Maps/Documents/Sept.%208%202015/Route%20506_Sept8.pdf

29. Ibid.

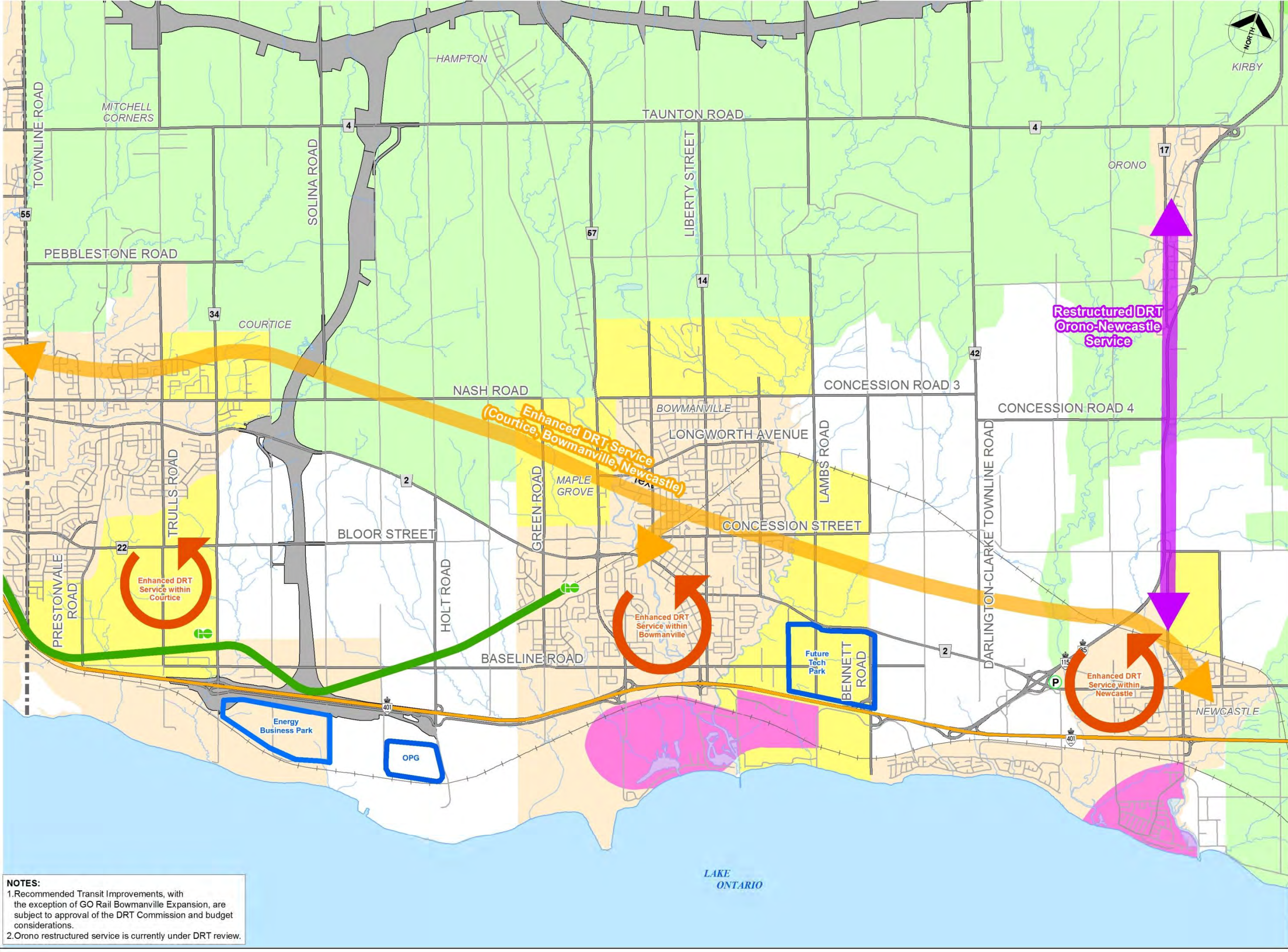
AM peak period. The level of increase over a 5% baseline level would depend on the level of investment in local transit in Courtice, Bowmanville, and Newcastle.

The Municipality needs to assume a strong support role in facilitating transit use through the following measures:

- Promote higher density and mixed-use development in growth centres / intensification areas and along transit corridors.
- Develop a municipal mobility hub plan for both of the proposed new GO stations (consistent with the recommendations of the Growth Management Discussion Paper prepared in support of the Official Plan Review).
- Focus new office / commercial development in locations served by rapid transit or high frequency bus service.
- Secure accommodation for bus loops or terminal facilities during development or intensification of land parcels where such transit facilities align and are required with planned DRT transit services.
- Ensure that new developments provide required physical infrastructure to support transit, such as bus pads, bus shelters, and sidewalks, as early as possible during development. Development should be phased to support introduction of transit service during early development phases.
- Work with DRT and GO Transit to encourage provision of convenient and safe access to public transit by placing transit stops within walking distance of key community destinations (i.e., recreation facilities, community centres, parks, medical offices, grocery stores, etc.). Support provision of bike parking shelters and bike racks at bus stations and bus stops. Maintain access to transit stops.
- Provide mid-block collectors in new growth areas for local bus routes.
- Expand the pedestrian and cycling network to ensure improved transit access.
- Focus TDM programs on the need for a modal shift to transit.

Figure 5.6 illustrates the transit improvements that have been recommended in this Plan. Note that all of the recommendations, with the exception of GO Transit services (both rail and bus), are subject to the approval of the DRT Commission and Regional budget considerations.

Figure 5.7 outlines the range of possible policy alternatives, from passive to aggressive, that are available to support and encourage transit in Clarington and were considered in this study. The policies that are recommended by this study are highlighted in red.



DRT Enhancements

- DRT Service
- Restructured DRT Service
- Expand Service to Growth Areas
- Existing Service Gaps

GO Transit

Lakeshore East Rail Extension

- Future GO Station
- Future GO Rail Service

Other Features

- Carpool Lot
- Freeway
- Arterial Road
- Collector Road
- Local Road
- Railway
- Highway 407 Corridor
- Municipal Boundary
- Urban
- Oak Ridges Moraine
- Greenbelt
- Waterbody
- Watercourse

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Clarington

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PROPOSED TRANSIT ROUTES AND FACILITIES

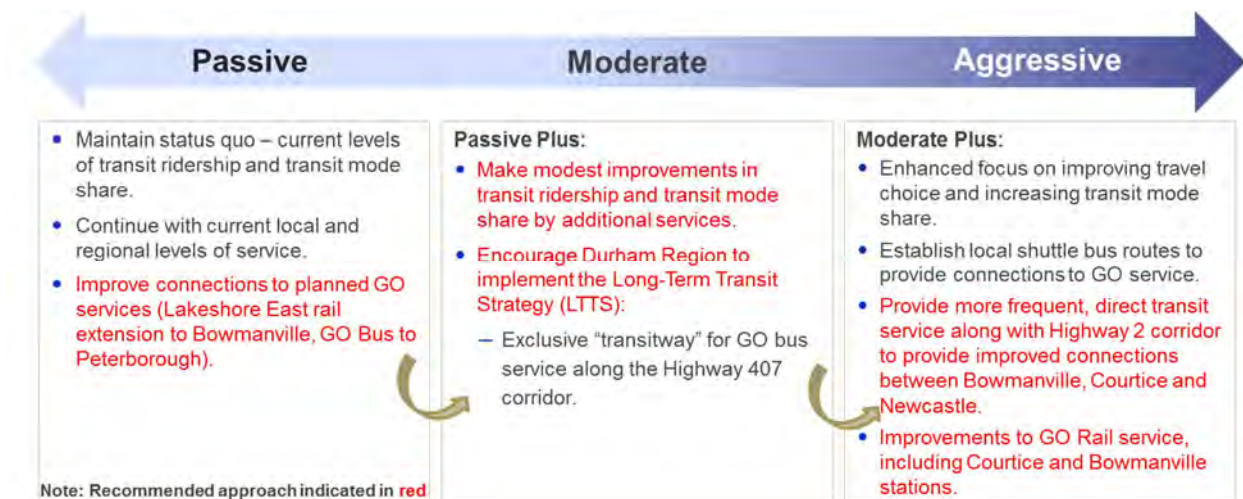
PREPARED BY:	CHECKED BY:	PROJECT No.:
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DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	5-6
SCALE:	DATE:	
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NOTES:

1. Recommended Transit Improvements, with the exception of GO Rail Bowmanville Expansion, are subject to approval of the DRT Commission and budget considerations.

2. Orono restructured service is currently under DRT review.

Figure 5.7: Transit Policy Alternatives and Recommendations



Members of the public that attended the PICs were generally supportive of a Moderate-to-Aggressive approach to Public Transit (less than 30% favoured a Passive approach). Furthermore, there was strong support for the planned Lakeshore East rail extension to Bowmanville, providing enhanced local transit connections to the GO service, and providing more frequent direct transit service along Regional Highway 2 to connect Bowmanville, Courtice, and Newcastle.

Table 5.5 identifies the comments received from the public concerning questions asked related to transit, and identifies how each comment was addressed in the CTMP.

Table 5.5: Incorporating Public Feedback on Transit Service

Public Comment / Feedback	How was the public feedback considered as part of the CTMP?
<ul style="list-style-type: none"> - Include service in both directions (for loop routes) - Integrate transit in Clarington with service to the GTA - Improve service between urban centres - Improve service to Durham College/UOIT - Improve accessibility and frequency of service - Expedite GO train service to Bowmanville - Make transit a desired service to encourage use 	<p>While not a direct provider of transit service in the community, Clarington is committed to taking an active role in supporting DRT and GO initiatives, as well as encouraging transit use throughout the community.</p>

5.3 Transportation Demand Management (TDM)

5.3.1 Background

Transportation Demand Management (TDM) is a series of specialized policies and programs that work to improve the efficiency of the transportation system by influencing travel behaviour. The core goal of TDM is to reduce the number of motor vehicles (particularly single-occupancy autos) on the road during peak periods of congestion by encouraging people to shift travel modes, use rideshares/carpools, shift times of travel, and shift trip making patterns. The focus of TDM is on optimizing the movement of people rather than the movement of motor vehicles and making more effective use of existing infrastructure.

Benefits of TDM include:

- **Reduced congestion** – A reduction in auto trips reduces congestion on the road network. Even a small reduction in travel demand can be the difference between a street operating acceptably and a street being congested with long queues of vehicles.
- **Reduced air and noise emissions** – With fewer vehicles on the road, a reduction in air and noise emissions can improve public health and quality of life.
- **Improved public health** – TDM initiatives include promoting the use of active and accessible transportation, which can improve health by increasing the amount of physical activity that is performed by people of all ages and abilities.
- **Cost effectiveness** – Implementation of TDM initiatives results in more efficient use of existing infrastructure, allowing existing facilities to better accommodate transportation needs, and potentially deferring the need for costly infrastructure improvements.
- **Improved safety** – TDM results in fewer vehicles on the road, which reduces the probability of auto collisions.

TDM strategies can be grouped into two types:

1. Strategies that reduce peak-period demand across all modes (e.g., changing the time period of travel via flexible work hours or eliminating the need to travel via telecommuting); and

2. Strategies that shift travel demand to modes other than single-occupant vehicles (e.g. active transportation, transit, and carpooling).

Figure 5.8 presents a summary of the primary goals that TDM strategies aim to achieve:

Figure 5.8: TDM Primary Goals



Specific examples of TDM programs include:

Transit Incentives

- Discounted / subsidized transit passes
- Increased level of transit service

Promotion of Active Transportation

- Designated pedestrian corridors
- Expanded cycling network with dedicated corridors or lanes
- Secure bicycle storage facilities at key activity destinations

Managing Auto Vehicle Trips

- Limiting parking availability and implementation of pricing premiums
- Promotion of carpooling (e.g., HOV lanes / routes)
- Promotion of park-and-ride
- Management of parking supply

Managing Trip Making

- Promoting the elimination of non-essential trips (e.g., teleworking, teleconferencing, online shopping)
- Diversion of trips to other times (e.g., working hours). Flexible work arrangements can eliminate the need to travel to the workplace on certain days or even on most days of the week.
- Diversion of trips to other less congested routes (e.g. journey planners and traveller information)
- Trip chaining (do several things on one trip)

Lastly, it should be recognized that the success and participation of TDM initiatives is ultimately in the hands of the individuals and the organizations that have control over their travel decisions (e.g., businesses, institutions, schools). For example, businesses need to be aware of the TDM program options that are available and promote acceptable TDM options to their employees, while employees need to choose to take advantage of the TDM options that are attractive to them. As such, all successful TDM strategies must include an outreach and marketing program that actively engages local businesses, community associations, and schools. The program is required to communicate the importance of TDM, present the available options, and even incentivize their participation.

5.3.2 Smart Commute Durham

Smart Commute Durham, which was established in 2007 and funded by Metrolinx and the Region of Durham, is an existing champion of TDM in Durham Region and within the Municipality of Clarington. Smart Commute is a non-profit transportation management association (TMA) that works to help commuters change their travel

behaviour by providing a number of services, including: workplace-based support, such as site assessment, promotion of travel options, carpool-matching, employee vanpool programs and emergency rides home; promotion of the benefits of transit-supportive development and smart-growth strategies; and tips for travelling via walking, cycling and transit. Smart Commute works directly with member employers to encourage employees to use active transportation or engage in carpooling / ridesharing. There are currently more than 20 member companies across Durham Region, including the Municipality of Clarington.

Membership in Smart Commute Durham is open to all Durham-area business, and employers within Durham that have more than 50 employees can join the program for no charge. The free program includes an employee travel survey, a site assessment, and a customized outreach plan. Each member is asked to identify a workplace champion that will be the contact person for Smart Commute Durham and will liaise with the organization to develop a program that best suits the commuting needs of employees at the organization.

5.3.3 TDM Policy Alternatives and Recommendations

Alongside the provision of convenient and reliable transit services and extensive walking and cycling links, initiatives are needed to encourage Clarington's residents and workers to travel sustainably. As noted above, the Municipality of Clarington is currently a member of Smart Commute Durham. It is recommended that the Municipality continue to build on its relationship with Smart Commute by becoming actively engaged in TDM throughout the Municipality. Moving forward, as transit, walking and cycling facilities are improved, additional TDM initiatives will serve to highlight these improvements, promote new travel options, and encourage their use by the travelling public. Working with Smart Commute, the Region of Durham, and local employers and stakeholders, the Municipality should use TDM activities to engage the public and promote Clarington's sustainable transportation options.

It is envisioned that transportation demand measures in Clarington should focus on the following four key objectives:

- Overall trip reduction (through initiatives to support and promote employer flexible working programs such as telecommuting and compressed work weeks) – there is a significant opportunity to encourage employers to avail themselves of Smart Commute Durham's existing free programs;

- Mode of travel shifts (from auto to transit, cycling and walking) – there are particular opportunities related to planned new transit investments in the Municipality by DRT and GO Transit and the new Regional Cycling Network;
- Time of travel shifts for necessary auto trips (shifting trips out of the peak periods); and
- Increases in vehicle occupancy for necessary auto trips (through carpooling initiatives).

Metrolinx has been partnering with municipalities and other organizations over the last several years to encourage more walking to school. From 2009 to 2011, Metrolinx led the “Stepping It Up” project, a pilot project at 30 elementary schools in the GTHA based on the Canadian School Travel Planning model. The project led to an increase in walking to school, a decrease in driving near schools, and safer travel conditions near schools. Since this project, Metrolinx has continued to study and encourage the use of active transportation as a means for school travel, including collaborating on a study analyzing School Travel Planning initiatives (“The Costs and Benefits of School Travel Planning Projects in Ontario, Canada”) and providing input on background reports into active and sustainable school transportation (“Active and Sustainable School Transportation: Policy Scan and Barriers and Enablers Reports”).

It is important that TDM strategies are complementary to the transportation infrastructure that is in place in the Municipality; if commuters are to be encouraged to look at alternate transportation modes, there must be feasible and attractive alternatives. As such, planned investments in transit and active transportation infrastructure in the urbanized parts of Clarington will serve to support and enhance the impact of TDM strategies. It is within this TDM-supportive context that the Clarington TMP sets out a proposed TDM Strategy comprised of the following initiatives:

- **Assume an appropriate leadership role** – Working closely with Metrolinx, the Region of Durham, and Smart Commute, the Municipality should:
 - Support Smart Commute Durham.
 - Promote TDM by educating Clarington residents and businesses of its benefits.
 - Effectively monitor implementation and the benefits of TDM measures throughout Clarington.

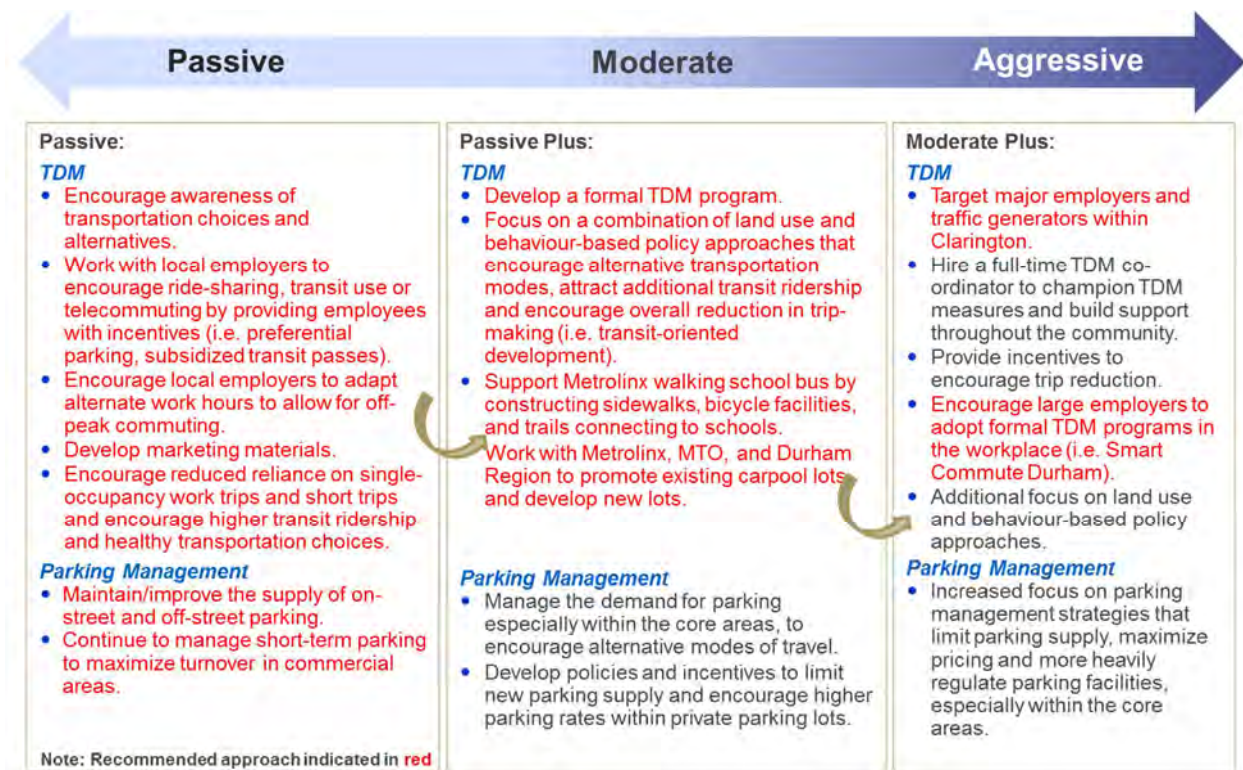
- **Co-host special events with Smart Commute Durham** – The Municipality could co-host special events with Smart Commute that promote walking, cycling, and transit at the municipal or neighbourhood level. These activities could be organized as part of “shop local” campaigns supporting the Municipality’s historic downtowns of Bowmanville, Newcastle, and Orono or as part of other existing events (e.g., community Canada Day Celebrations, Bowmanville Apple Festival, Summer Fest). Furthermore, sustainable transportation practices could be integrated into event / festival planning and implementation (e.g., user information, bike parking, preferential carpool parking spaces, transit cross-promotion), which would benefit transportation system performance during the events, since parking and road space is typically constrained during such events, and serve to promote available TDM options to event patrons.
- **Take a lead role in supporting the Municipality’s large employers in implementing trip reduction plans** – A simple first step would be to encourage employers with over 50 employees to take advantage of Smart Commute Durham’s free programming. The Municipality could also consider providing awards / recognition for stand-out corporate, community, or individual contributions to TDM.
 - OPG, which is already a member of Smart Commute, should be a focus of TDM efforts. The new Darlington Energy Complex and the upcoming Darlington Refurbishment Project are specific opportunities for engaging with OPG to encourage the implementation of TDM plans that reduce the impact of OPG operations on AM and PM peak period congestion in Clarington. Anticipated employment related to the Clarington refurbishment will, on average, nearly double during the construction period from the current base of just over 2,600 personnel. TDM, including conscious shift scheduling to avoid peak periods and vanpools, should be explicitly included in the Traffic Management Plan developed for the refurbishment project.
- **Encourage the Region and Smart Commute Durham to develop and implement school-based TDM programs at both the elementary and high school levels** – The Municipality can support these efforts by ensuring that new developments provide continuous sidewalk and trail connections between residential areas and schools.
- **Lead by example through establishing a visionary TDM program for Municipality of Clarington employees** – Smart Commute Durham can help facilitate the development of a TDM program that both respects the business requirements and constraints of the Municipality and meets the needs of its employees. In particular, TDM investments such as designated carpool parking

spaces and bike racks would be highly visible at the Municipal offices located in the centre of historic downtown Bowmanville and would serve to demonstrate the Municipality's commitment to sustainable transportation. Furthermore, any reductions in peak auto travel demand achieved by the Municipality would serve to directly alleviate congestion in the constrained downtown Bowmanville area.

- **Develop a parking strategy for Bowmanville** – The Intensification Discussion Paper, developed as part of the Official Plan Review, recommended that the Municipality develop a detailed parking strategy for the Bowmanville Historic Downtown, which should consider the possibility of constructing an elevated municipal parking structure that would help to free up land for intensification and infilling (e.g. residential land uses to support local businesses). The parking strategy should differentiate between long-term, all-day parking, which is primarily used by employees, and short-term parking with high turnover, which supports shopping. The study could explore how long-term parking can be managed or priced differently from short-term parking that supports commercial businesses, to balance commute trip reduction benefits with the recognition of the need to support downtown business viability.
- **Promote existing carpool lots and support the development of new lots** – Several provincially owned carpool lots exist in Clarington. The Municipality should work with Metrolinx and MTO to promote the use of these lots. The Municipality should also support the continued development of carpool lots at the future Bowmanville and Courtice GO stations and near interchanges along Highways 401 and 407. In addition, the Small Urban and Rural Carpool Lots program has established designated carpool spaces at municipal facilities in Clarington. The program could be expanded if warranted (monitoring of the designated spaces would be required to determine level of use).
- **Require TDM Plans for major developments** – The Region of Durham has implemented a policy requiring the development of TDM plans for major developments. Therefore, the Municipality should implement this requirement as part of its development approvals process. TDM plans for developments should be site-specific for each development and consider a variety of measures to reduce single-occupant vehicle demand for that development, such as preferential carpool parking, parking pricing, transit subsidies, and informational programs.

Figure 5.9 outlines the range of possible policy alternatives, from passive to aggressive, that are available to support and encourage TDM in Clarington and were considered in this study. The policies that are recommended by this study are highlighted in red.

Figure 5.9: TDM Policy Alternatives and Recommendations



Members of the public that attended the PICs were generally supportive of a Passive-to-Moderate approach to Transportation Demand Management (only 20% of attendees favoured an aggressive approach). PIC attendees were also overwhelmingly opposed to more aggressive parking management measures that manage or limit parking supply and increase parking rates in core areas (only two attendees favoured a moderate or aggressive approach). In terms of specific TDM measures, members of the public supported working with employers to encourage sustainable transportation options, including ride-sharing, transit use, and telecommuting with incentives such as preferential parking and subsidized transit passes.

Table 5.6 identifies the comments received from the public concerning TDM initiatives, and identifies how each comment was addressed in the CTMP.

Table 5.6: Incorporating Public Feedback on TDM

Public Comment / Feedback	How was the public feedback considered as part of the CTMP?
<ul style="list-style-type: none"> - Consider long-distance commuters - Establish car pool parking lots at access points to Highway 401 	<p>The traffic analyses carried out as part of this study considered long distance travel to and from Clarington. As such, the traffic modelling included travel behaviours beyond the limits of the municipality. Recommendations to consider future investment in additional carpool parking have been identified as part of this CTMP.</p>

5.4 Long Term Road Network



This section presents the assessment and evaluation of the long term road network capacity improvement needs for Clarington, which were identified in **Section 4.3 – Problem and Opportunity Statement**. Based on the forecast capacity deficiencies identified on roads within Clarington by 2031, each of the road network alternatives presented in this report were assessed against a series of evaluation criteria to compare their respective advantages and disadvantages using both quantitative and qualitative measures. The evaluation criteria and indicators listed in **Table 5.7** were selected to systematically evaluate the effectiveness of each alternative and identify preferred alternatives in accordance with the Municipal Class EA process.

Table 5.7: Evaluation Criteria

Evaluation Criteria	Indicators
Technical	Meets travel demands Access from Highway 401 Reduction in congestion / travel delay Aligned with Clarington's Strategic Goals
Social/Cultural Environment	Potential impacts / benefits to neighbourhoods Potential impacts to heritage areas Potential impacts to agricultural areas Potential impact / benefit to downtown areas
Natural Environment	Potential effects on environmentally sensitive areas Potential impacts on air quality
Economic	Cost Community Accessibility Support Future Growth Areas and Facilitate Related Investment Accommodates goods movement Support Movement Between Communities

5.4.1 Future Alternatives

As previously discussed in **Section 4.2**, Longworth Avenue and Concession Road 3 east of Regional Road 57 are forecast to be over-capacity during the PM Peak Hour by 2031. Additionally, Liberty Street to the north of the Highway 401 is forecast to operate over capacity, while Waverly Road and Courtice Road are approaching capacity at Highway 401. This study considered the following key network improvement alternatives to address these long term needs:

- Longworth Avenue Extension:** The Longworth Avenue extension as an improved arterial standard from Regional Road 57 west to Holt Road, from Mearns Avenue to Lambs Road, and ultimately to Bennett Road, was identified as a long range improvement in the Official Plan. As part of this study, the extension was evaluated as both a 2- and 4-lane arterial from Scugog Street to Holt Road, as well as a 2-lane arterial extension from Mearns Avenue to Lambs Road.

- **Nash Road / Concession 3 Improvements and New Crossing:** The improvement of Nash Road and Concession Road 3 to an arterial standard in addition to a new bridge crossing over Bowmanville Creek connecting Concession Road 3 and Nash Road were identified as potential future improvements in the official plan. The 2031 base traffic forecast revealed that the new bridge crossing and improving Concession Road 3/Nash Road to an arterial standard from Holt Road to Mearns Avenue may sufficiently address future capacity issues for the area.
- **Highway 401 Interchanges:** The 2031 base forecast identified congestion issues adjacent to the Highway 401 interchanges at Waverley Road and Liberty Street. These capacity issues can be addressed by increasing the usage of the Highway 401 / Holt Road interchange through network improvements, and / or through a new Highway 401 interchange at Lambs Road. In order to realize the full benefit of a Lambs Road interchange, the highway interchanges at Liberty Street and / or Bennett Road would need to be closed, primarily due to interchange spacing. As a result of the shift to a new interchange at Lambs Road, some traffic patterns would change, shifting traffic travelling to / from Highway 401 to other routes outside of the downtown core of Bowmanville.
- **Baseline Road and Holt Road Improvements:** Improve Baseline Road and Holt Road to arterial standard, as per the COP, will serve to improve access to the Highway 401 / Holt Road interchange, which has already been targeted for improvement.

In addition to the above alternatives other long-term improvements identified in the Clarington Official Plan were also assessed, including the three additional long term road network improvements, listed below, and twelve proposed road-rail grade separations:

- Townline Road extension / realignment to Courtice Road
- New Highway 401 interchange at proposed Townline Road extension
- Bloor Street/Baseline Road Type A Arterial Connection

Alternatives were first screened based on their feasibility and their technical ability to address the identified long-term transportation deficiencies. Based on this screening exercise, the following network improvement alternatives were not carried forward for future evaluation:

































- **Nash Road / Concession 3 Crossing:** The forecasting results suggested that a new crossing did not serve to address capacity deficiencies along Longworth Avenue and did not perform as well at directing traffic to the improved Holt Road interchange. Due to the anticipated environmental impacts and costs associated with a new bridge structure over Bowmanville Creek, the Longworth Avenue widening was retained as the more feasible option to assess. Additionally, the Longworth Avenue bridge crossing of Bowmanville Creek can support widening to 4 lanes, making it a good candidate for future improvement. However in addition, it is recommended that the Municipality protect for a long-term active transportation link across the Bowmanville Creek.
- **Longworth Avenue Extension East to Lambs Road:** The forecasting results suggest that the extension of Longworth Avenue through to Lambs Road is not required by 2031. No capacity issues were observed on Mearns Avenue or Concession Street without the full eastward extension to Lambs Road in place. It is recommended that the Municipality continue to protect for the ultimate extension of Longworth Avenue beyond 2031 and monitor traffic volumes as areas in eastern Bowmanville develop.
- **Townline Road extension / re-alignment to Courtice Road:** Although identified as a long term improvement in the Official Plan, the forecasting results suggest that this extension will not be required by 2031.
- **New Highway 401 interchange at proposed Townline Road extension:** Although identified as a long term need in the Official Plan, the traffic forecasts do not indicate a need for an additional Highway 401 interchange in Courtice by 2031.
- **Bloor Street-Baseline Road Type A arterial connection:** The model results on Bloor Street and Baseline Road suggest that a new Type A connection between Bloor and Baseline is not required by 2031.

The road-rail grade separation assessment is reviewed in further detail in **Section 5.6**. The remaining improvements, which were found to be feasible and have technical merit, were packaged into three network alternatives and carried forward for further, more-detailed evaluation against the “Do Nothing” scenario. The “Do Nothing” scenario is taken to be existing conditions in addition to the network improvements included in the 2031 Base Road Network (as listed in **Table 4.6**). Although the model analysis and alternative assessment is focused on recommendations to the 2031 horizon, it is recognized that other projects that are currently in the COP may be required beyond

2031 in order to support the overall network in the longer-term (see **Table 6.4** for more details).

Each of the three alternatives (A, B, and C) is discussed in more detail below. The road network improvements assumed in the alternatives are summarized in **Table 5.8**.

Table 5.8: Preferred Road Network Alternatives – Assumed Improvements

Improvements	To/From	Preferred Alternative Networks		
		A	B	C
Longworth Avenue widening (2 to 4 lanes)	Scugog Street to Regional Road 57			
New Longworth Avenue extension (4 lanes)	Regional Road 57 to Maple Grove Road			
	Maple Grove Road to Holt Road			
Improve Holt Road to Arterial Standard	Longworth Avenue extension to Bloor Street			
	Bloor Street to Highway 401			
Holt Road widening (4 lanes)	Longworth Avenue extension to Regional Highway 2			
	Baseline Road to South of Highway 401			
Maple Grove Road widening (4 lanes)	Longworth Avenue extension to Bloor Street			
Bloor Street widening (4 lanes)	Maple Grove Road to Holt Road			
Improve Baseline Road to Arterial Standard	Lambs Road to Holt Road			
Baseline Road widening (4 lanes)	Lambs Road to Waverley Road			
Lambs Road/401 Interchange	At Highway 401			
Lambs Road widening	Regional Highway 2 to South of Highway 401			
Re-align Concession Road 3	At Regional Road 57; convert N Scugog Court to cul-de-sac			
Improve Concession Road 3 to Arterial Standard	Mearns Road to Regional Road 57			



Improvement included in Preferred Alternative Network

Alternative A – “Longworth Avenue Extension to Holt Road”

The improvements outlined in Alternative A are intended to address the one-lane road deficiency identified in **Section 4.2** at Longworth Avenue and Concession Road 3 to the east of Regional Road 57. Additionally, the extension of Longworth Avenue to Holt Road and upgrades to Holt Road are proposed to encourage traffic to / from central Bowmanville and the new growth areas to access Highway 401 via Holt Road rather than the Waverley Road and Liberty Street interchanges. Similarly, the upgrades to Baseline Road are expected to facilitate access to the Holt Road interchange. The intersection improvement at Concession Road 3 and Regional Road 57 will improve the overall flow of traffic in that corridor, and eliminate future traffic queuing issues at the North Scugog Court / Concession Road 3 junction. **Figure 5.10** depicts the improvements included in Alternative A.

Figure 5.10: Alternative A – “Longworth Avenue Extension to Holt Road”



Alternative B – “Longworth Avenue Extension to Maple Grove Road”

The improvements outlined in Alternative B are intended to address the same needs as the Alternative A improvements. In Alternative B, the Longworth Avenue extension terminates at Maple Grove Road instead of Holt Road, thereby avoiding the Provincially Significant Wetland (PSW) located between Maple Grove Road and Holt Road to the north of Regional Highway 2.

The improvements to Maple Grove Road and Bloor Street are intended to facilitate access to the Highway 401 Holt Road interchange via the Longworth Avenue extension. **Figure 5.11** depicts the improvements included in Alternative B.

Figure 5.11: Alternative B – “Longworth Avenue Extension to Maple Grove Road”



Alternative C – “New Lambs Road Interchange”

The improvements outlined in Alternative C are intended to address the congestion at the Highway 401 interchanges at Waverly Road and Liberty Street, while also continuing to address the capacity deficiencies at Longworth Avenue and Concession Road 3 to the east of Regional Road 57.

By removing the Liberty Street and Bennett Road interchanges, it is expected that traffic will shift to the Waverly Road interchange and the new Lambs Road interchange which are both better suited to accommodate the traffic accessing Highway 401. The Lambs Road interchange is also intended to reduce congestion in the downtown Bowmanville core by shifting traffic from the Liberty Street interchange to Lambs Road, and it will accommodate future traffic that will be created by growth east of Soper Creek.

The improvements to Lambs Road and Baseline Road are intended to facilitate additional traffic attracted to the Lambs Road interchange, and to encourage access to Highway 401 at Holt Road (as in Alternatives A and B). The Longworth Avenue extension to Holt Road is also included (as in Alternative A). **Figure 5.12** depicts the improvements included in Alternative C.

Figure 5.12: Alternative C – New Lambs Road Interchange



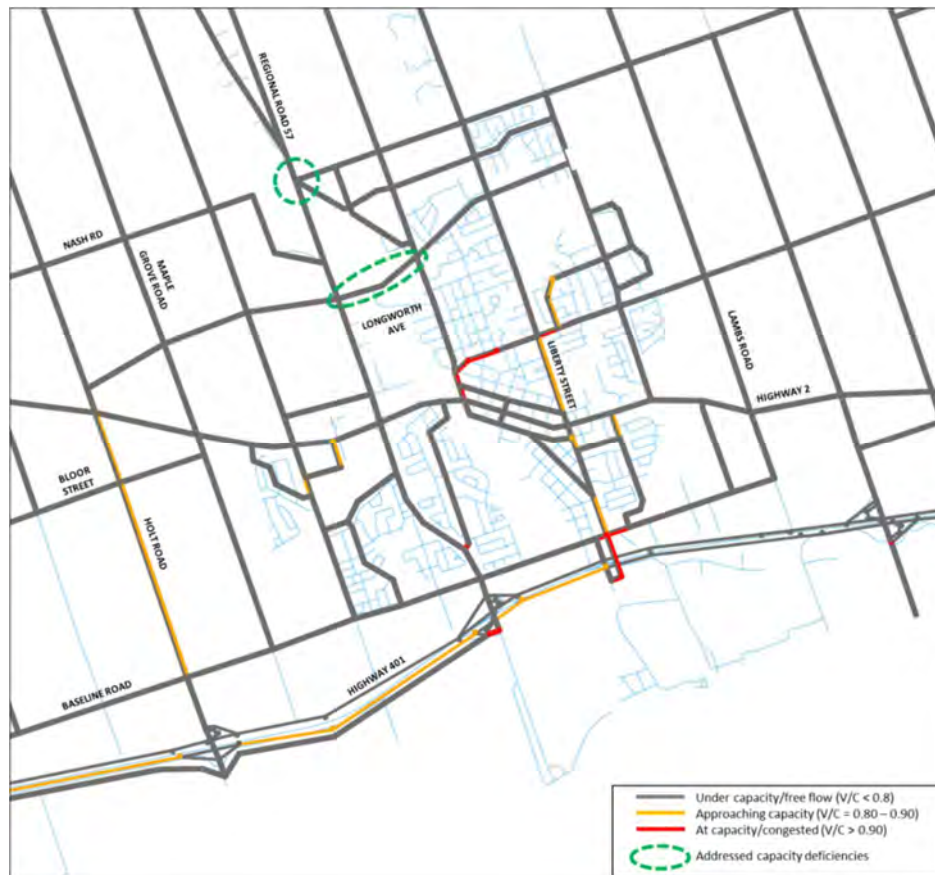
5.4.2 Model Results for Alternatives

Each of the alternatives outlined in **Section 5.4.1** were assessed using the refined Durham Region Travel Demand model to determine how well the improvement addressed the original capacity deficiencies and improved the operation of the transportation network. Maps showing the PM peak hour v/c ratios are used to indicate the level of projected congestion on the local area road network with the improvement in place.

For more details on the alternative model results and complete network plots, please refer to **Appendices C and D**.

Alternative A – Model Results

Figure 5.13: 2031 PM Peak Hour Alternative A Model Results (V/C Ratios)



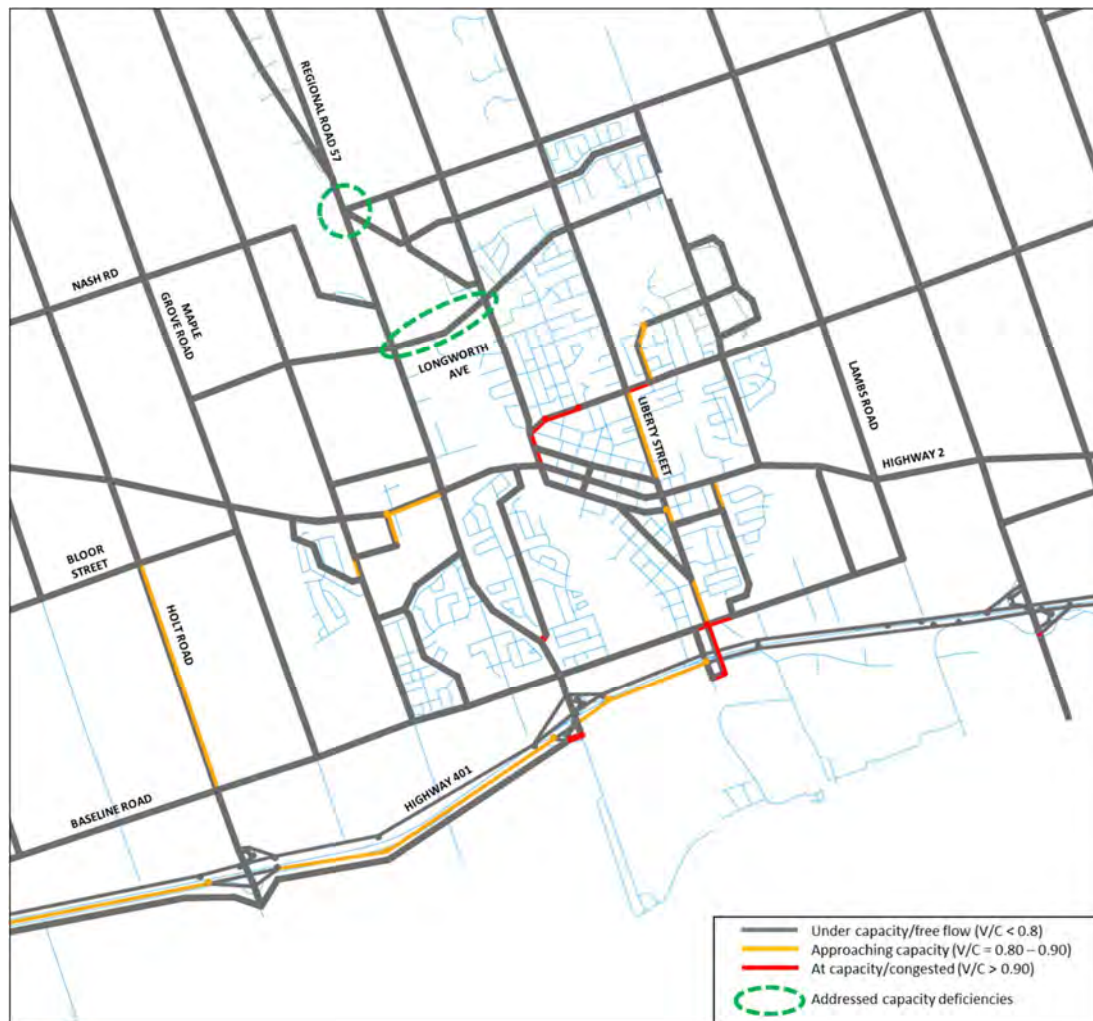
The model results for Alternative A (as shown in **Figure 5.13** above) show that the widening and extension of Longworth Avenue reduces the v/c ratio over Concession Road 3 and Longworth Avenue east of Regional Road 57 from **1.02** (congested) to **0.69** (free-flow traffic). Thus, the improvement would provide sufficient capacity to address the projected congestion east Bowmanville Creek (circled in **Figure 5.13**). Holt Road to the south of Regional Highway 2 is forecast to approach capacity, but is not over the 0.9 v/c threshold and will not require additional widening by 2031. Congestion is also observed with v/c over 0.9 in the vicinity of the Waverley Road interchange with Highway 401 (at South Service Road) and on the approaches to the Liberty Street interchange.

Finally, the road network improvements implemented in Alternative A result in a 6% reduction in traffic (evaluated by Vehicle Kilometers Travelled (VKT)) along Liberty Street through the Bowmanville downtown core due to traffic shifting from the Liberty

Street/Highway 401 interchange to the Holt Road/Highway 401 interchange. However, the reduction in traffic does not address the capacity issues on the approach to the Highway 401 interchange at Liberty Street.

Alternative B – Model Results

Figure 5.14: 2031 PM Peak Hour Alternative B Model Results (V/C Ratios)



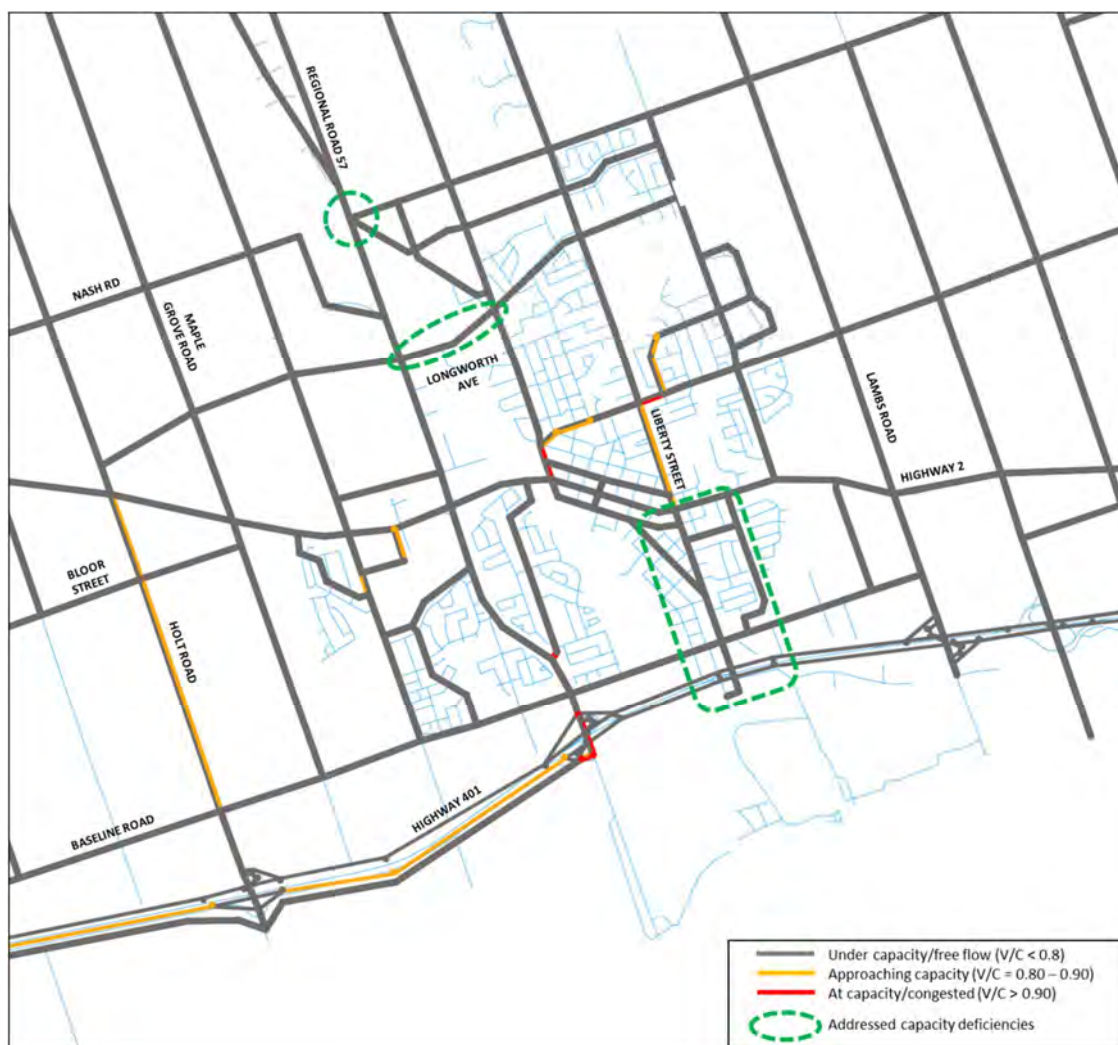
As with Alternative A, the model results for Alternative B (as shown in **Figure 5.14** above) show that the widening and extension of Longworth Avenue reduces the v/c ratio over Concession Road 3 and Longworth Avenue from **1.02** (congested) to **0.69** (free-flow traffic). Thus, the improvement would provide sufficient capacity to address the projected congestion east at Bowmanville Creek (circled in **Figure 5.14**). Additionally, the improvements to Maple Grove Road (widening to four lanes) and Bloor Street (widening to four lanes) also provide sufficient capacity to accommodate the

traffic from the Longworth Avenue extension to the Holt Road/Highway 401 interchange. Holt Road south of Bloor Street is forecast to approach capacity, but is not congested beyond the 0.9 v/c threshold. Congestion is also observed with v/c over 0.9 in the vicinity of the Waverley Road interchange with Highway 401 (at South Service Road) and on the approaches to the Liberty Street interchange.

Additionally, the road network improvements implemented in Alternative B result in a 3% reduction in traffic (by VKT) along Liberty Street through the Bowmanville downtown core, but do not address the congestion issues in the vicinity of the Highway 401 interchange at Liberty Street.

Alternative C – Model Results

Figure 5.15: 2031 PM Peak Hour Alternative C Model Results (V/C Ratios)



The model results for Alternative C (as shown in **Figure 5.15** above) sufficiently address the same issues that Alternative A addressed, resulting in a v/c ratio reduction from **1.02** (congested) to **0.65** (free-flow traffic) over Concession Road 3 and Longworth Avenue. Holt Road south of Bloor Street is forecast to approach capacity, but is not congested beyond the 0.9 v/c threshold.

The implementation of the Lambs Road/Highway 401 interchange coupled with the closure of the Liberty Street and Bennett Road Highway 401 interchanges reduces the previously observed congestion on the approaches to Liberty Street/Highway 401 interchange south of Regional Highway 2. In addition, the widening and upgrades to Baseline Road and Lambs Road also help to re-distribute traffic that previously accessed Highway 401 through Liberty Street, resulting in an 18% reduction in traffic along Liberty Street through the downtown core (by VKT). Baseline Road west of Green Road is forecast to approach capacity, but is below the 0.9 v/c threshold. Capacity issues with v/c over 0.9 remain in the vicinity of the Waverley Road interchange with Highway 401 (at South Service Road).

5.4.3 Alternatives Evaluation Summary

Table 5.9 summarizes the results of the evaluation process for each of the Clarington road network alternatives. Each alternative is evaluated on a scale of “Least Preferred” to “Moderately Preferred” to “Most Preferred” across each of the four major evaluation criteria outlined in **Table 5.7**.

As a result of the evaluation analysis, the recommended alternative for the Clarington road network is **Alternative C**, which is highlighted in green in **Table 5.9**. This alternative was selected as a result of the following considerations:

- Addresses capacity deficiencies on Longworth Avenue and Concession Road 3 to the east of the Bowmanville Creek, resulting in a v/c ratio reduction from 1.02 (congested) to 0.65 (free-flow traffic).
- Addresses capacity deficiencies on Liberty Street adjacent to Highway 401
- Improves network performance in Bowmanville by shifting commuter “through” traffic away from the Liberty Street through the downtown core and onto the Holt Road/Highway 401 interchange, resulting in a 29% reduction in traffic along Liberty Street.

- Supports planned population and employment growth by providing accessibility to growing areas
- Improves east-west movement within Bowmanville due to Longworth Avenue improvements and extension, as well as the Baseline Road improvements.
- Although Alternative C includes the full Longworth Extension through to Regional Highway 2 near Holt Road, it is recommended that both the full extension (Alternative C-1 with improved / widened Holt Road) and the shortened extension through to Maple Grove Road (Alternative C-2 with improvement to Maple Grove Road and Bloor Street) be carried forward for further study as part of the EA process. The full extension performs marginally better from a technical point of view by providing a more direct route to Holt Road and its Highway 401 interchange, but the full extension crosses through a known PSW. Both the full extension and the shortened extension also have the potential issues with property impacts. Future phases of the EA process will evaluate the benefits, impacts, and potential mitigation measures (e.g. route alternatives) in more detail.

Figure 5.16 summarizes the preferred road network improvements.

Table 5.9: Evaluation Summary for Clarington Road Network Alternatives

Evaluation Criteria	Alternative Solutions			
	2031 Base Network (Do Nothing)	Alternative A	Alternative B	Alternative C
Technical	Does not accommodate growth and associated higher travel demands	Accommodates growth and higher travel demands in North Bowmanville		
	Does not address capacity issues to the East of the Bowmanville Creek at Longworth Avenue and Concession Road 3	Addresses capacity issues on Longworth Avenue and Concession Road 3 to the east of the Bowmanville Creek		
	Does not provide better access to the improved Holt Road Highway 401 interchange	Provides best access to the improved Holt Road Highway 401 interchange via full Longworth Avenue extension to Holt Road / Hwy 2	Provides better access to the improved Holt Road Highway 401 interchange via partial Longworth Avenue extension to Maple Grove Road	Provides best access to the improved Holt Road Highway 401 interchange via full Longworth Avenue extension to Holt Road / Hwy 2
	Does not address capacity issues and congestion at Liberty Street interchange			Addresses capacity issues and congestion at Liberty Street interchange
	Commuter traffic continues to largely travel through downtown Bowmanville to access Highway 401	Some capacity relief to downtown Bowmanville by encouraging usage of Holt Road interchange. Less than 3% reduction in downtown traffic (compared to “Do Nothing”)		Performs best at directing Highway 401 commuter traffic away from the downtown Bowmanville core 18% reduction in downtown traffic (compared to “Do Nothing”)
	Least Preferred	Moderately Preferred	Least-Moderately Preferred	Most Preferred
Social/Cultural Environment	Does not impact: - Residential property and/or buildings - Commercial facilities and/or institutions - Agricultural lands	Some impact: - Residential property and/or buildings at Holt Road and Regional Highway 2 - Agricultural lands	Some impact: - Frontage of residential property along Bloor Street and Maple Grove Road	Some impact: - Residential property and/or buildings at Holt Road and Regional Highway 2 - Agricultural lands
	Most Preferred	Least-Moderately Preferred	Moderately Preferred	Least-Moderately Preferred
Natural Environment	Does not impact: - Designated Natural Areas - Provincially Significant Wetlands (PSW)	The Longworth Avenue extension to Holt crosses a PSW. Potential to avoid PSW through route planning.	The Longworth Avenue extension to Maple Grove Road would avoid PSW	The Longworth Avenue extension to Holt Road crosses a PSW. Potential to avoid PSW through route planning. Soper Creek crossing requires additional assessment for widening of Baseline Road to assess Natural Environment impacts.
	Potential decrease in localized and regional air quality in association with growth in traffic congestion.	Less impact to air quality with reduction in congestion		
	Most Preferred	Least-Moderately Preferred	Moderately Preferred	Least Preferred

Evaluation Criteria	Alternative Solutions			
	2031 Base Network (Do Nothing)	Alternative A	Alternative B	Alternative C
Economic	Does not support future growth	Supports growth by providing accessibility to growing areas in North Bowmanville		
	Does not improve movement between communities	Improves east-west movement between communities through improvements to Longworth Avenue and Baseline Road	Improves east-west movement between communities through improvements to Longworth Avenue, Maple Grove Road, and Baseline Road	Improves east-west movement between communities through improvements to Longworth Avenue and Baseline Road
	Does not support goods movement	Is supportive of improved goods movement		
	Congested downtown Bowmanville not conducive to business	Minimal reduction in commuter traffic along Liberty Street through the Bowmanville downtown		Significant reduction in commuter traffic along Liberty Street through the Bowmanville downtown
	Cost is in terms of lost benefit by not supporting growth and development	Construction costs and property costs are moderately high (includes crossing of PSW)	Construction costs and property costs are moderate (includes widening of Maple Grove Road)	Construction costs and property costs are high (includes interchanges and crossing of PSW). However, cost may be mitigated by removing the need to improve Liberty Street and Bennett Road interchanges.
	Least Preferred	Least Moderately Preferred	Moderately Preferred	Most Preferred
Overall Alternative C is the Preferred Alternative				



- Road Network Improvements**
- Potential Ramp Closure
 - Potential New Interchange
 - Future Corridor Protection (Beyond 2031)
 - Future Collector Road
 - New Connection
 - Geometric/Operational Upgrades
 - Road Widening
 - Future/Upgraded Arterial Grade Separation

- MTO Projects and Studies**
- Highway 401 Corridor Improvements & Studies
 - Holt Road Interchange Improvements
 - Corridor Study: Courtice Road to East Townline
 - Corridor Study: Brock Street to Courtice Road
 - Overpass Improvements
 - Future Highway 407
 - Crossing
 - Freeway Interchange
 - Interchange
 - Highway 407 - Phases by Completion Date
 - Phase 2A - 2017
 - Phase 2B - 2020

- Other Features**
- Freeway
 - Arterial Road
 - Collector Road
 - Local Road
 - Municipal Boundary
 - Watercourse
 - Waterbody
 - Existing Arterial Grade Separation
 - Oak Ridges Moraine
 - Urban Area
 - Greenbelt

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CLIENT:

Clarington
Leading the Way

PROJECT:

CTMP | Clarington Transportation Master Plan

DRAWING:

EXISTING ROAD NETWORK & RECOMMENDED IMPROVEMENTS

PREPARED BY:	CHECKED BY:	PROJECT No.:
—	N. DAY	60264232
DESIGNED BY:	APPROVED BY:	FIGURE:
M. TRACEY	S. HARMSWORTH	5.16
SCALE:	DATE:	
1" = 100,000	JUNE 2014	

5.4.4 Assessment of Clarington DC Projects

The alternatives and recommendations presented in the previous sections (i.e. **Sections 5.4.1, 5.4.2 and 5.4.3**) were identified and assessed based on their ability to address the forecasted municipal road network capacity deficiencies through to 2031 (as previously detailed in **Section 4**). It is recognized that additional roadway improvement projects will be required in order to support network connectivity and development / neighbourhood-level access.

Table 5.10 below summarizes the road improvement projects (i.e. widening and new road construction projects) that are included in the 2010 Clarington DC. As previously noted in **Section 4.2.1.4**, the Clarington DC projects were not assumed to be a part of the 2031 Base Network in order to allow for an overall assessment of the future road network needs and potential improvements within Clarington. **Table 5.10** also provides commentary and strategic recommendations for each DC project.

Table 5.10: Clarington DC Road Widening and New Road Construction Projects

Road	From	To	Description	Recommendation
Baseline Road	Lambs Road	Bennett Road	New Arterial	Improves connectivity to future development areas and to Bennett Road Highway 401 interchange
Green Road	Baseline Road	Regional Highway 2	Widening	Improves overall performance of Green Road (decreases V/C to below 0.8), serves future development, and improves connectivity and access to future GO Station.
Queen Street	St. George Street S	Frank Street	New Urban Collector	Improves local road network connectivity in the vicinity of the Downtown Bowmanville core. Improves access to the Lakeridge Health Centre.
Simpson Avenue	Simpson Avenue	Baseline Road	Soper Creek Crossing / Realignment	Improves traffic operations and local network connectivity by allowing Simpson Avenue to serve as an alternate to Liberty Street for local traffic.
Simpson Avenue	King Street	Future Church Street	New Urban Collector	Improves local road network connectivity in the vicinity of the Downtown Bowmanville Core.
Rudell Road	Grady Drive	C.P.R. Tracks	New Urban Collector	Supports development and provides future GO Station access

5.4.5 Road Network Policy Alternatives and Recommendations

This section provides recommendations on the Municipality of Clarington policies for roadway design and operational standards, including:

- **Road Network Optimization:** The approach to optimizing the operation of existing intersections and infrastructure. Clarington has a focused program of improvements for key corridors and intersections, including main arterial road corridor optimization. The policy recommendation is to continue with the current approach.
- **Safety:** The approach to the maintenance / management of signage, pavement markings, and safety barriers. Clarington is already working towards introducing a signage and pavement marking program review and implementing a systematic improvement plan across the municipal road network, as identified by the policy recommendations.
- **Design Standards:** The geometric design standards that influence the efficient and safe operation of municipal roadways. Currently, Clarington typically follows the policies and industry standards outlined in the Transportation Association of Canada (TAC) Design Guidelines and / or the MTO Geometric Design Standards. New policy recommendations are to introduce Urban Design Standards / Context Sensitive Solutions (i.e. Complete Streets) for roads located in built-up areas. As noted in the Active Transportation / Transit discussions, road network studies and reviews are conducted in a manner that looks at opportunities for facilitating new or upgraded active transportation and transit facilities.
- **Truck Routes:** The identification of routes where truck traffic should be restricted from / directed to. Currently, trucks are permitted to use posted municipal roads. Future TMP updates should consider at what point a more comprehensive truck route system would be applicable. This truck route system should be prepared giving consideration to the Durham Region Goods Movement Strategy.
- **Traffic Calming:** The approach to the implementation of traffic calming measures that manage speeds on municipal roads, community safety zones, and pedestrian crossings. Currently, traffic calming issues are identified and addressed on an as requested basis using industry standard approaches to mitigation treatments. Clarington monitors and discourages speeding, particularly in known “problem areas”.
- **Network Integration:** The approach to collaborating with the Region of Durham and the Province of Ontario to address road network needs. As the road network in Clarington is a two-tiered system, the Municipality works closely with Durham Region to identify safety concerns, and required road and intersection upgrades.

Figure 5.17, 5.18 and 5.19 outline the range of possible policy alternatives (from passive to aggressive) that were considered in this study. The policies that are recommended by this study are highlighted in red.

Figure 5.17: Road Network Policy Alternatives and Recommendations (Optimization and Safety)

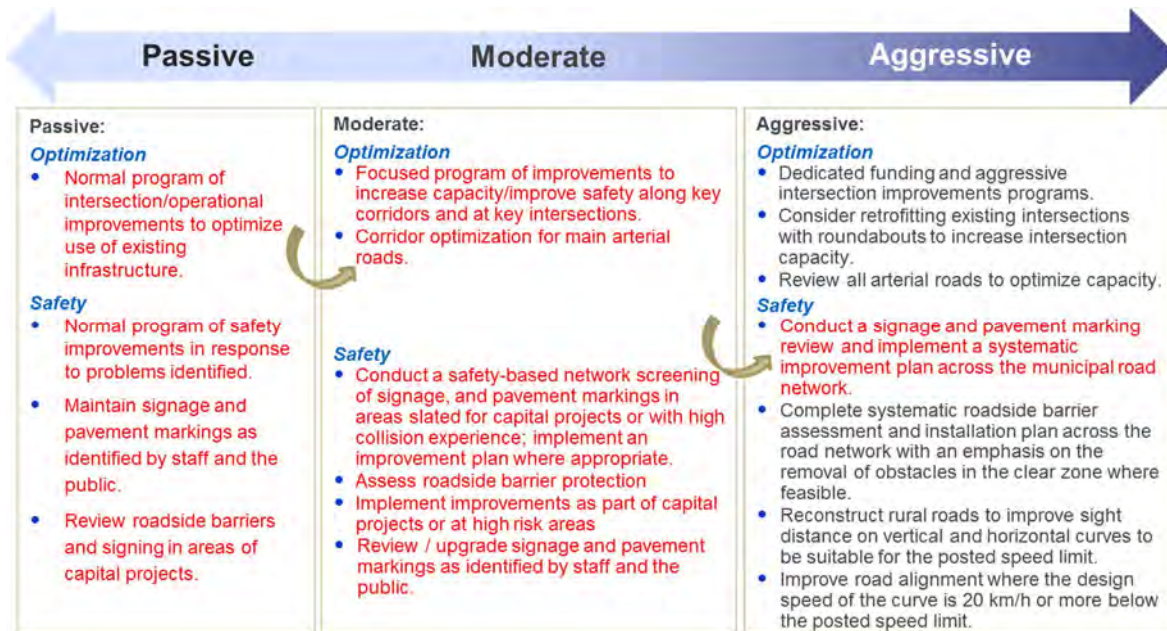


Figure 5.18: Road Network Policy Alternatives and Recommendations (Design Standards and Trucks)

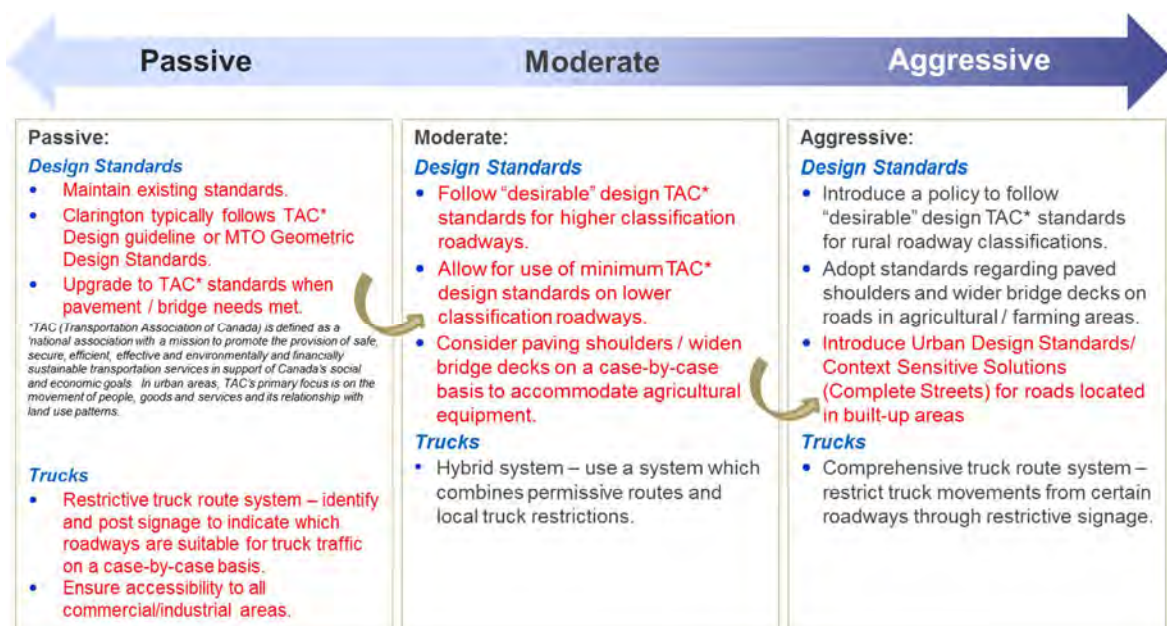


Figure 5.19: Road Network Policy Alternatives and Recommendations (Traffic Calming and Network Integration)

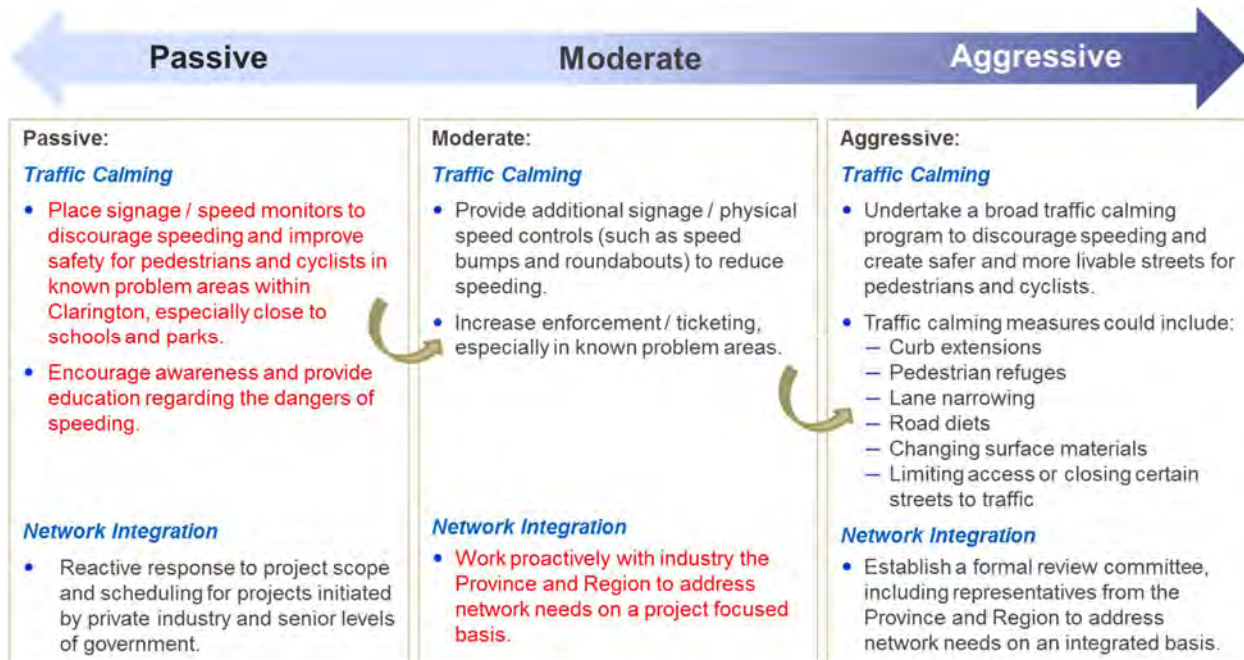


Table 5.11 identifies the comments received from the public concerning the Road Network recommendations, and identifies how each comment was addressed in the CTMP.

Table 5.11: Incorporating Public Feedback on the Road Network

Public Comment / Feedback	How was the public feedback considered as part of the CTMP?
- East-west routes need to be developed, especially through Newcastle	Based on the results of the traffic analyses carried out as part of this study, no capacity deficiencies were identified within the east-west road system. However, it should be noted that this CTMP will be reviewed and/or updated every 5 years and will include a review of traffic conditions and travel behaviours in Clarington.
- Improve existing roadways - Improve connectivity	A number of roadway improvements have been recommended as part of this CTMP (please refer to Section 6.4 for an outline of the recommended road network improvement plan and associated priorities). In addition, a number of major road network improvements are already planned to be in place by 2031 by Durham Region and MTO.

Public Comment / Feedback	How was the public feedback considered as part of the CTMP?
- Improve country roads	Improvement from a Rural to Urban Collector roadway for portions of Baseline Road and Concession Road have been recommended as part of this TMP and were already included as part of Clarington's Capital Budget. However, no capacity deficiencies were identified on the balance of the rural road system as part of the traffic analyses carried out for this study. It should be noted that this CTMP will be reviewed and/or updated every 5 years and will include a review of traffic conditions and travel behaviours in Clarington.
- Implement stoplights at key intersections to improve traffic flow	Intersection operational analyses were carried out at selected intersections (please refer to Section 5.5) to determine intersection control and geometric requirements. Recommendations for modifications were also made, where warranted.
- Add wider shoulders	Improvements to shoulders have been made as part of the active transportation policy recommendations (please refer to Section 5.1.3).
- Improve maintenance / cleanliness of roadway shoulders	While cleanliness is not a component of the CTMP, the regular maintenance of shoulders, surface pavement, pot holes and road grates have been recommended as part of this CTMP (Please refer to Section 5.1).
- Provide more / permanent flashing speed signs along roadways	Placing signage and / or speed monitors to discourage speeding and improve safety for pedestrians and cyclists in known problem areas has been recommended in this CTMP in combination with encouraging awareness and providing education regarding the dangers of speeding (please refer to Figure 5.19). Traffic calming measures that manage speeds on municipal roads, community safety zones, and pedestrian crossings are recommended.

5.5 Intersection Operational Analysis

Intersection operational assessments were conducted at the following intersections to determine intersection control and geometric requirements that would address the future (i.e., Horizon Year 2031) capacity issues identified in the updated Durham Region Travel Demand model in the approaches to the following intersections:

- Regional Highway 2 / Prestonvale Road (Courtice - Signalized)
- Regional Highway 2 / Scugog Street (Bowmanville - Signalized)
- Regional Road 57 / Concession Road 3 (Bowmanville - Unsignalized).

The subject intersections are shown in **Figures 5.20, 5.21, and 5.22**, respectively.

Figure 5.20: Regional Highway 2 / Prestonvale Road (Courtice)



Figure 5.21: Regional Highway 2 / Scugog Street (Bowmanville)



Figure 5.22: Regional Road 57 / Concession Road 3 (Bowmanville)



5.5.1 Study Methodology and Analysis Periods

The intersections outlined above are analysed at existing and future conditions (horizon year 2031). The methodology used to assess the intersection requirements is summarized below:

- Utilize screenline growth rates as forecasted by the transportation demand model to grow existing traffic to the 2031 horizon year;
- Assess existing and future traffic operations and the potential need for road and / or traffic control improvements at the subject intersections.

As with the model forecast assessment, the weekday PM peak period is used in the analysis as it is the critical period for analysis.

5.5.2 Existing Conditions

5.5.2.1 Traffic Data

The intersection Turning Movement Count (TMC) data used in this analysis includes:

- Regional Highway 2 / Prestonvale Road (October 2012);
- Regional Highway 2 / Scugog Street (May 2013); and
- Regional Road 57 / Concession Road 3 (April 2013).

Traffic volumes for existing conditions are illustrated in **Figures 5.23, 5.24, and 5.25.**

Lane configurations for existing conditions are illustrated in **Figure 5.26, 5.27, and 5.28.**

The traffic data is included in **Appendix E.**

Figure 5.23: Regional Highway 2 / Prestonvale Road Existing Volumes (2012)

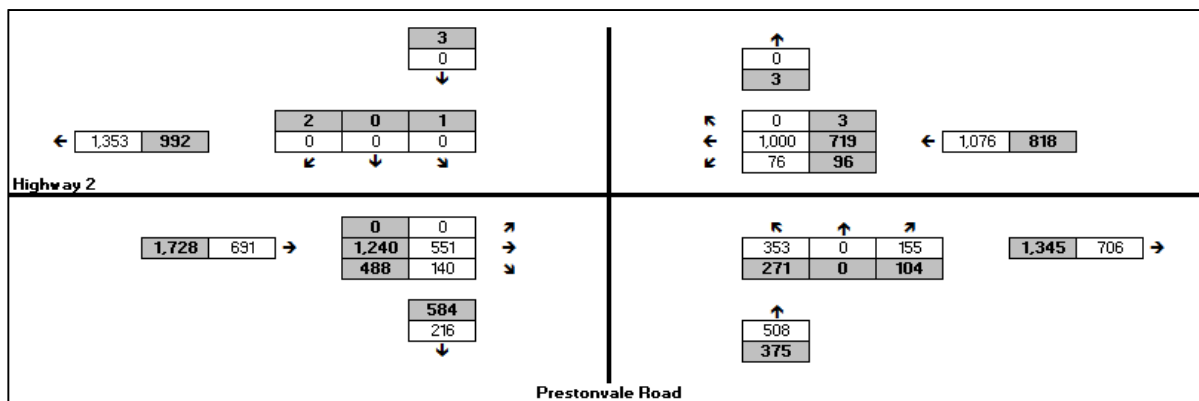


Figure 5.24: Regional Highway 2 / Scugog Street Existing Volumes (2013)



Figure 5.25: Regional Road 57 / Concession Road 3 Existing Volumes (2013)

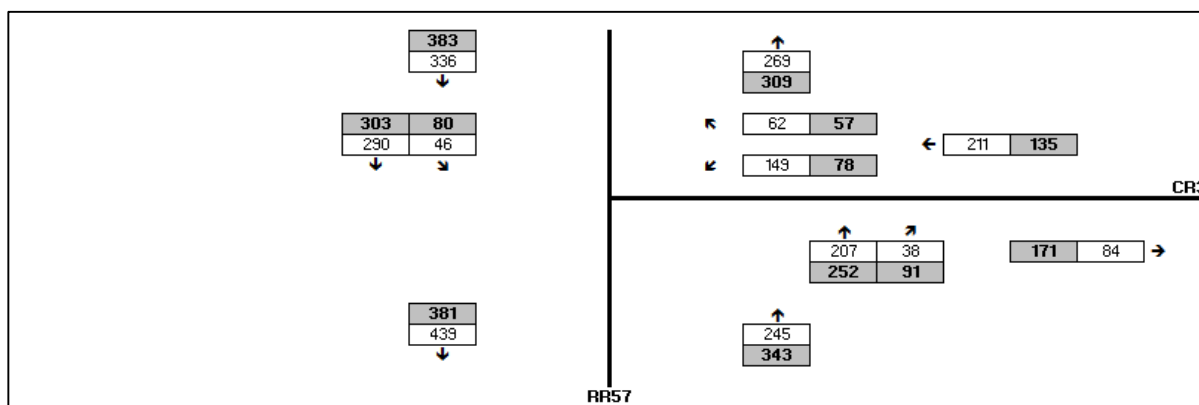


Figure 5.26: Regional Highway 2 / Prestonvale Road Existing Lane Configuration

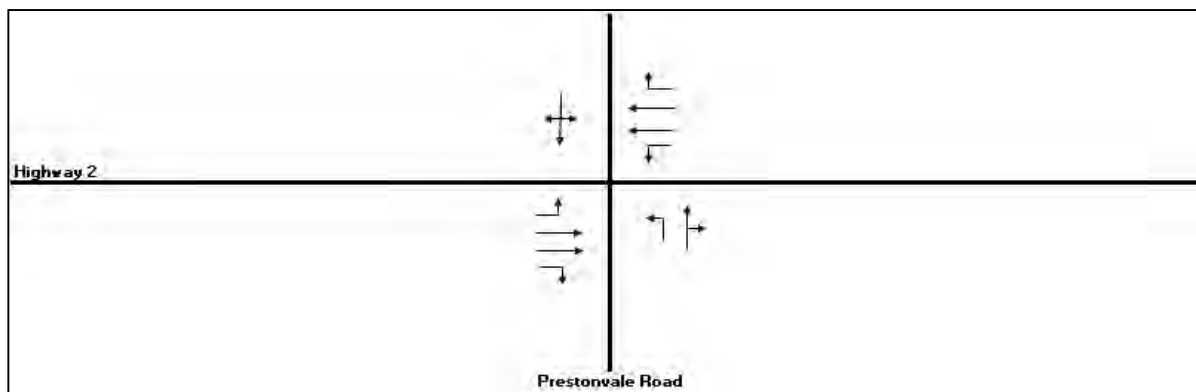


Figure 5.27: Regional Highway 2 / Scugog Street Existing Lane Configuration

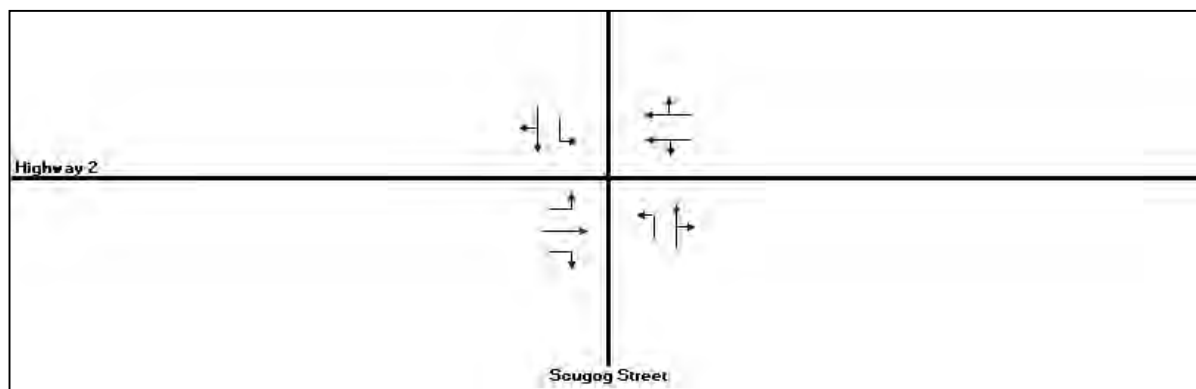
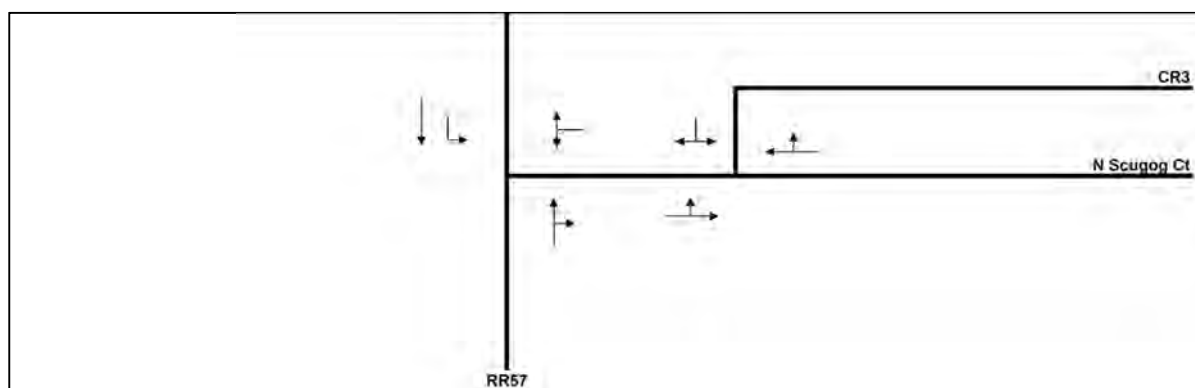


Figure 5.28: Regional Road 57 / Concession Road 3 Existing Lane Configuration



5.5.2.2 Existing Traffic Operations Assessment

The quality of intersection operations is typically measured in terms of level of service (LOS). The LOS is assigned on the basis of average delay per vehicle and includes deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS ranges from A for 10 seconds or less average delay, to LOS F for delays greater than 80 seconds. For un-signalized intersections the LOS ranges from 10 seconds or less for LOS A, to LOS F for delays greater than 50 seconds. Acceptable operations are generally considered to be LOS D or better, however during peak hours a LOS E may be considered acceptable.

To assess existing conditions during peak hours, a level of service analysis was undertaken for the subject intersections using Synchro 7.0 / SimTraffic Software, which implements the methods of the 2000 Highway Capacity Manual. The distribution of existing traffic within the peak hours periods has been accounted for in the analysis by calculating the peak hour factor (PHF = peak hour volume/four times the largest 15-minute volume).

Therefore, the peak hour analysis reflects operating conditions for the highest 15-minute period within the hour. The key parameters used in the analysis include:

- Calculated Peak Hour Factors;
- Signal timing plans provided by Durham Region;
- Heavy vehicle percentages derived from the traffic counts; and
- Default Synchro values for all other inputs.

The current operational conditions of the existing intersections are provided in **Table 5.12**. Synchro analysis worksheets have been provided for reference in **Appendix E**.

Table 5.12: Existing Traffic Peak Hour Operations

Intersection	Approach/Movement		PM		
			Delay	LOS	v/c
Regional Highway 2 / Prestonvale Road (Signalized)	EB	Left	-	-	-
		Dual Thru	17.5	B	0.72
		Right	13.4	B	0.42
	WB	Left	62.1	E	0.86
		Dual Thru	13.1	B	0.41
		Right	10.3	B	0.00
	NB	Left	27.2	C	0.57
		Thru/Right	19.4	B	0.14
	SB	Left/Thru/Right	18.0	B	0.00
	Overall Intersection		18.1	B	0.75
Regional Highway 2 / Scugog Street (Signalized)	EB	Left	23.9	C	0.83
		Thru	16.5	B	0.73
		Right	9.3	A	0.13
	WB	Left/Thru-Thru/Right	23.8	C	0.68
	NB	Left	52.1	D	0.81
		Thru/Right	16.5	B	0.09
	SB	Left	16.5	B	0.09
		Thru/Right	20.2	C	0.39
	Overall Intersection		21.5	C	0.78
Regional Road 57 / Concession Road 3 (Unsignalized)	WB	Left/Right	19.6	C	0.42
	NB	Thru/Right	0.0	-	0.22
	SB	Left	8.3	A	0.08
		Thru	0.0	-	0.19
**Highlighted cells denote critical movements (LOS E or F and / or v/c ratio greater or equal to 0.90)					

The results presented in **Table 5.12** show that all intersections are operating below capacity. Overall, motorists experience a delay of 21.5 seconds (LOS 'C') which is acceptable during the peak period.

5.5.3 Future Conditions

5.5.3.1 Future Traffic Volume Projections

Traffic volumes for horizon year 2031 were calculated based on screenline growth rates obtained from the EMME model. The growth rates would yield future traffic forecasts when applied to existing traffic counts. The screenline growth rates used to generate horizon year 2031 traffic can be found in **Appendix E**.

Future background traffic volumes are shown in **Figures 5.29, 5.30, and 5.31**.

Figure 5.29: Regional Highway 2 / Prestonvale Road Future Traffic Volumes (2031)

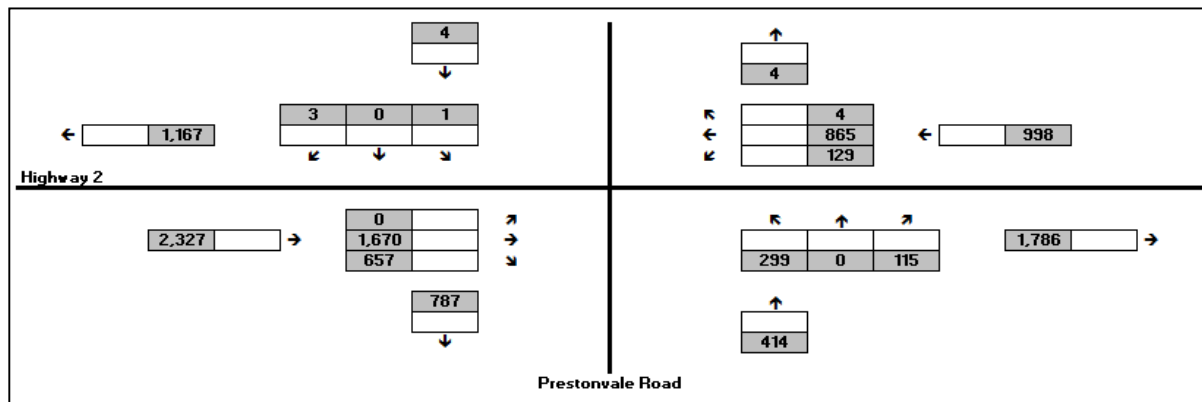


Figure 5.30: Regional Highway 2 / Scugog Street Future Traffic Volumes (2031)

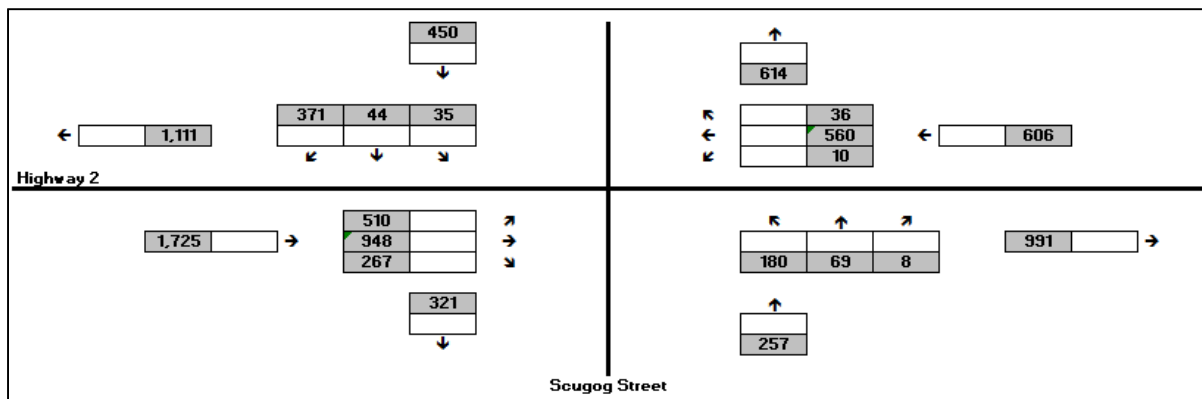
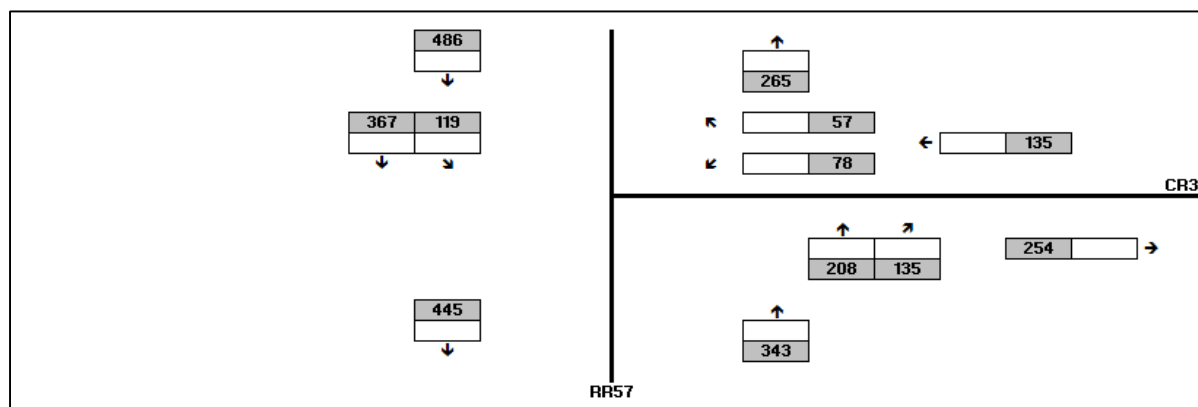


Figure 5.31: Regional Road 57 / Concession Road 3 Future Traffic Volumes (2031)



5.5.3.2 Future Traffic Conditions Analysis

The future traffic conditions analysis was conducted for horizon year 2031. For the Synchro analysis, the following inputs used in the Existing Conditions analysis were maintained and used in the Future Conditions analysis:

- Calculated Peak Hour Factors;
- Analysis period = 15 minutes;
- Signal timing plans;
- Heavy vehicle percentages derived from the traffic counts; and
- Default Synchro values for all other inputs.

The results of the PM peak hour intersection operations are presented in **Table 5.13**.

The results in **Table 5.13** show the deterioration of intersection operations at both Regional Highway 2 intersections without the introduction of intersection improvements. As a result of traffic growth, the following movements are considered critical at horizon year 2031:

- Regional Highway 2 / Prestonvale Road (LOS 'C', v/c 1.25)
 - Westbound left-turn (LOS 'F', v/c 1.56)
- Regional Highway 2 / Scugog Street (LOS 'E', v/c 1.10)
 - Eastbound left-turn (LOS 'F', v/c 1.19)

- Eastbound through (LOS 'E', v/c 1.04)
- Northbound left-turn (LOS 'F', v/c 1.08)

Table 5.13: Future Traffic Peak Hour Operations

Intersection	Approach/Movement		PM		
			Delay	LOS	v/c
Regional Highway 2 / Prestonvale Road (Signalized)	EB	Left	-	-	-
		Dual Thru	23.7	C	0.89
		Right	15.0	B	0.60
	WB	Left	320.5	F	1.56
		Dual Thru	12.5	B	0.46
		Right	9.3	A	0.00
	NB	Left	35.9	D	0.70
		Thru/Right	23.9	C	0.22
	SB	Left/Thru/Right	21.4	C	0.00
	Overall Intersection		30.7	C	1.25

Intersection	Approach/Movement		PM		
			Delay	LOS	v/c
Regional Highway 2 / Scugog Street (Signalized)	EB	Left	122.8	F	1.19
		Thru	61.0	E	1.04
		Right	11.6	B	0.22
	WB	Left/Thru- Thru/Right	34.1	C	0.81
	NB	Left	118.0	F	1.08
		Thru/Right	20.4	C	0.12
	SB	Left	20.1	C	0.09
		Thru/Right	23.5	C	0.35
	Overall Intersection		58.4	E	1.10
Regional Road 57 / Concession Road 3 (Unsignalized)	WB	Left/Right	24.6	C	0.50
	NB	Thru/Right	0.0	-	0.23
	SB	Left	8.4	A	0.12
		Thru	0.0	-	0.23
**Highlighted cells denote critical movements (LOS E or F and / or v/c ratio greater or equal to 0.90)					

5.5.3.3 Future Traffic Conditions Analysis - Improvements

To address the degraded intersection operations of the Regional Highway 2 / Prestonvale Road and Regional Highway 2 / Scugog Street intersections, the following improvements were added and modelled to assess whether the additional capacity would alleviate high delays and v/c ratios:

- Regional Highway 2 / Prestonvale Road;
 - Westbound left-turn phase becomes permissive+protected
- Regional Highway 2 / Scugog Street;
 - Eastbound and northbound left-turn phases become permissive+protected

- Southbound left-thru/right configuration modified to left-thru-right

Additionally, the intersection of Regional Road 57 / Concession Road 3 is proposed to be reconfigured which would result in North Scugog Court being converted into a cul-de-sac and Concession Road 3 connecting directly with Regional Road 57. The current configuration has the potential to create blockages for traffic attempting to turn left onto Concession Road 3 from Regional Road 57 as westbound traffic on North Scugog Court queues. The delays and v/c ratios are expected to remain unchanged from **Table 5.12**.

A signal warrant analysis was completed using horizon year 2031 PM Peak hour traffic volumes for the intersection of Regional Road 57 / Concession Road 3. The warrant indicates that signals are not required by 2031. It is recommended that the intersection be monitored as development continues in the area, as growth rates may exceed that used in this assessment. Sight distances from the reconfigured intersection were not reviewed as part of this assessment, and any limitation in sight distance may also contribute to the requirement for signals. Please refer to **Appendix E** for further details on the signal warrant analysis.

The results of the PM peak hour intersection operations after the introduction of the aforementioned modifications are presented in **Table 5.14** below.

Table 5.14: Future Traffic Peak Hour Operations - Improvements

Intersection	Approach/Movement		PM		
			Delay	LOS	v/c
Regional Highway 2 / Prestonvale Road (Signalized)	EB	Left	-	-	-
		Dual Thru	26.5	C	0.92
		Right	16.0	B	0.62
	WB	Left	42.2	D	0.80
		Dual Thru	8.7	A	0.40
		Right	6.5	A	0.00
	NB	Left	58.1	E	0.88
		Thru/Right	26.9	C	0.12
	SB	Left/Thru/Right	25.5	C	0.00
	Overall Intersection		23.6	C	0.90

Intersection	Approach/Movement		PM		
			Delay	LOS	v/c
Regional Highway 2 / Scugog Street (Signalized)	EB	Left	27.6	C	0.90
		Thru	20.5	C	0.88
		Right	6.6	A	0.20
	WB	Left/Thru- Thru/Right	22.3	C	0.59
	NB	Left	35.7	D	0.61
		Thru/Right	25.2	C	0.18
	SB	Left	24.8	C	0.13
		Thru	24.4	C	0.11
		Right	26.6	C	0.26
	Overall Intersection		22.7	C	0.81
Regional Road 57 / Concession Road 3 (Unsignalized)	WB	Left/Right	24.6	C	0.50
	NB	Thru/Right	0.0	-	0.23
	SB	Left	8.4	A	0.12
		Thru	0.0	-	0.23
**Highlighted cells denote critical movements (LOS E or F and / or v/c ratio greater or equal to 0.90)					

After the implementation of the intersection modifications, both Regional Highway 2 intersections and all respective movements are expected to operate below capacity; however, there remain some critical movements:

- Regional Highway 2 / Prestonvale Road (v/c 0.90): Eastbound thru (v/c 0.92)
- Regional Highway 2 / Scugog Street (v/c 0.81):
 - Eastbound left (v/c 0.90)
 - Eastbound thru (v/c 0.88)

Although the movements above have v/c ratios above 0.90, the anticipated delay for all of the movements are less than 90 seconds (cycle length) which shows that motorists will complete their movements within one cycle.

The southbound right turn movement at the Regional Highway 2 / Scugog Street intersection did not contribute to an overall improvement for the intersection operation; however, there may be other reasons to proceed with this improvement such as reduction of queues on the north leg of Scugog Street. For example, an increase in pedestrian traffic may lead to longer delays for right-turning vehicles from Scugog Street and the southbound right-turn lane may help reduce delay for southbound through vehicles.

5.5.4 Summary and Conclusions

Based on the results of the intersection operational analysis, it was shown that the growth in traffic would trigger the need for modifications to intersection control and / or road geometry.

The following modifications are proposed:

- Regional Highway 2 / Prestonvale Road;
 - Westbound left-turn phase becomes permissive+protected.
- Regional Highway 2 / Scugog Street;
 - Eastbound and northbound left-turn phases become permissive+protected
 - Southbound left-thru/right configuration modified to left-thru-right.

The intersection of Regional Road 57 / Concession Road 3 is proposed to be reconfigured which would result in North Scugog Court being converted into a cul-de-sac and Concession Road 3 connecting directly with Regional Road 57. The current road configuration has the potential to create blockages for traffic attempting to turn left onto Concession Road 3 from Regional Road 57 as westbound traffic on North Scugog Court queues. No further modifications are required at this intersection and stop sign control is suggested to be retained, with the intersection monitored to determine when signals would be required.

5.6 Grade Separations (Rail Crossings)

The need for grade separation for roads within Clarington which cross Canadian Pacific (CP) and Canadian National (CN) railway lines (and are not presently grade separated) can generally be identified using the cross-product of the Annual Average Daily Traffic (AADT) on the crossing roads and the CP and CN train traffic on the railways. Thus to determine the need for future grade separation for at-grade rail crossings, AADT volumes must be forecasted for the crossing roads in the 2031 recommended network. The forecast for rail traffic used in this assessment was provided by the Municipality of Clarington.

Since the Durham Model is a macro level demand model that is calibrated at the screenline level, utilizing link-level future traffic forecasts at the rail crossing sites may yield skewed AADT results due to the variance in trip distribution across roads within a screenline or low volumes roads in rural areas. To compensate for this, the 2031 AADT volumes were computed by applying screenline-level traffic growth rates extracted from Durham Model (2011 to 2031) to observed AADT data from traffic counts. The screenlines employed to develop the growth rates are consistent with the screenlines from the model validation and evaluation of future road network needs presented in **Section 4**. It should be noted that the observed AADT data at the crossing sites were collected from as early as 1994 (particularly in rural areas). Hence for AADT data older than 2011, it is assumed that traffic growth will remain static from the data collection date to 2011. Beyond 2011, growth rates extracted from the model are applied to determine the 2031 forecast AADT volumes. For areas with relatively low traffic where a nearby screenline does not exist (i.e., south of Highway 401), it is assumed that traffic will remain static to 2031 reflecting the stable nature of traffic in these areas.

Table 5.15 summarizes the roadways within Clarington which intersect CP and CN rail lines, and which roadways warrant potential grade separation by 2031. Recommended grade separations identified in Table 5.15 are reflected in Figure 5.16. The warrant for grade separation at crossing roads is determined by the cross-product of the AADT at the crossing site and the CP/CN rail traffic. The cross-product threshold of 200,000 identifies where a grade separation may be required, and this methodology is consistent with the Municipality of Clarington accepted standard for identification of road-rail grade separation requirements.

Table 5.15: Future Grade Separation Warrants

Road	Crossing Location		Data Year	2031 AADT	Rail X AADT Cross Product	Grade Separation Warrant
	From	To				
CP Rail Crossing						
East Townline Rd	Lakeshore Rd	Conc Rd 1	2007	350	7,339	Grade Separation is not warranted
Lakeshore Rd	808m E of Jaynes Rd	1208m E of Jaynes Rd	2002	236	4,946	Grade Separation is not warranted
Lakeshore Rd	Riley Rd	Stephenson Rd	2012	167	3,507	Grade Separation is not warranted
Arthur St	North End Newcastle	Conc Rd 3	2012	1,116	23,429	Grade Separation is not warranted
Concession St E	Bragg Rd	Darlington Clarke Townline	2012	2,386	50,104	Grade Separation is not warranted
Lambs Rd	Concession St E	CPR Crossing	2012	503	10,564	Grade Separation is not warranted
Mearns Av	Flaxman Av	Sprucewood Cr	2012	4,583	96,249	Grade Separation is not warranted
Scugog St	King St	Odell St	2009	10,287	216,034	Grade Separation is warranted
Maple Grove Rd	Baseline Rd	Bloor St	2012	3,398	71,362	Grade Separation is not warranted
Holt Rd	Baseline Rd	Bloor St	2011	6,969	146,348	Grade Separation is not warranted
Baseline Rd	Rundle Rd	Holt Rd	2012	3,572	75,009	Grade Separation is not warranted
Baseline Rd	Courtice Rd	Hancock Rd	2012	4,241	89,055	Grade Separation is not warranted
Trulls Rd	Baseline Rd	Bloor St	2012	707	14,838	Grade Separation is not warranted

Clarington Transportation Master Plan

Prestonvale Rd	Baseline Rd	1100m N of Baseline Rd	2012	2,078	43,633	Grade Separation is not warranted, however location should be monitored.
CN Rail Crossing						
East Townline Rd	Lakeshore Rd	Conc Rd 1	2007	349	22,716	Grade Separation is not warranted
Lakeshore Rd	808m E of Jaynes Rd	1208m E of Jaynes Rd	2002	236	15,310	Grade Separation is not warranted
Riley Rd	Lakeshore Rd	Metcalf St	1994	60	3,900	Grade Separation is not warranted
Metcalf St	Mill St S	Riley Rd	1994	603	39,165	Grade Separation is not warranted, however location should be monitored.
Toronto St	1184m W of Amos St	41m N of Milligan St	2002	24	1,560	Grade Separation is not warranted
Cobbledick Rd	Regional Highway 2	Service Rd	1994	405	26,325	Grade Separation is not warranted
Bennett Rd	South Service Rd	50m S of Wilmot Creek Drive	2004	80	5,200	Grade Separation is not warranted
Port Darlington Rd	West Beach Rd	Lake Rd	2012	2,993	194,545	Grade Separation is warranted
Darlington Park Rd	Courtice Rd	West End (Darlington Park)	1994	590	38,350	Grade Separation is not warranted, however location should be monitored.

6. Implementation Strategy

The key recommendations of the CTMP can be implemented through a series of strategic policies and specific infrastructure optimization / improvements. It is recommended that Clarington allocate funding for the further development and implementation of these policies, which should be reviewed on an annual basis, to support the recommended strategies.

The Class Environmental Assessment for Municipal Road projects provides for four types of projects or activities:

- **Schedule A** - municipal maintenance, operational and emergency activities - pre-approved; therefore, the municipality can proceed without further approval under the EA Act
- **Schedule A+** - pre-approved; however, the public is to be advised prior to project implementation
- **Schedule B** - projects with the potential for some adverse environmental effects - these are approved subject to a screening process including consultation with directly affected public and agencies
- **Schedule C** - projects with the potential for significant environmental effects which must proceed under the planning and documentation procedures outlined in the Municipal Class EA document

For the implementation of specific infrastructure optimization / improvement projects, the TMP process is intended to address the requirements of Phases 1 and 2 Municipal Class EA planning process, providing an assessment of the problem or opportunity and an assessment of alternative solutions. This TMP forms the basis for the projects recommended within it. Subsequent Class EA projects will be required for the recommended Schedule B and C projects as the Municipality of Clarington moves forward with implementation. As such, more detailed investigations will be carried out as part of the specific Schedule B and C projects. In addition, the Schedule B projects would require the filing of a Project File for public review while the Schedule C project would have to fulfil Phases 3 and 4 prior to filing an Environmental Study Report for public review.

Implementation recommendations for the key elements of the CTMP are outlined in the following sections.



6.1 Active Transportation

In order to support an increased role for active transportation in the Municipality, the CTMP has proposed an Active Transportation System consisting of interconnected on-road facilities and off-road trails. Supporting policy measures were also developed to increase the attractiveness, awareness, and visibility of active transportation in Clarington. Section **Section 5.1**, and **Figures 5.3** and **5.4** outline the recommended policies and active transportation network.

Table 6.1 and **6.2** present estimates of the capital funding requirements to support the implementation of the proposed Active Transportation System. The cost estimates are based on high-level unit per km costs developed from recently implemented on-road bicycle lanes and off-road trails in Clarington.

Table 6.1 presents cost estimates for the proposed on-road cycling facilities that are under Clarington's jurisdiction (or to be implemented by Clarington in co-operation with the Region in the case of Clarington Initiatives located on Regional roads). **Table 6.2** presents cost estimates for proposed off-road trails that are under Clarington's jurisdiction.

It is recommended that the Municipality develop an active transportation program that would be overseen by a new Active Transportation Advisory Committee. The Committee would assist with the development of an Active Transportation Master Plan, which is intended to further develop and prioritize a funding mechanism for the policies and programs that support and encourage use of active transportation. A Complete Streets Policy is also recommended to support new development areas and for implementation along identified active transportation corridors.

Table 6.1: Budget Cost Estimates for Proposed Cycling Facilities

Cycling Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Courtice	Cycle Lane	Nash Road	Townline Road to Varcoe Road	0.40	\$20,000	\$8,000
Courtice	Signed / Shared Lanes	Nash Road	Varcoe Road to Centerfield Drive	0.40	\$15,000	\$6,000
Courtice	Cycle Lane	Nash Road	Centerfield Drive to Harry Gay Drive	2.50	\$20,000	\$50,000
Courtice	Signed / Shared Lanes	Trulls Road	Pebblestone Road to Adelaide Avenue (extension)	1.10	\$15,000	\$16,500
Courtice	Cycle Lane	Trulls Road	Adelaide Avenue (extension) to south of Avondale Drive	2.60	\$20,000	\$52,000
Courtice	Signed / Shared Lanes	Trulls Road	South of Avondale Drive to Bloor Street	0.75	\$15,000	\$11,250
Courtice	Signed / Shared Lanes	Prestonvale Road	Regional Highway 2 to Robert Adams Drive	0.17	\$15,000	\$2,550
Courtice	Cycle Lane	Prestonvale Road	Robert Adams Drive to Glenabbey Drive	1.00	\$20,000	\$20,000
Courtice	Signed / Shared Lanes	Prestonvale Road	Glenabbey Drive to Bloor Street	0.65	\$15,000	\$9,750
Courtice	Cycle Lane	Trulls Road	Bloor Street to Cigas Road	1.70	\$20,000	\$34,000

Cycling Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Courtice	Cycle Lane	Cigas Road	Trulls Road to Baseline Road/Courtice Road	0.95	\$20,000	\$19,000
Courtice	Cycle Lane	New Road to Future GO Station	Trulls Road to Future GO Station	0.65	\$20,000	\$13,000
Courtice	Paved Shoulder	Courtice Road	Baseline Road to South Service Road	0.40	\$175,000	\$70,000
Courtice	Signed / Shared Lanes	Sandringham Driver/Yorkville Drive	Prestonvale Road/Claret Road to Trulls Road/Yorkville Drive	1.00	\$15,000	\$15,000
Courtice	Clarington / Region Initiative	Regional Highway 2	Townline Road to Courtice Road	3.00	\$20,000	\$60,000
Courtice to Bowmanville	Clarington / Region Initiative	Regional Highway 2	Courtice Road to Green Road	5.40	\$350,000	\$1,890,000
Courtice to Bowmanville	Signed / Shared Lanes	Nash Road	Harry Gay Drive to Regional Road 57	5.90	\$15,000	\$88,500
Bowmanville	Clarington Initiative	Regional Highway 2	Green Road to Lambs Road	4.40	\$20,000	\$88,000
Bowmanville	Cycle Lane	Green Road	Nash Road to Baseline Road	4.10	\$20,000	\$82,000
Bowmanville	Paved Shoulder	Baseline Road/Holt Road	Holt Road (at OPG Darlington) to Baseline Road/Green Road	2.70	\$175,000	\$472,500

Cycling Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Bowmanville	Cycle Lane	Baseline Road	Martin Road to Lambs Road	3.30	\$20,000	\$66,000
Bowmanville	Cycle Lane	Aspen Springs Drive	Bonnycastle Drive to Regional Road 57	0.17	\$20,000	\$3,400
Bowmanville	Signed / Shared Lanes	Lake Road/Port Darlington	Liberty Street to Port Darlington/East Beach Road	1.60	\$15,000	\$24,000
Bowmanville	Cycle Lane	Longworth Avenue	Green Road to 400m east of Regional Road 57	1.26	\$20,000	\$25,200
Bowmanville	Cycle Lane	Longworth Avenue	Don Morris Court to Laurelwood Street	0.45	\$20,000	\$9,000
Bowmanville	Cycle Lane	Longworth Avenue	Argent Street to Mearns Avenue	1.00	\$20,000	\$20,000
Bowmanville	Cycle Lane	Concession Road 3	Regional Road 57 to Mearns Avenue	2.50	\$20,000	\$50,000
Bowmanville	Cycle Lane	Middle Road	Bowmanville North Boundary to Bons Avenue	1.40	\$20,000	\$28,000
Bowmanville	Cycle Lane	Scugog Street	Fourth Street to Concession Street	0.80	\$20,000	\$16,000
Bowmanville	Clarington / Region Initiative	Regional Road 57	Stevens Road to Aspen Springs Drive (Future GO Station)	0.75	\$20,000	\$15,000

Cycling Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Bowmanville	Signed / Shared Lanes (Clarington / Region Initiative)	Liberty Street	Concession Road 3 to Longworth Avenue	0.75	\$15,000	\$11,250
Bowmanville	Cycle Lane	Concession Street	Liberty Street to Mearns Avenue	0.80	\$20,000	\$16,000
Bowmanville	Cycle Lane	Lambs Road	Rail Crossing to Baseline Road	3.10	\$20,000	\$62,000
Bowmanville to Newcastle	Signed / Shared Lanes	Concession Street/Arthur Street	Mearns Avenue to Arthur Street / Regional Highway 2	9.40	\$15,000	\$141,000
Newcastle	Cycle Lane	Rudell Road/Edwards Street	Rudell Road / Regional Highway 2 to Edward Street / Brookhouse Drive	1.40	\$20,000	\$28,000
Newcastle	Cycle Lane	Mill Street	Edward Street to Highway 401	0.35	\$20,000	\$7,000
Newcastle	Signed / Shared Lanes	Mill Street	Highway 401 to Toronto Street	0.29	\$15,000	\$4,350
Newcastle	Multi Use Path	Mill Street	Toronto Street to Port of Newcastle Drive	0.26	\$350,000	\$91,000
Newcastle	Cycle Lane	Brookhouse Drive	Regional Highway 2 to Edward Street	0.35	\$20,000	\$7,000
Newcastle	Clarington / Region Initiative	Mill Street/North Street	Concession Road 3 to Edward Street	2.50	\$20,000	\$50,000

Cycling Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Newcastle	Clarington / Region Initiative	Regional Highway 2	Rudell Road to Brookhouse Drive	1.60	\$20,000	\$32,000
Total Cost						\$3,714,250

Table 6.2: Budget Cost Estimates for Proposed Off Road Trails

Future Trails Network						
Community	Facility Type	Route	Location	Estimated Facility Length (km)	Estimated Unit Cost (\$/km)	Cost (\$)
Courtice	Key Off Road Trail	Farewell Creek	Townline Road to Varcoe Road	4.00	\$462,500	\$1,850,000
Courtice	Off Road Trail	Robinson Creek	East of Townline Road to Trulls Road (north of Regional Highway 2)	2.80	\$385,714	\$1,080,000
Courtice	Off Road Trail	Lake Side Trail	Courtice Road (south of Darlington Park Road) to Osborne Road	2.20	\$395,456	\$870,000
Bowmanville	Off Road Trail	North of Stevens Road	Regional Road 57 (at Stevens Road) to Green Road (north of Brookhill Boulevard)	1.00	\$350,000	\$350,000
Bowmanville	Off Road Trail	Bowmanville Creek	Existing Trail to Nash Road	3.30	\$365,152	\$1,205,000
Bowmanville	Off Road Trail	Soper Creek	Liberty Street (south of rail crossing) to Barley Mill Crescent	2.80	\$367,857	\$1,030,000
Bowmanville	Off Road Trail	Lake Side Trail	East Beach Road to Waterfront Trail	1.25	\$350,000	\$437,500
Bowmanville	Off Road Trail	Bowmanville Creek	Baseline Road to Waterfront Trail	0.60	\$585,000	\$351,000
Total Cost						\$7,173,500

In addition to the network infrastructure implementation costs that were outlined in **Table 6.1** and **6.2**, funding will also be required to support the implementation of wayfinding and route signage, promotional and marketing activities (development and printing of maps), and the provision of bicycle racks and other amenities. It is recommended that a fixed annual budget is allocated to the support of such non network infrastructure related initiatives. The types of initiatives that would qualify for funding and the funding limits and conditions can be established and reviewed annually by the Active Transportation Advisory Committee.

6.2 Transit



The CTMP has stressed the importance of shifting more trip making to transit and increasing the existing Municipal transit mode share of 4.4% in the AM peak period to 5.5%, although a shift to an 8.8% mode split would be an aspirational target that would require significant transit investment beyond that included within the CTMP.

Shifts to transit are particularly important within the rapidly growing urban areas of Courtice, Bowmanville, and Newcastle where there are opportunities to encourage more dense transit oriented development within Centres and along Corridors. It is recognized that the planning and operation of transit services is not under the Municipality's jurisdiction and as such the Municipality will continue to work with Durham Region and Durham Region Transit (DRT), the Province and Metrolinx, and the Federal Government to ensure that continuous and necessary transportation investments are made within Clarington. It will be critical for the Municipality to work closely with these agencies to ensure both funding availability and a well-co-ordinated implementation effort.

The following planned investments in new transit infrastructure by Metrolinx / GO Transit and DRT are seen as key opportunities for the Municipality. The policy and network recommendations of this TMP have been developed to leverage and take advantage of these significant investments. The Municipality will be a strong advocate for these projects and will articulate their expected benefits and provide inputs into the business case development process (as required) in order to advance each project as part of the "Next Wave" of the Big Move or other future yet to be determined funding mechanisms.

- **GO Rail Extension to Bowmanville:** The Municipality will work with Metrolinx / GO Transit to secure funding commitments for early implementation of the planned extension of GO Rail service to Clarington. The future GO Rail station sites in Courtice and Bowmanville will be stressed as being critical to achieving many of the objectives of both the CTMP and the concurrent Official Plan Review.
- **Regional Highway 2 Higher Order Transit to Courtice:** The Municipality will work with Durham Region to secure funding commitments for early implementation of the planned extension of higher order transit (BRT or LRT) along Regional Highway 2 into Courtice. The Municipality will also advocate for the potential further extension of higher order transit along Regional Highway 2 through to the Bowmanville GO Rail station.

The Municipality will also encourage DRT to increase existing service frequencies and to reduce the usage of looping routes within the urban areas of Clarington. Furthermore, the Municipality will advocate for the provision of conventional bus service to existing urban areas where service gaps currently exist (i.e., no service within typical walking distance of 400m) and to expand services to new growth areas during the initial stages of development. It is critical that alternatives to the automobile are available at the time of occupancy before auto-oriented habits are established. The Municipality will work with DRT in order to demonstrate the benefits and estimate the potential ridership gains that would be realized as a result of proposed service enhancements and expansions in order to secure DRT Commission funding approval.

Finally, the Municipality encourages GO Transit to maintain and potentially increase the frequency of the existing bus service that connects Courtice, Bowmanville, and Newcastle. It is expected that this service will continue to be an important Transit Spine when the GO Rail extension is in place and the Municipality will work with GO Transit and DRT to ensure that a high quality transit service is maintained along this corridor.

As noted previously, the Municipality needs to assume a strong support role in facilitating transit use by undertaking the following responsibilities, ultimately creating transit-friendly communities:

- Promote higher density and mixed-use development in growth centres / intensification areas and along transit corridors.
- Develop a municipal mobility hub plan for both of the proposed new GO stations (consistent with the recommendations of the Growth Management Discussion Paper prepared in support of the Official Plan Review).

- Focus new office / commercial development in locations served by rapid transit or high frequency bus service.
- Secure accommodation for bus loops or terminal facilities during development or intensification of land parcels where such transit facilities are required to support improved transit.
- Ensure that new developments provide required physical infrastructure to support transit, such as bus pads and sidewalks, as early as possible during development. Development should be phased to support introduction of transit service during early development phases.
- Provide mid-block collectors in new growth areas for local bus routes.
- Expand the pedestrian and cycling network to ensure improved transit access.
- Focus TDM programs on the need for a modal shift to transit.

6.3 Transportation Demand Management (TDM)

The TDM policies and programs proposed in this TDP serve to build on and enhance the impact of the previously discussed roadway network, active transportation, and transit initiatives. Indeed, it is a top priority for the Municipality to manage congestion and support initiatives that will reduce the growth in auto travel demands.

To support the successful implementation of TDM in Clarington and potentially delay or avoid the need for additional costly infrastructure improvements, it is recommended that the Municipality designate an individual or group to champion TDM at the Municipal level. Although it is recognized that Metrolinx and Durham Region will continue to lead TDM programming at the Regional level through Smart Commute Durham, the Municipality is in a unique position to assume a leadership role at the local level and directly work with employers through already established contacts at the Municipality's Planning Departments and Board of Trade and Office of Economic Development.

The TDM champion would be responsible for the development, implementation, co-ordination, marketing, and monitoring of Municipal TDM initiatives. It will also be important for the champion to develop strong working relationships with the various public sector agencies that have a stake in TDM, including Smart Commute Durham, the Region of Durham, Metrolinx, school boards, MTO, DRT, and other Municipality of

Clarington departments. As a first step, the champion would be expected to establish a showcase TDM program for the Municipality of Clarington's employees with the assistance of Smart Commute Durham. Similarly, the Municipality should focus on encouraging major employers with 50 or more employees to take advantage of Smart Commute Durham's existing free programming. A modest annual fund could also be established to market and promote TDM options at special events and to recognize Municipality of Clarington employees and Clarington employers that have adopted smart and efficient commuting choices.

At first, it is expected that the TDM champion would consist of a group of existing Municipal staff members with a broad knowledge of the issues that are facing the users of Clarington's multi-modal transportation system (motorists, pedestrians, cyclists, transit users). As the TDM program develops and its benefits are more fully realized and documented, the Municipality may eventually consider hiring a full time TDM Lead that would be responsible for co-ordinating and overseeing implementation and monitoring of the Municipality's TDM program. A combined Active Transportation and TDM Lead position may also be considered since the promotion and implementation of TDM is complementary to and serves to further enhance investments in Active Transportation. Further, the scope of the TDM Lead position alone may not be sufficient to justify the hiring of a dedicated staff member.

6.4 Road Network Infrastructure Priorities and Costing



To guide the municipality in managing the implementation of the infrastructure plans recommended in the CTMP, a suggested timing for recommended projects has been developed based on:

- Committed projects currently budgeted in the Region of Durham 2013 Development Charge Study / Capital Works Program.
- Forecasts of transportation demands for interim horizon years and assessment of when the improvements are required to address deficiencies. The horizon years assessed for road improvement costs include:
 - Short Term (2015 to approximately 2021)

- Medium Term (approximately 2021 to horizon year 2031)
- Long Term (beyond horizon year 2031)
- The need to undertake future Class EA studies to determine the recommended design for road improvements projects. Subsequent Class EA projects will be required for the recommended Schedule B and C projects as the Municipality of Clarington moves forward with implementation. As such, more detailed investigations will be carried out as part of the specific Schedule B and C projects. In addition, the Schedule B projects would require the filing of a Project File for public review while the Schedule C projects would have to fulfill Phases 3 and 4 prior to filing an Environmental Study Report for public review.
- The desire to distribute capital budget requirements across the life of the plan.

The Municipality of Clarington may choose to implement the recommended projects in a different order or phasing than has been suggested in the Master Plan in order to accommodate other council priorities such as the need to coordinate with other infrastructure works, planned developments in the area, or other considerations beyond the scope of this project.

Short and Medium Term Projects

The capital funding requirements for the proposed road improvements identified for the TMP are summarized in **Table 6.3** for short term (2015 to approximately 2021) and medium term (approximately 2021 to horizon year 2031) time horizons.

While **Table 6.3** provides the summary of overall project cost and length, the detailed cost tables are included in Appendix. Where project length is not indicated in **Table 6.3**, there is more than one project included in this item.

Table 6.3: Road Network Improvement Plan & Priorities

Community	Road	Location	Type of Improvement	Source	EA Schedule	Estimated Length (km)	Cost (\$2014)
Short Term (2015 to approximately 2021) Road Improvements							
Bowmanville	Regional Highway 2 / King St	at Scugog St	Operational Improvement (Roadworks)	CTMP	A+	0.02	\$93,000
Bowmanville	Baseline Rd	Mearns Ave/Court to Holt Rd	Upgrade Standards/Bridge Construction	CTMP/COP	C	5.79	\$21,355,000
Bowmanville	Concession Rd 3	Mearns Ave to 90 m west of Jollow Dr	Upgrade Standards	CTMP/COP	B	-	\$1,454,000
Subtotal Cost (2015 to approximately 2021)							\$22,902,000
Medium Term (approximately 2021 to horizon year 2031) Road Improvements							
Bowmanville	Longworth Ave	West of Bowmanville Creek to Regional Rd 57	Widening to 4 lanes	CTMP/COP	C	0.36	\$1,668,000
Bowmanville	Longworth Ave Extension (a and b)	Regional Rd 57 to Bowmanville West Urban Boundary	New Arterial 4 lanes	CTMP/COP	C	1.26	\$2,174,000
Bowmanville	Longworth Ave Extension (a) ⁶	Bowmanville West Urban Boundary to Holt Road	New Arterial 4 lanes	CTMP	C	1.33	\$2,295,000
Bowmanville	Longworth Ave Extension (b) ⁶	Bowmanville West Urban Boundary to Maple Grove Road	New Arterial 4 lanes	CTMP	C	0.47	\$810,000
Bowmanville	Holt Rd ¹	Longworth Ave Extension (a) to Regional Highway 2	Widening to 4 lanes	CTMP	C	0.24	\$1,112,000
Bowmanville	Holt Rd ¹	Regional Highway 2 to Bloor St	Upgrade Standards	CTMP	B	0.71	\$2,294,000

Bowmanville	Holt Rd	Bloor St to Baseline Rd	Upgrade Standards	CTMP/COP	B	1.94	\$6,267,000
Bowmanville	Holt Rd ⁵	Baseline Rd to north limit of Holt Road interchange	Widening to 4 lanes	CTMP/COP	C	1.00	\$2,432,000
Bowmanville	Maple Grove Rd ²	Longworth Ave Extension (b) to Bloor St	Widening to 4 lanes	CTMP	C	1.12	\$5,189,000
Bowmanville	Bloor St ²	Maple Grove Rd to Holt Rd	Upgrade Standards	CTMP	B	0.82	\$2,672,000
Bowmanville	Baseline Rd ³	Lambs Rd to Waverley St	Widening to 4 lanes	CTMP/COP	C	2.90	\$13,437,000
Bowmanville	Lambs Rd ³	Regional Highway 2 to Baseline Rd	Widening to 4 lanes	CTMP/COP	C	0.67	\$3,104,000
Subtotal Cost (approximately 2021 to horizon year 2031) -- Longworth Avenue Extension (a)							\$39,693,000
Subtotal Cost (approximately 2021 to horizon year 2031) -- Longworth Avenue Extension (b)							\$41,788,000
Total Cost -- Longworth Ave Extension (a) in place⁴							\$62,595,000
Total Cost -- Longworth Ave Extension (b) in place⁴							\$64,690,000

Notes:

3) Only required if Lambs Road / Highway 401 interchange is built

1) Only required if Longworth Ave Extension (a) is built

4) Property costs are excluded from these calculations

2) Only required if Longworth Ave Extension (b) is built

5) Upgrades to the Holt Road/Highway 401 interchange are not included in cost estimates

6) Longworth Avenue Extension (a) and Longworth Avenue Extension (b) projects are exclusive; only one of these projects will go forward, not both

Recommended Projects currently in Capital Works Program

The following road network projects are recommended in the CTMP, but have already been accounted for in the Capital Budget. Thus, the costs for these projects are not included in **Table 6.3**.

- Regional Highway 2/King Street: Operational Improvement (signal improvements)
- Baseline Road (Lambs Road to Mearns Avenue): Upgrade Standards from Rural to Urban Collector
- Concession Road 3 (Regional Road 57 to Middle Road): Upgrade Standards from Rural to Urban Collector
- Concession Road 3 (Middle Road to Liberty Street): Upgrade Standards from Rural to Urban Collector
- Concession Road 3 (Liberty Street to 90m west of Jollow Drive): Upgrade Standards from Rural to Urban Collector
- Longworth Avenue (Scugog Street to Regional Road 57): Road Oversizing³⁰

Other Projects: Lambs Road Interchange

In addition to the road network improvements outlined in **Table 6.3** for the medium term period, a new highway interchange at Lambs Road will also be required by approximately year 2021, along with Highway 401 interchange closures at Liberty Street and Bennett Road. Prior to implementation, the Lambs Road interchange will require further study and discussion with MTO. The road widening on Lambs Road and Baseline Road recommended for the medium term horizon will only be required when the Lambs Road interchange is implemented, as these initiatives are intended to shift traffic to use the new interchange. It is estimated that the Lambs Road Interchange would cost approximately \$25 million (including property costs).

Grade Separations

³⁰ "Road Oversizing" is a term that references developer responsibility. All roads internal to a development are a direct developer responsibility under Section 59 of the Development Charge (DC) Act as a local service built to a width up to and including ten metres. The cost for roads constructed to a greater width are included in the road oversizing portion of the DC calculations, excluding property costs.

As identified in Section 5.6, potential road-rail grade separations were identified by comparing the cross-product of the number of daily trains and the AADT crossing the tracks for horizon year 2031; if greater than 50,000, the crossing is identified as having a potential need for future grade separation. The crossings that exceed this 50,000 cross-product threshold include:

- CP Rail crossings at Concession Street East, Mearns Avenue, Scugog Street, Maple Grove Road, Holt Road, Baseline Road (Rundle Road to Holt Road), and Baseline Road (Courtice Road to Hancock Road).
- CN Rail crossings at Port Darlington Road

Long Term Network Improvements

The long term (beyond horizon year 2031) transportation improvements for the Clarington road network are listed in **Table 6.4**. The 2031 future traffic forecasts did not reveal the need for these improvements, which are currently included in the COP, in the short or medium term, but it is recommended that the municipality protect for these corridors beyond 2031.

Table 6.4: Long Term Road Network Improvements (COP Projects Beyond 2031)

Road	Location	Jurisdiction
Baseline Road Extension and upgrades	Bennet Road to Kurve Inn Road / Regional Highway 2	Clarington
Bloor Street / Baseline Road connection	Bloor Street / Solina Road to Baseline Road west of Maple Grove Road	Clarington
Concession Road 3 Realign to Concession Road 4	Darlington-Clarke Townline	Clarington
Concession Road 9 Connection/Realignment	Enfield Road to Concession Road 9	Clarington
Courtice Road/Enfield Road Connection	Courtice Road / Taunton Road to Enfield Road (South of Proposed Highway 407)	Durham Region
Lambs Road Extension	Lambs Road/Concession Road 4 to Bethesda Road	Clarington

Road	Location	Jurisdiction
Longworth Avenue Extension	Mearns Road to Providence Road	Clarington
Nash Road Extension	New bridge crossing over Bowmanville Creek, connecting at Concession Road 3	Clarington
New Type C Arterial Road	South of Concession Road 4, Regional Road 57 to Lambs Road	Clarington
New Highway 401 Interchange	Prestonvale Road / Highway 401	MTO
Pebblestone Road	Courtice Road to Solina Road	Clarington
Townline Road Connection	Concession Road 6 to Regional Road 3	Clarington/Oshawa
Townline Road Extension	Southport Drive to Prestonvale Road	Durham Region

6.5 Additional Studies

As identified in **Table 6.3**, several of the recommended projects are classified as Schedule C. According to the Class Municipal Environmental Assessment (EA) process, additional studies (i.e., EAs) are required to obtain approval to proceed with project implementation. In accordance with the Municipal Class EA, these studies are required to consider all provincial and municipal policy direction. As such, the policies, goals and objectives of the Central Lake Ontario Conservation Authority's (CLOCA) Action Plans are to be considered as part of future infrastructure planning. These include Wildlife Corridor Protection and Enhancement Plan and relevant Watershed Plans.

The six identified Schedule C projects, all located within or adjacent to Bowmanville, are as follows:

7. Baseline Road from Mearns Avenue to Holt Road – Upgrade Standards/Bridge Construction
8. Baseline Road from Lambs Road to Waverly Street – Widening to 4 lanes
9. Longworth Avenue Extension (A):

- Longworth Avenue Extension (a and b) from Regional Road 57 to Bowmanville West Urban Boundary – Widening to 4 lanes
- Longworth Avenue Extension (a) from Bowmanville West Urban Boundary to Holt Road – New Arterial 4 lanes
- Holt Road from Longworth Avenue Extension (a) to Highway 2 – Widening to 4 lanes

Longworth Avenue Extension (B):

- Longworth Avenue Extension (a and b) from Regional Road 57 to Bowmanville West Urban Boundary – Widening to 4 lanes
- Longworth Avenue Extension (b) from Bowmanville West Urban Boundary to Maple Grove Road – New Arterial 4 lanes
- Maple Grove Road from Longworth Avenue Extension (b) to Bloor Street – Widening to 4 lanes

10. Holt Road from Baseline Road to north limit of Highway 401 interchange – Widening to 4 lanes

11. Lambs Road from Regional Highway 2 to Baseline Road – Widening to 4 lanes

12. Lambs Road Interchange

Note that Longworth Avenue Extension (A) and Longworth Avenue Extension (B) are alternate road network options that are to be assessed in the same Schedule C Class EA project.

6.6 Official Plan Amendment

The CTMP is not a statutory document and therefore has no legal status. The core recommendations of this plan must be incorporated into the COP in order to provide a statutory basis for the application and enforcement of the transportation policies contained in the CTMP and to ensure long term protection for proposed new and widened transportation corridors (i.e., protection from encroachment due to development). As previously discussed in **Section 2.2.7**, the development of the CTMP has taken place concurrently with the Municipality's comprehensive Official Plan Review. The CTMP study team has actively co-ordinated with the Official Plan Review

team and has provided input into the updates required to make Section 19 “Transportation” of the COP consistent with the policy and infrastructure recommendations of this TMP. Key updates to Section 19 of the COP include the following, with the specific recommendations and / or outcomes to be achieved through the CTMP noted in support of the policy revisions:

- **Transportation Maps** J1 through J4, which depict existing and proposed roadways and major transit lines, were updated to reflect the long-term network recommendations of the CTMP.
 - **CTMP Recommendations and / or outcomes:** the CTMP recommends three short-term and 12 medium-term projects identified by the applicable Municipal Class EA Schedule (refer to Table 6.3), and also highlights two potential future road/rail grade separations (refer to Section 6.4). The CTMP recommends corridors to be protected for long-term network improvements (refer to Table 6.4). The CTMP recommends revising the following Road Network policies (refer to Section 5.4.5)
 - **Truck Routes:** Currently, trucks are permitted to use posted municipal roads. Future TMP updates should consider at what point a more comprehensive truck route system would be applicable.
 - The intersection of Regional Road 57 / Concession Road 3 is proposed to be reconfigured which would result in North Scugog Court being converted into a cul-de-sac and Concession Road 3 connecting directly with Regional Road 57.
- **New Active Transportation Maps** (K - Trails), which depict existing and proposed on and off-road cycling facilities, were developed to support the implementation of a interconnected and continuous system of routes in Clarington.
 - **CTMP Recommendations and / or outcomes:** Develop a detailed Active Transportation Plan based on the recommendations of the CTMP (refer to Table 6.1 – Proposed Cycling Facilities and Table 6.2 – Proposed Off-Road Trails). The Active Transportation Plan should determine a detailed phasing of various network components of the Active Transportation System that is tied to the Municipality’s overall roadway maintenance and improvement program.

- Policies prioritizing the **implementation of the Active Transportation Network** as part of roadway maintenance and improvement projects and as part of the development approval process.
 - **CTMP Recommendations and / or outcomes:** It is recommended that the Municipality establish a new Active Transportation Advisory Committee (refer to Section 6.1). The Committee would advise Council on active transportation matters, and be responsible for the monitoring of the implementation of the network components of the Active Transportation System, liaising and consulting with active transportation stakeholders, and providing input into the development of policies and programs that support and market active transportation.
- Policies supporting an **increased role for active transportation**, including implementing “Share the Road” signage for on-road network components, implementing wayfinding signage to key destinations, requiring bicycle storage facilities as a condition of approval for site plans, maintaining Key Trails during the winter, and establishing an Active Transportation Advisory Committee.
 - **CTMP Recommendations and / or outcomes:** Section 5.1 of the CTMP outlines key considerations under the headings of: Network Connectivity, Travel Time, Cost / Affordability, Maintenance, Safety, Design Standards, Trip End Facilities, and Marketing. Two strong recommendations identified in this section are the requirement for regular maintenance of shoulders, surface pavement, pot holes and road grates to ensure a high-quality riding surface (for cycling facilities), as well as the proper visibility (design), signage and paint markings for alerting drivers to the presence of cyclists to improve safety.
- Policies encouraging the use of **Complete Streets principles** in new capital projects and planning initiatives, particularly within Centres and Corridors.
- Policies encouraging the more efficient use of the existing transportation system and reducing the dependency on the single occupant automobile via a **Transportation Demand Management (TDM) program**.
 - **CTMP Recommendations and / or outcomes:** The CTMP recommends that the Municipality designate an individual or group to champion TDM at the Municipal level, to support the successful implementation of TDM policies and programs, such as the following:

- Work closely with Metrolinx and the Region of Durham to support Smart Commute Durham, promote TDM and monitor implementation and the benefits of TDM measures throughout Clarington.
 - Co-host special events with Smart Commute Durham
 - Take a lead role in supporting the Municipality's large employers in implementing trip reduction
 - Encourage the Region and Smart Commute Durham to develop and implement school-based TDM programs at both the elementary and high school
 - Lead by example through establishing a visionary TDM program for the Municipality of Clarington
 - Develop a parking strategy for Bowmanville
 - Promote existing carpool lots and support the development of new lots
 - Require TDM Plans for major developments
- Policies encouraging the early funding and implementation of the planned **GO Rail extension** to Courtice and Bowmanville and **higher order transit along Regional Highway 2** into Courtice.
 - **CTMP Recommendations and / or outcomes:** The Municipality will work with Durham Region and Metrolinx to review and support the implementation of these recommended services (refer to Section 5.2.) as part of DRT and GO Transit to achieve a target overall transit mode share of 9% by 2031 (in-line with the forecasts of the Durham Region model).
- Policies requiring the adoption of **transit oriented development principles**, particularly for locations in close proximity to a Transportation Hub or Commuter Station, including complementary higher density and mixed uses, buildings oriented towards the street, ensuring more direct access pedestrian and cyclist access to transit stops, and limiting surface parking.

6.7 CTMP Monitoring and Updates

The success of long-range plans depends on the ongoing monitoring of relevant conditions, actions, and impacts. The Municipality of Clarington must remain aware of

its progress toward key objectives, so that it can add, modify, or delete priorities as needed.

Through the study, the municipality has adopted a transportation strategy and laid out a plan to attain the particular transportation goals associated with it. As identified in the plan, a number of transportation capital works projects would be required, along with an aggressive program of other initiatives. Many of these components of the plan are based on prevailing attitudes of Clarington residents and forecasted future travel demands over the transportation network based on future land use development patterns. The Plan must be able to respond to changes in these factors that might affect demand or the emphasis placed on alternative modes of transportation.

Ongoing monitoring would also be necessary in determining the effectiveness of the initiatives identified in the plan in meeting the adopted strategic direction. Ideally the performance measures can be tied to broader municipal management measures such as, the Municipal Performance Measurement Program (MPMP).

A TMP is not intended to be a static document and must retain some measure of flexibility and be adaptable to changes in the travel behaviour, and other conditions in Clarington. As growth and economic conditions change over the next few years the municipality should consider the need to update the CTMP to take advantage of or reflect changes beyond the scope of this study. This can be best accomplished through ongoing monitoring of relevant conditions and periodic updates to the Travel Demand Model and Master Plan.

The following recommendations should be considered in the ongoing monitoring of transportation conditions in Clarington:

Turning Movement Counts (TMC) – Particularly at intersections where there are known issues, or at intersections adjacent to new development areas, regular intersection count is beneficial to:

- Track changes over time;
 - Determine when or if intersection control revisions are required;
 - Determine if pedestrian signals or other pedestrian requirements need to be filled;
 - Assess truck volumes; and

- Assess queues, etc.

Transportation Tomorrow Survey (TTS) - The Region and municipality should also continue to participate in the TTS, undertaken every 5 years, to provide an update of transportation patterns in Clarington and surrounding areas and to ensure that up to date information is available to assess changing transportation trends in the community.

Monitoring the usage of bicycles – As part of the development of the cycling routes, the use of bicycles on both on- and off-road facilities will assist with determining priorities for new or upgraded facilities. Annual reporting on the use of active transportation facilities and any increase in mode share to active transportation modes would assist with determining direct benefits of improved facilities.

Transportation Plan Review & Updates

As noted previously, a TMP is not intended to be a static document and must retain some measure of flexibility and be adaptable to changes in the travel behaviour, and other conditions in Clarington.

It is recommended that the CTMP be reviewed and / or updated every 5 years, in conjunction with statutory requirements to review the Official Plan. Given the close integration between land use planning, land use policy, and transportation; any updates to the CTMP should be undertaken in conjunction with the Official Plan Update.

As public consultation is a key input to the completion of a strategic TMP, all future CTMP updates should include a proactive and comprehensive public outreach program featuring formal Public Consultation Centres, stakeholder workshops, and other innovative outreach strategies to solicit input from a wide cross section of the Community.

6.8 A Sustainable Clarington Transportation Master Plan

Section 1.4.1 of this report outlined 12 principles for Sustainable Transportation Planning. The following is a summary indicating how this TMP addressed each of these principles through the course of this study.

Transportation and Community Sustainability

- Principle 1: Integrate transportation & land use planning

- To determine the future transportation network needs and develop the recommendations for the future road network, the future growth forecasts for population and employment to horizon year 2031 were considered (refer to Section 4.1)
- Principle 2: Protect environmental health
 - The proposed long-term road network improvements were evaluated against criteria and indicators developed in consultation with the public and stakeholders. These criteria include Technical, Social/Cultural Environment, Natural Environment, and Economic categories, with specific indicators assigned to each, as outlined in Table 5.7. The evaluation results are provided in Table 5.9.
- Principle 3: Incorporate social objectives
 - In addition to the evaluation of alternatives based on social/cultural criteria, as noted under Principle 2, social objectives are incorporated into the CTMP through strong recommendations for policy improvements to support Active Transportation development, and specific projects recommended to be undertaken in support of the Active Transportation network (refer to Section 6.1)
- Principle 4: Support economic development
 - In addition to the evaluation of alternatives based on economic criteria, as noted under Principle 2, support for economic development is achieved through the CTMP through recommendations to improve traffic operations and localized bottlenecks, such as the intersection improvements outlined in Section 5.5.4.

Transportation System Perspective

- Principle 5: Take a strategic approach
 - The CTMP itself is a strategy for Clarington to follow to achieve a sustainable transportation network; the strategies for Active Transportation, Transit Service, Transportation Demand Management, Long-Term Network Improvements, Intersection Operations, and Grade Separations (at Rail Crossings) are outlined in Section 5. Clarington's Strategic Plan is also noted in Section 2.2.6, and Priority #5 – Invest in Infrastructure has several action items that are relevant to the CTMP.

- Principle 6: Consider all modes
 - The CTMP considers travel by active transportation (primarily walking and cycling, transit (both bus and rail), and vehicle (including personal vehicles and heavy trucks), as outlined in Section 5.
- Principle 7: Manage transportation demand
 - Section 5.3 of the CTMP outlines policy alternatives and recommendations for implementing TDM measures.
- Principle 8: Manage transportation supply
 - Section 5.4 of the CTMP outlines the long-term road network capacity improvements. In making recommendations for the “Transportation Supply”, there is a great effort to minimize infrastructure costs, and manage the existing infrastructure as best as possible to meet future demands.

The Way Ahead

- Principle 9: Provide implementation guidance
 - Section 6 of the CTMP is the Implementation Strategy, which provides guidance to the Municipality for the implementing the study recommendations
- Principle 10: Provide financial guidance
 - Section 6.1 and 6.4 of the CTMP outlines infrastructure priorities and costs, providing the Municipality with a guide for recommended cycling and road network infrastructure improvements, respectively.
- Principle 11: Measure performance
 - Section 6.7 of the CTMP speaks to monitoring improvements and updating the plan.
- Principle 12: Create a living plan with public involvement
 - As with this update of the CTMP, the CTMP will continue to be updated on a regular basis, and each update will incorporate public consultation, as per the requirements of the Municipal Class Environmental Assessment Process.

Appendix A

Public Consultation

- **Notice of Assessment**
- **Public Information Centres**
- **Agency Comments**
- **Stakeholder Meeting**



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February 12, 2013

Mr. Ron Albright, P.Eng
Manager Infrastructure and Capital Works
Municipality of Clarington
40 Temperance Street,
Bowmanville, ON L1C 3A6

Dear Mr. Albright:

Subject: Clarington Transportation Master Plan (CTMP) – PIC #1; IMS: PGDG39

The Central Lake Ontario Conservation Authority offers the following comments with respect to the CTMP. CLOCA is interested in this project and would like to receive future notices and information associated with this project.

Watershed Plan Recommendations Specific to Transportation and Infrastructure Projects

The Watershed Plans for Oshawa, Black/Harmony/Farewell and Bowmanville Soper are either finalized or very close to completion. These Watershed Plans identify a connected Natural Heritage System (NHS) which is vital to ensuring a healthy watershed. Landscape, regional and local corridors which support wildlife and aquatic movement are included as components of the NHS. To ensure a healthy, diverse and sustainable watershed, it is important that the function of these corridors, and the NHS, continue. The "Wildlife Corridor Protection and Enhancement Plan" is one of the Action Plans that CLOCA will carry out to implement recommendations of the Watershed Plan. This Action Plan will include a corridor assessment and barriers to movement analysis (based upon existing conditions) to identify corridor enhancement, culvert improvement and stewardship opportunities. This work is underway and will be available to the Municipality when completed.

Policy recommendations contained in the Watershed Plans advocate that where possible, new transportation and infrastructure projects should either avoid wildlife corridors or demonstrate that the project will not create a barrier. Past monitoring work carried out by CLOCA at Lynde Shores Conservation Area along Victoria Road clearly exhibits the adverse impact roads have on wildlife movement. A summary of the results of this monitoring is attached. While avoiding

Page 1 of 4

What we do on the land is mirrored in the water



Mr. Ron Albright
Municipality of Clarington

February 12, 2013
Page 3

wildlife corridors may not always be possible, it is asked that adequate crossing provisions be provided in new infrastructure and transportation projects. The same consideration is requested for existing infrastructure improvement projects, including elimination of any existing barriers to wildlife/aquatic movement.

A number of recommendations and policies supporting the protection and enhancement of the NHS are provided in the Watershed Plans. There are also some voluntary policies which reference transportation projects (V4, V7, V14, V20, V27) and speak to the design, operation, repair/upgrade, and management of these facilities in a manner consistent with the principles of the Watershed Plan. Recognition and consideration of the Watershed Plan objectives and applicable policies in the CTMP to guide the planning and implementation of future transportation projects is recommended. The Watershed Plans are available on CLOCA's website and copies have been made available to the Clarington Planning Department.

General Comments

Attached is a copy of correspondence addressed to the Region of Durham dated February 2008 offering comments on "Growing Durham". Please refer to Page 3 of this letter as comments regarding future roads within the Municipality of Clarington still apply.

It was noted at the Feb 7, 2013 PIC that the south portion of Bethesda Road, between Taunton and Concession Road 4, currently jogs west, distancing the road from significant natural areas and Stephen's Gulch Conservation Area. The future North – South alignment of Bethesda connecting it directly to Lambs Road would have an impact on the significant natural areas in Stephen's Gulch. It is requested that this future alignment be removed from the mapping.

A future proposed trail along the Farewell Valley (between Highway 2 and Bloor) was identified and is directed south, ending in the vicinity of Pebble Beach Road and Pinedale Crescent. It is suggested that the trail continue along the valley which would facilitate any future valley trail connections across municipal jurisdictions. Trails within valleys will be subject to CLOCA implementation of Ontario Regulation 42/06 "Development, Interference with Wetlands and Alteration to Shorelines and Watercourses". Trails are permitted within the NHS provided there will be no negative impact to the features and functions of the system.

The mapping presented at the PIC identified some of CLOCA's Conservation Areas, but did not identify all 5 of our Conservation Areas within the Municipality of Clarington. Nor was the mapping of the Conservation Areas up to date as it did not include lands the Authority has purchased in the last 3-4 years. In an upcoming transfer of data from CLOCA to the Municipality, the latest information will be available. In future, if maps are to include components such as Conservation Areas, please contact CLOCA for the most recent data layers. Use of the most recent mapping layers is always appreciated.



Mr. Ron Albright
Municipality of Clarington

February 12, 2013
Page 3

If you have any questions regarding these comments, please contact myself. As the CTMP progresses and upon receipt of further information, CLOCA will be reviewing these documents and providing additional comments.

Sincerely,



Heather Brooks, MCIP, RPP
Director, Watershed Planning and Natural Heritage
Attachments

cc: Chris Darling, Director of Development Review & Regulation
Perry Sisson, Director of Engineering and Field Operations
Lisa Backus, Municipality of Clarington
Will McCrae, Project Manager, AECOM Canada Ltd.



Victoria Road Wildlife Mortality Survey

	2007	2008	2012
Amphibians	830	280	289
Birds	37	67	42
Insects	147	61	123
Mammals	41	68	70
Reptiles	15	37	29
<i>Snakes</i>	5	22	12
<i>Turtles</i>	10	15	17
TOTAL	1070	513	553
Monitoring Days	48	58	47



**Central
Lake Ontario
Conservation**

100 Whiting Avenue
Oshawa, Ontario
L1H 3T3
Tel: (905) 579-0411
Fax: (905) 579-0994

Web: www.cloca.com
Email: mail@cloca.com

Member of Conservation Ontario
February 20, 2008

Mr. Roger Saunders
The Regional Municipality of Durham
Planning Department
P.O. Box 623
605 Rossland Road East, 4th Floor
Whitby, ON L1N 6A3

Dear Mr. Saunders:

**Subject: Durham Region Growth Plan Implementation Study
Growing Durham – Our Future, Our Community
CLOCA IMS File: PSSG229**

A copy of the report entitled "Growing Durham, Growth Plan Implementation Study – Draft Phase 1 & 2: Summary of Understanding and Initial Analysis" has been reviewed by the Authority. This report examines Durham's existing structure, summarizes initial findings of Durham's growth forecast (residential and employment) and identifies preliminary land requirements to accommodate forecasted growth.

The report identifies that areas designated Greenfield in the Provincial Growth Plan excludes natural heritage features such as wetlands, woodlands, ANSIs, valleylands, habitat of endangered and threatened species, wildlife and fish habitat and as such have not been included in the Region's land supply. However, it is unclear as to whether the same consideration has been granted to the Authority's Conservation Areas and it is asked that the Region clarify this matter. It is also requested that the Region confirm whether the above noted natural features and the Authority's Conservation Areas, if located within the Built-up Area, have or have not been included or identified in the land supply for intensification purposes.

cont'd.....2



Seven principles that will govern and inform each potential growth scenario were presented in the report. One of these principles is "live in harmony with the environment". In order to fulfill this principle, the following objectives have been identified:

- Protect, maintain and enhance natural heritage features, functions and systems that are identified in the Regional Structure Plan.
- Protect the Major Open Space system that is identified in the Regional Structure Plan.

This is an important principle with reasonable objectives. However, it is unclear as to what is the "Regional Structure Plan". Is it the Durham Region Official Plan, or another document? Clarification regarding this would be appreciated.

The protection and enhancement of the Region's waterfront has also been identified as one of the seven principles. One of the objectives in achieving this principle is the protection of existing waterfront open space networks and the possible extension of this network. This objective is supported by the Authority and intensification of the waterfront was noted by CLOCA in previous correspondence as impacting bird migration patterns along the shore of Lake Ontario. In order to facilitate the principle of protection and enhancement of the Lake Ontario waterfront now and in the future, this objective should not only protect the existing waterfront open space network, but clearly provide for the protection of future opportunities to expand this open space network.

Despite this commendable objective, another objective is the encouragement of "complete community" development along the shore of Lake Ontario. There is no explanation or definition of "complete community", making it impossible to understand what this entails other than to speculate based on comments made on page 33 of the Report. It is here that it is identified that Durham's waterfront resource is not being "fully capitalized", indicating that the waterfront may be a significant component in achieving growth targets through medium to high density mixed use neighbourhoods. Balancing this type of growth and development with ensuring a continuous open space network both along the waterfront and northerly, will be a challenge.

Lastly, another principle identified in this document is that new infrastructure and servicing shall be planned in a manner that minimizes environmental impact. This is a laudable principle, one which is supported by CLOCA. It is important that the Region adheres to this principle, particularly when considering new roads, realignment of existing roads and road widenings. The Authority is quite concerned

Mr. Roger Saunders
The Regional Municipality of Durham

February 20, 2008
Page 3

about the identification of future roads, specifically the extension of Lyndebrook in Whitby, the extension/realignment of Concession Road 9 in Clarington and the future realignment of Regional Road 34 north of Taunton Road. The extension of Lyndebrook/Conlin would go through Heber Down Conservation Area effectively severing the Conservation Area. This Conservation Area comprises Provincially Significant Wetlands and a Provincially Significant ANSI. Severing the Conservation Area would have significant detrimental impact on the natural heritage features and functions contained within this Conservation Area, including reducing overall natural core habitat.

The extension/realignment of Concession Road 9 in Clarington would go through the recently acquired Enniskillen lands. These lands are indicative of ORM lands, exhibiting wetlands, steep valleylands and treacherous terrain. It is also noted that the Region contributed significant funds towards the acquisition of the lands. It would be detrimental to recent conservation activities, including acquisition of environmentally sensitive lands to extend a road through this area.

The alignment of Regional Road 34 (Courtice/Enfield Roads) is currently disrupted and it is proposed that these roads be connected. However the proposed realignment is very close to the Solina Bog. The Solina Bog is a provincially rare kettle peatland and is one of only 2 located south of the Oak Ridges Moraine in Durham Region. The Solina Bog has also been identified as a candidate Provincial Life Science ANSI. The Conservation Authority has been successful in identifying the significance of the Solina Bog to the Ministry of Transportation, with the result being acceptance of the need to adjust the proposed alignment of Highway 407 in the vicinity of the Bog.

It is acknowledged that the future road network information has been taken directly from Durham's Official Plan and is conceptual, but there begets a time to identify change and this is a good document in which to recognize the significant environmental features and functions that development of these roads would have to cross through. The time is now to no longer perpetuate past mapping, whether conceptual or not, and to eliminate these future roads from the mapping.

The recent release of the Region's proposed Recommended Servicing Strategy for Water and Wastewater Management identifies a proposed wastewater treatment facility adjacent to the Lynde Shores Conservation Area. This is of great concern to the Authority as the lands in this area are either owned by CLOCA or have been and continue to be, actively targeted for public ownership. In 2004, these lands were recognized as being of high natural value and a plan was implemented to protect them from future development. The Runnymede property, which is located directly

cont'd.....4

east of the proposed treatment plant, was acquired in 2004 as part of this plan using funds from both the provincial government and the Town of Whitby. The property on which the Region proposes to place a wastewater treatment plant is also within this acquisition area. The proposed recommendation of this Servicing Strategy seems to contradict 2 principles of the Growing Durham Report being that new infrastructure shall minimize environmental impact and that the Region's waterfront shall be protected and enhanced.

Specific Comments

The Regional Greenland System is identified in Section 3.1.4 as including the Major Open Space System, Oak Ridges Moraine, Waterfront Open Space and Prime Agricultural lands, noting that the Major Open Space System follows the path of major valley systems including the "Rouge, Duffins, Carruthers, Lynde, Oshawa, Harmony, Wilmot and Graham". The Bowmanville/Soper Creek valley system has not been identified, and the Harmony Creek should be identified as the Black/Harmony/Farewell Creek valley system. It is requested that this oversight be acknowledged and the necessary changes made.

Mapping Comments

In addition to comments already made regarding infrastructure mapping, the following questions with respect to Map 6: Proposed Long-Term Growth and Mobility Structure are provided.

What is the purpose of identifying Lakeridge Road south of Victoria/Bayly Road to Lake Ontario as a "connection"? It is unclear as to how this road will function as a "collector", particularly since the lands on either side of Lakeridge Road are in the Greenbelt.

Lakeridge Road north of Victoria/Bayly is identified as a "Connector – Parkway", and this "Connector – Parkway" goes through 75% of Audley Road Woods Conservation Lands. Clarification as to what is a "Connector – Parkway" is suggested. Until clarification is provided, the Authority cannot comment as to the impact this "Connector – Parkway" would have on the Authority's lands.

Along the Highway 407 alignment appears to be the identification of "Strategic Employment Growth Areas". As indicated on Map 6, the north portion of Heber Down Conservation Area is located within the Strategic Employment Growth Area that

Mr. Roger Saunders
The Regional Municipality of Durham

February 20, 2008
Page 5

follows the alignment of Highway 407. There does not appear to be any policies or description with respect to this type of Growth Area. It would be helpful to know if Conservation Areas or natural heritage features would be excluded from these areas similar to the manner in which these areas are dealt with in Greenfield areas. Again, the Authority cannot comment as to the impact this would have on the Authority's land holdings until more information is provided.

The Conservation Authority appreciates the opportunity to comment on this report. Please continue to keep the Authority informed as to progress on the development of this project.

Yours truly,



Heather Brooks
Director, Watershed Planning & Natural Heritage

HB/klt

cc J.R. Powell, Chief Administrative Officer, CLOCA
cc R. Hersey, Director, Development Review & Regulation, CLOCA
cc R. Perry Sisson, Director, Engineering & Field Operations, CLOCA

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Notices



Notice of Study Commencement

Clarington Transportation Master Plan

The Municipality of Clarington has initiated a Municipal Class Environmental Assessment (MCEA) for a municipal-wide Transportation Master Plan (TMP). This study will follow an approved process under the Environmental Assessment Act and is being conducted in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment document (October 2000, as amended in 2007). Master Plans are long-range plans that integrate infrastructure requirements for existing and future land use with environmental assessment planning principles in an effort to make comprehensive planning decisions.

By 2031, Clarington's population is expected to increase by 72% (58,000 new residents) and bring an estimated 18,000 new jobs to the Municipality. Since the adoption of the current Official Plan in 1996, Provincial planning legislation, which includes the Greenbelt and Places to Grow Plans, has been developed to reflect both global and local social, environmental and economic trends. The Clarington Transportation Master Plan (CTMP) will facilitate the interaction of land use planning and transportation infrastructure planning in an effort to foster an economically and environmentally sustainable community that will accommodate this growth and support Provincial planning legislation.

Preparation of the CTMP will proceed in coordination with the Municipality's Official Plan Review to ensure a seamless planning process. The study will incorporate public consultation to assist in defining a scope of issues, will develop a multi-modal transportation vision (i.e., active transportation modes such as walking and cycling, and established modes such as personal assistive devices, public transit, automotive, rail initiatives, goods movement, etc.), forecast future travel demands, identify opportunities, existing deficiencies, recommend new transportation facilities, establish policies and priorities, and will be followed by an action plan for implementation.

Public participation and consultation with regulatory agencies is essential. During the course of the study two sets of meetings (public information centres) will be held to discuss technical findings and to seek public input with respect to proposed transportation infrastructure improvements. Notices will be published and circulated in advance of future public meetings.

In accordance with the requirements of the Class EA, background and current study information related to this issue will be made available for public and agency review on the Transportation Master Plan Review website at www.claringtontmp.ca, at all Clarington Libraries and at the Clarington Town Hall during regular business hours (40 Temperance Street, Bowmanville, ON L1C 3A6).

For further information on the Transportation Master Plan please contact one of the following project team members:

Dan Campbell, B.A.
Project Manager
AECOM Canada Ltd.
53 Division Street
Cobourg, ON K9A 5K7
Tel: 905.372.2121 (ext. 223)
Fax: 905.372.3621
E-mail: dan.campbell@aecom.com

Ron Albright, P. Eng.
Manager, Infrastructure and Capital Works
Municipality of Clarington
40 Temperance Street
Bowmanville, Ontario L1C 3AC
Phone: 905.623.3379 (ext. 2305)
Fax: 905.623.9282
Email: ralbright@clarington.net



Notice of Public Information Centre 1

Clarington Transportation Master Plan

The Municipality of Clarington is undertaking a study to develop a Transportation Master Plan (TMP). The Clarington Transportation Master Plan (CTMP) will identify current transportation issues and opportunities to develop a multi-modal transportation vision for the Municipality. The multi-modal vision will consider active transportation modes such as walking and cycling, as well as, public transit, automotive, rail initiatives and goods movement. The CTMP will consider the needs of the existing community and planned growth to recommended transportation policies and infrastructure projects that will be used to manage the Municipality's transportation infrastructure to the 2031 planning horizon.

The CTMP study is being undertaken in accordance with the Municipal Class Environmental Assessment document (October 2000, as amended in 2007) and includes opportunities for the public to attend information centres and submit comments at specific points throughout the study.

The first set of Public Information Centres will be held in different locations as follows:

Monday, February 4, 2013

6:00 PM – 8:00 PM

Newcastle Community Hall
20 King Avenue
Newcastle

Wednesday, February 6, 2013

6:00pm – 8:00pm

Council Chambers
40 Temperance Street
Bowmanville

Thursday, February 7, 2013

6:00pm – 8:00pm

Courtice Community Complex
2950 Courtice Road North
Courtice

This is the first set of three planned sets PIC's to be conducted as part of the CTMP process. The Municipality is inviting the public and other stakeholder groups to participate in the study and assist the project in the development of a TMP that addresses community needs, changing trends and new opportunities.

At the PIC you will be able to review a series of displays to understand the CTMP process, discuss specific issues members of the project team and provide your input on a range of potential policy options.

You are encouraged to attend the PIC and provide your comments to either of the individuals identified below by February 22, 2013 so that they may be considered as part of the project.

Will McCrae, P. Eng.

Project Manager
AECOM Canada Ltd.
513 Division Street
Cobourg, ON K9A 5K7
Tel: 905.372.2121 (ext. 244)
Fax: 905.372.3621
E-mail: will.mccrae@aecom.com

Ron Albright, P. Eng.

Manager, Infrastructure and Capital Works
Municipality of Clarington
40 Temperance Street
Bowmanville, Ontario L1C 3A6
Phone: 905.623.3379 (ext. 2305)
Fax: 905.623.9282
Email: ralbright@clarington.net



Notice of Public Information Centre 2

Clarington Transportation Master Plan

In January 2013, the Municipality of Clarington initiated a Transportation Master Plan study (hereinafter referred to as the CTMP) to identify current transportation issues and opportunities to develop a multi-modal transportation vision for the Municipality, in consideration of existing and planned growth in the community. Recommended transportation policies and infrastructure projects that will be used to manage the Municipality's transportation infrastructure to the 2031 planning horizon are being developed as part of the CTMP.

This study is being undertaken in accordance with the Municipal Class Environmental Assessment document, as amended in 2011. One series of Public Information Centre (PIC) events were held in February 2013 (i.e., PIC #1) to present the changes affecting the existing CTMP, the work being completed as part of the study, the preliminary findings of technical studies, as well as the range of policy and infrastructure alternatives that were being considered.

Since PIC #1, the study team has reviewed and considered the feedback received from the public, completed an inventory of existing conditions, identified long-term cycling, transit and road network needs, evaluated network improvement alternatives, and developed/evaluated related policies/standards.

The public is invited to attend PIC #2 to review and comment of the findings of the study. This is your opportunity to review the draft study recommendations and discuss the study with team representatives. This is also your opportunity to provide input on the active transportation and transit components of the plan, including your support for the identified future pedestrian and cycling routes/connections, and opportunities for enhanced transit services.

The PIC has been scheduled as follows:

Tuesday, May 6, 2014
6:00pm – 8:00pm
Clarington Council Chambers
40 Temperance Street
Bowmanville

You are encouraged to attend the PIC and provide your comments to either of the individuals identified below by May 23, 2014 so that they may be considered as part of the project.

Sheri Harmsworth, P. Eng.
Senior Project Manager
AECOM Canada Ltd.
300 Water Street
Whitby, ON L1N 9J2
Tel: 905.668.9363 (ext. 2350)
Fax: 905.668.0221
E-mail: sheri.harmsworth@aecom.com

Ron Albright, P. Eng.
Manager, Infrastructure and Capital Works
Municipality of Clarington
40 Temperance Street
Bowmanville, Ontario L1C 3AC
Phone: 905.623.3379 (ext. 2305)
Fax: 905.623.9282
Email: ralbright@clarington.net

Public Information Centres

Welcome

Municipality of Clarington Transportation Master Plan

PIC #1

Monday February 4, 2013
6:00 P.M. to 8:00 P.M.
Newcastle Community Hall
20 King Avenue
Newcastle

Wednesday February 6, 2013
6:00 P.M. to 8:00 P.M.
Council Chambers
40 Temperance Street
Bowmanville

Thursday February 7, 2013
6:00 P.M. to 8:00 P.M.
Courtice Community Complex
2950 Courtice Road North
Courtice

Developing the Clarington Transportation Master Plan (CTMP)

What is the CTMP?

- The Clarington Transportation Master Plan (CTMP) will provide a comprehensive assessment of Clarington's current and future transportation system needs.
- The CTMP will provide recommendations for new or improved infrastructure (roads, transit, cycling, walking, etc.), operational standards, and transportation policies that Clarington uses to manage its transportation infrastructure.

Why Now?

- Clarington's TMP was started in 2009 in parallel with the Official Plan Review.
- CTMP was put on hold pending resolution of ROPA 128 and subsequent updates to travel demand models.
- CTMP is included as an objective of the Clarington Strategic Plan.

What is the Process?

This Transportation Master Plan is being developed in accordance with the planning and design processes of the Municipal Class EA and incorporates the key principles of environmental planning under the Ontario Environmental Assessment Act. The transportation master plan study will follow Phases 1 and 2 of the Class EA process. The master planning process identifies a recommended 'set' of proposed works and the rationale for their implementation.



For some infrastructure projects identified in the Transportation Master Plan, additional phases of the Municipal Class EA process will be required. The level of complexity of an individual project and the potential impacts of that project on the environment determines which phases need to be addressed, the level of detail required to be examined, and the extent of mitigation that may be required in future work.

CTMP Background

Purpose of the CTMP

- Identify current transportation issues and opportunities to developing a multi-modal transportation vision.
- Consider the needs of the existing community, planned improvements, changing trends and new opportunities.
- Consider active transportation modes such as walking and cycling, public transit, travel by car, rail initiatives and goods movement
- Recommend transportation policies and infrastructure projects which will be used to manage transportation infrastructure to the 2031 planning horizon.
- The public and other key stakeholders are invited to participate in the study and assist in the development of the CTMP.

Context for the CTMP

- Support the function of distinct communities.
- Improve linkages between communities internal and external to Clarington .
- Maximize opportunities presented by existing and future east-west linkages (Waterfront Trail, Highway 401, GO Transit, 407 East Extension).
- Creating a framework for managing the impacts of growth and change on the rural transportation network.
- Focused group of engaged major employers presents unique opportunities.
- Areas of growth present opportunity for implementation of pro-active policy to realize a vision.

Related Clarington Strategic Plan Objectives

- **Maintain Financial Stability**
 - Balanced transportation system that minimizes the need for the most expensive types of projects by promoting more cost-effective alternatives.
- **Promote Green Initiatives**
 - An increased focus on supporting alternatives to auto-related trips to improve modal split and reduce the reliance on the automobile.
- **Investing In Infrastructure**
 - Identifying priority locations for key transportation infrastructure investments that will allow the municipality to utilize scarce resources to deliver the most effective transportation system.

Other Current Related Studies and Initiatives

Clarington Initiatives

- Official Plan Review
 - Parks, Open Space and Trails Master Plan
 - Courtice Main Street Secondary Plan
 - Courtice Employment Lands Secondary Plan
 - Growth Management
 - Natural Heritage and Countryside Discussion Papers
- Green Community Strategy
 - Sustainable Clarington Community Advisory Committee



Region of Durham

- Resolution of Regional Official Plan Amendment (ROPA)128
- Durham Transportation Master Plan Review
- Regional Cycling Plan
- Long-Term Transit Strategy (LTTS)
- Arterial Design Guidelines

Ontario Power Generation

- Darlington Refurbishment / Holt Road Interchange
- Darlington New Nuclear Project (DNNP)

Metrolinx

- Big Move projects
 - Bus Rapid Transit (BRT) in Durham
 - Extension of GO Train service along the Lakeshore East line to Bowmanville - regular rush-hour service will be extended beyond Oshawa to Bowmanville

Ministry of Transportation

- Draft Cycling Strategy released (November 2012)
- Highway 401 Corridor Study from Brock Road to Courtice Road
- Highway 401 Improvements from Courtice Road to Durham Regional Boundary (East Townline Road)
- Highway 407 and East Link - MTO website notes that the target is to open the first phase in late 2015 and be to Highway 35/115 in 2020 with an interim opening at Taunton Road at the East Durham Link by 2017

Changes on the Horizon

Communities which are successfully improving the sustainability of their transportation networks are doing so as part of a wider program of creating more vibrant, livable and sustainable cities.

Considerations in developing the Transportation Master Plan include:

Population Growth

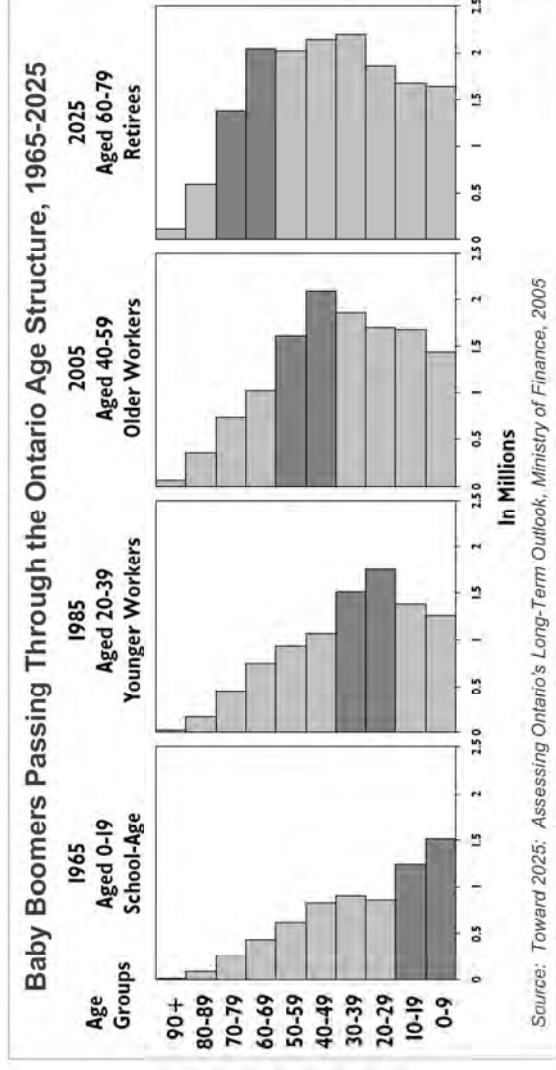
- Population and employment growth in Clarington and surrounding areas will result in increases to commuter and visitor trips to and from the area.

An Aging Population

- An increase in the adult population aged 65 and over will place new and growing demands on transportation systems.

Climate Change & Sustainability

- Consider policy changes that can encourage a more sustainable transportation system and improve mobility choices.
- Consider planning and design standards for infrastructure that lessen adverse environmental impacts.



Changes on the Horizon cont'd...

Communities Designed Around the Car

- Auto use dominates given the trip distances and convenience of travel.
- Average auto trip length for Clarington residents is approximately 22km (2006 Transportation Tomorrow Survey).
- What measures are practical in Clarington to provide choices for travel?



Changing Economic Climate

- Municipalities continue to face budget constraints and cannot keep pace with infrastructure needs.
- Quality of transportation infrastructure and travel efficiency are key factors influencing an area's future economic capabilities including growth, productivity and competitiveness.



Energy Supply & Costs

- Rising fuel costs could cause people to drive their cars less frequently, carpool more often, reconsider where they live and work, or choose other methods of travel if available (i.e. public transit).
- Limited infrastructure and services in rural areas.



Community Health

- There is a growing recognition of the health benefits of more active lifestyles and how transportation infrastructure decisions can support healthy communities.



Key Changes Affecting the CTMP

Growth Forecasts

- Growth forecasts for Clarington comply with the *Provincial Growth Plan: Places to Grow*.
- Places to Grow establishes the Province's vision for managing population and employment growth in the Greater Golden Horseshoe region to 2031. An amendment to Places to Grow is currently under consideration to include growth forecasts to 2041.
- Places to Grow directs growth to Built Up Areas, including Courtyce, Bowmanville and Newcastle, and emphasizes infrastructure that links Urban Growth Centres.
- Region of Durham Official Plan Amendment No. 128 was recently approved. ROPA 128 designates Courtyce, Bowmanville, Newcastle and Orono as Urban Areas.
- Clarington is currently conducting an Official Plan Review.

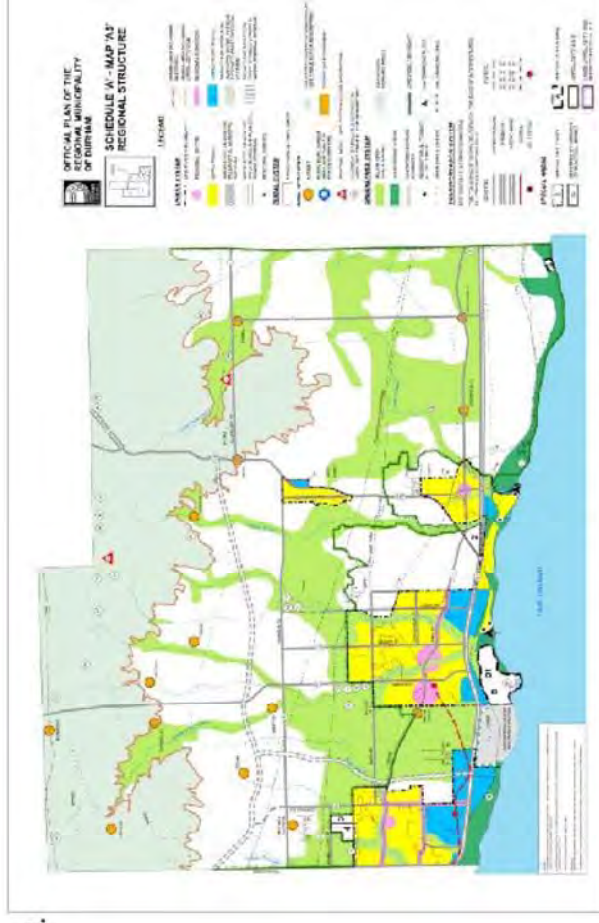
Approved Growth Forecasts for Clarington

	2011	2016	2021	2026	2031
Urban Population	72,705	81,665	92,635	111,915	124,685
Rural Population	15,275	15,380	15,465	15,565	15,655
Total Population	87,980	97,050	108,100	127,480	140,340
Households	30,225	34,025	39,170	46,585	52,120
Employment	22,575	26,895	32,150	36,070	38,420

Source: Region of Durham Official Plan Amendment No. 128



Source: Places to Grow: Growth Plan for the Greater Golden Horseshoe (2006)



Key Changes Affecting the CTMP cont'd ...

Darlington Nuclear Generating Station Refurbishment and Expansion

- Ontario Power Generation (OPG) is prepared to move forward with refurbishing existing Darlington reactors upon completion of the Environmental Assessment process.
- Environmental Assessment recently approved by the Federal Government as an initial phase for the potential Darlington New Nuclear project.
- Anticipated employment related to Darlington refurbishment will, on average, nearly double during the construction period from the current base of just over 2,600 personnel.
- If the New Nuclear Project proceeds, an estimated peak workforce of approximately 5,000 – 8,000 personnel, and possibly as many as 10,000 personnel, may be in place across the Darlington Nuclear site during the construction phases of both projects depending on construction scheduling.
- “The employment count for the New Nuclear at Darlington project would be equal to building a car plant and running it for 60 years.”



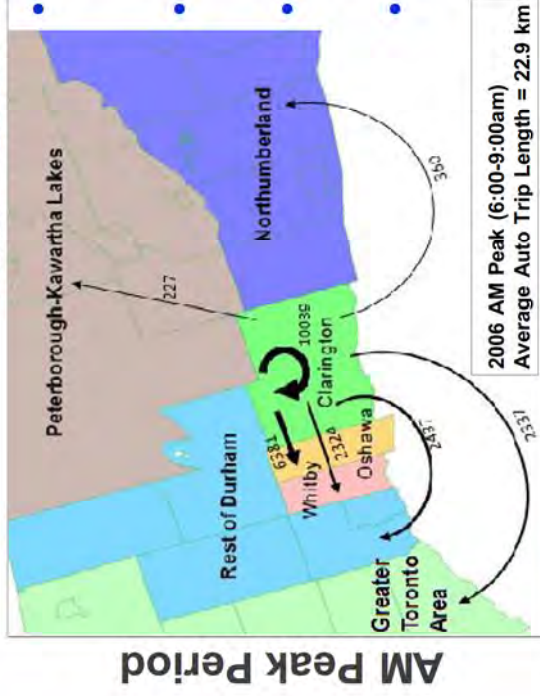
Darlington Nuclear Generating Station – top right corner
Potential Darlington New Nuclear Project Site – centre area
(photo courtesy of OPG)



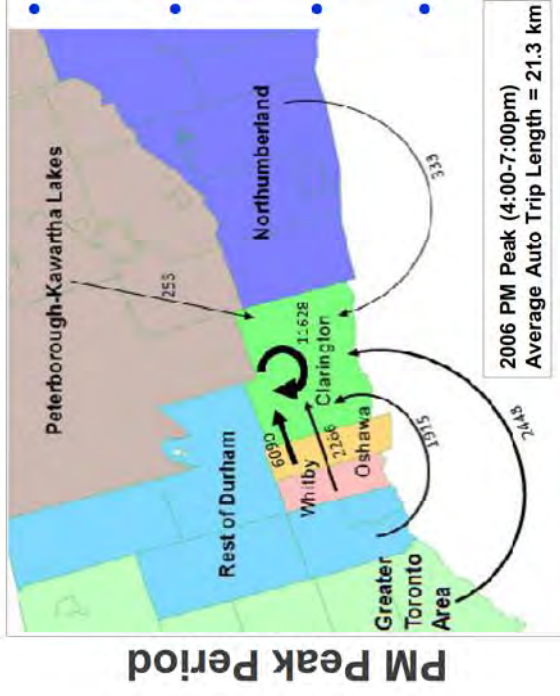
Highway 401 Corridor from Courtyce Road to Waverley Road
Darlington Nuclear Generating Station – bottom centre
(Aerial view in 2010)

Existing Travel – During Peak Periods

Auto Travel Patterns

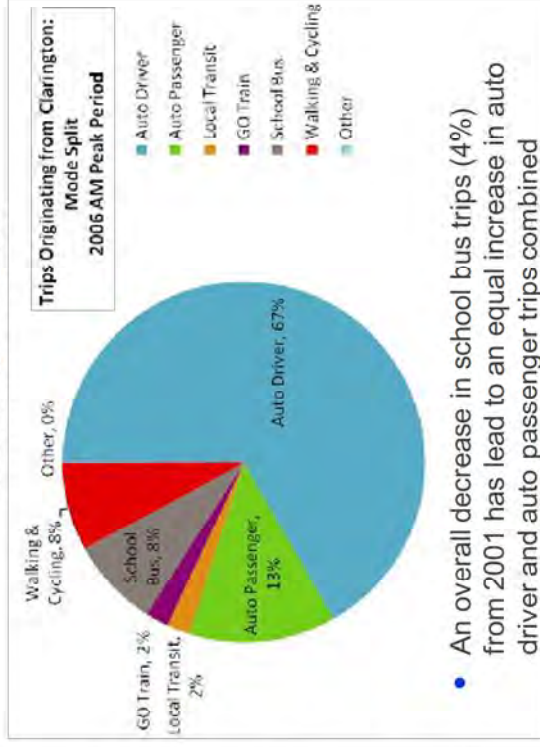


- Trips internal to Clarington during the AM peak period account for 42% of all auto trips originating in Clarington
- Trips internal to Clarington have increased by 30% since 2001
- 79% of trips leaving Clarington during the AM peak period remain in Durham Region
- Trips from Clarington destined for the GTA (i.e. Toronto and York Region) decreased by 3% since 2001

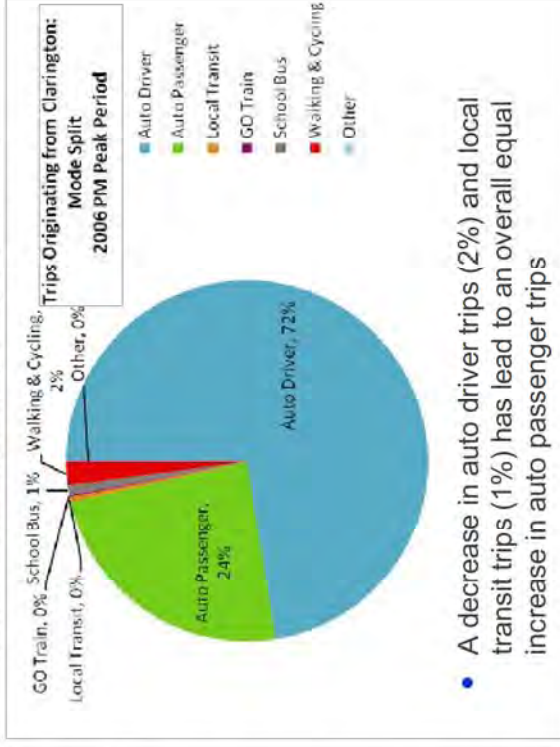


- Trips internal to Clarington during the PM peak period account for 47% of all auto trips originating in Clarington
- The majority of external trips destined for Clarington during the PM originate in Oshawa (46%)
- 77% of external trips destined for Clarington originate from Durham Region
- Trips destined for Clarington from the GTA (i.e. Toronto and York Region) remain relatively constant from 2001 (10%)

Mode of Travel



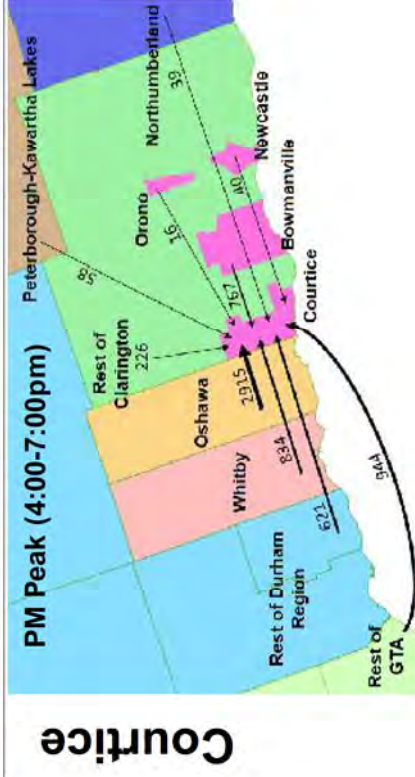
- An overall decrease in school bus trips (4%) from 2001 has led to an equal increase in auto driver and auto passenger trips combined



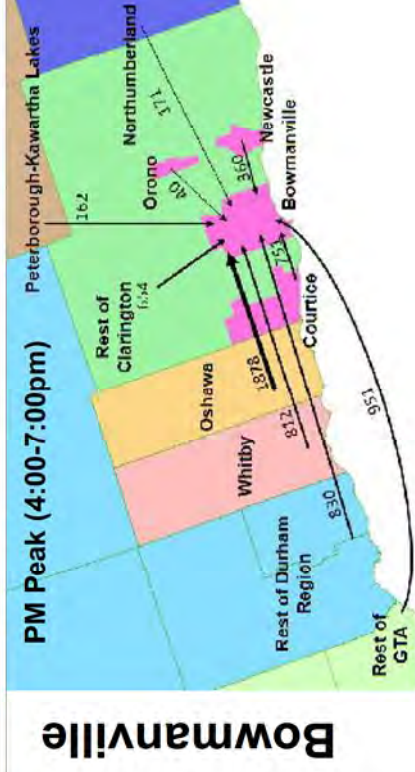
- A decrease in auto driver trips (2%) and local transit trips (1%) has led to an overall equal increase in auto passenger trips

Note: Comparison of 2001 and 2006 data from the Transportation Tomorrow Survey

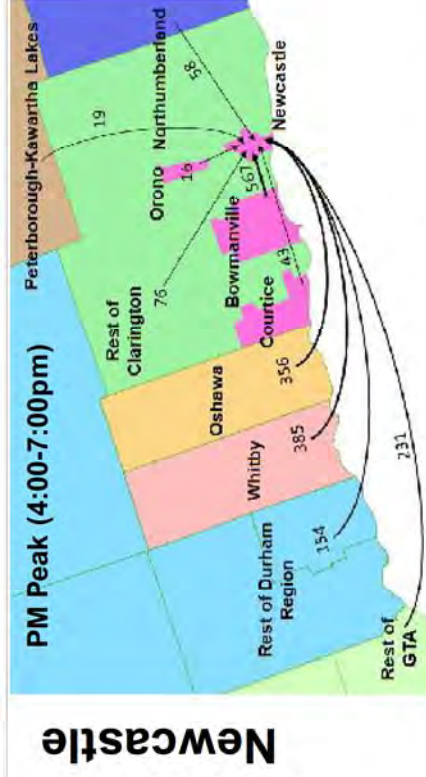
Existing Travel – During PM Peak Period (Auto Travel Patterns)



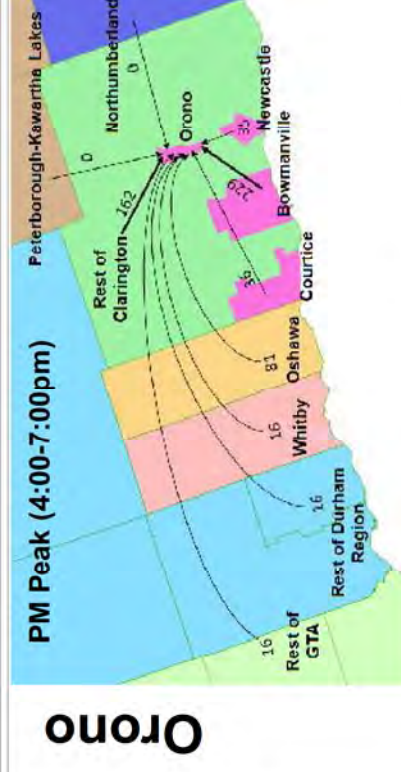
- Most of the trips destined for Courice in the PM peak period are from Oshawa, Whitby, Bowmanville and the GTA beyond Durham (i.e. Toronto).
- 1259 (16%) of PM peak period auto trips are internal to Courice.



- Most of the trips destined for Bowmanville in the PM peak period are from Oshawa, Whitby, other parts of Durham, and the GTA (i.e. Toronto).
- 4082 (37%) of PM peak period auto trips are internal to Bowmanville.



- Most of the trips destined for Newcastle in the PM peak period are from Bowmanville, Whitby and Oshawa..
- 381 (16%) of PM peak period auto trips are internal to Newcastle.



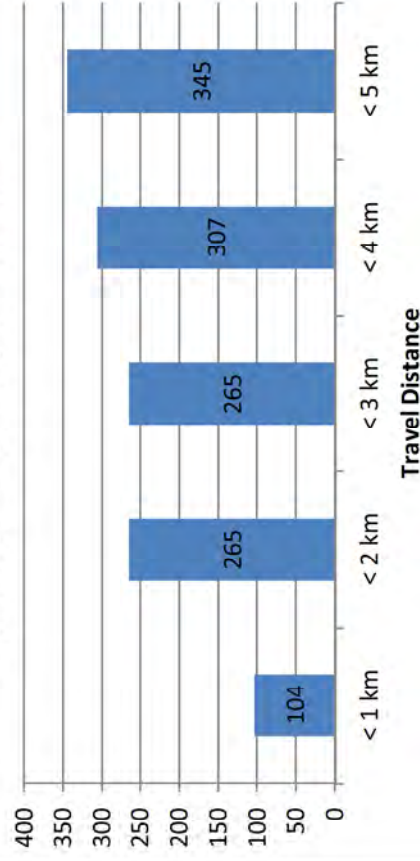
- Most of the trips destined for Orono in the PM peak period originate from Bowmanville and the rest of Clarington.
- 81 (12%) of PM peak period auto trips are internal to Orono.

Source: Transportation Tomorrow Survey, 2006

Existing Travel – Active Transportation

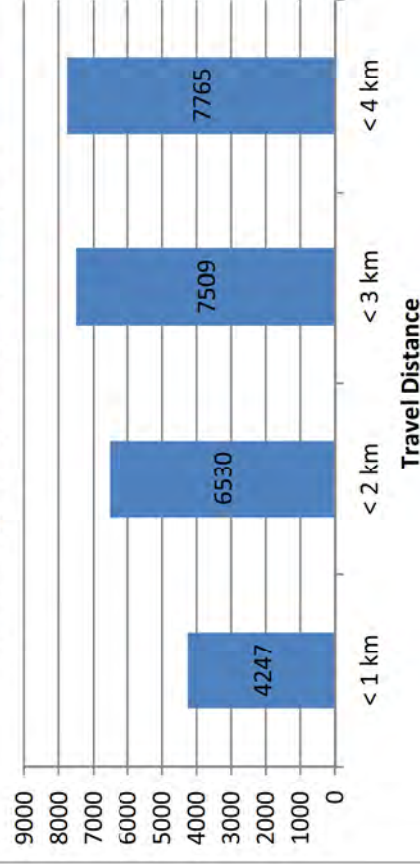
- Active transportation, for the purposes of the CTMP, includes walking and cycling.
- Walking and cycling trips accounted for 6% of all daily trips originating in Clarington in 2001 and 2006.
- Although the walking and cycling mode share remained constant between 2001 and 2006, the auto-based mode share increased by 1%.
- The auto-based mode share (auto driver and auto passenger) accounts for 87% of daily trips originating in Clarington, which indicates a significant opportunity to increase trips by walking and cycling, especially for short trips.

Cycling Trips by Distance



- Vast majority of cycling trips originating in Clarington are for short-distance travel (5km or less).
- Cycling trips with a travel distance between 1 km and 2 km make up 47% of all cycling trips originating within Clarington.

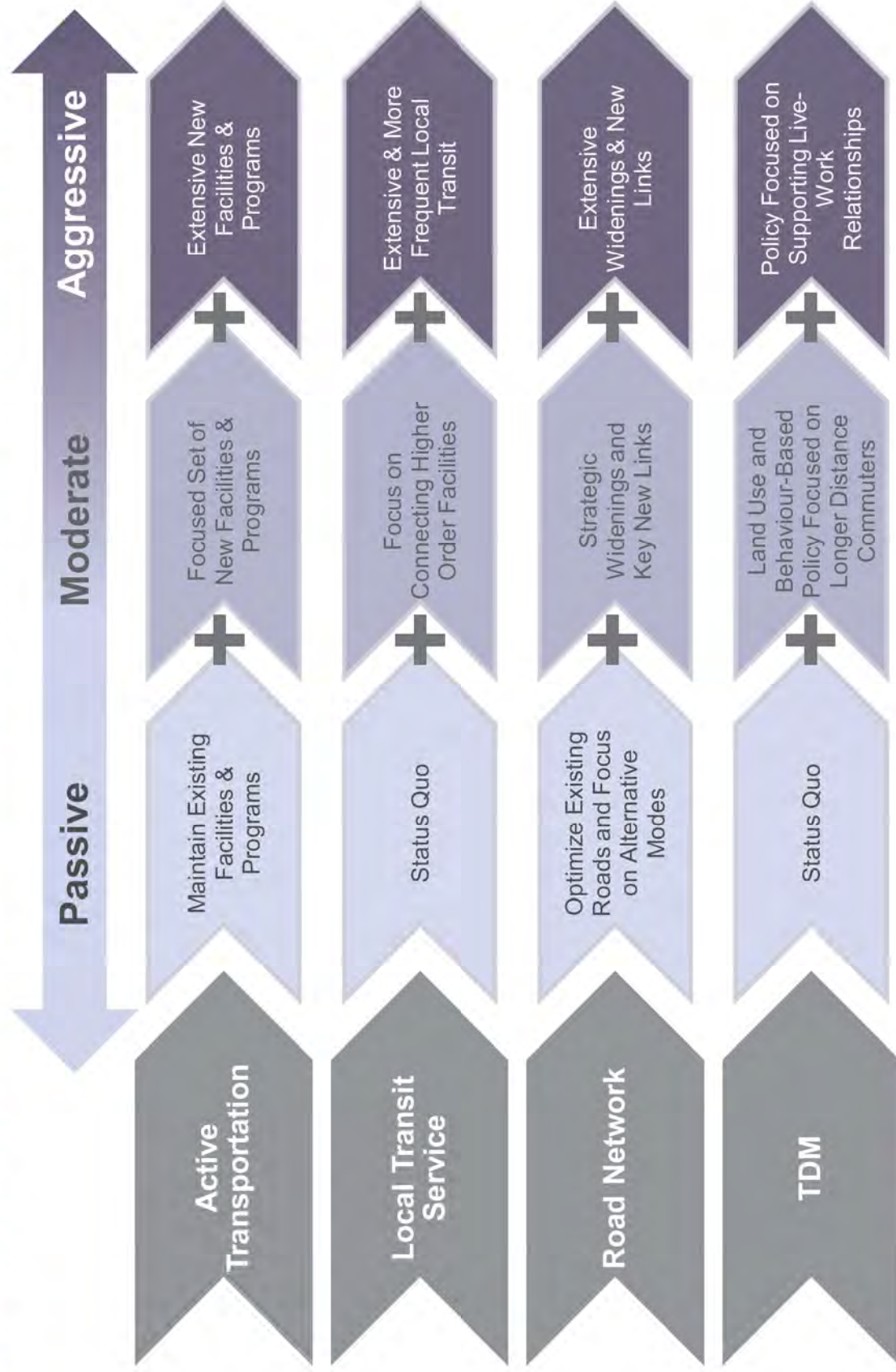
Walking Trips by Distance



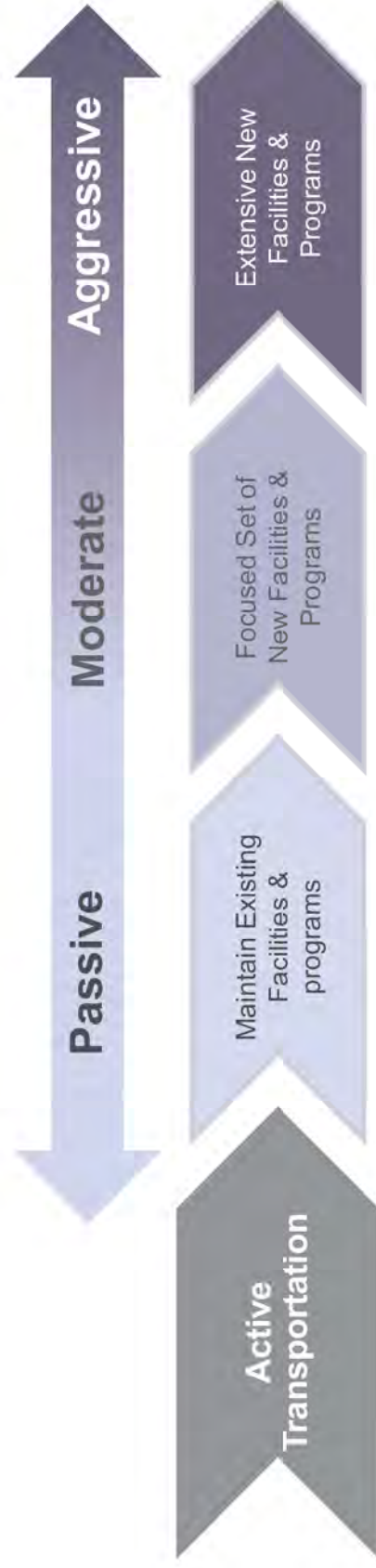
- All walking trips originating in Clarington are for short-distance travel (4km or less).
- Walking trips with a travel distance less than 1 km account for 55% of all walking trips originating within Clarington.

2006 data from the Transportation Tomorrow Survey

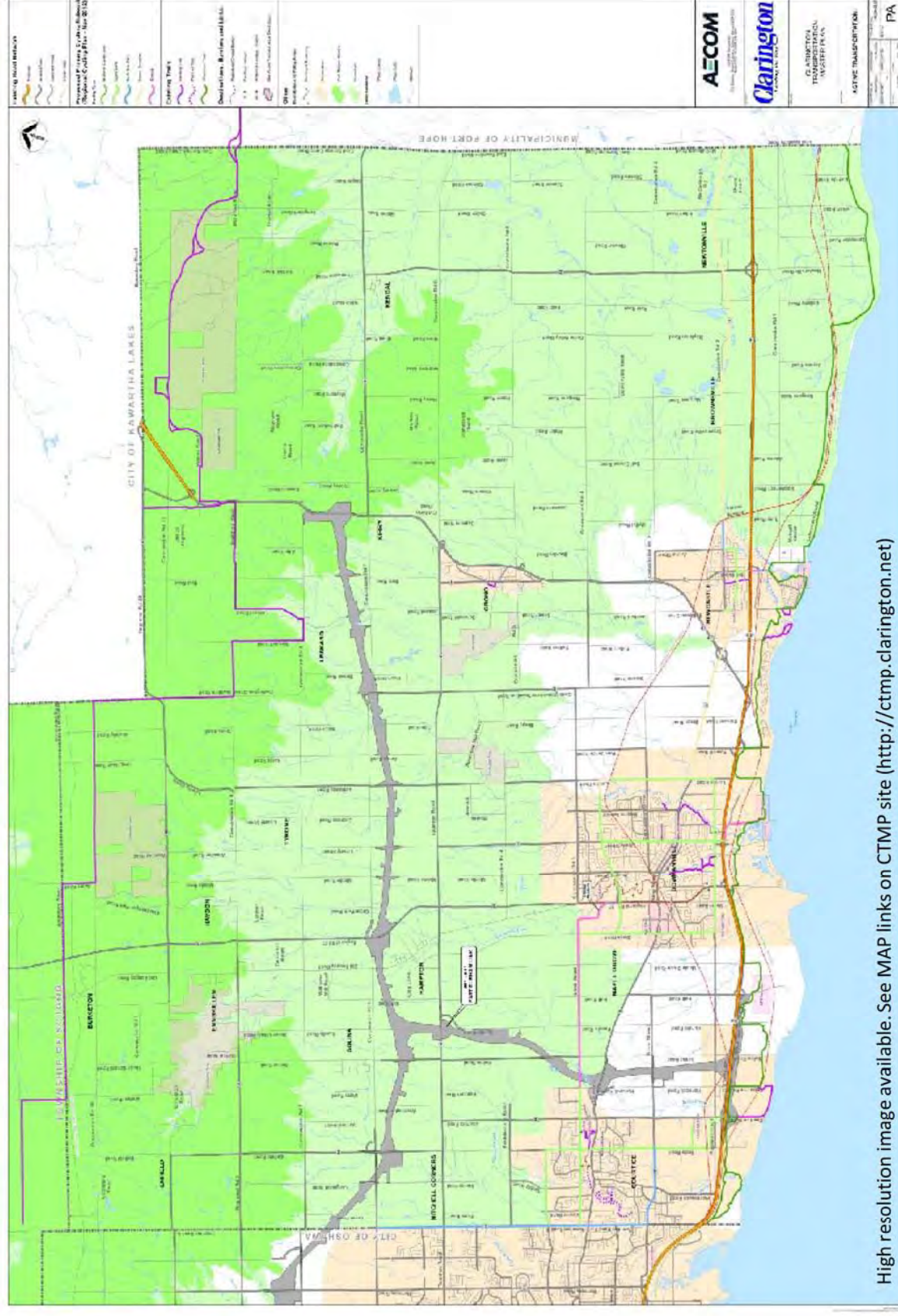
CTMP Key Policy Areas – Range of Potential Approaches



CTMP Key Policy Area – Active Transportation



Active Transportation – Existing Network & Planned Improvements by Others



High resolution image available. See MAP links on CTMP site (<http://ctmp.clarington.net>)

Planning for Active Transportation

- Recognition of cycling and walking in Transportation Master Plans gaining prominence.
- Role of active transportation:
 - Recreation:
 - Bike tourism
 - Cycling clubs
 - Touring
 - Utilitarian mode of transportation:
 - Commuting & school trips
 - Improve the travel mode share
 - Reduce reliance on the car



Welcome Cyclists!



Key Considerations

- **Network** – Routes should connect and link communities and destinations
- **Cost / Affordability** – Construction and ongoing maintenance
- **Maintenance** – Shoulder stability/pavement, pot holes and road grates
- **Safety** – Visibility, signage, striping alerting drivers to presence of cyclists
- **Facilities** – Bike racks / secure storage at community buildings and promoting private sector partnerships/co-operation
- **Marketing** – Public awareness and education, economic development



Clarington
Leading the Way
Clarington Transportation Master Plan

Types of Cycling Facilities



Shared road lane / signed route

Lower traffic volumes
and/or lower speeds



Paved shoulder (1.2 - 1.5m)



Designated / striped bike lane



Separated / buffered bike lane



Off-road multi-use trail (3 - 4m)

Higher traffic volumes
and/or higher speeds



Active Transportation – Alternatives



- Maintain a recreational focus for active transportation.
- Maintain existing off-road trail system.
- Support identification of additional off-road trails to create a broader network and improve links to Waterfront Trail.
- Provide bike route signage for shared routes on rural roads that are popular cycling routes.
- Coordinate with stakeholders, such as local municipalities and cycling groups, to promote use of active transportation trails and facilities throughout Clarington.

Passive Plus:

- Develop policies that support active transportation for commuting and school trips, especially within built-up areas, as well as for recreational purposes.
- Work with Region of Durham to implement Regional Cycling Plan.
- Develop an active transportation network plan that includes both on-road and off-road cycling facilities.
- Identify local roads that could be included as cycling routes and develop a plan for determining appropriate cycling facilities.
- When local roads are being rehabilitated, consider cycling facilities.
- Provide bike racks at municipal facilities.
- Promote identification of rest stops to support the active transportation network.

Moderate Plus:

- Develop Clarington vision and policies to support reduced reliance on cars, especially for short trips.
- Support complete streets within built-up areas.
- Adopt design standards for on-road bike facilities on Clarington roads.
- Identify Clarington roads where striped/arked bike lanes could be appropriate.
- Require paved shoulders on rural roads.
- Promote Clarington as a premier active transportation destination.
- Fully integrate active transportation into transportation and land use planning and decision making.

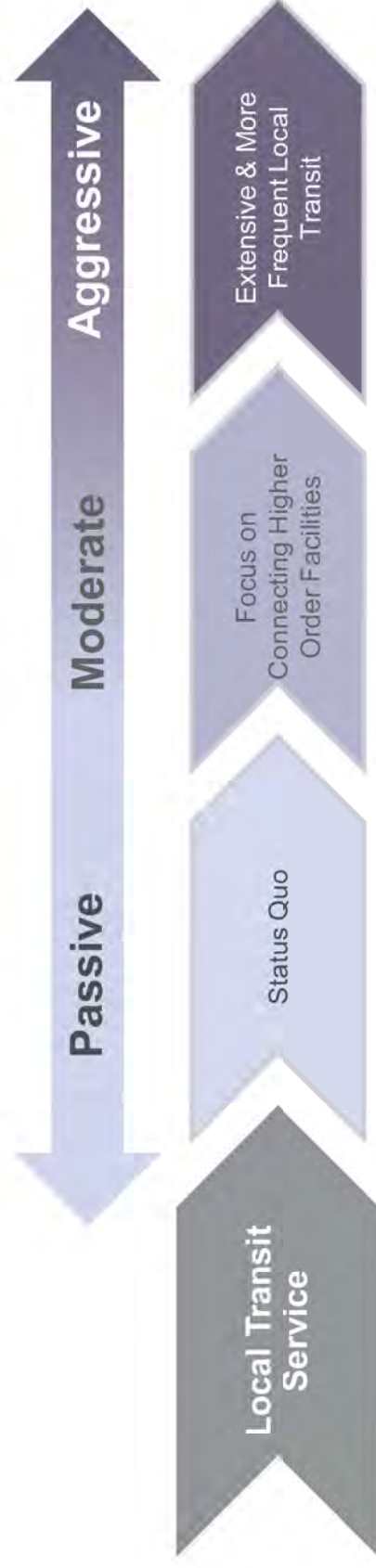


Clarington
Transportation
Master Plan

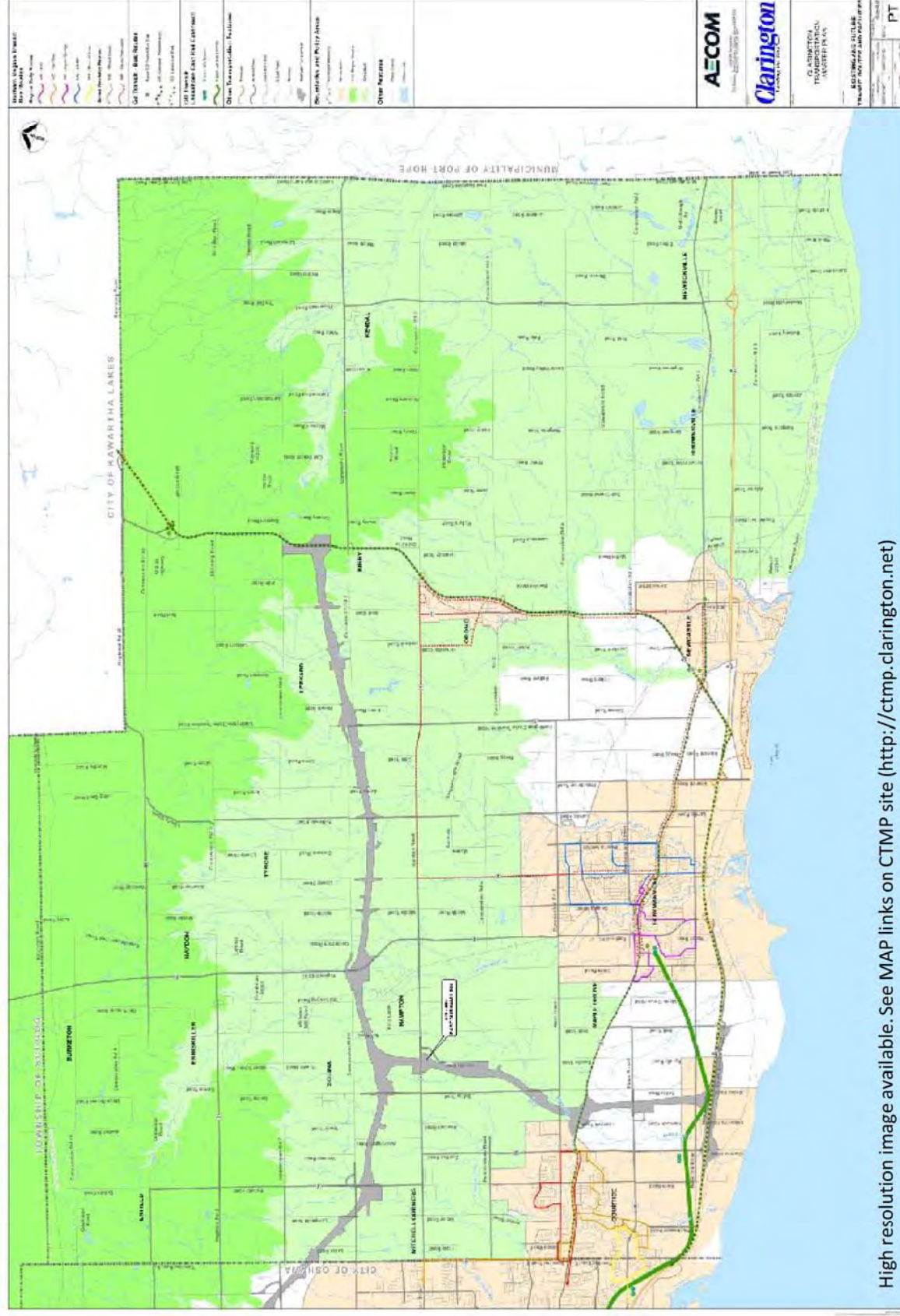
CTMP |

Clarington
Leading the Way

CTMP Key Policy Area – Local Transit



Transit Service – Existing Transit & Planned Improvements By Others



High resolution image available. See MAP links on CTMP site (<http://ctmp.clarington.net>)

Local Transit Service – Alternatives



- Maintain status quo – current levels of transit ridership and transit mode share.
- Continue with current local and regional levels of service.
- Improve connections to planned GO services (Lakeshore East rail extension to Bowmanville, GO Bus to Peterborough).

Passive Plus:

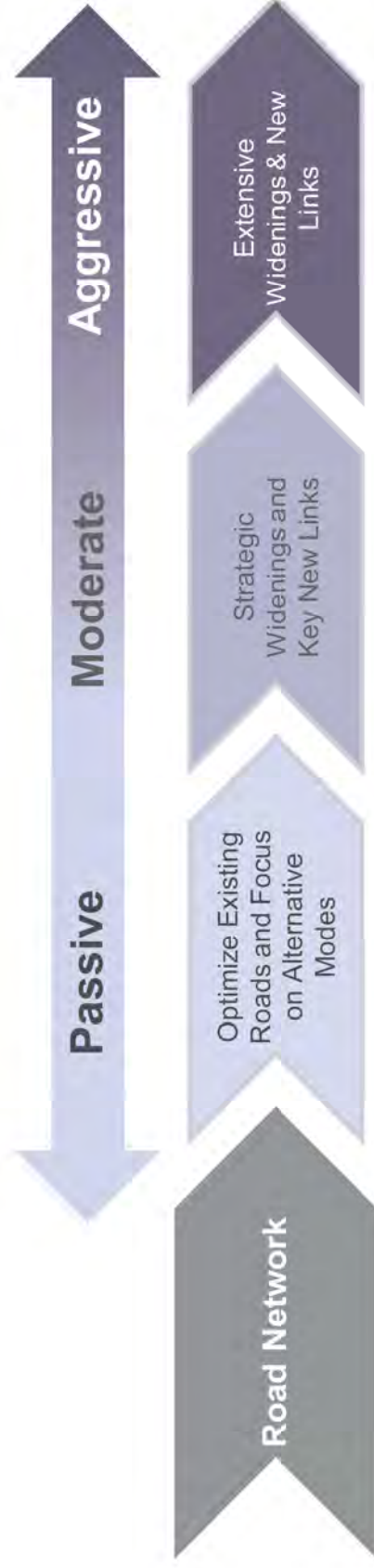
- Make modest improvements in transit ridership and transit mode share by additional services.
- Encourage Durham Region to implement the Long-Term Transit Strategy (LTTS):
 - Exclusive “transitway” for GO bus service along the Highway 407 corridor.
 - Improvements to GO Rail service, including additional stations.

Moderate Plus:

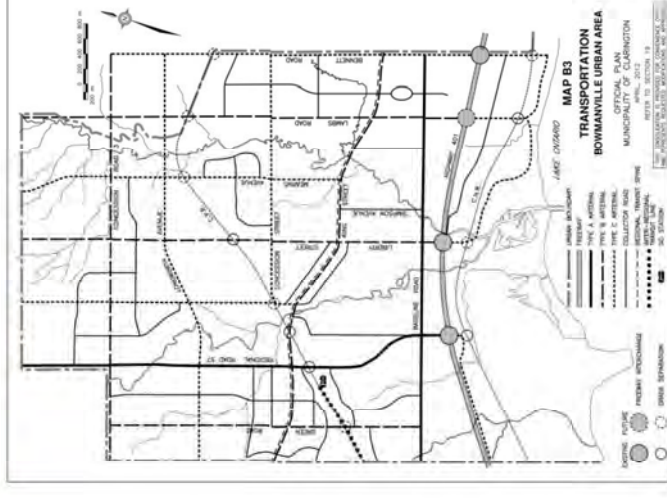
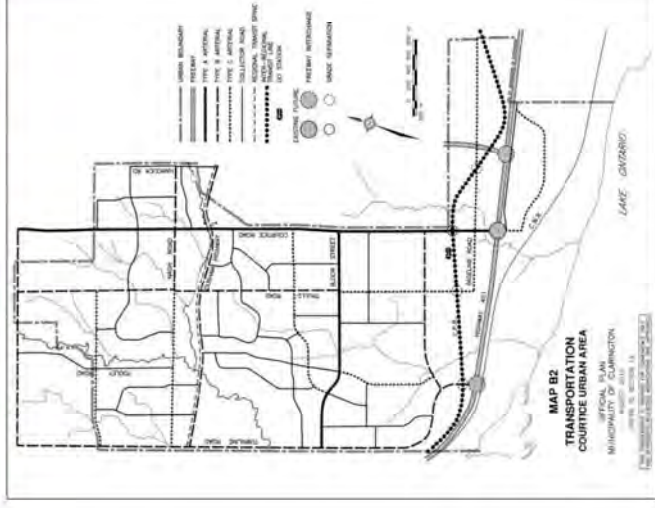
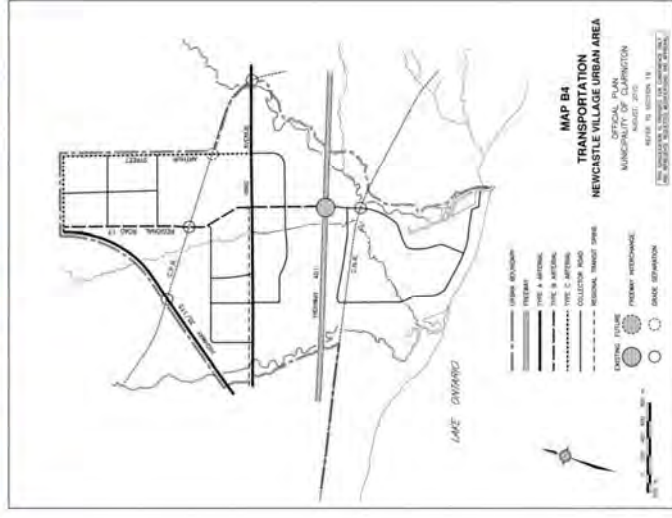
- Enhanced focus on improving travel choice and increasing transit mode share.
- Establish local shuttle bus routes to provide connections to GO service.
- Provide more frequent, direct transit service along with Highway 2 corridor to provide improved connections between Bowmanville, Courtice and Newcastle.



CTMP Key Policy Area – Road Network

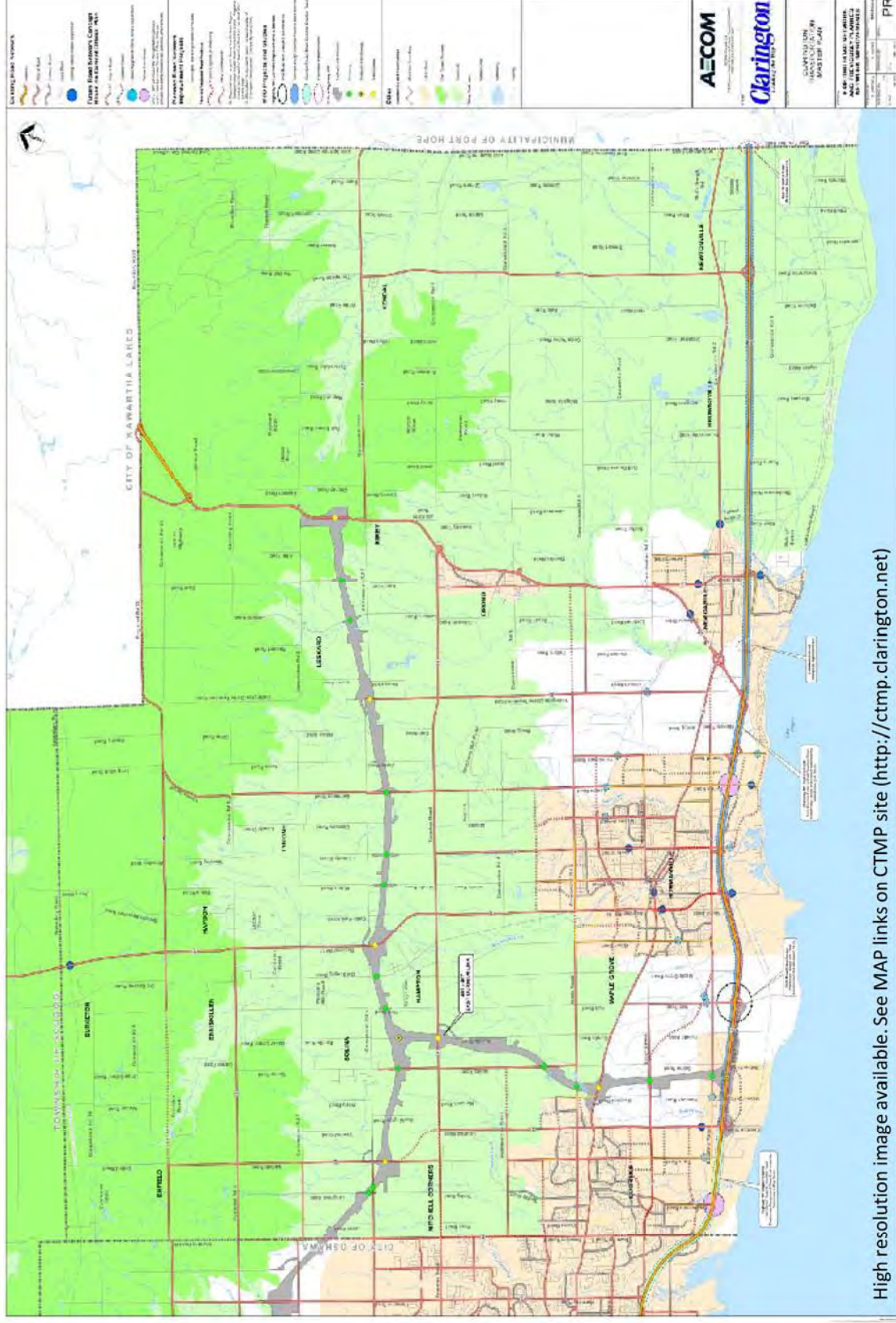


Road Network – Official Plan Transportation Network



- The CTMP will revisit the transportation policies and schedules of the Official Plan and provide recommendations for potential amendments.

Road Network – Existing Network and Planned Improvements



High resolution image available. See MAP links on CTMP site (<http://ctmp.clarington.net>)

Roadway Network – Alternatives



Passive:

Optimization

- Normal program of intersection/operational improvements to optimize use of existing infrastructure.

Safety

- Normal program of safety improvements in response to problems identified.
- Maintain signage and pavement markings as identified by staff and the public.
- Review roadside barriers and signing in areas of capital projects.

Moderate:

Optimization

- Focused program of improvements to increase capacity/improve safety along key corridors and at key intersections.
- Corridor optimization for main arterial roads.

Safety

- Conduct a safety-based network screening of signage, pavement markings, and roadside barrier protection in areas slated for capital projects or with high collision experience; implement an improvement plan where appropriate.
- Implement improvements as part of capital projects.
- Review / upgrade signage and pavement markings as identified by staff and the public.

Aggressive:

Optimization

- Dedicated funding and aggressive intersection improvements programs.
- Consider retrofitting existing intersections with roundabouts to increase intersection capacity.
- Review all arterial roads to optimize capacity.

Safety

- Conduct a signage and pavement marking review and implement a systematic improvement plan across the municipal road network.
- Complete systematic roadside barrier assessment and installation plan across the road network with an emphasis on the removal of obstacles in the clear zone where feasible.
- Reconstruct rural roads to improve sight distance on vertical and horizontal curves to be suitable for the posted speed limit.
- Improve road alignment where the design speed of the curve is 20 km/h or more below the posted speed limit.



Roadway Network – Alternatives



Passive:

Design Standards

- Maintain existing standards.
- Clarington typically follows TAC Design guideline or MTO Geometric Design Standards.
- Upgrade to TAC standards when pavement / bridge needs met.

Trucks

- Permissive truck route system – identify and post signage to indicate which roadways are suitable for track traffic.



Moderate:

Design Standards

- Follow “desirable” design TAC standards for higher classification roadways.
- Allow for use of minimum TAC design standards on lower classification roadways.
- Consider paving shoulders / widen bridge decks on a case-by-case basis to accommodate agricultural equipment.

Trucks

- Restrictive truck route system – restrict truck movements from certain roadways through restrictive signage.
- Ensure accessibility to all commercial/industrial areas.



Aggressive:

Design Standards

- Introduce a policy to follow “desirable” design TAC standards for rural roadway classifications.
- Adopt standards regarding paved shoulders and wider bridge decks on roads in agricultural / farming areas.
- Introduce Urban Design Standards/ Context Sensitive Solutions for roads located in built-up areas

Trucks

- Hybrid system – use a system which combines permissive routes and local truck restrictions.
- Review areas that may require additional truck restriction signing to discourage inappropriate truck movements.



Roadway Network – Alternatives



Passive:
Traffic Calming

- Place signage / speed monitors to discourage speeding and improve safety for pedestrians and cyclists in known problem areas within Clarington, especially close to schools and parks.
- Encourage awareness and provide education regarding the dangers of speeding.

Network Integration

- Reactive response to project scope and scheduling for projects initiated by private industry and senior levels of government.

Moderate:
Traffic Calming

- Provide additional signage / physical speed controls (such as speed bumps and roundabouts) to reduce speeding.
- Increase enforcement / ticketing, especially in known problem areas.

Network Integration

- Work proactively with industry the Province and Region to address network needs on a project focused basis.

Aggressive:
Traffic Calming

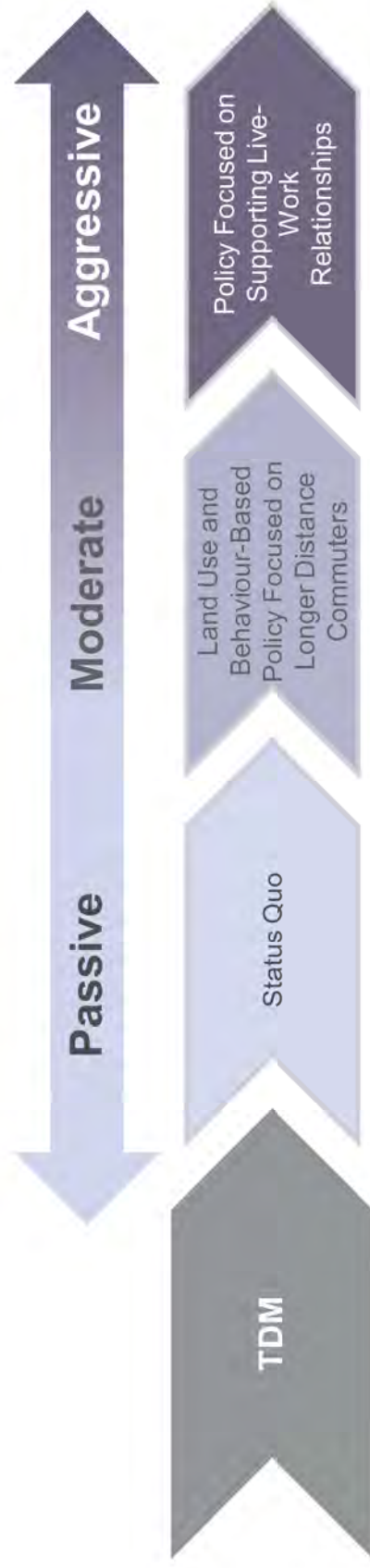
- Undertake a broad traffic calming program to discourage speeding and create safer and more livable streets for pedestrians and cyclists.
- Traffic calming measures could include:
 - Curb extensions
 - Pedestrian refuges
 - Lane narrowing
 - Road diets
 - Changing surface materials
 - Limiting access or closing certain streets to traffic

Network Integration

- Establish a formal review committee, including representatives from the Province and Region to address network needs on an integrated basis.



CTMP Key Policy Area – Transportation Demand Management (TDM)



Transportation Demand Management (TDM)

What is TDM?

- Set of initiatives aimed at:
 - Reducing auto demand, specifically single-occupancy auto trips.
 - Encouraging travel outside of the peak periods.
 - Reducing travel distances.
 - Other initiatives such as work sharing, telecommuting, carpooling.
- Focused on optimizing the movement of people rather than the movement of motor vehicles.
- Supports making use of the existing infrastructure more effectively and efficiently.

Benefits of TDM:

- **Reduced congestion** – reduction in auto trips reduces congestion within the road network.
- **Reduced air and noise emissions** – with less vehicles on the road, a reduction in air and noise emissions can improve public health and quality of life.
- **Improved public health** – TDM initiatives include promoting the use of active transportation.
- **Cost effective** – Implementation of TDM initiatives allows communities to accommodate transportation needs without significant funding for infrastructure improvements.
- **Improved Safety** – Fewer vehicles on the road, increased transit use, safe cycling facilities, etc.

Durham TMP TDM Targets

- The Durham TMP emphasizes the provision of a more balanced transportation system.
- Goal of reducing peak-period automobile driver trips by 15% by 2021.

Durham Smart Commute

- Established in 2007, Durham Smart Commute works with employers to reduce single-occupancy auto trips by encouraging employees to use active transportation or ride-sharing.
- Currently includes more than 20 member companies across Durham Region.

Metrolinx

- The Big Move outlines a vision for transportation for the GTHA.
- The Big Move identifies additional Regional Rail routes into Clarington during peak periods and BRT service along the Highway 407 East Extension.



Transportation Demand Management (TDM)



Passive:
TDM

- Encourage awareness of transportation choices and alternatives.
- Work with local employers to encourage ride-sharing, transit use or telecommuting by providing employees with incentives (i.e. preferential parking, subsidized transit passes).
- Encourage local employers to adapt alternate work hours to allow for off-peak commuting.
- Develop marketing materials.
- Encourage reduced reliance on single-occupancy work trips and short trips and encourage higher transit ridership and healthy transportation choices.

Parking Management

- Maintain/improve the supply of on-street and off-street parking.

Passive Plus:
TDM

- Develop a formal TDM program.
- Focus on a combination of land use and behaviour-based policy approaches that encourage alternative transportation modes, attract additional transit ridership and encourage overall reduction in trip-making (i.e. transit-oriented development).

Parking Management

- Manage the demand for parking, especially within the core areas, to encourage alternative modes of travel.
- Continue to manage short-term parking to maximize turnover in commercial areas.
- Develop policies and incentives to limit new parking supply and encourage higher parking rates within private parking lots.

Moderate Plus:
TDM

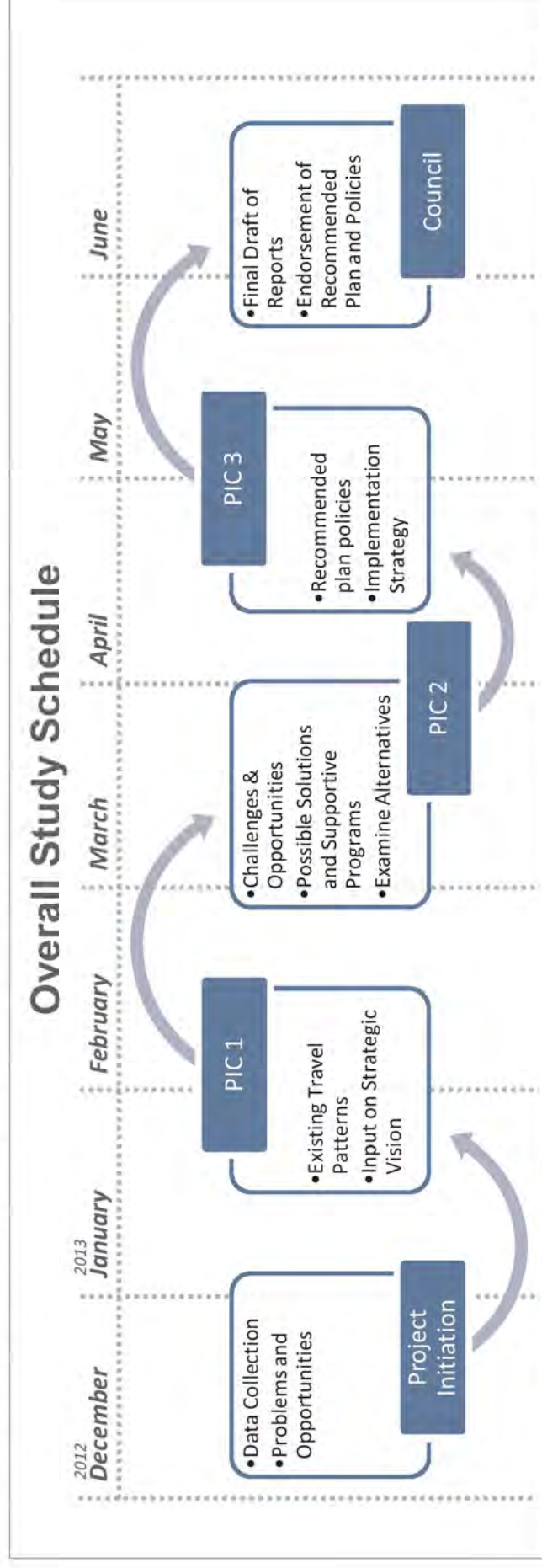
- Target major employers and traffic generators within Clarington.
- Hire a full-time TDM coordinator to champion TDM measures and build support throughout the community.
- Provide incentives to encourage trip reduction.
- Encourage large employers to adopt formal TDM programs in the workplace (i.e. Smart Commute Durham).
- Additional focus on land use and behaviour-based policy approaches.

Parking Management

- Increased focus on parking management strategies that limit parking supply, maximize pricing and more heavily regulate parking facilities, especially within the core areas.

CTMP Next Steps & Schedule

- Review public comments received from PIC #1
- Complete existing conditions inventory and undertake needs assessment / network analysis
- Identify long-term network improvements and areas of deficiency
- Undertake a review of policies and standards and update them in support of active transportation, transit and transportation demand management
- Hold PIC #2 to present draft findings (April 2013)
- Develop an implementation plan to support the development of the ten- and twenty-year capital program
- Prepare Transportation Master Plan, including road network recommendations and plans for active transportation, public transit, and TDM components of Master Plan



Your Comments are Appreciated

- Provide your input regarding the key transportation issues facing Clarington.
- Give us your ideas for the vision for travel in the future community.
- What are your views for the future of public transit, the development of the road network, walking, cycling?
- Help us generate ideas to guide the development of the CTMP and the future transportation system in Clarington.

Comments/Questions?

Your comments are very important to this study. Please fill in a comment sheet and deposit in the comment box. Alternatively, you can send your comments by mail, fax or email to the contacts noted below. Information presented at this PIC is also available for further review, along with an online version of the comment sheet, at <http://ctmp.clarington.net>.

Will McCrae, P. Eng.
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Ron Albright, P. Eng.
Manager, Infrastructure and Capital Works
Municipality of Clarington
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Bowmanville, ON L1C 3A6
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Fax: 905.623.9282
E-mail: ralbright@clarington.net

COMMENTS ARE REQUESTED BY FEBRUARY 22, 2013

Public Information Centre #1 - Comments

This is the first of a series of three PIC's planned as part of the Clarington Transportation Master Plan (CTMP). Your comments and suggestions are important to us. Please take a few minutes to complete this comment sheet. All comments will be considered. **(PLEASE PRINT)**

1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER THE NEXT 20 YEARS?

Having proper infrastructure for added traffic

467 traffic Hopefully will bring more business along with resident in area, proper traffic flow will be needed

Use of Metrolinx expanding will help flow

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

Passive

Moderate

Aggressive

Active Transportation

☐ Maintain Existing Facilities & Programs

☒ Focused Set of New Facilities & Programs

☐ Extensive New Facilities & Programs

Why?

Local Transit Service

☐ Status Quo

☒ Focus on Connecting Higher Order Facilities

☐ Extensive & More Frequent Local Transit

Why?

Road Network

☐ Optimize Existing Roads and Focus on Alternative Modes

☒ Strategic Widening and Key New Links

☐ Extensive Widening & New Links

Why?

Transportation Demand Management

☐ Status Quo

☒ Land Use and Behaviour Based Policy Focused on Longer Distance Commuters

☐ Policy Focused on Supporting Live-Work Relationships

Why?

Name: _____

Mailing Address: _____

Email: _____

Phone: _____

Would you like to be added to the CTMP mailing list? (check one)

☐ Yes

☐ No

PLEASE TURN OVER

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

407 flow
metrolix connection bus bike walk and parking

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

- walking Biking trails connection to Transit routes
- 407 Transit connections

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

THANK YOU FOR YOUR COMMENTS.

PLEASE PLACE YOUR COMMENT FORM IN THE COMMENT BOX PROVIDED AT THIS MEETING.

YOU CAN ALSO RETURN YOUR COMMENT FORM TO THE AECOM PROJECT MANAGER BY FEBRUARY 22, 2013.

PLEASE RETURN YOUR COMMENT FORM TO:

Will McCrae, P. Eng.
Project Manager
AECOM Canada Ltd.
53 Division Street
Cobourg, ON K9A 5G6
Tel: 905.372-2121 Ext. 244
Fax: 905.372.3621
E-mail: will.mccrae@aecom.com

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Good flow of traffic from Courtice to Newcastle
and alternate routes in all directions.
Congested areas may hamper traffic flow. - there fore
traffic lights at busy intersections in towns.
407 will affect traffic flow where we live -
but should help congestion on 401.

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

	<u>Passive</u>	<u>Moderate</u>	<u>Aggressive</u>
Active Transportation	<input type="checkbox"/> Maintain Existing Facilities & Programs	<input checked="" type="checkbox"/> Focused Set of New Facilities & Programs	<input type="checkbox"/> Extensive New Facilities & Programs

Why? Moderate may be more financially completed to budget. Aggressive may result in not as many ideas/programs being completed or too high in budget.

Local Transit Service	<input type="checkbox"/> Status Quo	<input checked="" type="checkbox"/> Focus on Connecting Higher Order Facilities	<input type="checkbox"/> Extensive & More Frequent Local Transit
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Why? As houses and businesses continue to be added to Clarington, roads/services have to be considered. Truck routes may be affected too.

Road Network	<input checked="" type="checkbox"/> Optimize Existing Roads and Focus on Alternative Modes	<input type="checkbox"/> Strategic Widenings and Key New Links	<input type="checkbox"/> Extensive Widenings & New Links
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Why? Use and improve what we have in place. New links to industry if needed.

Transportation Demand Management	<input type="checkbox"/> Status Quo	<input checked="" type="checkbox"/> Land Use and Behaviour Based Policy Focused on Longer Distance Commuters	<input type="checkbox"/> Policy Focused on Supporting Live-Work Relationships
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Why? That may be the majority of citizens in the future - to commute to Toronto or farther for a job.
* Unless we have bigger industry for jobs to keep people here.

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

Move people through Clarington easily.
Stoplight in key intersections to enhance traffic flow.

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

I live in a rural area so I need to drive to most locations. Our road is very busy and cycling is not an option for us. We do walk and connect with other roads not as busy.

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

Proper location of industry - separate from residential

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

Well presented. Ron & John very personable and knowledgeable.
Hope you have more interest from public. All presenters were very courteous and forthcoming with good information.

THANK YOU FOR YOUR COMMENTS.

PLEASE RETURN YOUR COMMENT FORM TO:

PLEASE PLACE YOUR COMMENT FORM IN THE COMMENT BOX PROVIDED AT THIS MEETING.

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Thank-you!

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1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER THE NEXT 20 YEARS?

Improving the OTR service I find it ridiculous that the buses only go in a single direction. If you were to take one of the buses & have it drive in the opposite direction it would GREATLY improve service.

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

	<u>Passive</u>	<u>Moderate</u>	<u>Aggressive</u>
Active Transportation	<input type="checkbox"/> Maintain Existing Facilities & Programs	<input type="checkbox"/> Focused Set of New Facilities & Programs	<input checked="" type="checkbox"/> Extensive New Facilities & Programs

Why? need barriers between cars & bikers, physical barriers.

Local Transit Service	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Focus on Connecting Higher Order Facilities	<input checked="" type="checkbox"/> Extensive & More Frequent Local Transit
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Why? It is shameful. As a student of Durham College living in Bowmanville. It takes me 2 hours! And three buses to get to campus.

Road Network	<input type="checkbox"/> Optimize Existing Roads and Focus on Alternative Modes	<input checked="" type="checkbox"/> Strategic Widening and Key New Links	<input type="checkbox"/> Extensive Widening & New Links
---------------------	---	--	---

Why?

Transportation Demand Management	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Land Use and Behaviour Based Policy Focused on Longer Distance Commuters	<input checked="" type="checkbox"/> Policy Focused on Supporting Live-Work Relationships
---	-------------------------------------	---	--

Why?

.....

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

More service between cities

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

Improve public transit! I would opt to take the bus more if it wasn't a nightmare

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

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1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER THE NEXT 20 YEARS?

Integrating transit in Clarington with the GTA. When I moved to Bowmanville, the GO Train was scheduled to go to Bowmanville in September 1991. That was 22 years ago! Bring it on.
Also, we need to connect the Bowmanville bus to Oshawa to make it useful. Most travellers want to go to Oshawa, not loop around Bowmanville. Currently, it is the bus to nowhere. Let's make it useful!

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

	<u>Passive</u>	<u>Moderate</u>	<u>Aggressive</u>
Active Transportation	<input type="checkbox"/> Maintain Existing Facilities & Programs	<input type="checkbox"/> Focused Set of New Facilities & Programs	<input checked="" type="checkbox"/> Extensive New Facilities & Programs

Why?

Dedicated, separated bike lanes would encourage people to consider riding to work. Currently, it is too dangerous to ride along Hwy 2 or other road ways.

Local Transit Service	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Focus on Connecting Higher Order Facilities	<input checked="" type="checkbox"/> Extensive & More Frequent Local Transit
------------------------------	-------------------------------------	--	---

Why? Bowmanville is in desperate need of the GO Train & a DRT bus that connects to Oshawa. People drive because there is no viable alternative. If you give people alternatives, they will use them.

Road Network	<input type="checkbox"/> Optimize Existing Roads and Focus on Alternative Modes	<input type="checkbox"/> Strategic Widening and Key New Links	<input checked="" type="checkbox"/> Extensive Widening & New Links
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Why?

401

Transportation Demand Management	<input type="checkbox"/> Status Quo	<input checked="" type="checkbox"/> Land Use and Behaviour Based Policy Focused on Longer Distance Commuters	<input type="checkbox"/> Policy Focused on Supporting Live-Work Relationships
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Why?

.....

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

- GO Train to Bowmanville ASAP. It was originally announced in 1990 & we are still waiting.
- Integrate Clarington Transit to larger cities like Oakville & not rural routes like Orono.
- 407

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

- viable transit
- bike lanes separated by a divider

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

- Too much jargon & industry terminology in your slides. Plain language would have been better.

THANK YOU FOR YOUR COMMENTS.

PLEASE PLACE YOUR COMMENT FORM IN THE COMMENT BOX PROVIDED AT THIS MEETING.

YOU CAN ALSO RETURN YOUR COMMENT FORM TO THE AECOM PROJECT MANAGER BY FEBRUARY 22, 2013.

PLEASE RETURN YOUR COMMENT FORM TO:

Will McCrae, P. Eng.
Project Manager
AECOM Canada Ltd.
53 Division Street
Cobourg, ON K9A 5G6
Tel: 905.372-2121 Ext. 244
Fax: 905.372.3621
E-mail: will.mccrae@aecom.com

Information received will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments received will become part of the public record.

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1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER THE NEXT 20 YEARS?

East-west corridor to be developed w/ this Railcenter

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

	<u>Passive</u>	<u>Moderate</u>	<u>Aggressive</u>
Active Transportation	<input type="checkbox"/> Maintain Existing Facilities & Programs	<input type="checkbox"/> Focused Set of New Facilities & Programs	<input type="checkbox"/> Extensive New Facilities & Programs

Why?

Local Transit Service	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Focus on Connecting Higher Order Facilities	<input checked="" type="checkbox"/> Extensive & More Frequent Local Transit
------------------------------	-------------------------------------	--	---

Why?

Road Network	<input type="checkbox"/> Optimize Existing Roads and Focus on Alternative Modes	<input checked="" type="checkbox"/> Strategic Widening and Key New Links	<input type="checkbox"/> Extensive Widening & New Links
---------------------	---	--	---

Why?

Transportation Demand Management	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Land Use and Behaviour Based Policy Focused on Longer Distance Commuters	<input type="checkbox"/> Policy Focused on Supporting Live-Work Relationships
---	-------------------------------------	---	---

Why?

.....

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

*Improve flow on road
Public Transit accessibility & frequency increased
Extension of GO system eastward*

Improve lights to access Hwy 2 in Newmarket

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

More frequent public transit

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

*Thank you for all your work & helpful comments
this evening*

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1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER THE NEXT 20 YEARS?

G-O Train to Bowmanville
more bike lanes, paths
407 exten

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY APPROACHES, AS PRESENTED AT THE MEETING.

	<u>Passive</u>	<u>Moderate</u>	<u>Aggressive</u>
Active Transportation	<input type="checkbox"/> Maintain Existing Facilities & Programs	<input type="checkbox"/> Focused Set of New Facilities & Programs	<input checked="" type="checkbox"/> Extensive New Facilities & Programs

Why? go train and 407 extensions - preparation for these

Local Transit Service	<input type="checkbox"/> Status Quo	<input type="checkbox"/> Focus on Connecting Higher Order Facilities	<input checked="" type="checkbox"/> Extensive & More Frequent Local Transit
------------------------------	-------------------------------------	--	---

Why? decrease commute time from Newcastle
so more will commute from Newsc.

Road Network	<input type="checkbox"/> Optimize Existing Roads and Focus on Alternative Modes	<input checked="" type="checkbox"/> Strategic Widening and Key New Links	<input type="checkbox"/> Extensive Widening & New Links
---------------------	---	--	---

Why? for 407 extension

Transportation Demand Management	<input type="checkbox"/> Status Quo	<input checked="" type="checkbox"/> Land Use and Behaviour Based Policy Focused on Longer Distance Commuters	<input type="checkbox"/> Policy Focused on Supporting Live-Work Relationships
---	-------------------------------------	--	---

Why? commuting from Newcastle - shorter time

.....

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS?

407 extension + connection to 401

* - more bike paths

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN?

I'm retired - I won't ride my bike on King st, limited travel on Liberty st - It isn't safe.

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

- keep improving country roads

- adding bike lanes

- more

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

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Welcome

Municipality of Clarington Transportation Master Plan PIC #2

Tuesday May 6, 2014
6:00 P.M. to 8:00 P.M.

Council Chambers
40 Temperance Street
Bowmanville



Developing the Clarington Transportation Master Plan (CTMP)

What is the CTMP?

- The Clarington Transportation Master Plan (CTMP) will provide a comprehensive assessment of Clarington's current and future transportation system needs.
- The CTMP will provide recommendations for new or improved infrastructure (roads, transit, cycling, walking, etc.), operational standards, and transportation policies that Clarington uses to manage its transportation infrastructure.

Why Now?

- Clarington's TMP was started in 2009 in parallel with the Official Plan Review.
- CTMP was put on hold pending resolution of ROPA 128 and subsequent updates to travel demand models.
- CTMP is included as an objective of the Clarington Strategic Plan.

What is the Process?

This Transportation Master Plan is being developed in accordance with the Municipal Class EA document (as amended in 2007 & 2011) and addresses Phases 1 and 2 of the Municipal Class EA process. The master planning process identifies a recommended 'set' of proposed works and the rationale for their implementation.



For some infrastructure projects identified in the Transportation Master Plan, additional requirements of the Municipal Class EA process will need to be fulfilled. The level of complexity of an individual project and the potential impacts of that project on the environment determines which phases need to be addressed, the level of detail required to be examined, and the extent of mitigation that may be required in future work.

CTMP Background and Current Related Studies & Initiatives

Purpose of the CTMP

- Identify current transportation issues and opportunities to developing a multi-modal transportation vision.
- Consider the needs of the existing community, planned improvements, changing trends and new opportunities.
- Consider active transportation modes such as walking and cycling, public transit, travel by car, rail initiatives and goods movement.
- Recommend transportation policies and infrastructure projects which will be used to manage transportation infrastructure to the 2031 planning horizon.
- The public and other key stakeholders are invited to participate in the study and assist in the development of the CTMP.

Current Related Initiatives

A number of related studies and initiatives recently completed by multiple agencies include:

- Metrolinx – Big Move Projects
- Region of Durham – TMP, Regional Cycling Plan, Long-Term Transit Strategy, Arterial Design Guidelines, ROPA128
- Ministry of Transportation – Cycling Strategy (#CycleON), Highway 401 Studies, Highway 407 & East Link
- Ontario Power Generation – Darlington Refurbishment, Holt Interchange
- Official Plan Review
 - Parks, Open Space and Trails Master Plan
 - Courtice Main Street Secondary Plan
 - Courtice Employment Lands Secondary Plan
 - Growth Management
 - Natural Heritage and Countryside Discussion Papers
- Green Community Strategy
 - Sustainable Clarington Community Advisory Committee

Clarington Initiatives

Additional information is available on the Municipality of Clarington website: <http://ctmp.clarington.net>

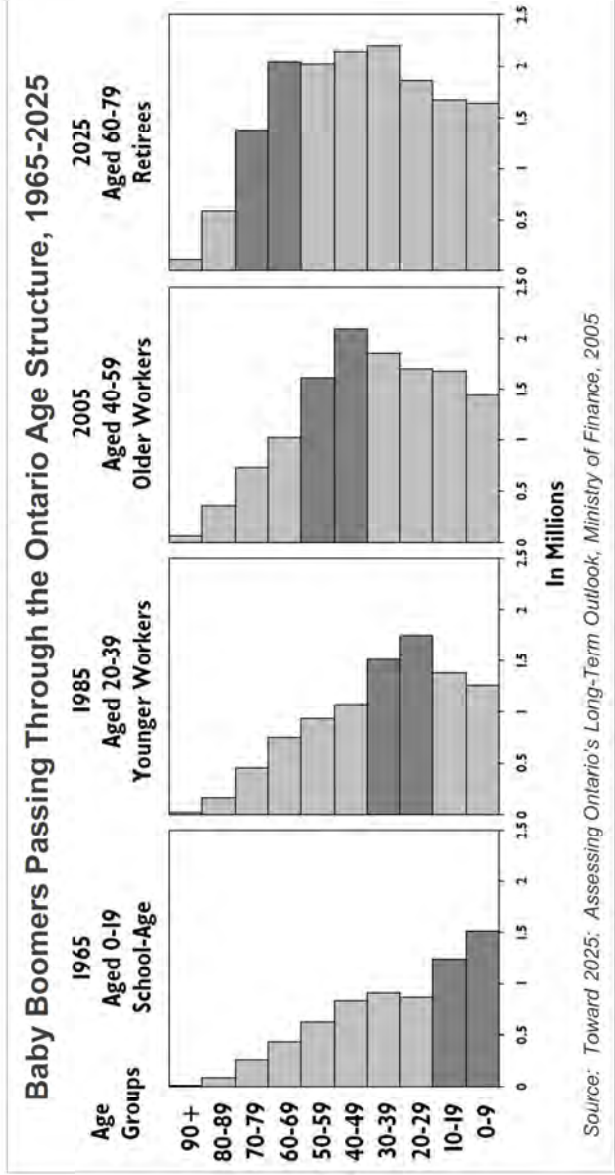


Changes on the Horizon

Communities which are successfully improving the sustainability of their transportation networks are doing so as part of a wider program of creating more vibrant, livable and sustainable cities.

Considerations in developing the Transportation Master Plan include:

- Population Growth
- An Aging Population
- Climate Change & Sustainability
- Existing Auto-centric Communities
- Changing Economic Climate
- Energy Supply and Costs
- Community Health



Additional information is available on the Municipality of Clarington website: <http://ctmp.clarington.net>

What We Heard From You

The feedback we received at/following PIC #1, generally consisted of the following:

Cycling Infrastructure	Transit Service	Roads
<ul style="list-style-type: none"> • Provide dedicated and separated cycling lanes • Provide more off-road cycling paths • Improve cyclist safety • Provide more “Share the Road” signs • Provide a cycling route along Nash Road from Courtice to Bowmanville • Provide pavement markings to delineate cycling routes 	<ul style="list-style-type: none"> • Include service in both directions (for loop routes) • Integrate transit in Clarington with service to the GTA • Improve service between urban centers • Improve service to Durham College/UOIT • improve accessibility and frequency of service • Expedite GO train service to Bowmanville • Make transit a desired service to encourage use 	<ul style="list-style-type: none"> • East-west routes need to be developed, especially through Newcastle • Improve existing roadways • Consider long-distance commuters • Improve country roads • Implement stoplights at key intersections to improve traffic flow • Add wider shoulders • Improve maintenance/cleanliness of roadway shoulders • Provide more/permanent flashing speed signs along roadways • Improve connectivity

CTMP Future Assessment Assumptions

Growth Forecasts

- Growth forecasts for Clarington comply with the *Provincial Growth Plan: Places to Grow*.
- Places to Grow establishes the Province's vision for managing population and employment growth in the Greater Golden Horseshoe region to 2031.
- Places to Grow directs growth to Built Up Areas, including Courtice, Bowmanville and Newcastle, and emphasizes infrastructure that links Urban Growth Centres.
- Region of Durham Official Plan Amendment (ROPA) No. 128 was approved in January 2013. The expansions of the Living Area boundary of Courtice, and the Living Area boundary between Bowmanville and Newcastle, were approved as part of ROPA 128.
- Clarington is currently conducting an Official Plan Review.

Growth Forecasts for Clarington

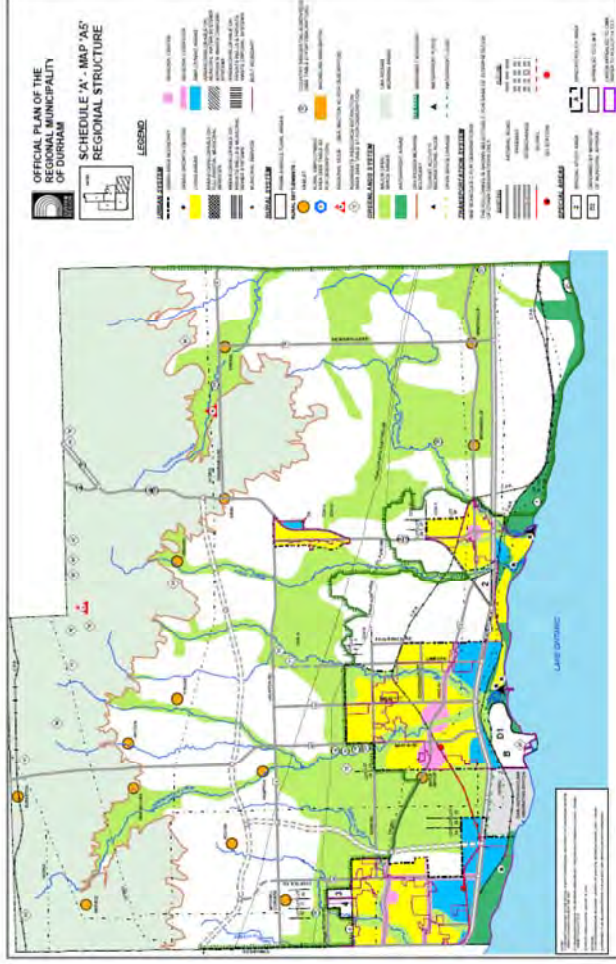
	2011	2016	2021	2026	2031
Population					
Clarington (total)	86,400	95,150	107,535	122,045	140,431
<i>Courtice</i>	22,810	23,415	25,605	28,845	36,441
<i>Bowmanville</i>	35,315	42,270	48,495	57,090	67,704
<i>Newcastle</i>	7,095	7,370	10,875	13,275	16,037
<i>Rural / Rest of Clarington</i>	21,180	22,095	22,560	22,835	20,249
Employment					
Clarington (total)	20,095	23,685	28,900	32,935	34,930
<i>Courtice</i>	4,090	6,035	8,945	10,920	13,320
<i>Bowmanville</i>	8,490	9,900	11,565	13,180	13,205
<i>Newcastle</i>	765	885	1,420	1,765	1,545
<i>Rural / Rest of Clarington</i>	6,750	6,865	6,970	7,070	6,860

Note: Employment totals exclude workers with no fixed place of work (NFPOW).

Source: 2011 to 2026 – Durham DC Update Study (2013); 2031 – Clarington Official Plan Review



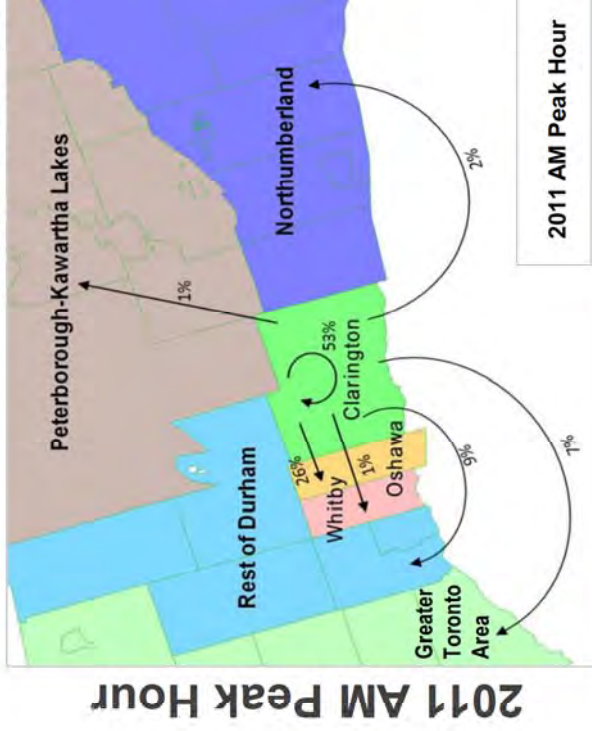
Source: Places to Grow: Growth Plan for the Greater Golden Horseshoe (2006)



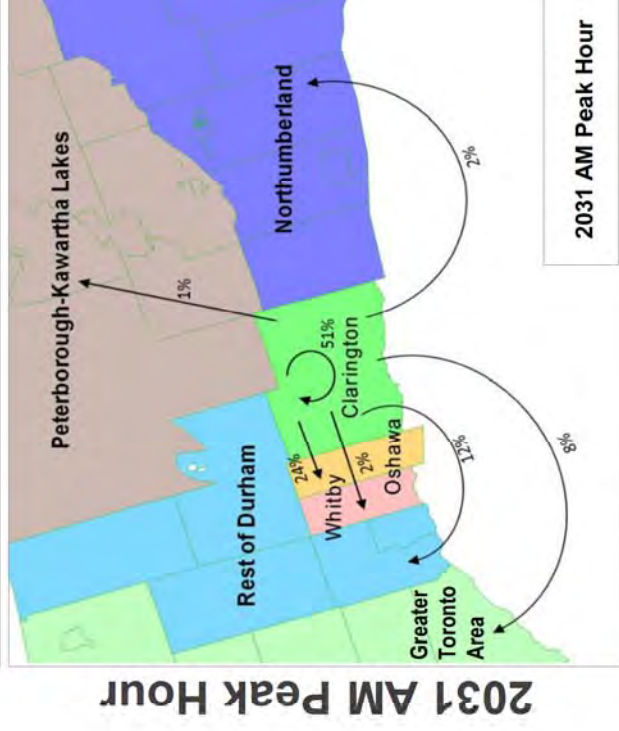
Source: Unofficial Working Consolidation, Durham Regional Official Plan, as of August 13, 2013

Future Travel – During AM Peak Hour

Auto Travel Patterns

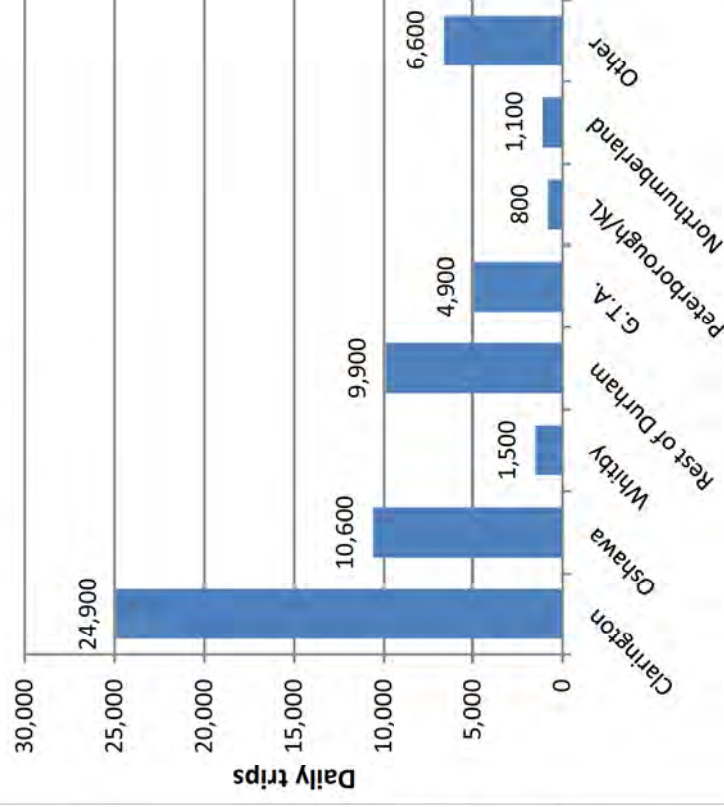


- Trips internal to Clarington during the AM peak hour account for 53% of all auto trips originating in Clarington
- The majority of external trips originating in Clarington during the AM are destined to Oshawa (26%)
- 78% of trips leaving Clarington during the AM peak hour remain in Durham Region



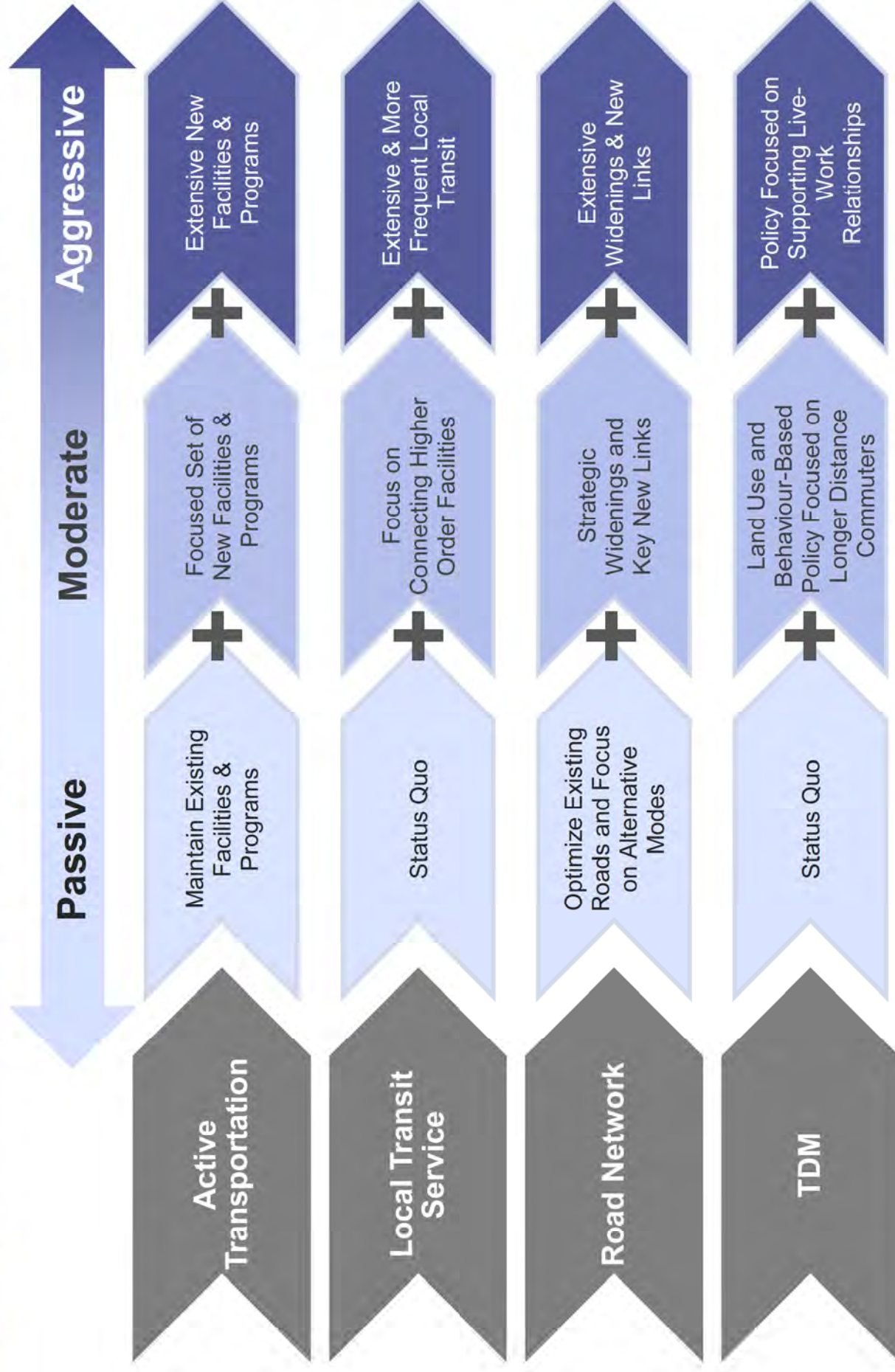
- Overall trip distribution will remain the same as existing conditions in 2031
- Amount of total trips destined to Rest of Durham in the AM increase to 12% in 2031

Daily traffic growth from 2011 to 2031



- 60,300 additional daily auto trips to/from Clarington expected by 2031 (53% increase from 2011).

CTMP Key Policy Areas – Range of Potential Approaches



Planning for Active Transportation

- Recognition of cycling and walking in Transportation Master Plans gaining prominence.
- Role of active transportation:
 - Recreation:
 - Bike tourism
 - Cycling clubs
 - Utilitarian mode of transportation:
 - Commuting & school trips
 - Reduce reliance on the car
- Complete Streets – designing roads and adjacent public spaces for *all* users (pedestrians, cyclists, transit users, and motorists).
- Improve travel mode share; existing AM peak period mode share across Clarington is 6%.



Welcome Cyclists!

#CycleON Ontario's Cycling Strategy

Key Considerations

- **Network** – Routes should connect and link communities and destinations
- **Travel Time** – Directness of route and travel time
- **Cost / Affordability** – Construction and ongoing maintenance
- **Maintenance** – Shoulder stability/pavement, pot holes, road grates, and winter plowing, sanding, and salting
- **Safety** – Visibility, signage, striping alerting drivers to presence of cyclists
- **Design Standards** – The use of consistent design and standards for cycling facilities
- **Facilities** – Bike racks / secure storage at community buildings and promoting private sector partnerships/co-operation
- **Marketing** – Public awareness and education, economic development, and promotional events

Types of Cycling Facilities



Shared road lane / signed route

*Lower traffic volumes
and/or lower speeds*



Paved shoulder (1.2 - 1.5m)



Designated / striped bike lane



Separated / buffered bike lane



Off-road multi-use trail (3 - 4m)

*Higher traffic volumes
and/or higher speeds*



Active Transportation Recommendations

- **Network connections and barrier elimination**
 - Implement recommended Active Transportation network (see map)
 - Local on-road routes to complement Regional cycling spines and Municipal off-road trails
 - Highway 2 serves as the primary cycling spine connecting Newcastle, Bowmanville, Courtice, and into Oshawa
 - Pave the Waterfront Trail and construct new connections to it
 - Enhance connectivity across barriers such as Highway 401 interchanges, railway, and creek crossings
- **Leverage and complement Regional initiatives**
 - Encourage addition of Highway 2 and RR 17 to *Regional Cycling Plan* and encourage implementation of this plan
 - Examine the feasibility of implementing “Share the Road” signage on suggested cycling routes
 - Integrate cycling-related improvements into overall roadway improvement program
- **Multi-modal connections and wayfinding**
 - Enhance connections to Bowmanville GO Bus Station / carpool lot and future GO rail stations
 - Enhance wayfinding signage within the Municipality to/from key destinations (downtown Bowmanville, GO Stations, Waterfront Trail, etc.)
- **Marketing and promotion**
 - Include cycling information on the Municipality’s website and provide printed copies of maps at key locations; continue to promote cycle tourism and recreational cycling in Clarington
 - Coordinate marketing with Smart Commute Durham and Region of Durham, including regional Cycling Communications Strategy
- **Municipality-wide active transportation plan**
 - Initial focus on improving active transportation network to connect people and places within Clarington’s Urban Centres
 - Determine phasing of the recommended network; link to roadway maintenance and improvement program
 - Develop a Complete Streets Policy, particularly for new development areas and key existing corridors
- **Winter maintenance**
 - Maintenance of key Municipal on and off-road trail components to encourage year-round usage
- **Updated sidewalk policies**
 - Review existing sidewalk policies to ensure a more complete network and to elaborate where sidewalks should be required on local streets



Active Transportation – Recommendations



Passive

Moderate

Aggressive

- Maintain a recreational focus for active transportation.
- Maintain existing off-road trail system.
- Support identification of additional off-road trails to create a broader network and improve links to Waterfront Trail.
- Provide bike route signage for shared routes on rural roads that are popular cycling routes.
- Coordinate with stakeholders, such as local municipalities and cycling groups, to promote use of active transportation trails and facilities throughout Clarington.
- Continue to promote Clarington as a premier active transportation destination.

Passive Plus:

- Develop policies that support active transportation for commuting and school trips, especially within built-up areas, as well as for recreational purposes.
- Establish an Active Transportation Advisory Committee.
- Develop phasing strategy for proposed active transportation network (e.g. together with road rehabilitation)
- Work with Region of Durham to implement Regional Cycling Plan.
- Implement active transportation network components under Clarington jurisdiction.
- Provide bike racks at municipal facilities.
- Promote identification of rest stops to support the active transportation network

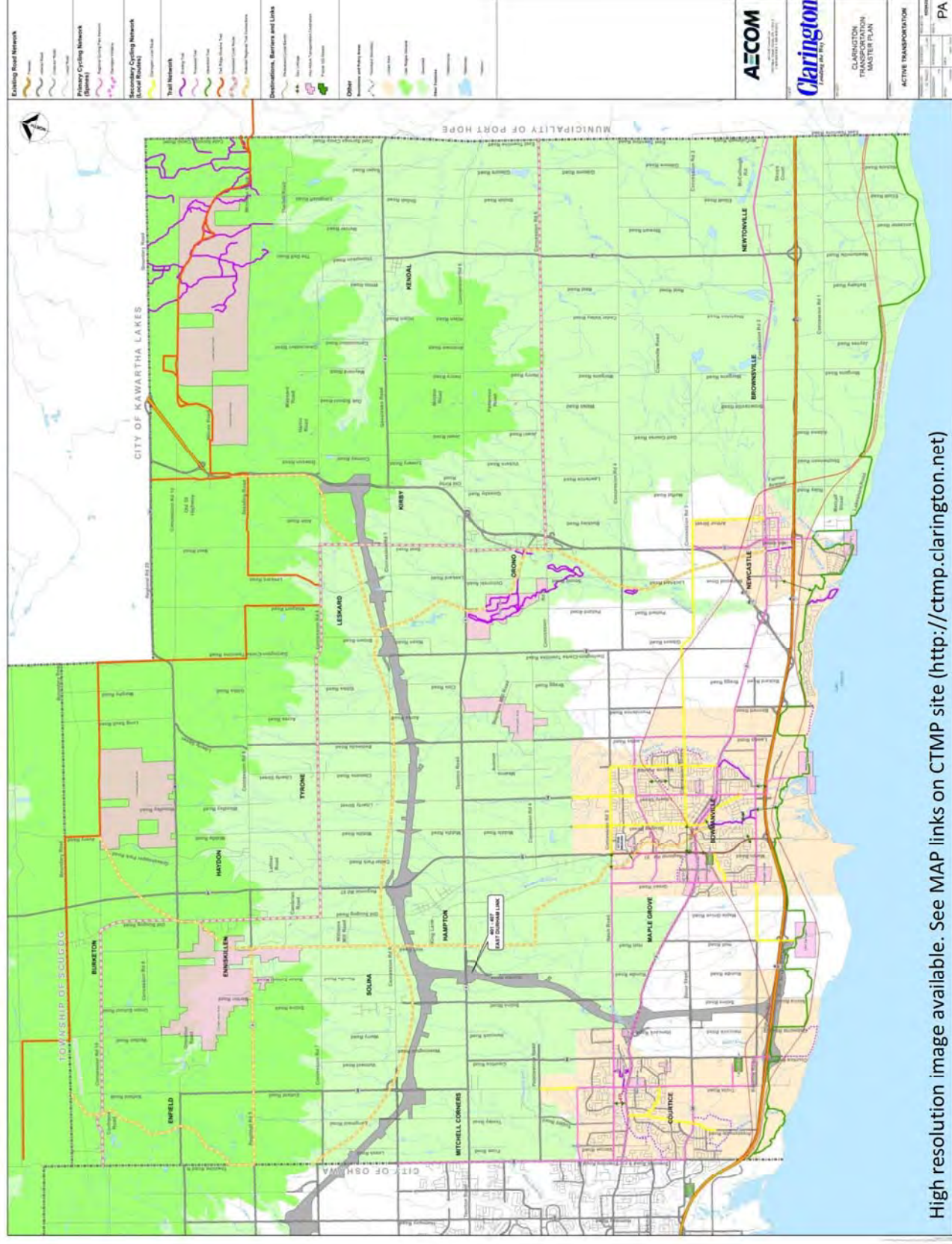
Note: Recommended approach indicated in **red**

Moderate Plus:

- Develop Clarington vision and policies to support reduced reliance on cars, especially for short trips.
- Develop a “Complete Streets Policy” and support complete streets within built-up areas.
- Adopt design standards for on-road bike facilities on Clarington roads.
- Require paved shoulders on rural roads.
- Fully integrate active transportation into transportation and land use planning and decision making.

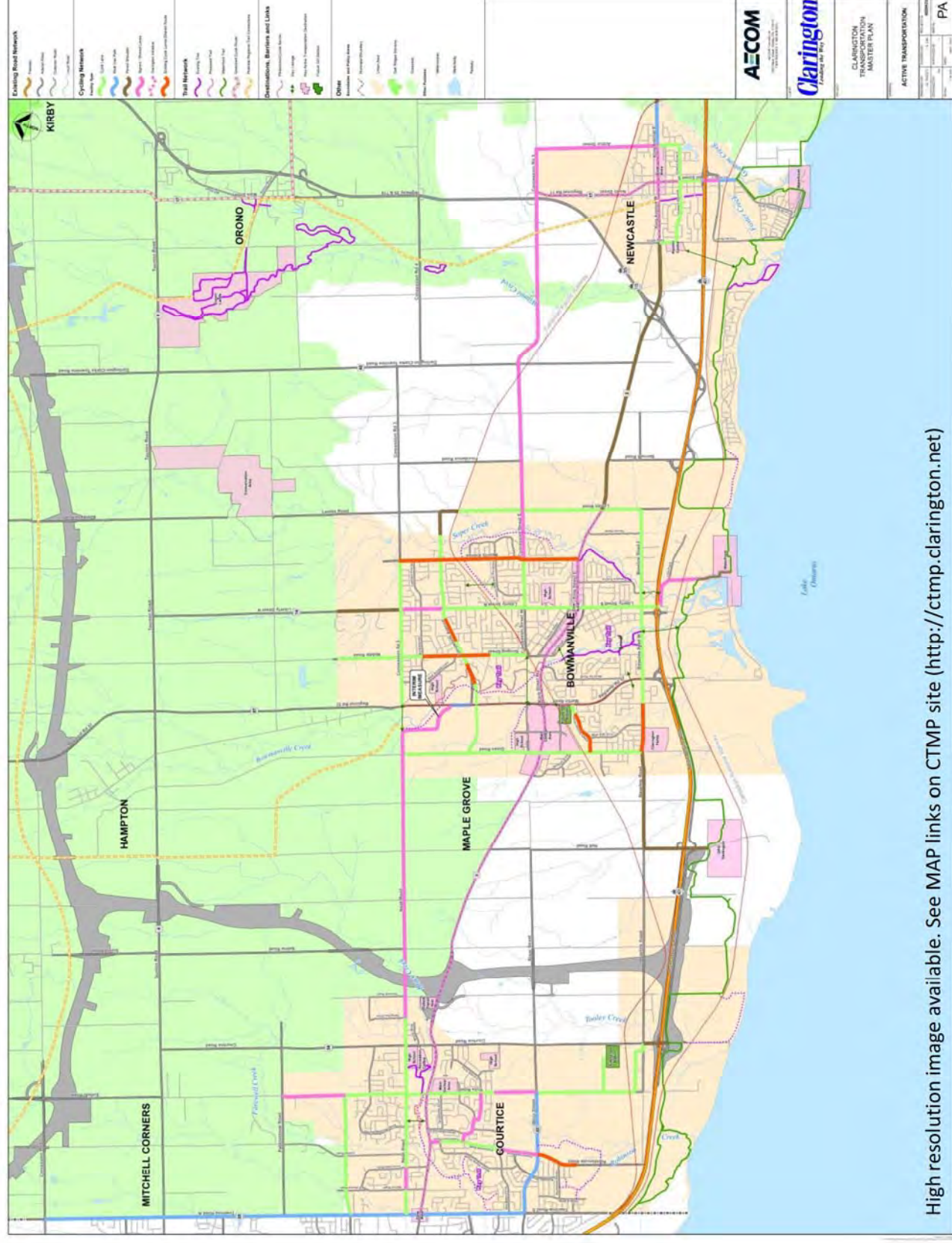


Active Transportation – Recommended Network



High resolution image available. See MAP links on CTMP site (<http://ctmp.clarington.net>)

Active Transportation – Recommended Network



Local Transit Service – Recommendations

Baseline Mode Share

- A 5% policy mode share is recommended as a baseline target for transit in Clarington.
- This mode share is a modest increase from existing conditions.
- The target could be achieved through the GO Rail Bowmanville Extension and modest expansion of transit service within Courtice, Bowmanville, and Newcastle.
- This mode share was used to assess road capacity deficiencies as part of this TMP.

Optimistic Mode Share

- A 9% transit mode share should be considered as an aspirational target.
- This mode share represents a doubling of transit mode share compared to existing conditions.
- A number of transit improvements throughout Clarington would need to be implemented to achieve this target (see “Recommended Transit Improvements”).

- Existing AM peak period transit mode split of 4.4% for Clarington trips (largely GO Rail)
- Support for bold implementation of transit service improvements in Clarington by Metrolinx / GO Transit and Durham Region Transit (DRT) to further encourage usage of transit
- Recognizing the uncertainty in future investments in transit, two possible transit mode share scenarios have been considered: Baseline and Optimistic
 - Optimistic accounts for full implementation of recommended transit service improvements in Clarington
 - Baseline accounts for likely level of actual transit service expansion in Clarington

Recommended Transit Improvements

- GO Rail Bowmanville Extension
 - Encourage extension of rail service to Courtice and Bowmanville
- Higher-order transit on Highway 2 to Courtice
 - Support extension of Pulse bus rapid transit or light rail transit along Highway 2 into Courtice
 - Suggest a further extension of Pulse to the future 407 Transit Hub in Courtice
- Enhanced DRT service on Highway 2 (Courtice to Newcastle)
 - Support implementation of conventional Durham Region Transit (DRT) service along Highway 2 between Courtice, Bowmanville, and Newcastle
- Restructured service to Orono (currently under DRT review)
 - Encourage conversion of loop service to Orono to a standard route directly connecting Orono and Newcastle
- Further expanded service in Courtice and Bowmanville
 - Support expansion of DRT conventional service within these two communities, including increased frequencies and the provision of more direct bi-directional routes
- Expanded service to areas with existing service gaps
 - Encourage the extension of DRT service to communities that are not served by transit
- Expanded service in growth areas
 - Support the provision of DRT service during the initial stages of development in new growth areas
- **Recommended Transit Improvements, with exception of GO Rail Bowmanville Expansion, are subject to the approval of the DRT Commission and budget considerations.**



Local Transit Service – Recommendations



Passive

Moderate

Aggressive

- Maintain status quo – current levels of transit ridership and transit mode share.
- Continue with current local and regional levels of service.
- **Improve connections to planned GO services (Lakeshore East rail extension to Bowmanville, GO Bus to Peterborough).**

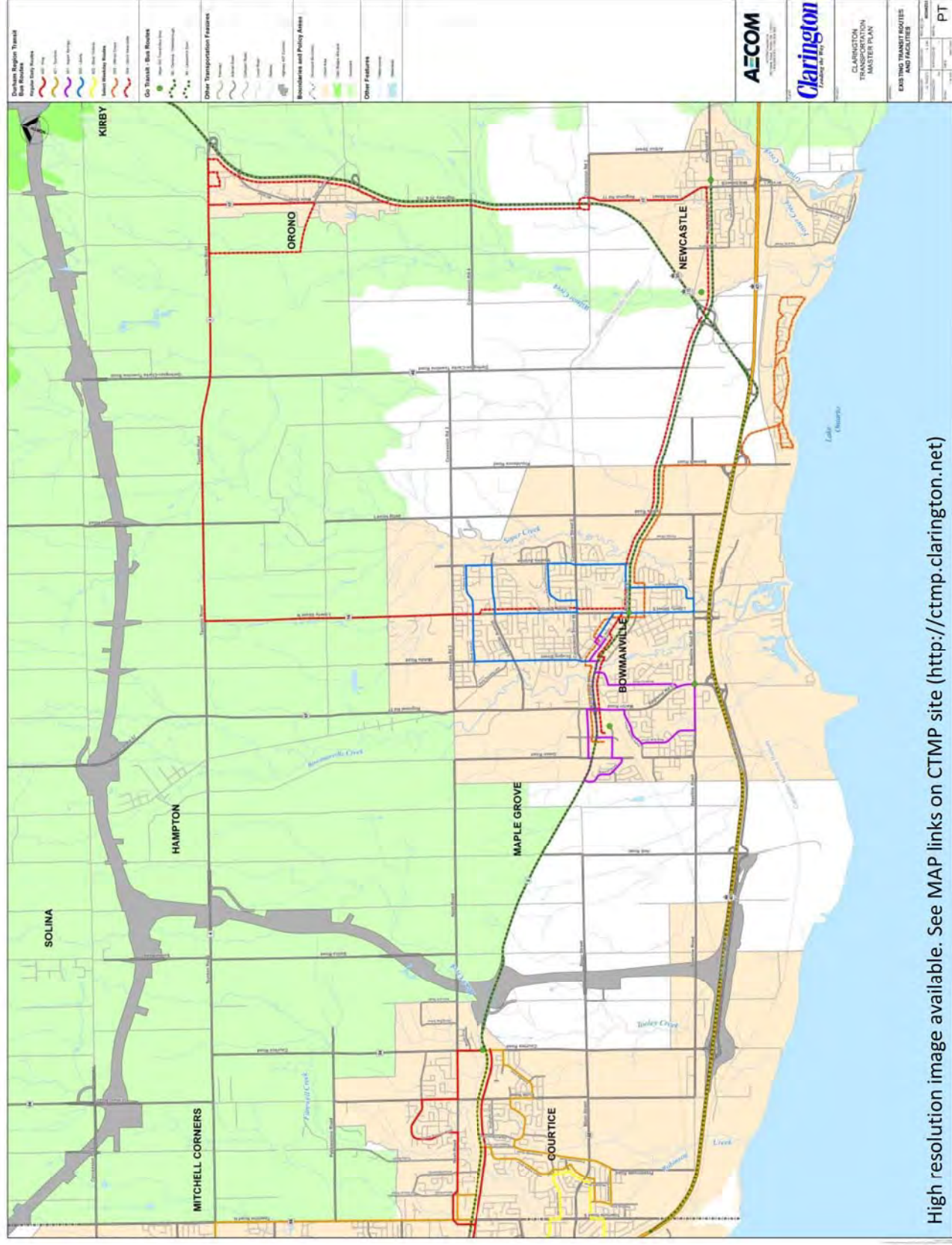
- Passive Plus:**
- **Make modest improvements in transit ridership and transit mode share by additional services.**
 - **Encourage Durham Region to implement the Long-Term Transit Strategy (LTTTS):**
 - Exclusive “transitway” for GO bus service along the Highway 407 corridor.

- Moderate Plus:**
- Enhanced focus on improving travel choice and increasing transit mode share.
 - Establish local shuttle bus routes to provide connections to GO service.
 - **Provide more frequent, direct transit service along with Highway 2 corridor to provide improved connections between Bowmanville, Courtice and Newcastle.**
 - **Improvements to GO Rail service, including Courtice and Bowmanville stations.**

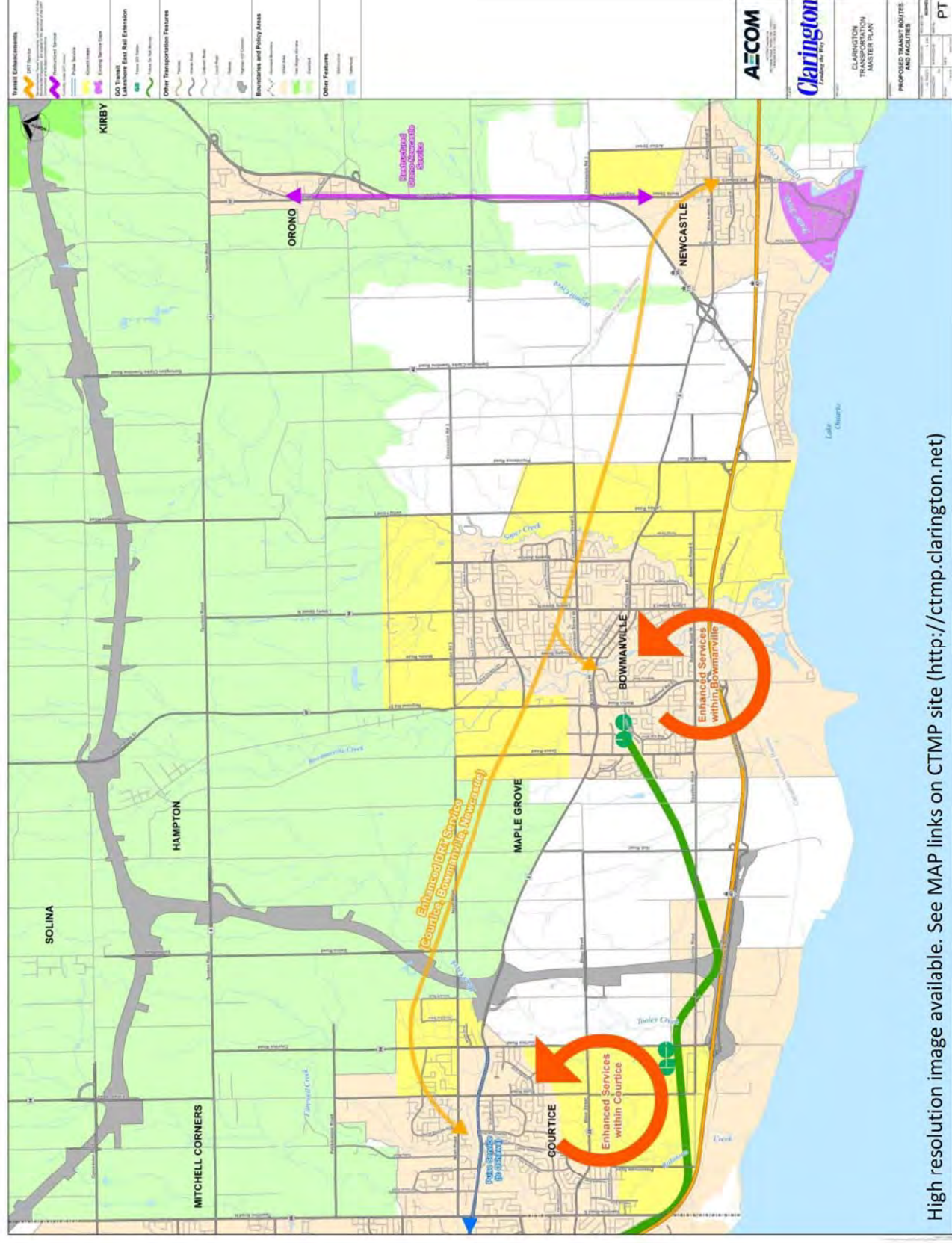
Note: Recommended approach indicated in **red**



Transit Service – Existing Transit & Planned Improvements By Others

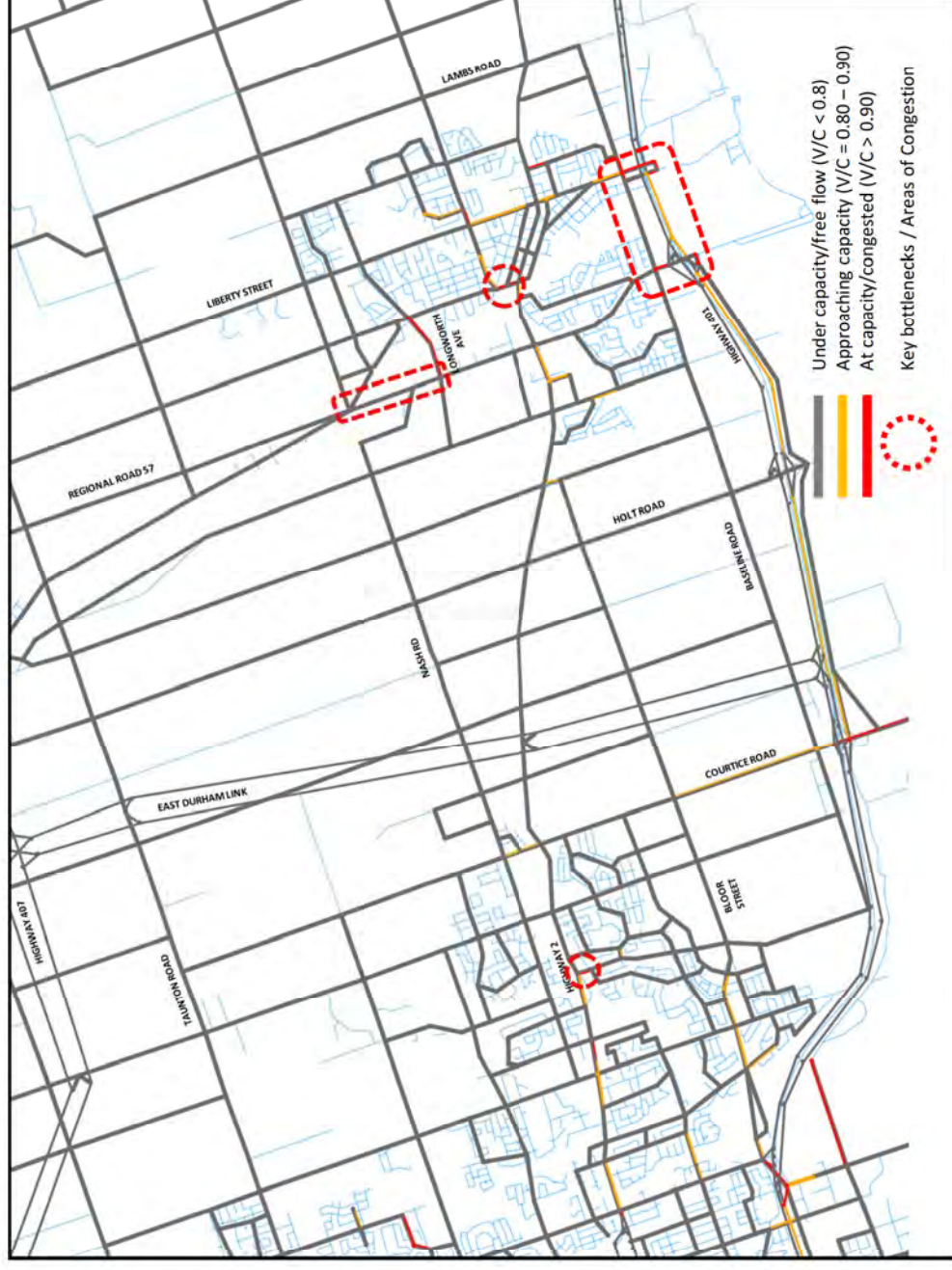


Transit Service – Recommended Improvements



Future Travel – 2031 Forecasting / Future Deficiencies

- Traffic forecasted using Durham Region transportation demand model
 - Updated for Clarington
- Incorporates Recommended improvements from Region's DC Study (updated 2013), including:
 - Highway 401 widening to 8 lanes to the East Durham Link
 - Highway 407 East extension to Highway 35/115
 - East Durham Link connection between Highway 407 and Highway 401
- Bottlenecks / Areas of Congestion localized in Clarington communities.
- **Key capacity deficiencies at:**
 - Longworth Ave and Concession 3 east of RR57 (at creek)
 - Highway 401 interchanges
 - Downtown Bowmanville and Courtice



Future Travel – Potential Road Network Alternatives

Potential Road Network Improvements to address future transportation deficiencies:

- Longworth Avenue Extension (Scugog Street to Maple Grove Road or Holt Road)
- Nash Road / Concession 3 Improvements
- New Highway 401 Interchange at Lambs Road
- Baseline Road and Holt Road Improvements

Alternatives were screened based on feasibility and technical ability to address long-term transportation deficiencies. Based on screening, the following network improvement alternatives were not carried forward for future evaluation:

- **Nash Road / Concession 3 Crossing:**
 - Forecasting results suggested new crossing did not address capacity deficiencies along Longworth Avenue and did not perform as well at directing traffic to the improved Hold Road interchange. Due to the environmental impacts and costs associated with a new bridge structure over Bowmanville creek, the Longworth Avenue widening was retained as the more feasible option.
- **Longworth Avenue Extension East to Lambs Road:**
 - Forecasting results suggest that extension through to Lambs Road not required by 2031.
- **Townline Road extension / re-alignment to Courtice Road:**
 - Forecasting results suggest that extension not required by 2031.
- **New Highway 401 interchange at proposed Townline Road extension:**
 - Future traffic forecasts do not indicate a need for an additional Highway interchange in Courtice by 2031.
- **Bloor Street-Baseline Road Type-A arterial connection:**
 - Forecasting results on Bloor Street and Baseline Road suggest that this new connection will not be required by 2031.
- **Additional Traffic generated by Darlington Nuclear Generation Station Refurbishment:**
 - Forecasting suggest that traffic generated by DNGS Refurbishment work force will not require additional road improvements (local operational improvements near site still required).

Future Travel – Preferred Network Alternatives

Improvements	To/From	Preferred Alternative Networks		
		Alternative A	Alternative B	Alternative C
Longworth Avenue widening (2 to 4 lanes)	Scugog Street to Regional Road 57	●	●	●
New Longworth Avenue extension (4 lanes)	Regional Road 57 to Maple Grove Road	●	●	●
	Maple Grove Road to Holt Road	●		●
Upgrade Holt Road to Type-B Arterial	Longworth Avenue extension to Bloor Street	●		●
	Bloor Street to Highway 401	●	●	●
Holt Road widening (4 lanes)	Longworth Avenue extension to Highway 2	●		
	Baseline Road to South of Highway 401	●	●	●
Maple Grove Road widening (4 lanes)	Longworth Avenue extension to Bloor Street		●	
Bloor Street widening (4 lanes)	Maple Grove Road to Holt Road		●	
Upgrade Baseline Road to Type-B Arterial	Lambs Road to Holt Road	●	●	●
Baseline Road widening (4 lanes)	Lambs Road to Waverly Road			●
Lambs Road/401 Interchange	At Highway 401			●
Lambs Road widening	Highway 2 to South of Highway 41			●
Re-align Concession Road 3	At Regional Road 57; convert N Scugog Court to cul-de-sac	●	●	●
Upgrade Concession Road 3 to Type-B Arterial	Mearns Road to Regional Road 57	●	●	●
Improvement included in Preferred Alternative Network				



Improvement included in Preferred Alternative Network



Future Travel – Preferred Alternative Networks



Note: Alternative C interchange recommendations require further study and discussion with MTO before moving forward. MTO's EA from Courtice Road to East Townline Road recommended widening Highway 401 and improving both Liberty Street and Bennett Road interchanges. Clarington will continue to work with MTO to assess interchange treatment options for these three Bowmanville interchanges.

Future Travel – Evaluation of Network Alternatives

Evaluation Criteria	Alternative Solutions		
	2031 Base Network (Do Nothing)	Alternative A	Alternative B
Technical	Does not accommodate growth and associated higher travel demands	Accommodates growth and higher travel demands in North Bowmanville	
	Does not address capacity issues to the East of the Bowmanville Creek at Longworth Avenue and Concession Road 3	Addresses capacity issues on Longworth Avenue and Concession Road 3 to the east of the Bowmanville Creek	
	Does not provide better access to the improved Holt Road Highway 401 interchange	Provides better access to the improved Holt Road Highway 401 interchange via full Longworth Avenue extension to Holt Road / Hwy 2	Provides best access to the improved Holt Road Highway 401 interchange via full Longworth Avenue extension to Holt Road / Hwy 2
	Does not address capacity issues and congestion at Liberty Street interchange	Addresses capacity issues and congestion at Liberty Street interchange	Addresses capacity issues and congestion at Liberty Street interchange
Social/Cultural Environment	Commuter traffic continues to largely travel through downtown Bowmanville to access Highway 401	Some capacity relief to downtown Bowmanville by encouraging usage of Holt Road interchange. Less than 3% reduction in downtown traffic (compared to "Do Nothing")	
	Least Preferred	Moderately Preferred	Least-Moderately Preferred
	Does not impact: - Residential property and/or buildings - Commercial facilities and/or institutions - Agricultural lands	Some impact: - Residential property and/or buildings at Holt Road and Highway 2 - Agricultural lands	Some impact: - Residential property and/or buildings at Holt Road and Highway 2 - Agricultural lands
Natural Environment	Most Preferred	Least-Moderately Preferred	Moderately Preferred
	Does not impact: - Designated Natural Areas - Provincially Significant Wetlands (PSW)	The Longworth Avenue extension to Holt crosses a PSW. Potential to avoid PSW through route planning.	The Longworth Avenue extension to Holt crosses a PSW. Potential to avoid PSW through route planning.
	Potential decrease in localized and regional air quality in association with growth in traffic congestion.	Less impact to air quality with reduction in congestion	
Economic	Most Preferred	Least-Moderately Preferred	Moderately Preferred
	Does not support future growth	Supports growth by providing accessibility to growing areas in North Bowmanville	
	Does not improve movement between communities	Improves east-west movement between communities through improvements to Longworth Avenue and Baseline Road	Improves east-west movement between communities through improvements to Longworth Avenue and Baseline Road
	Does not support goods movement	Is supportive of improved goods movement	
	Congested downtown Bowmanville not conducive to business Cost is in terms of lost benefit by not supporting growth and development	Minimal reduction in downtown Bowmanville traffic	Significant reduction in downtown Bowmanville traffic
	Least Preferred	Least Moderately Preferred	Moderately Preferred
			Most Preferred

OVERALL, ALTERNATIVE C IS THE PREFERRED ALTERNATIVE



Roadway Network – Recommendations



Passive

Passive:

Optimization

- Normal program of intersection/operational improvements to optimize use of existing infrastructure.

Safety

- Normal program of safety improvements in response to problems identified.
- Maintain signage and pavement markings as identified by staff and the public.
- Review roadside barriers and signing in areas of capital projects.



Moderate

Moderate:

Optimization

- Focused program of improvements to increase capacity/improve safety along key corridors and at key intersections.
- Corridor optimization for main arterial roads.

Safety

- Conduct a safety-based network screening of signage, and pavement markings in areas slated for capital projects or with high collision experience; implement an improvement plan where appropriate.
- Assess roadside barrier protection
- Implement improvements as part of capital projects or at high risk areas
- Review / upgrade signage and pavement markings as identified by staff and the public.



Aggressive

Aggressive:

Optimization

- Dedicated funding and aggressive intersection improvements programs.
- Consider retrofitting existing intersections with roundabouts to increase intersection capacity.
- Review all arterial roads to optimize capacity.

Safety

- **Conduct a signage and pavement marking review and implement a systematic improvement plan across the municipal road network.**
- Complete systematic roadside barrier assessment and installation plan across the road network with an emphasis on the removal of obstacles in the clear zone where feasible.
- Reconstruct rural roads to improve sight distance on vertical and horizontal curves to be suitable for the posted speed limit.
- Improve road alignment where the design speed of the curve is 20 km/h or more below the posted speed limit.



Roadway Network – Recommendations



Passive:

Design Standards

- Maintain existing standards.
- Clarington typically follows TAC* Design guideline or MTO Geometric Design Standards.
- Upgrade to TAC* standards when pavement / bridge needs met.

*TAC (Transportation Association of Canada) is defined as a 'national association with a mission to promote the provision of safe, secure, efficient, effective and environmentally and financially sustainable transportation services in support of Canada's social and economic goals. In urban areas, TAC's primary focus is on the movement of people, goods and services and its relationship with land use patterns.

Trucks

- Restrictive truck route system – identify and post signage to indicate which roadways are suitable for truck traffic on a case-by-case basis.
- Ensure accessibility to all commercial/industrial areas.

Moderate:

Design Standards

- Follow “desirable” design TAC* standards for higher classification roadways.
- Allow for use of minimum TAC* design standards on lower classification roadways.
- Consider paving shoulders / widen bridge decks on a case-by-case basis to accommodate agricultural equipment.

Trucks

- Hybrid system – use a system which combines permissive routes and local truck restrictions.

Aggressive:

Design Standards

- Introduce a policy to follow “desirable” design TAC* standards for rural roadway classifications.
- Adopt standards regarding paved shoulders and wider bridge decks on roads in agricultural / farming areas.
- Introduce Urban Design Standards/ Context Sensitive Solutions (Complete Streets) for roads located in built-up areas

Trucks

- Comprehensive truck route system – restrict truck movements from certain roadways through restrictive signage.



Roadway Network – Recommendations



Passive:

Traffic Calming

- Place signage / speed monitors to discourage speeding and improve safety for pedestrians and cyclists in known problem areas within Clarington, especially close to schools and parks.
- Encourage awareness and provide education regarding the dangers of speeding.

Network Integration

- Reactive response to project scope and scheduling for projects initiated by private industry and senior levels of government.

Moderate:

Traffic Calming

- Provide additional signage / physical speed controls (such as speed bumps and roundabouts) to reduce speeding.
- Increase enforcement / ticketing, especially in known problem areas.

Network Integration

- Work proactively with industry the Province and Region to address network needs on a project focused basis.

Aggressive:

Traffic Calming

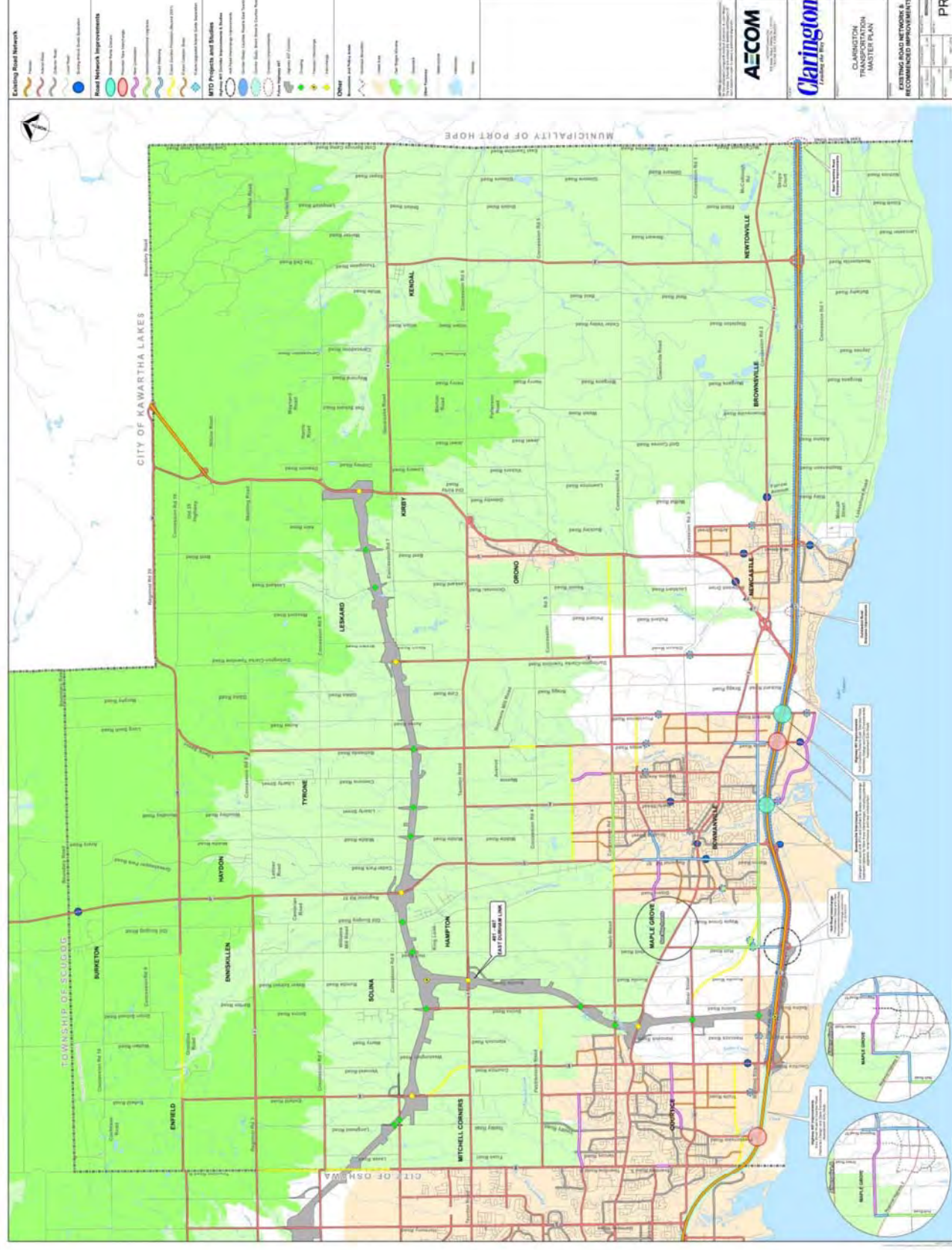
- Undertake a broad traffic calming program to discourage speeding and create safer and more livable streets for pedestrians and cyclists.
- Traffic calming measures could include:
 - Curb extensions
 - Pedestrian refuges
 - Lane narrowing
 - Road diets
 - Changing surface materials
 - Limiting access or closing certain streets to traffic

Network Integration

- Establish a formal review committee, including representatives from the Province and Region to address network needs on an integrated basis.



Road Network – Recommended Network Improvements



Transportation Demand Management (TDM)

What is TDM?

- Set of initiatives aimed at:
 - Reducing auto demand, specifically single-occupancy auto trips.
 - Encouraging travel outside of the peak periods.
 - Reducing travel distances.
 - Other initiatives such as work sharing, telecommuting, carpooling.
- Focused on optimizing the movement of people rather than the movement of motor vehicles.
- Supports making use of the existing infrastructure more effectively and efficiently.

Benefits of TDM:

- **Reduced congestion** – reduction in auto trips reduces congestion within the road network.
- **Reduced air and noise emissions** – with less vehicles on the road, a reduction in air and noise emissions can improve public health and quality of life.
- **Improved public health** – TDM initiatives include promoting the use of active transportation.
- **Cost effective** – Implementation of TDM initiatives allows communities to accommodate transportation needs without significant funding for infrastructure improvements.
- **Improved Safety** – Fewer vehicles on the road, increased transit use, safe cycling facilities, etc.

Durham TMP TDM Targets

- The Durham TMP emphasizes the provision of a more balanced transportation system.
- Goal of reducing peak-period automobile driver trips by 15% by 2021.

Durham Smart Commute

- Established in 2007, Durham Smart Commute works with employers to reduce single-occupancy auto trips by encouraging employees to use active transportation or ride-sharing.
- Currently includes more than 20 member companies across Durham Region.

Metrolinx

- The Big Move outlines a vision for transportation for the GTHA.
- The Big Move identifies additional Regional Rail routes into Clarington during peak periods and BRT service along the Highway 407 East Extension.



Transportation Demand Management (TDM) Recommendations

- **Assume a leadership role to promote TDM**
 - Support regional TDM policies , including Smart Commute Durham, and ensure municipal programs meet Regional requirements
 - Encourage employers with 50+ employees to participate in Smart Commute's existing free programs
- **Promote walking, cycling, and transit at the municipal or neighbourhood level**
 - Could co-host "shop local" campaigns with Smart Commute Durham
 - Integrate sustainable transportation practices within events and festivals
- **Encourage the implementation of school-based TDM programs**
 - Municipality can support these programs by constructing sidewalks, bicycle facilities, and trails connecting to schools
- **Establish a visionary TDM program for municipal employees**
 - Program would serve as a demonstration for the community and would reduce congestion within Bowmanville
- **Develop a parking strategy for Bowmanville**
 - Differentiate between long-term parking (employees) and short-term parking (shoppers/patrons)
 - Support short-term parking while encouraging employees to use TDM
- **Work with Metrolinx, MTO, and Durham Region to promote existing carpool lots and develop new lots**
 - Carpool lots could be developed at future GO rail stations in Courtyce and Bowmanville
 - Promote existing carpool lots and development new carpool lots near interchanges along Highways 401 and 407

TDM Program Goals:

- **Overall trip reduction** – TDM marketing / promotion efforts and support for telecommuting programs (Smart Commute).
- **Mode of travel shifts** – support expanded transit by DRT and GO and municipal active transportation network.
- **Time of travel shifts** – shifting necessary trips out of peak periods by supporting employer-based programs.
- **Increased vehicle occupancies** – support of planned carpool lots and carpooling initiatives.

Transportation Demand Management (TDM)



Passive:

TDM

- Encourage awareness of transportation choices and alternatives.
- Work with local employers to encourage ride-sharing, transit use or telecommuting by providing employees with incentives (i.e. preferential parking, subsidized transit passes).
- Encourage local employers to adapt alternate work hours to allow for off-peak commuting.
- Develop marketing materials.
- Encourage reduced reliance on single-occupancy work trips and short trips and encourage higher transit ridership and healthy transportation choices.

Parking Management

- Maintain/improve the supply of on-street and off-street parking.
- Continue to manage short-term parking to maximize turnover in commercial areas.

Note: Recommended approach indicated in **red**

Passive Plus:

TDM

- Develop a formal TDM program.
 - Focus on a combination of land use and behaviour-based policy approaches that encourage alternative transportation modes, attract additional transit ridership and encourage overall reduction in trip-making (i.e. transit-oriented development).
 - Support Metrolinx walking school bus by constructing sidewalks, bicycle facilities, and trails connecting to schools.
- Work with Metrolinx, MTO, and Durham Region to promote existing carpool lots and develop new lots.

Parking Management

- Manage the demand for parking especially within the core areas, to encourage alternative modes of travel.
- Develop policies and incentives to limit new parking supply and encourage higher parking rates within private parking lots.

Moderate Plus:

TDM

- **Target major employers and traffic generators within Clarington.**
- Hire a full-time TDM coordinator to champion TDM measures and build support throughout the community.
- Provide incentives to encourage trip reduction.
- **Encourage large employers to adopt formal TDM programs in the workplace (i.e. Smart Commute Durham).**
- Additional focus on land use and behaviour-based policy approaches.

Parking Management

- Increased focus on parking management strategies that limit parking supply, maximize pricing and more heavily regulate parking facilities, especially within the core areas.

CTMP Next Steps

- Review public comments received from PIC #2
- Develop an implementation plan to support the development of the ten- and twenty-year capital program
- Prepare Transportation Master Plan, including road network recommendations and plans for active transportation, public transit, and TDM

Your Comments are Appreciated

- Provide your input regarding the Preferred Alternatives for the Clarington TMP

Comments/Questions?

Your comments are very important to this study. Please fill in a comment sheet and deposit in the comment box. Alternatively, you can send your comments by mail, fax or email to the contacts noted below.

Information presented at this PIC is also available for further review, along with an online version of the comment sheet, at <http://ctmp.clarington.net>.

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COMMENTS ARE REQUESTED BY MAY 20, 2014



Clarington
Leading the Way

Clarington
Transportation
Master Plan

AECOM

Public Information Centre #2 - Comments

May 6, 2014

This is the last of two PICs planned as part of the Clarington Transportation Master Plan (CTMP). Your comments and suggestions are important to us. Please take a few minutes to complete this comment sheet. All comments will be considered. **(PLEASE PRINT)**

1. DO YOU AGREE WITH THE RECOMMENDED TRANSPORTATION IMPROVEMENTS?

Yes

They look good, but they need to be completed

* The more we can make our roads safe for different types of travel like walking, biking, the better off our community will be.

2. DO YOU AGREE WITH THE ACTIVE TRANSPORTATION IMPROVEMENTS (FOR WALKING, CYCLING, ETC.) BEING RECOMMENDED? ARE THERE OTHER IMPROVEMENTS YOU WOULD LIKE TO SEE CONSIDERED?

Yes,

* Put a paved shoulder or path on #2 highway King St. between the Bowmanville creek bridge and Durham St.

3. DO YOU AGREE WITH THE RECOMMENDED TRANSPORTATION POLICY APPROACHES PRESENTED?

Yes

Continue to improve the recommendation that do not cost a lot of \$\$\$

4. DO YOU HAVE ANY ADDITIONAL COMMENTS?

Look at where the housing density is being built and plan routes to get people to the schools downtown, new downtown shopping centre.

THANK YOU FOR YOUR COMMENTS.

PLEASE SUBMIT YOUR COMMENT FORM ON-LINE, OR PRINT AND RETURN YOUR COMMENT FORM TO THE AECOM PROJECT MANAGER, BY MAY 20, 2013.

Please return your comment form to:
Sheri Harmsworth, P. Eng.
Project Manager
AECOM Canada Ltd.
300 Water Street, Whitby ON L1N 9J2
T 905.668.9363 F 905.668.0221
sheri.harmsworth@aecom.com

Subject: FW: CTMP COMMENTS (94c)

-----Original Message-----

From:

Sent: Friday, May 16, 2014 7:45 PM

To: Albright, Ron

Subject: RE: CTMP COMMENTS (94c)

1. WHAT DO YOU SEE AS THE MOST IMPORTANT TRANSPORTATION ISSUES FACING CLARINGTON OVER

THE NEXT 20 YEARS? Getting people out of cars and walking, cycling and using transit more. Creating a master plan that preserves green space and minimizes the impact on ecosystems

2. PLEASE INDICATE YOUR PREFERENCES FOR THE RANGE OF POTENTIAL TRANSPORTATION POLICY

APPROACHES, AS PRESENTED AT THE MEETING. not at the meeting

WHY?

WHY?

WHY?

WHY?

Would you like to be added to the CTMP mailing list? (check one) YES

NAME:

MAILING ADDRESS:

EMAIL:

PHONE:

3. WHAT ARE THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS THAT SHOULD BE CONSIDERED AS PART OF THE CTMP TO ADDRESS THE NEEDS OVER THE NEXT 20 YEARS? -keep pedestrian walkways in mind when clearing winter ice and snow -keep pedestrians in mind when planning malls and big box stores -snow clearing in these locations can also be problematic for pedestrians walking from one store to another -local trails through green space should be maintained and their use encouraged -create connections between one green space and another so that there is a mini-transportation route through the community -enforce speed limits on major arteries where there are residential areas (eg. Courtice Rd.) -establish car pooling parking lots at access points to the 401 eg. Courtice Road

4. WHAT IMPROVEMENTS DO YOU FEEL ARE NEEDED TO CHANGE YOUR DRIVING HABITS AND GET YOU

WALKING, CYCLING OR USING PUBLIC TRANSIT MORE OFTEN? -only have one car in our household so we walk a lot and use public transportation when necessary -others might be encouraged if walking and cycling were safer -I am frustrated with the ticket system where tickets expire -twice I have bought tickets only to find they have expired some time later

5. DO YOU HAVE ANY ADDITIONAL COMMENTS OR SUGGESTIONS FOR THE CTMP?

6. DO YOU HAVE ANY COMMENTS REGARDING THE CTMP PUBLIC CONSULTATION PROCESS?

--

Stakeholder Meetings

Minutes of Meeting

Date of Meeting	December 5, 2012	Start Time	10:30 AM	Project Number	60264232
Project Name	Clarington Transportation Master Plan				
Location	Meeting Room 3C, 40 Temperance Street, Bowmanville				
Regarding	Cycling Stakeholder Engagement and Input Meeting				
Attendees	Jim Boate - Beech Street Spinners Cycle Club				
	Rob Gardner - Beech Street Spinners Cycle Club				
	Melissa Claxton-Oldfield - Oshawa Cycling Club				
	Doug Barlow - Oshawa Cycling Club				
	Kelly Pigeau - Clarington Bike Friendly Coalition				
	Pat Thexton - The Hamptons B&B				
	Ron Albright - Manager, Infrastructure and Capital Works, Municipality of Clarington				
	Peter Windolf - Manager, Park Development, Municipality of Clarington				
	Dan Campbell - Project Manager, Community Infrastructure, AECOM				
	John Unruh - Technical Writer, Community Infrastructure, AECOM				
Distribution	Attendees / File				
Minutes Prepared By	John Unruh				

PLEASE NOTE: If this report does not agree with your records of the meeting, or if there are any omissions, please advise, otherwise we will assume the contents to be correct.

Dan Campbell opened discussion by providing an overview of the role of alternative transportation in the Transportation Master Planning process. He then requested input from attendees regarding key issues and concerns in their respective areas of expertise. The following points were discussed.

- Key cycling destinations in Clarington
 - Refueling stations during or after rides are often a focus for the recreational and touring rider, and an important part of the social nature of cycling as a small or large group activity. Refueling locations generally include restaurants, cafés and coffee shops near or on the cycling route
 - The Garnet B. Rickard Recreation Complex and the Newcastle & District Recreation Complex were noted
 - The Waterfront trail and suitable rural roadways are considered to be a destination for cyclists in urban setting (safe and convenient access to these locations is crucial)
 - Key stopover points for cyclists using the Waterfront Trail system would include the Port of Newcastle Marina/Harbour and possibly the Port Darlington Harbour
 - The Village of Newcastle is considered a key destination and access point to the Waterfront Trail System and a connection to Port Hope and Northumberland County

- Destination points for utility cyclists were not discussed
- Comments regarding the types of cyclists using roadways and trails
 - Consider the full range of cycling ability and needs when planning cycling network. Various ability groups will use different portions of the network (i.e., commuter/utility cyclists may prefer dedicated paths and bike lanes in urban settings that lead to commercial centres, schools and municipal recreational facilities; recreational cyclists may prefer multi-use trails associated with parklands and conservations areas as well as dedicated bike lanes or signed routes to get there; touring/athletic cyclists may prefer simple continuous, uninterrupted routes with paved shoulders through rural areas)
 - It is important to consider potential for conflict between pedestrians, e-bike riders and assisted-mobility-device-users on multi-use trails and pathways
- Gaps in cycling network and desired improvements
 - Lack of awareness for motorists that Clarington has a vibrant cycling community. Need to focus initially on raising this awareness by implementing low-cost fixes in the short-term that will benefit majority of cyclists. This would include line painting, sharrows, bike-friendly community signage at urban gateways, and similar initiatives (Town of Cobourg cited as excellent example)
 - Focus on north-south routes that connect Lake Ontario shoreline to rural areas / Oak Ridges Moraine and east-west routes that connect Oshawa to Newcastle and Northumberland
 - Provide safer alternative on RR57 from Longworth Avenue to Nash Road (approximately 350 metres (this is a fairly high volume cycling location – only viable crossing of Bowmanville valley in area)
 - Provide paved connection on Waterfront Trail easterly from Waverly Road south of 401 (approximately one kilometre section of trail through open field)
 - Provide alternative to mitigate loss of Regional Cycling Spine on Highway 2 from Oshawa to Bowmanville
 - Investigate potential for cycling network link to cross Hwy 401 and CN Rail corridors at Bowmanville Creek or other suitable locations
 - Seek funding and incorporate way-finding and community branding signage at intersection of Mill Street South and Port of Newcastle Drive to promote this critical stopover point for touring cyclists (this is a gateway to Bondhead, an access point to the Northumberland section of Waterfront Trail System and a natural overnight point for cyclists touring out of Toronto)
- Bicycle safety awareness and peripheral support initiatives
 - Share the Road (Eleanor McMann)
 - Investigate potential for providing cyclist end-of-use facilities as a requirement of future development agreements
 - CAA has recently launched a program (further investigation required)
 - Advocate general awareness campaigns and make motorists aware of cyclist rights (e.g., right to full use of travel lane to navigate roadway obstacles, right to use of road)
 - Advocate bicycle safety education programs for emerging cyclists)
- Consider successes in exemplary locations
 - Cobourg, Ontario
 - Boulder, Colorado

- Davis, California
- Portland, Oregon
- Montreal, Quebec
- Roads that existing cyclists prefer
 - Mearns Ave.
 - Bethesda Road
 - Middle Road
 - Green Road
 - Old Scugog Road
 - Solina Road (though pavement is poor)
 - Arthur Street, Newcastle
 - Mill Street, Newcastle
- Roads that existing cyclists avoid
 - RR 57
 - Liberty Street (especially at Hwy 401 underpass)
 - Maple Grove Road
- Conditions that cyclists prefer
 - Reduced speed differential between cyclist and vehicular traffic
 - Minimal frequency of pinch-points (narrow bridges, etc.) on cycling network
 - Enforce 1.5-metre separation, at a minimum, between cyclists and vehicular traffic when sharing higher speed roadway (supported by Bill 74)
 - Enforce 1.0-metre separation, at a minimum, between cyclists and vehicular traffic when sharing lower speed roadway (supported by Bill 74)
 - Smooth pavement / clean road edge
 - Painted lines that offer better grip potential on narrow bicycle tires (often cyclists must ride on and repeatedly cross these lines and they are extremely slippery when wet)
 - Prolific signage and line painting (sharrows, etc.) to raise driver awareness that the community is bicycle friendly and encouraging cycling as an alternate mode of transportation.
 - Lighting for trail systems and night-time use.
- Meeting adjourned at 12:30 PM

**CLARINGTON AGRICULTURAL ADVISORY COMMITTEE MEETING
THURSDAY, DECEMBER 13th, 2012**

MEMBERS PRESENT: Brenda Metcalf
John Cartwright
Les Caswell
Mary Ann Found
Jenni Knox
Gary Jeffery
Ted Watson
Don Rickard
Tom Barrie

STAFF: Faye Langmaid

REGRETS: Councillor Partner

ABSENT: Mark Bragg, Eric Bowman

GUESTS: Curry Clifford, CAO's Office, Ron Albright, Engineering Services, Dan Campbell, AECOM

Gary welcomed all to the meeting, everyone introduced themselves.

Adoption of Agenda

012-24 Moved by Brenda Metcalf, seconded by Jennifer Knox

"That the Agenda for December 13th, 2012 be adopted"

CARRIED

Approval of Minutes

012-25 Moved by Ted Watson, seconded by John Cartwright

"That the minutes of the November 8th, 2012 meeting be approved."

CARRIED

Presentations:

Ron Albright introduced the process that is being undertaken for the Transportation Master Plan and Dan Campbell. Dan's presentation is attached. The reason for the attendance of Ron and Dan is to gather input into the preliminary steps of the Clarington Transportation Master Plan.

The discussion following the presentation included a number of questions and comments:

- ~~guard~~-guiderails make the road narrower and obstruct farm equipment from being able to hang over the ditch out of the way of oncoming traffic, the policy on barriers and ~~guardrails~~-guiderails is protection for 3 metre depths and specific slopes (4:1 or steeper) at road sides
- there needs to be better consideration for setbacks of ~~guardrails~~-guiderails at driveways and roadsides to accommodate large vehicles and the turning radii of them

- in the near urban and urban areas the stoplights provide gaps where farm equipment can enter the flow of traffic, the timing on the stoplights needs to be synchronized
- many drivers are impatient and pass in unsafe locations or miss other road signs (like stop signs) as they are passing
- improvements in the transportation system are costly, who pays?
- incorporation of bikelanes gives an advantage to farm machinery as it gives them somewhere to go to get out of the way.
- if most rural road rights of way are 66' and the road surface is 24' then move the ditches out to the edge of the road right of way to allow more shoulder space
- farmers are using much bigger trucks and machinery than before therefore the corner turning radii have to be adjusted for rural roads
- overhanging trees impede large machinery
- culverts going into farm driveways have to be longer/wider
- mail boxes in rural areas are an impediment to farm machinery
- the MTO position on funding sidewalks on MTO owned bridges and culverts in the rural areas is counter to their policy of trying to encourage other modes of transportation and in particular cycling
- signage on roads is often obstructing farm machinery from pulling over, also the sightlines from a tractor or combine isare different than a car so the height of road signs needs to be visible for all while not impeding sight lines from higher vehicles
- agriculture is not just about getting goods out of the field and farm, it is also about getting them in, half-load restrictions affect the delivery of seed, fertilizer and tile drainage, exceptions should be considered as it affects corporate profits of farms, also pulling the half-load season earlier would assist, or modifying it to deal with the different north/south micro-climatic zones
- signs that warn drivers that agriculture is happening in the area are encouraged
- until the 407 is finished other rural roads are being used to access it, across the 7th and 8th concessions, this will continue until it is complete
- some urban residents do not even know what the farm machinery is and therefore have a hard time understanding its rate of travel, they follow too closely
- cycling and agricultural routes in the countryside are mostly the same and shared opportunities exist to provide infrastructure beneficial to both
- aggressive cyclists who ride in packs-larger groups and ride 3-4 abreast are an issue
- curbed corners in near urban areas are an impediment for farm machinery

Business Arising from Minutes

- 1) The Farmer's Parade of Lights on December 5th, 2012 was very successful, 19 floats. Eric's wrap-up e-mail did not indicate any issues.

Correspondence and Council Referrals

- 1) Faye distributed the resolution that Council passed on December 3rd regarding the cancellation of farm leases on MTO lands for the 407. This was a result of the comments from the Agriculture Advisory Committee and Clarington Board of Trade. Staff will continue to monitor the situation and apprise the committee of any response from MTO and the other ministries notified.
- 2) Mayor John Henry attended Council seeking support of the position of Oshawa Council against the Ethanol Plant. He was informed of the endorsement by the Agriculture

Advisory Committee. Council received his delegation for information and suggested he attend a committee meeting.

Liaison Reports

DAAC –No report.

DRFA –DRFA new President is Ken Lamb, continue to look for additional directors for Clarington. Meeting on November 13th had a presentation on predation by coyotes and what can be done about them. Farm Connections have been informed by the public school board (20 schools) that depending on the Bill 115 issues the attendance of these schools may not be possible as it is an extra-curricular activity. The DRFA is working on an Agriculture Education Strategy, currently they are collecting background information on the ways and amount of time different groups spend providing agricultural education.

CBOT – Don expressed his appreciation for being included in the CTMP stakeholders, as it is an example of how the agricultural community is being consulted and listened to, much like the input he has at the CBOT. Working on having a tour of farm operations for Directors and Councillors. CBOT is working on developing position papers of the impacts of provincial and federal policies so that when dignitaries come to the area they can be provided with the impacts.

Other Business

- 1) John provided a show and tell presentation on bio-security. There is a package of information and signs available from the Ontario Livestock & Poultry Council info@ontlpc.ca
- 2) The Clarington Heritage Committee is beginning a historical barns project and looking for the best way to contact those that own barns and also how to get an inventory of barns. There were some suggestions on advertisements and having the information e-mailed into the CHC.
- 3) Jenni informed the group of the issue of scrappers looking for metal on farm sites, there have been some local farmers have experienced theft for the value of the metal. This issue has been identified to the Safe Communities Committee.
- 4) Jenni informed the group that the reason for OPG lighting the new building in the Energy Park currently is that the lights when first installed have to “burn-off”, the crews are working 24 hours/day and are 6 months ahead of schedule, the sensors to control the lights and shut them off automatically (LEEDS building) have not been installed and finally security.

Future Agendas

The Director of Finance/Treasurer will attend as a follow-up to the MPAC presentation in the new year. Suggestions for other meeting are Rolf Kluem DRPS and Erin O’Toole.

John moved to Adjourn

Next Meeting January 10, 2013, 7:30pm. . Dan McMorrow will attend regarding insurance implications for on-farm retail sales.

Clarington Transportation Master Plan

Clarington Agricultural Advisory Committee

Dan Campbell – AECOM

December 13, 2012

Agenda

- What is a Transportation Master Plan
- How is a Transportation Master Plan Developed
- Relationship to Clarington Strategic Plan
- Project Schedule
- Key Policy Areas
- Discussion Points and Feedback

What is a Transportation Master Plan?

- Transportation Master Plans (TMP) include a set of policies that guide how future transportation direction and investment decisions are made throughout the municipality
- TMPs build upon the analysis and detailed policies developed through the Official Planning process adding detail related specifically to transportation
- The TMP guides how people and goods move around our communities by car, truck, transit, walking and cycling

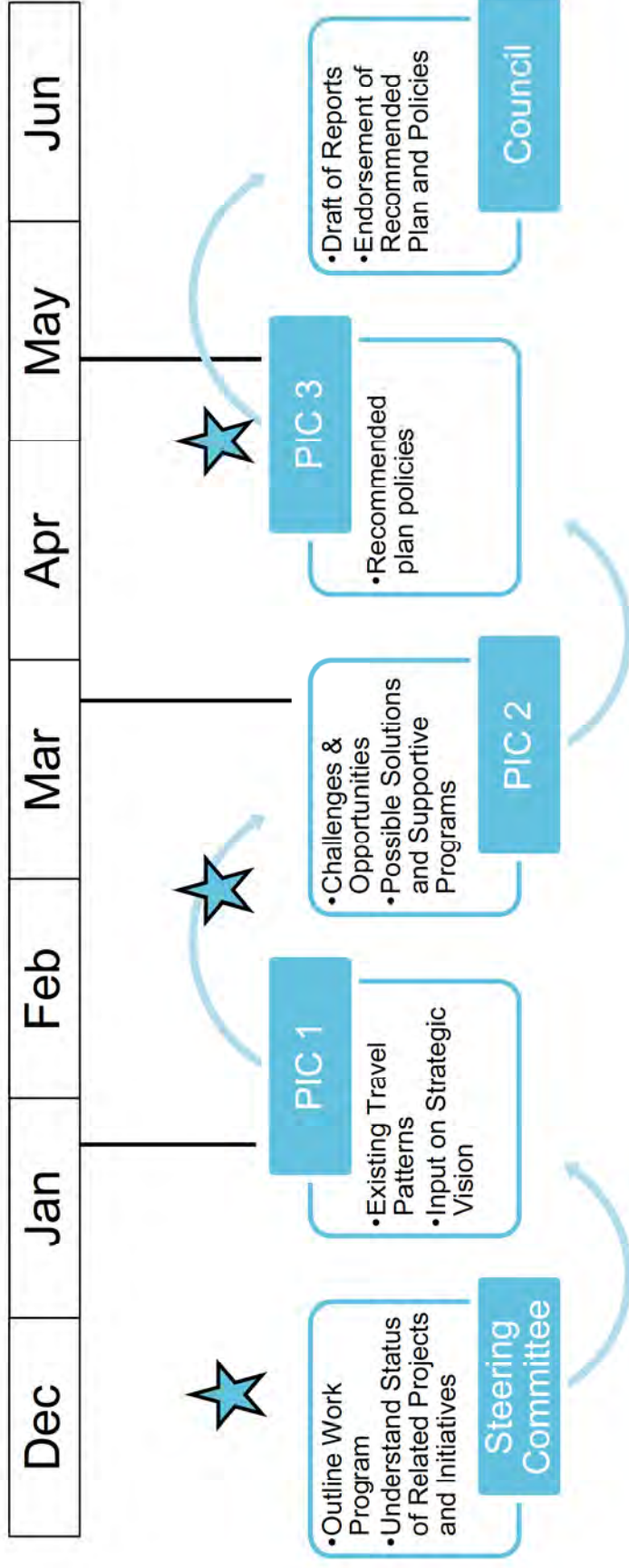
How is a TMP Developed

- Collecting input from the public early in the planning process so that decision making is collaborative
- Consideration of a reasonable range of alternatives
- Determining the effects of each alternative on the social, cultural, natural and economic environments
- Evaluating the advantages and disadvantages of identified alternatives to determine their environmental effects

Relationship to the Clarington Strategic Plan

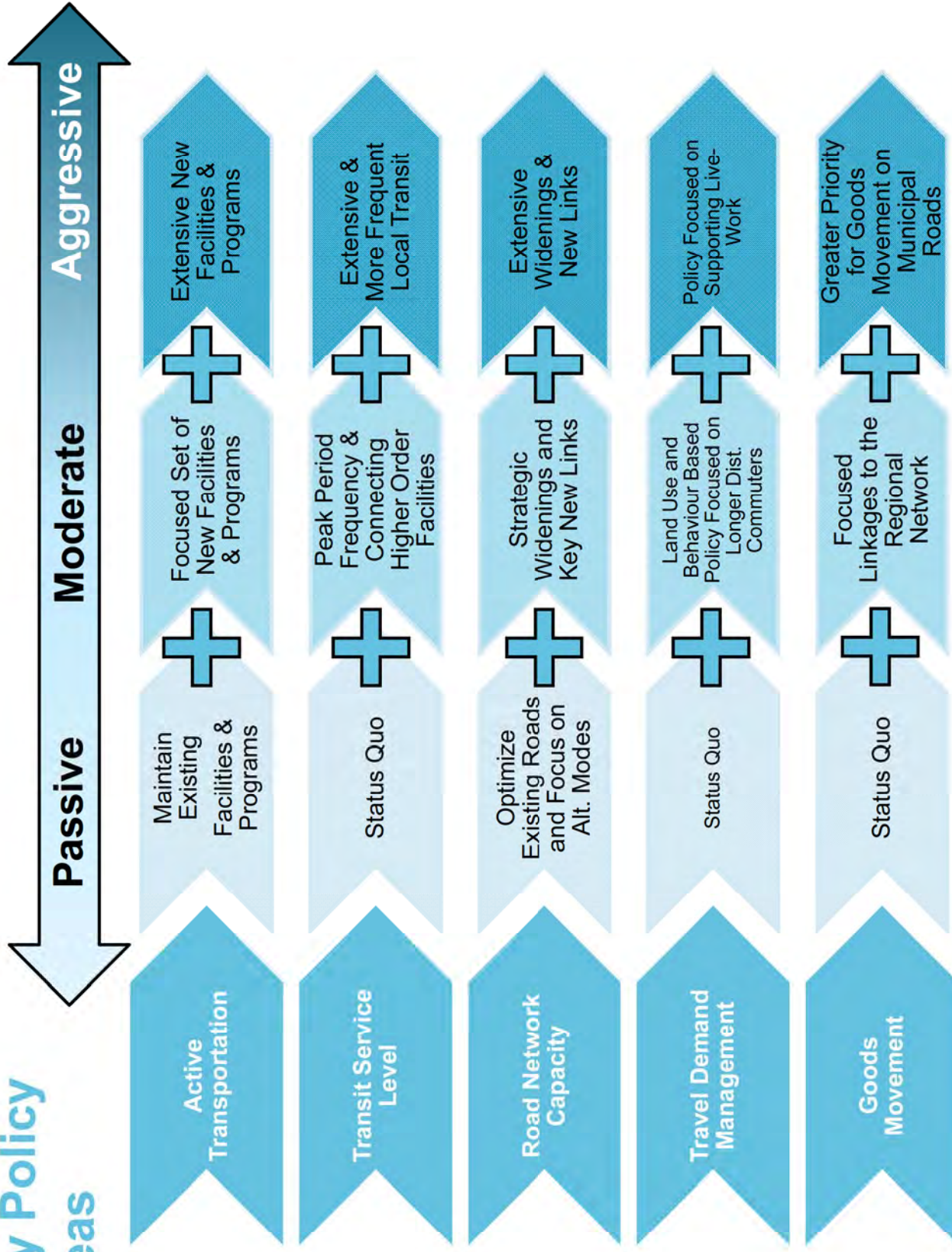
- **Maintain Financial Stability**
 - Balanced transportation system that minimizes the need for the most expensive types of projects by promoting increased choice and more cost effective alternatives
- **Promote Green Initiatives**
 - An increased focus on supporting alternatives to auto related trips to slowly improve modal split and reduce the reliance on the automobile
- **Investing In Infrastructure**
 - Identifying priority locations for key transportation infrastructure investments that will allow the municipality utilize scarce resources to deliver the most effective transportation system

Overall Project Schedule



★ Steering Committee Meeting

Key Policy Areas



Discussion Points

- Transportation policies and projects related to growth are key components of the Clarington TMP:
 - Are there particular transportation related challenges that impact agricultural operations in growth areas?
- The rural area of Clarington has become increasingly popular with recreational cyclists seeking paved roadways with lower traffic volumes:
 - Does the increase in cycling traffic have positive or negative impacts from an agricultural perspective?
- From a transportation perspective:
 - Are there existing issues associated with moving agricultural product to market?
 - How might these challenges be addressed?

Discussion Points (Continued)

- Anticipate that a recommendation of the CTMP will be a future study to update design guidelines for “complete streets” in both the rural and urban environments:
 - width of bridge & culvert crossings
 - width restrictions imposed by guiderail
- Potential to include policy emphasizing the importance of consultation with a the broader agricultural community for projects involving major detours & extended road closures in the rural area

Thank You

Appendix B

Durham Region Travel Demand Model Calibration

Memorandum

To	Ron Albright, Municipality of Clarington	Page 17
CC	Sheri Harmsworth, Nicholas Day	
Subject	Clarington TMP – APPENDIX B - Model Calibration Update	
From	Jamshaid Muzaffar, P.Eng.	
Date	June 2, 2014	Project Number 60264232

1. Introduction

This technical memorandum details the updates applied to the Durham Region Travel Demand Model (Durham Model) as part of the travel demand forecasting undertaken in support of the Clarington Transportation Master Plan (TMP).

Prior to using the model to forecast future traffic and identify future infrastructure requirements for Clarington, the Durham Model was reviewed to ensure that it accurately simulated local municipal level travel patterns and road network performance within Clarington. This technical memorandum summarizes the review of the Durham Model for Clarington traffic simulation, and the subsequent calibration updates that were applied to the model to ensure that it was suitable for use in the Clarington TMP traffic forecasting. Please refer to the “Review and Recalibration of the Durham Model for application to the 2013 Durham DC Update” and “Durham Region Transit Long Term Transit Strategy Final Report – Appendix G: Model Documentation” for more detailed background on the Durham Model.

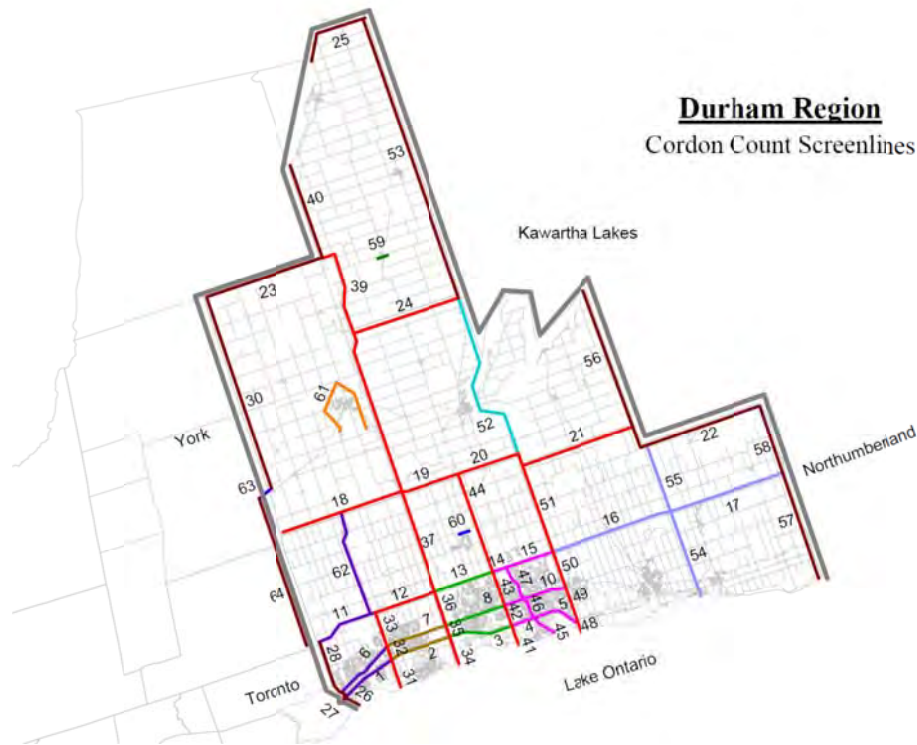
2. Review of Durham Model for use in simulating Clarington traffic

The Durham Model was developed for the Durham Region Long Term Transit Strategy (LTTS), and most recently updated for use in the 2013 Durham DC Update. Since the model was developed to forecast regional level traffic patterns, it must be evaluated at the local level to determine if the model is suitable for simulating traffic within Clarington.

Durham Region Travel Demand Model

The Durham Model was calibrated at the regional level and validated using Cordon Count screenline data. The Cordon Count screenlines are shown in **Figure 2.1** below. The calibration for the Durham 2013 DC Update was conducted using a factor method where a “mask” matrix was applied to the Durham Region travel demands to adjust traffic patterns to better correlate with the Cordon Count data.

Figure 2.1 – Cordon Count Screenlines



Although the Cordon Count screenlines adequately cover the municipalities located to the west of Clarington (Oshawa, Whitby, Ajax, and Pickering), significant gaps exist within Clarington (e.g. none of the screenlines capture travel between Bowmanville and Courtice). The Cordon Count screenlines within Clarington only capture traffic at the Clarington East Border with Northumberland, West Border with Oshawa, east of Darlington-Clarke Townline, and north of Taunton Road. As a result, travel patterns within the urban areas of Clarington (Courtice, Bowmanville, Newcastle) may not have been sufficiently accounted for as part of the calibration and validation of the Durham Model.

It also should be noted that the Durham Model assumed that many rural roads within Clarington carried minimal traffic and thus were omitted from the auto network in order to help traffic route to major corridors. This assumption encouraged traffic to use the main roads captured by the Clarington Cordon Count screenlines, thus providing better correlation between the simulated traffic and observed traffic. Although this approach may be acceptable for regional level traffic modelling, these omitted rural links are vital to include when modelling local level traffic within Clarington since they are observed to carry non zero levels of local Clarington traffic. Additionally, when considering possible future alternative routes, these omitted rural roads may be considered as candidates for upgrading to accommodate future growth. **Figure 2.2** below shows the links that were omitted for the Durham Model as part of the model re-calibration for the 2013 Durham DC update. As shown in the Figure, the omitted roads (highlighted in red) represent a significant proportion of the overall roadway network within Clarington.

Figure 2.2 – Roads omitted from Durham Region Model road network



Consideration of Transit in Durham Model

The Durham Model includes a transit network for Durham Region, incorporating Durham Region Transit (DRT) route, GO Rail lines and GO Bus routes within Durham. The transit demands are assigned to the network as local transit trips (Durham Region Transit), premium transit trips (including GO Bus), and GO Rail trips. For the purposes of this study, a policy mode split approach was adopted to account for the effect of transit on auto demands (instead of the transit assignment component of the Durham Model). Please refer to **Section 5.2** of the Clarington TMP report for further details on transit assumptions in the Durham Model. The auto demands for the Durham Region model include Park and Ride access trips for GO users.

Please refer to the “Durham Region Transit Long Term Transit Strategy Final Report – Appendix G: Model Documentation” for more details on the transit component of the Durham Model.

Model Validation against Clarington count data

Prior to being used for the Clarington TMP, the Durham Model's level of validation was reviewed through the use of additional traffic count data for the Clarington road network. As part of this review it was found that the model favored assigning trips to the major highway links in Clarington (Highway 401 and Highway 35/115) and subsequently under-simulated traffic on parallel local roads. Although the demand modifications applied in "mask" calibration method helped balance overall traffic levels at the Cordon Count screenlines, trips were over-assigned on the Highways and under-assigned on local roads within the Clarington municipal boundaries. As a result, the "mask" approach was abandoned for the demand modelling undertaken as part of the Clarington TMP and the original demands (prior to the Durham DC Update adjustments) were instead assigned to the 2011 base network with all previously omitted rural links re-introduced.

Detailed comparisons between the Durham Model's simulated traffic volumes and those observed in traffic count data were performed at the screenline level. Strategic screenline locations were designed to capture the key travel patterns within the Municipality. In particular, the model validation was conducted by comparing the 2011 traffic simulated by the model to observed traffic count information (collected between 2009 and 2012) from the following data sources:

- Clarington Turning Movement Counts
- Durham Region Automated Traffic Recorder (ATR) counts and Turning Movement Counts (TMC)
- MTO Highway counts
- Cordon Counts

The locations of observed traffic data in Clarington is shown in **Figure 2.3**, and the screenline locations are shown in **Figure 2.4**.

The Cordon Count data is generally collected in the spring and summer months, while the ATR and TMC data was collected at various periods throughout the year. Recognizing that there can be seasonal and daily variation in the traffic count volumes and that traffic count data is from various sources and years, an acceptable validation target of +/- 15% difference between simulated and observed traffic was adopted for this study.

In addition to comparing simulated traffic directly to observed traffic, the traffic data sets were also compared using the GEH statistic. The GEH Statistic is a calculation that quantifies the difference between two sets of traffic data (i.e. simulated traffic and observed traffic) while taking into account the magnitude of the traffic volumes being compared. This is a particularly useful statistic when evaluating the model's performance on roads with lower traffic volumes; on low traffic roads a direct comparison of simulated and observed traffic may yield large differences in percentages even if the absolute difference in actual vehicles is minimal (e.g. 10 additional vehicles on a road with an observed volume of 10 represents a 100% difference). For such situations, the GEH Statistic would indicate that the magnitude of the difference in volumes is not significant and thus the simulation may be valid. A GEH statistic less than 5 is generally taken to indicate that the correlation between simulated and observed volumes is acceptable. A GEH value between 5 and 10 indicates that the variation between simulated and observed may be acceptable, but warrants review. Finally, a GEH statistic greater than 10 generally indicates that the variation is greater than the acceptable range.

Figure 2.3 – Clarington Traffic Count Locations

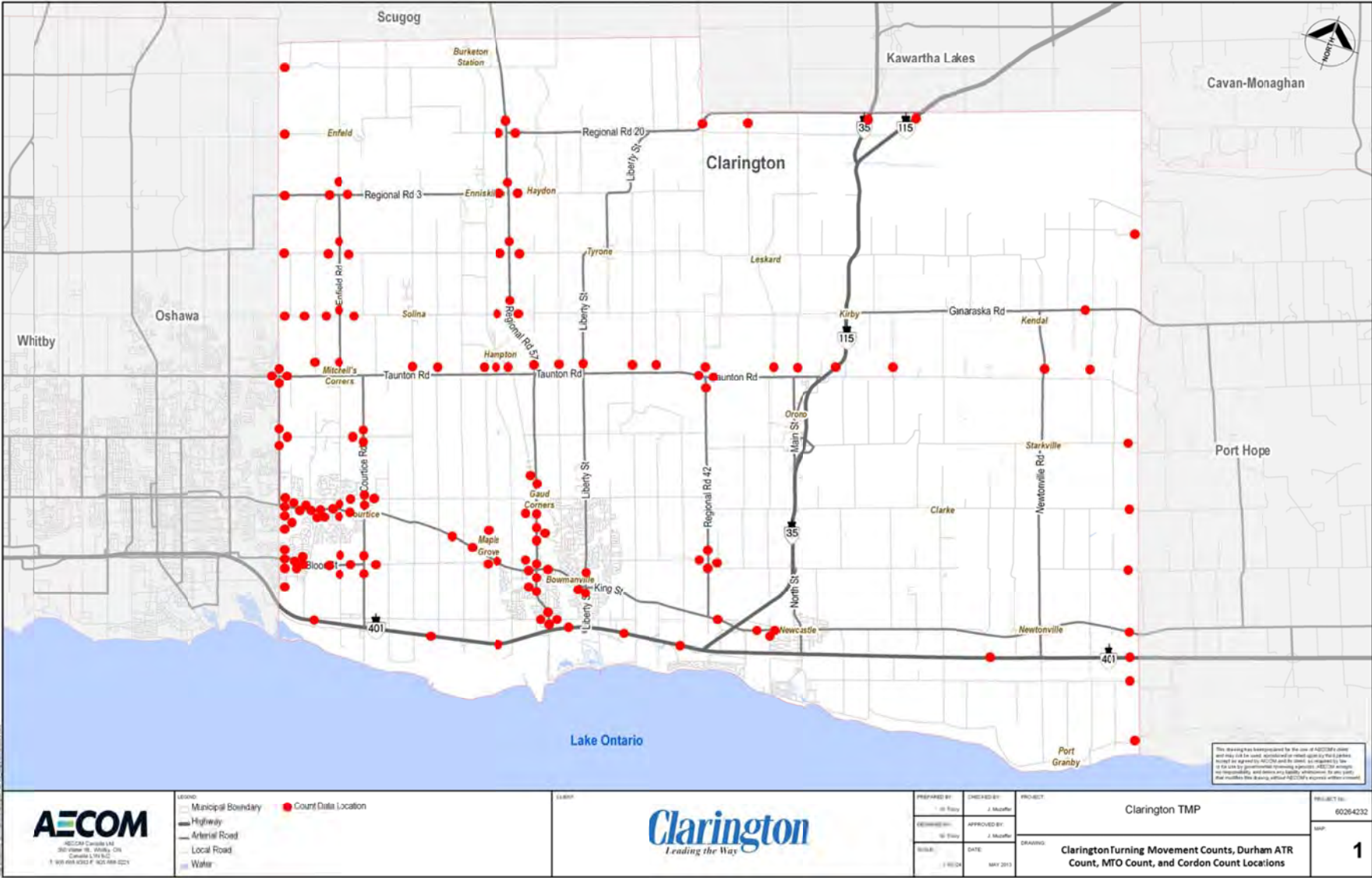


Figure 2.4 – Clarington Detailed Screenline locations

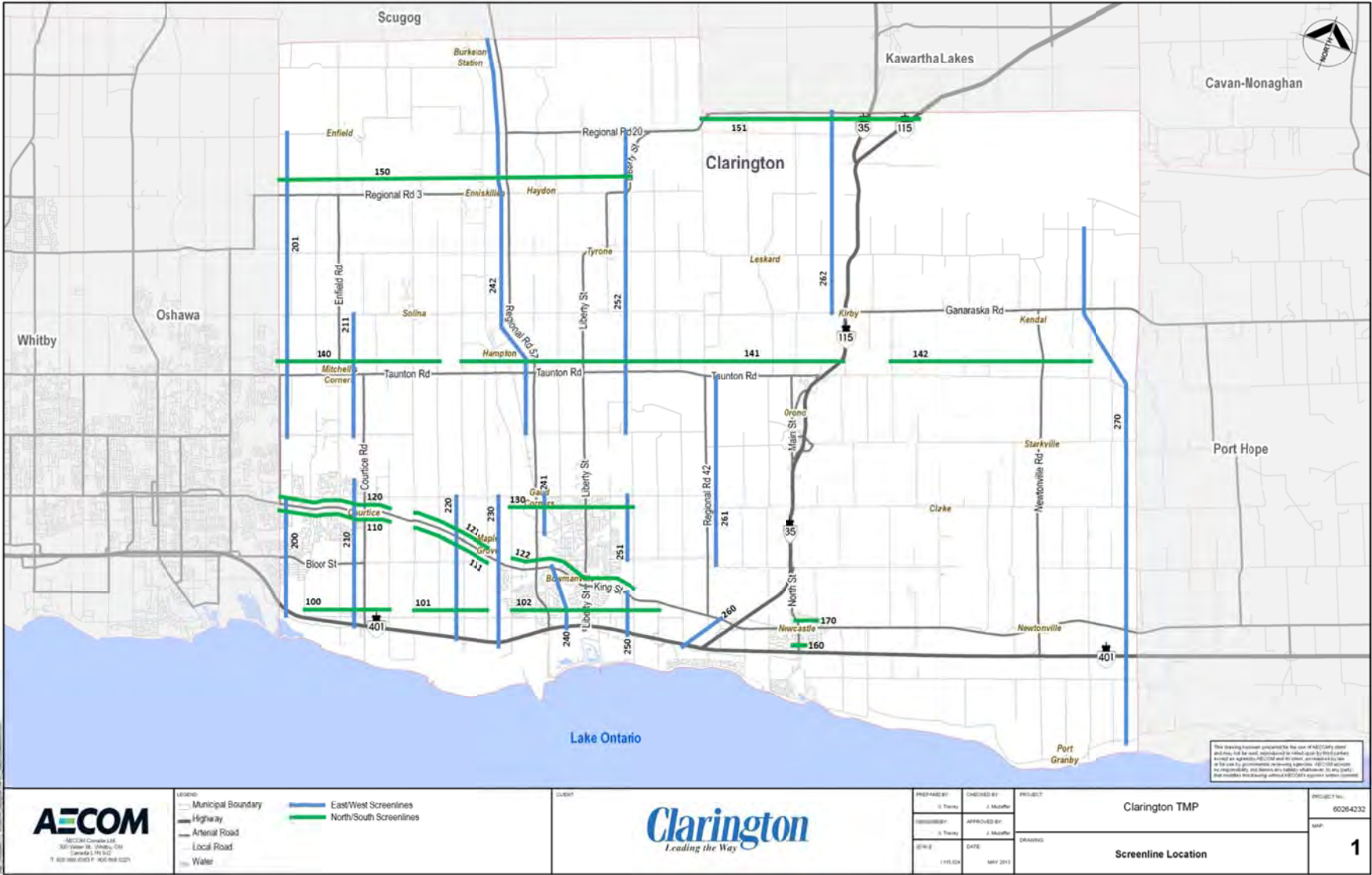


Table 2.1 and **Table 2.2** provide comparisons between the 2011 Durham Model simulated AM Peak Hour volumes and the 2011 count data across the screenlines previously shown in **Figure 2.4**. Screenlines where the simulated/observed ratio is within the acceptable +/-15% range are highlighted yellow, while under-simulated screenlines are highlighted orange and over simulated screenlines are highlighted red. Similarly for the GEH statistic, screenlines with acceptable values are highlighted yellow, while screenlines with a GEH statistic that may warrant review are highlighted orange and screenlines with a GEH statistic greater than the accepted range are highlighted red.

The AM Peak Hour screenline analysis found that simulated traffic from the model was generally inconsistent with the observed data within Clarington. The total east-west traffic is under-simulated by 3,501 vehicles in the peak direction of travel (westbound for the AM peak), and by 4,701 vehicles in the off-peak direction. The overall north-south traffic is under-simulated by 1,655 vehicles in the peak direction (southbound for the AM peak) and by 2,548 vehicles in the off-peak direction.

In addition, in the east-west direction only 46% of the detailed screenlines achieve the +/-15% validation target in the peak direction, while 27% of screenlines achieve the +/-15% validation target overall. In the north-south direction, only 31% of the detailed screenlines achieve the +/-15% validation target in the peak direction and 19% of screenlines achieve the +/-15% validation target overall. This reveals that the Durham Model struggles to accurately simulate local traffic patterns within Clarington.

As a result of the Durham Model review, it was concluded that while the model adequately simulates region wide traffic, comparisons to observed count data within Clarington revealed that the base model does not adequately simulate localized municipal-level travel patterns within Clarington

Table 2.1 –Durham Model 2011 AM Peak Hour screenline validation (Eastbound/Westbound)

SL ID	Screenline	Eastbound				Westbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
200	East of Clarington West Border (Highway 401 to Nash Road)	2,401	1,910	0.80	10.58	5,696	5,179	0.91	7.01
201	East of Clarington West Border (Pebblestone Road to Concession 9)	485	257	0.53	11.84	1,075	593	0.55	16.69
	East of Clarington West Border TOTAL	2,886	2,167	0.75	14.30	6,771	5,772	0.85	12.61
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	2,806	1,728	0.62	22.64	4,373	3,774	0.86	9.39
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	92	17	0.18	10.16	224	68	0.30	12.91
	West of Courtice Road TOTAL	2,898	1,745	0.60	23.93	4,597	3,842	0.84	11.62
220	West of Holt Road (South Service Road to Nash Road)	2,031	1,611	0.79	9.84	3,146	3,424	1.09	4.85
230	East of Maple Grove Road (South Service Road to Nash Road)	1,939	1,377	0.71	13.80	3,697	3,565	0.96	2.19
240	Bowmanville Creek (Highway 401 to Highway 2)	2,248	1,569	0.70	15.54	2,966	2,908	0.98	1.07
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	280	110	0.39	12.17	579	483	0.83	4.17
242	West of Regional Road 57 (Concession 4 to Boundary Road)	155	130	0.84	2.09	373	213	0.57	9.35
	Bowmanville Creek/Regional Road 57 TOTAL	2,683	1,809	0.67	18.44	3,918	3,604	0.92	5.12
250	West of Lambs Road (Highway 401 to Highway 2)	1,119	1,149	1.03	0.89	1,908	1,992	1.04	1.90
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,556	1,176	0.76	10.28	2,536	2,002	0.79	11.21
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	203	127	0.63	5.92	307	95	0.31	14.95
	West of Highway 35/115	1,759	1,303	0.74	11.65	2,843	2,097	0.74	15.01
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	980	433	0.44	20.58	1,020	103	0.10	38.70
	Overall (Eastbound/Westbound)	16,295	11,594	0.71	39.81	27,900	24,399	0.87	21.65

	Sim/Obs > 1.15; GEH > 10
	Sim/Obs 0.85 to 1.15; GEH < 5
	Sim/Obs < 0.85; GEH 5 to 10

Table 2.2 – Durham Model 2011 AM Peak Hour screenline validation (Northbound/Southbound)

SL ID	Screenline	Northbound				Southbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
100	North of Baseline Road (Prestonvale Road to Courtice Road)	295	91	0.31	14.68	591	596	1.01	0.21
102	North of Baseline Road (Green Road to Lambs Road)	415	139	0.33	16.58	716	759	1.06	1.58
	North of Baseline Road TOTAL	710	230	0.32	22.14	1,307	1,355	1.04	1.32
110	South of Highway 2 (Townline Road to Hancock Road)	1,038	279	0.27	29.58	598	228	0.38	18.21
111	South of Highway 2 (Solina Road to Maple Grove Road)	109	27	0.25	9.94	175	206	1.18	2.25
	South of Highway 2 TOTAL	1,147	306	0.27	31.20	773	434	0.56	13.80
120	North of Highway 2 (Townline Road to Hancock Road)	789	164	0.21	28.63	1,182	486	0.41	24.10
121	North of Highway 2 (Solina Road to Maple Grove Road)	13	0	0.00	5.10	20	1	0.05	5.86
122	North of Highway 2 (Green Road to Lambs Road)	750	174	0.23	26.80	1,344	895	0.67	13.42
	North of Highway 2 TOTAL	1,552	338	0.22	39.49	2,546	1,382	0.54	26.27
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	265	94	0.35	12.76	388	335	0.86	2.79
140	North of Taunton Road (Townline Road to Rundle Road)	369	81	0.22	19.20	307	124	0.40	12.47
141	North of Taunton Road (Holt Road to Highway 35/115)	816	1,002	1.23	6.17	1,260	1,207	0.96	1.51
142	North of Taunton Road (Jewel Road to Shiloh Road)	16	2	0.13	4.67	31	95	3.06	8.06
	North of Taunton Road TOTAL	1,201	1,085	0.90	3.43	1,598	1,426	0.89	4.42
150	North of Regional Road 3 (Townline Road to Liberty Street)	195	78	0.40	10.01	370	49	0.13	22.18
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	657	1,048	1.60	13.39	798	1,144	1.43	11.10
	South of Clarington North Border TOTAL	852	1,126	1.32	8.71	1,168	1,193	1.02	0.73
	Overall (Northbound/Southbound)	5,727	3,179	0.56	38.18	7,780	6,125	0.79	19.85

	Sim/Obs > 1.15; GEH > 10
	Sim/Obs 0.85 to 1.15; GEH < 5
	Sim/Obs < 0.85; GEH 5 to 10

3. Re-Calibration for Clarington TMP

In order to reliably utilize the Durham Region model for traffic simulation in Clarington as part of the TMP, the model must first be re-calibrated to better reflect localized traffic patterns within the Municipality. In particular, the model must demonstrate an acceptable level of validation to observed count data the detailed Clarington screenlines previously outlined in **Figure 2.4**.

Road Network Refinements

As a first step, the road network of the Durham Model was modified within the Clarington municipal limits in order to better represent the 2011 Clarington base road network. These network refinements included changing the layout of certain roads, adding in previously omitted local roads (as previously shown in **Figure 2.2**), and modifying traffic zone connectors to better reflect the way traffic loads onto the network.

The re-calibration of the Durham Region model for the municipality of Clarington followed an iterative process where road network attributes were modified to adjust the way traffic patterns are simulated by the model. The simulated traffic was then compared with observed traffic to re-evaluate the model's performance. The road network refinements that were applied as part of this effort include:

- Adjustments to road network attributes for roads within Clarington to better reflect existing conditions, including refinements to speed and lane capacity assumptions, and adjustments to the lane arrangements to be consistent with existing lane configurations.
- Refinements to traffic zone connectors, which are used to represent local and access roads in the model, to better reflect how traffic loads onto the Clarington road network. The refinements include shifting zone connectors from intersections to mid-block access points and adding new connectors to encourage more realistic traffic distribution patterns.
- Re-introducing and adding previously omitted roads not already included in the regional model, including local collector roads and several rural roads.

Additional Eastern External Demands

The Durham Model was found to under represent demands originating from external areas to the east of Clarington (Northumberland County, Trenton, etc.), which are beyond the Transportation Tomorrow Survey (TTS)¹ coverage area. These external demands were synthesized from Census Place of Work Data and were added to the base year traffic demands in the model.

Place of Residence/Place of Work linkage data was extracted from the 2006 Census. In particular, residents of Northumberland County, Quinte West (including Trenton), and Belleville with workplaces in Pickering, Ajax, Whitby, Oshawa, Clarington, Toronto (and all areas west of Toronto) were identified. By applying auto occupancy and peak hour factors to the census data, the total AM peak hour work trips for residents east of Clarington who commute into the GTA was estimated.

¹ The TTS survey is one of the primary datasets that was used to develop the core components of the Durham Region Model.

Each of the east external trips were assigned to representative traffic zones based on the place of work municipality reported in the Census data. The destination zones of AM peak period trips originating from Northumberland County (according to 1996 TTS data) were used to represent the likely distribution of trip destinations within Whitby, Oshawa, and Clarington. This was done in order to get a distribution of destinations that are not completely focused along Highway 401. Ultimately, the total AM Peak Hour trips that were added to the base Durham Model demands was 1,179 AM Peak Hour vehicles.

Adjustments to Travel Demands

With the network refinements and additional east demands in place, the model was re-run and its performance was re-assessed. Despite these changes, it was still found that the model still significantly under-represented travel demands within Clarington. As a result, the standard practise Demand Adjustment module in the EMME modelling suite was applied to adjust base traffic demands to more closely match observed count data. This module is an iterative process that references all traffic count data (as shown in **Figure 2.3**) and modifies the demands in the model to be more consistent with the counts.

Durham Model updated validation for Clarington

Table 3.1 and **Table 3.2** provide comparisons between the updated and re-calibrated 2011 Durham Model² simulated AM Peak Hour volumes and the 2011 count data across the screenlines previously shown in **Figure 2.4**. Additionally, **Table 3.3** and **Table 3.4** provide simulated and observed volume comparisons at aggregated screenlines to ensure the overall travel patterns throughout Clarington are consistent with observed data. The screenline analysis tables assume the same color coding as the Durham Model review screenline analysis tables (detailed in **Section 2** of this document). **Figure 3.1** shows the location of the aggregated screenlines.

In the east-west direction, 77% of the detailed screenlines achieve the +/-15% variation target in the peak direction of travel and 69% of screenlines achieve the +/-15% validation target overall, representing a 31% increase in validation compliance for the peak direction and 42% increase in compliance overall. Most of the detailed screenlines that do not achieve the validation target in the peak direction improve when analyzed at the aggregated screenline level. Screenlines 211 and 242 are both under-simulated by the model, but are balanced by adjacent screenlines when aggregated (aggregated screenlines 21 and 24, respectively). Thus although some over/under simulation was found at the detailed level, the overall traffic balance predicted by the model remains valid.

In the north-south direction, 54% of the screenlines achieve the +/-15% variation target in the peak direction of travel and 31% of screenlines achieve the +/-15% validation target overall, representing a 23% increase in validation compliance for the peak direction and 12% increase in compliance overall. The simulation in the north-south direction does not correlate with observed data as well as the east-west direction. This is partially due to the relatively low northbound and southbound demands in comparison to the east-west demands as lower volumes have a greater sensitivity to error (north-south peak direction demands are 20,120 vehicles lower than east-west peak direction demands). However, the north-south simulated volumes from the updated Durham Model show a marked

² Including network refinements, added east external demands, and demand adjustment.

Table 3.1 – Updated Durham Model AM Peak Hour screenline validation (Eastbound/Westbound)

SL ID	Screenline	Eastbound				Westbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
200	East of Clarington West Border (Highway 401 to Nash Road)	2,401	2,642	1.10	4.80	5,696	5,247	0.92	6.07
201	East of Clarington West Border (Pebblestone Road to Concession 9)	485	365	0.75	5.82	1,075	1,037	0.96	1.17
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	2,806	2,461	0.88	6.72	4,373	3,967	0.91	6.29
211	West of Courtice Road/East of Enfield Road (Pebblestone Road to Concession 6)	92	41	0.45	6.25	224	104	0.46	9.37
220	West of Holt Road (South Service Road to Nash Road)	2,031	2,281	1.12	5.38	3,146	3,728	1.18	9.93
230	East of Maple Grove Road (South Service Road to Nash Road)	1,939	2,041	1.05	2.29	3,697	3,843	1.04	2.38
240	Bowmanville Creek (Highway 401 to Highway 2)	2,248	2,160	0.96	1.87	2,966	3,131	1.06	2.99
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	280	192	0.69	5.73	579	614	1.06	1.43
242	West of Regional Road 57 (Concession 4 to Boundary Road)	155	72	0.46	7.79	373	146	0.39	14.09
250	West of Lambs Road (Highway 401 to Highway 2)	1,119	1,323	1.18	5.84	1,908	2,106	1.10	4.42
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,556	1,362	0.88	5.08	2,536	2,271	0.90	5.41
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	203	221	1.09	1.24	307	318	1.04	0.62
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	980	835	0.85	4.81	1,020	1,170	1.15	4.53
Overall (Eastbound/Westbound)		16,295	15,996	0.98	2.35	27,900	27,682	0.99	1.31

	Sim/Obs > 1.15; GEH > 10
	Sim/Obs 0.85 to 1.15; GEH < 5
	Sim/Obs < 0.85; GEH 5 to 10

Table 3.2 – Updated Durham Model AM Peak Hour screenline validation (Northbound/Southbound)

SL ID	Screenline	Northbound				Southbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
100	North of Baseline Road (Prestonvale Road to Courtice Road)	295	146	0.49	10.03	591	573	0.97	0.75
102	North of Baseline Road (Green Road to Lambs Road)	415	349	0.84	3.38	716	816	1.14	3.61
110	South of Highway 2 (Townline Road to Hancock Road)	1,038	639	0.62	13.78	598	324	0.54	12.76
111	South of Highway 2 (Solina Road to Maple Grove Road)	109	52	0.48	6.35	175	265	1.51	6.07
120	North of Highway 2 (Townline Road to Hancock Road)	789	644	0.82	5.42	1,182	1,033	0.87	4.48
121	North of Highway 2 (Solina Road to Maple Grove Road)	13	14	1.08	0.27	20	66	3.30	7.01
122	North of Highway 2 (Green Road to Lambs Road)	750	529	0.71	8.74	1,344	1,308	0.97	0.99
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	265	206	0.78	3.84	388	395	1.02	0.35
140	North of Taunton Road (Townline Road to Rundle Road)	369	106	0.29	17.07	307	162	0.53	9.47
141	North of Taunton Road (Holt Road to Highway 35/115)	816	958	1.17	4.77	1,260	1,212	0.96	1.37
142	North of Taunton Road (Jewel Road to Shiloh Road)	16	0	0.00	5.66	31	17	0.55	2.86
150	North of Regional Road 3 (Townline Road to Liberty Street)	195	33	0.17	15.17	370	237	0.64	7.63
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	657	783	1.19	4.70	798	874	1.10	2.63
Overall (Northbound/Southbound)		5,727	4,459	0.78	17.77	7,780	7,282	0.94	5.74

	Sim/Obs > 1.15; GEH > 10
	Sim/Obs 0.85 to 1.15; GEH < 5
	Sim/Obs < 0.85; GEH 5 to 10

Table 3.3 – Updated Durham Model AM Peak Hour aggregated screenline validation (Eastbound/Westbound)

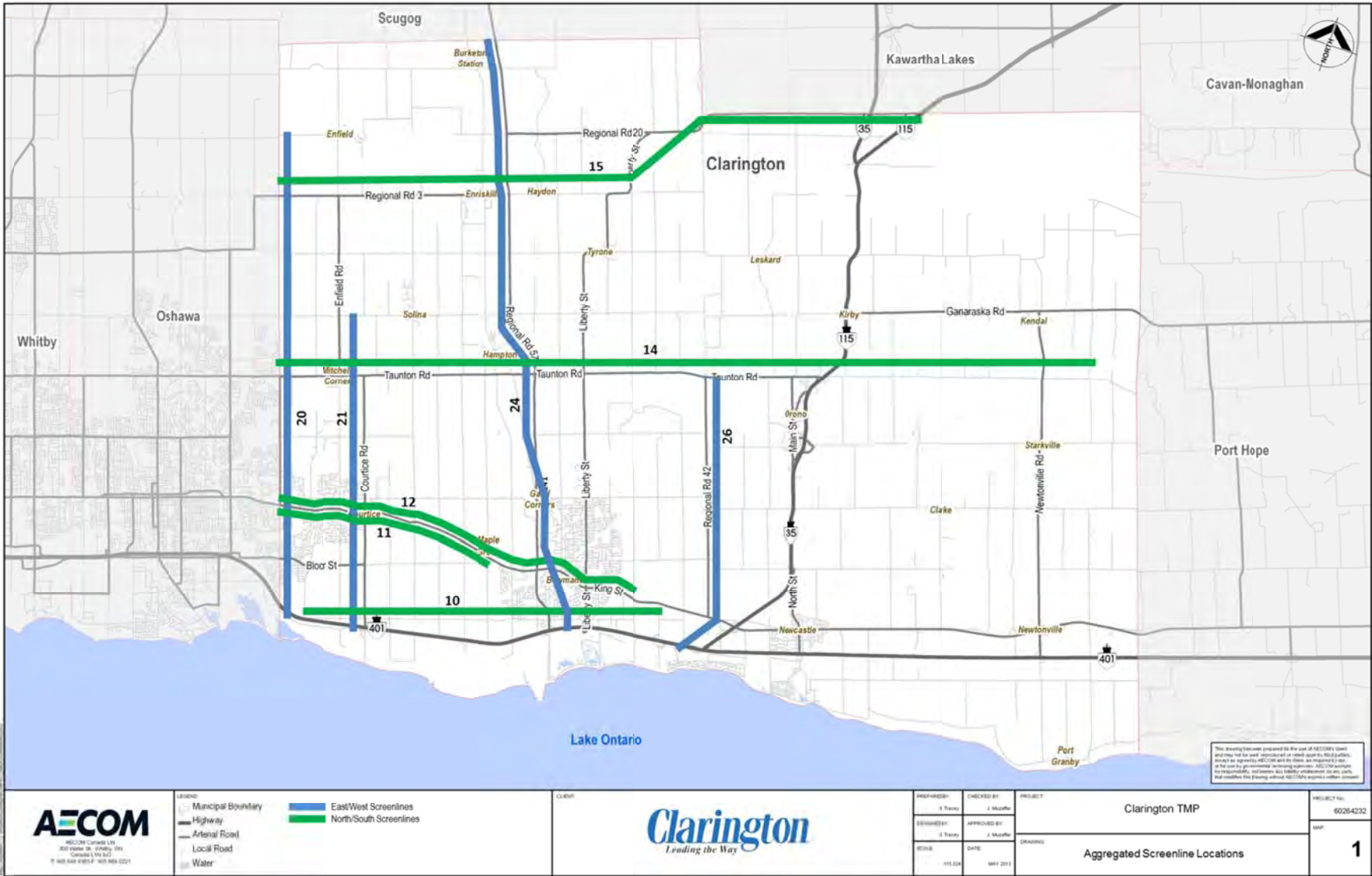
SL ID	Screenline	Eastbound				Westbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
20	East of Clarington West Border (Highway 401 to Concession 9)	2,886	3,007	1.04	2.23	6,771	6,284	0.93	6.03
21	West of Courtice Road (Highway 401 to Concession 6)	2,898	2,502	0.86	7.62	4,597	4,071	0.89	7.99
24	Bowmanville Creek/Regional Road 57 (Highway 401 to Boundary Road)	2,683	2,424	0.90	5.13	3,918	3,891	0.99	0.43
26	West of Highway 35/115 (Highway 401 to Taunton Road)	1,759	1,583	0.90	4.31	2,843	2,589	0.91	4.87

Table 3.4 – Updated Durham Model AM Peak Hour aggregated screenline validation (Northbound/Southbound)

SL ID	Screenline	Northbound				Southbound			
		2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH	2011 Observed	2011 Simulated	Sim/Obv Ratio	GEH
10	North of Baseline Road (Prestonvale Road to Lambs Road)	710	495	0.70	8.76	1,307	1,389	1.06	2.23
11	South of Highway 2 (Townline Road to Maple Grove Road)	1,147	691	0.60	15.04	773	589	0.76	7.05
12	North of Highway 2 (Townline Road to Lambs Road)	1,552	1,187	0.76	9.86	2,546	2,407	0.95	2.79
14	North of Taunton Road (Townline Road to Shiloh Road)	1,201	1,064	0.89	4.07	1,598	1,391	0.87	5.35
15	South of Clarington North Border (Townline Road to Highway 115)	852	816	0.96	1.25	1,168	1,111	0.95	1.69

	Sim/Obs > 1.15; GEH > 10
	Sim/Obs 0.85 to 1.15; GEH < 5
	Sim/Obs < 0.85; GEH 5 to 10

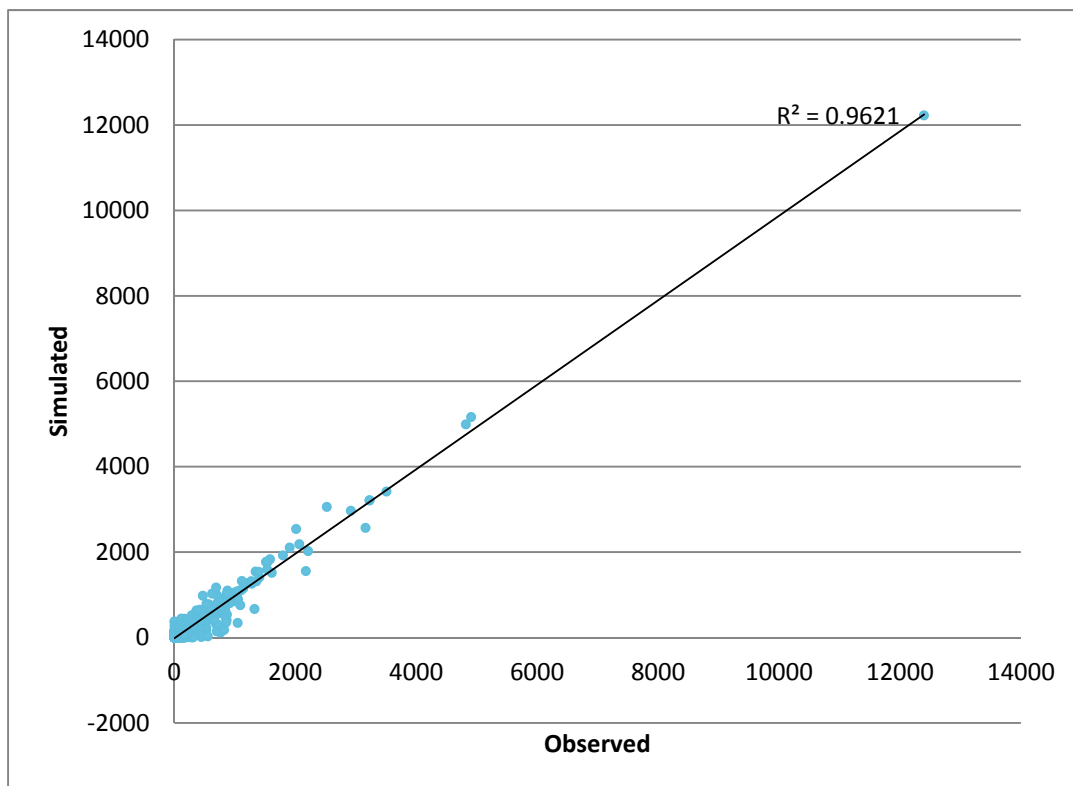
Figure 3.1 – Clarington Aggregated Screenline locations



improvement over the original volumes from the Durham Model. The total southbound (peak direction) traffic is under-simulating by only 6% which shows improvement over the 13% under-simulation from the Durham Model. Additionally, when observed at the aggregated screenline level, most screenlines achieve the +/- 15% threshold, indicating that the model is capturing overall north-south traffic flow reasonably well.

Figure 3.2 presents a scatterplot that further illustrates the correlation between the 2011 simulated and observed traffic volumes on all links where traffic counts exist. This plot confirms that there is a high degree of correlation between simulated and observed volumes at a link level with an R^2 value of 0.96³.

Figure 3.2 – 2011 Model Simulated Traffic vs. Observed Traffic [AM Peak hour]



4. Conclusions

On an overall basis, the updated Durham model provides a good level of correlation with observed traffic volumes crossing screenlines within Clarington. Most screenlines show simulated volumes within 15% of observed volumes and those that do not are improved on when evaluated at the aggregated screenline level. Additional, the overall fit between modelled and observed volumes was found to be acceptable, with an R^2 value of 0.96.

³ R^2 is a measure of the level of fit to observed data. A value of 1.0 indicates that the simulated forecasts exactly match the observed data.

Appendix C

**Horizon Year 2031 Base and
Preferred Alternatives Model
Results (AM and PM Peak)**

Clarington TMP
Screenline Deficiency Analysis - AM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31240
NETWORK: 2031 Base Network
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	3,569	14	13,100	0.27	0	7,429	14	13,100	0.57	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	726	9	9,000	0.08	0	2,254	9	9,000	0.25	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	3,735	12	11,800	0.32	0	5,799	12	11,800	0.49	0
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	771	5	6,100	0.13	0	1,735	5	6,100	0.28	0
220	West of Holt Road (South Service Road to Nash Road)	2,400	9	9,550	0.25	0	6,070	9	9,550	0.64	0
230	East of Maple Grove Road (South Service Road to Nash Road)	2,156	8	9,350	0.23	0	6,279	8	9,350	0.67	0
240	Bowmanville Creek (Highway 401 to Highway 2)	2,372	6	7,450	0.32	0	4,682	6	7,450	0.63	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	178	2	1,400	0.13	0	1,345	2	1,400	0.96	1
242	West of Regional Road 57 (Concession 4 to Boundary Road)	417	10	8,400	0.05	0	1,486	10	8,400	0.18	0
250	West of Lambs Road (Highway 401 to Highway 2)	1,899	5	6,650	0.29	0	3,535	5	6,650	0.53	0
251	West of Lambs Road (Concession Street to Concession 3)	219	2	1,500	0.15	0	210	2	1,500	0.14	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	367	8	8,000	0.05	0	713	8	8,000	0.09	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,715	4	5,950	0.29	0	2,980	4	5,950	0.50	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	258	4	3,100	0.08	0	471	4	3,100	0.15	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	146	5	5,600	0.03	0	250	5	5,600	0.04	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,056	10	9,250	0.11	0	1,166	10	9,250	0.13	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Northbound					Southbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	115	5	5,500	0.02	0	1,486	5	5,500	0.27	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	28	3	1,700	0.02	0	329	3	1,700	0.19	0
102	North of Baseline Road (Green Road to Bennett Road)	1,037	9	5,800	0.18	0	3,119	9	5,800	0.54	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,057	7	4,050	0.26	0	991	7	4,050	0.24	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	50	4	2,200	0.02	0	465	4	2,200	0.21	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,247	9	7,800	0.16	0	1,779	9	7,800	0.23	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	13	4	2,000	0.01	0	126	4	2,000	0.06	0
122	North of Highway 2 (Green Road to Lambs Road)	714	7	5,150	0.14	0	3,414	7	5,150	0.66	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	355	8	5,400	0.07	0	723	8	5,400	0.13	0
140	North of Taunton Road (Townline Road to East Durham Link)	605	7	6,600	0.09	0	619	7	6,600	0.09	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,452	13	9,300	0.16	0	1,172	13	9,300	0.13	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	0	4	2,200	0.00	0	16	4	2,200	0.01	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	23	5	3,300	0.01	0	181	5	3,300	0.05	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,069	7	8,100	0.13	0	1,130	7	8,100	0.14	0
160	South of Highway 2 (Mill Street)	327	1	700	0.47	0	379	1	700	0.54	0
170	North of Highway 2 (Manvers Road to Arthur Street)	59	2	1,250	0.05	0	214	2	1,250	0.17	0
300	North of Highway 401 (Holt Road to Lambs Road)	719	4	3,200	0.22	0	2,527	4	3,200	0.79	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31240
NETWORK: 2031 Base Network
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Link Level Deficiency Analysis

				Northbound/Eastbound					Southbound/Westbound				
MSL ID	SL ID	Link Tag	Description	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	5	1	550	0.01	0	127	1	550	0.23	0
10	100	1002	Trulls Road North of Baseline Road	1	1	550	0.00	0	123	1	550	0.22	0
10	100	1003	Courtice Road North of Baseline Road	64	1	800	0.08	0	662	1	800	0.83	0
10	100	1004	East Durham Link North of Baseline Road	44	2	3,600	0.01	0	574	2	3,600	0.16	0
10	101	1011	Solina Road North of Baseline Road	0	1	500	0.00	0	58	1	500	0.12	0
10	101	1012	Holt Road North of Baseline Road	28	1	700	0.04	0	271	1	700	0.39	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	11	1	500	0.02	0	102	1	500	0.20	0
10	102	1022	West Side Drive North of Baseline Road	5	1	400	0.01	0	191	1	400	0.48	0
10	102	1023	Regional Road 57 North of Baseline Road	592	2	1,800	0.33	0	1,194	2	1,800	0.66	0
10	102	1024	Liberty Street South North of Baseline Road	320	1	800	0.40	0	612	1	800	0.77	0
10	102	1025	Simpson Avenue North of Baseline Road	5	1	400	0.01	0	204	1	400	0.51	0
10	102	1026	Haines Street North of Baseline Road	17	1	600	0.03	0	112	1	600	0.19	0
10	102	1027	Lambs Road North of Baseline Road	48	1	700	0.07	0	380	1	700	0.54	0
10	102	1028	Bennett Road North of Baseline Road	38	1	600	0.06	0	322	1	600	0.54	0
11	110	1101	Townline Road South of Highway 2	73	1	700	0.10	0	107	1	700	0.15	0
11	110	1102	Darlington Blvd South of Highway 2	29	1	400	0.07	0	13	1	400	0.03	0
11	110	1103	Prestonvale Road South of Highway 2	440	1	550	0.80	0	150	1	550	0.27	0
11	110	1104	Sandringham Drive South of Highway 2	42	1	400	0.11	0	1	1	400	0.00	0
11	110	1105	Trulls Road South of Highway 2	314	1	700	0.45	0	167	1	700	0.24	0
11	110	1106	Courtice Road South of Highway 2	159	1	800	0.20	0	552	1	800	0.69	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	0	1	500	0.00	0	55	1	500	0.11	0
11	111	1112	Rundle Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	1	1	700	0.00	0	15	1	700	0.02	0
11	111	1114	Maple Grove Road South of Highway 2	49	1	500	0.10	0	394	1	500	0.79	0
12	120	1201	Townline Road North of Highway 2	95	2	1,400	0.07	0	188	2	1,400	0.13	0
12	120	1202	Varcoe Road North of Highway 2	57	1	400	0.14	0	101	1	400	0.25	0
12	120	1203	Centerfield Drive North of Highway 2	129	1	400	0.32	0	174	1	400	0.43	0
12	120	1204	Trulls Road North of Highway 2	338	1	700	0.48	0	291	1	700	0.42	0
12	120	1205	Courtice Road North of Highway 2	499	1	800	0.62	0	667	1	800	0.83	0
12	120	1206	Hancock Road North of Highway 2	6	1	500	0.01	0	27	1	500	0.05	0
12	120	1207	East Durham Link North of Highway 2	123	2	3,600	0.03	0	332	2	3,600	0.09	0
12	121	1211	Solina Road North of Highway 2	2	1	500	0.00	0	7	1	500	0.01	0
12	121	1212	Rundle Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	0	1	500	0.00	0	3	1	500	0.01	0
12	121	1214	Maple Grove Road North of Highway 2	11	1	500	0.02	0	116	1	500	0.23	0
12	122	1221	Green Road North of Highway 2	68	1	500	0.14	0	325	1	500	0.65	0
12	122	1222	Regional Road 57 North of Highway 2	229	2	2,000	0.11	0	1,214	2	2,000	0.61	0
12	122	1223	Scugog Street North of Church Street	187	1	550	0.34	0	631	1	550	1.15	1
12	122	1224	Liberty Street N North of Church Street	135	1	800	0.17	0	568	1	800	0.71	0
12	122	1225	Mearns Avenue North of Highway 2	36	1	600	0.06	0	337	1	600	0.56	0
12	122	1226	Lambs Road North of Highway 2	58	1	700	0.08	0	339	1	700	0.48	0
13	130	1301	Green Road South of Nash Road	16	1	800	0.02	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	15	1	500	0.03	0	0	1	500	0.00	0
13	130	1303	Regional Road 57 South of Concession 3	187	1	1,000	0.19	0	445	1	1,000	0.45	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	0	1	400	0.00	0
13	130	1305	Scugog Street South of Concession 3	9	1	600	0.01	0	27	1	600	0.05	0
13	130	1306	Liberty Street N South of Concession 3	86	1	800	0.11	0	221	1	800	0.28	0
13	130	1307	Mearns Avenue South of Concession 3	20	1	600	0.03	0	8	1	600	0.01	0
13	130	1308	Lambs Road South of Concession 3	22	1	700	0.03	0	20	1	700	0.03	0
14	140	1401	Townline Road North of Taunton Road	102	1	500	0.20	0	165	1	500	0.33	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	468	1	1,000	0.47	0	252	1	1,000	0.25	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	35	1	500	0.07	0	64	1	500	0.13	0
14	140	1406	East Durham Link North of Taunton Road	1	2	3,600	0.00	0	138	2	3,600	0.04	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	7	1	400	0.02	0	31	1	400	0.08	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	70	1	700	0.10	0	46	1	700	0.07	0
14	141	14105	Regional Road 57 North of Taunton Road	436	1	1,000	0.44	0	137	1	1,000	0.14	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	2	1	700	0.00	0	33	1	700	0.05	0
14	141	14108	Bethesda Road North of Taunton Road	1	1	800	0.00	0	3	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	6	1	500	0.01	0	5	1	500	0.01	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	5	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	925	2	2,800	0.33	0	916	2	2,800	0.33	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	0	1	700	0.00	0	16	1	700	0.02	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	1	1	500	0.00	0	69	1	500	0.14	0
15	150	1503	Old Scugog Road North of Regional Road 3	2	1	500	0.00	0	14	1	500	0.03	0
15	150	1504	Regional Road 57 North of Regional Road 3	9	1	1,000	0.01	0	97	1	1,000	0.10	0
15	150	1505	Liberty Street North of Concession 8	10	1	800	0.01	0	0	1	800	0.00	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	40	1	1,000	0.04	0	0	1	1,000	0.00	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	198	2	2,000	0.10	0	457	2	2,000	0.23	0
15	151	1515	Highway 115 South of Boundary Road	832	2	3,600	0.23	0	673	2	3,600	0.19	0
16	160	1601	Mill Street North of Highway 401	327	1	700	0.47	0	379	1	700	0.54	0
17	170	1701	Manvers Road North of Highway 2	40	1	700	0.06	0	156	1	700	0.22	0
17	170	1702	Arthur Street North of Highway 2	19	1	550	0.03	0	58	1	550	0.11	0
20	200	2001	Highway 401 East of Harmony Road	2,607	4	6,600	0.40	0	4,616	4	6,600	0.70	0
20	200	2002	Bingham Gate East of Townline Road	3	1	500	0.01	0	263	1	500	0.53	0
20	200	2003	Gord Vinson Avenue East of Townline Road	110	1	600	0.18	0	193	1	600	0.32	0
20	200	2004	Bloor Road East of Townline Road	194	1	750	0.26	0	619	1	750	0.83	0
20	200	2005	Glenabbey Drive East of Townline Road	4	1	600	0.01	0	338	1	600	0.56	0
20	200	2006	Kingswood Drive East of Townline Road	7	1	600	0.01	0	65	1	600	0.11	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	599	2	1,800	0.33	0	1,283	2	1,800	0.71	0
20	200	2009	Nash Road East of Townline Road	37	1	550	0.07	0	17	1	550	0.03	0
20	200	20010	Lawson Road East of Townline Road	8	1	700	0.01	0	35	1	700	0.05	0

20	201	2011	Pebblestone Road East of Townline Road	48	1	800	0.06	0	138	1	800	0.17	0
20	201	2012	Taunton Road East of Townline Road	300	2	2,000	0.15	0	810	2	2,000	0.41	0
20	201	2013	Concession 6 East of Townline Road	65	1	700	0.09	0	189	1	700	0.27	0
20	201	2017	Highway 407 West of Enfield Road	310	2	3,600	0.09	0	1,016	2	3,600	0.28	0
20	201	2014	Concession 7 East of Townline Road	1	1	600	0.00	0	20	1	600	0.03	0
20	201	2015	Regional Road 3 East of Townline Road	2	1	800	0.00	0	68	1	800	0.09	0
20	201	2016	Concession 9 East of Townline Road	0	1	500	0.00	0	13	1	500	0.03	0
21	210	2101	Highway 401 West of Courtice Road	2,607	4	6,600	0.40	0	4,616	4	6,600	0.70	0
21	210	2102	Baseline Road West of Courtice Road	103	1	700	0.15	0	108	1	700	0.15	0
21	210	2103	Bloor Street West of Courtice Road	267	1	700	0.38	0	124	1	700	0.18	0
21	210	2108	Meadowglade Road extension West of Courtice Road	134	1	500	0.27	0	50	1	500	0.10	0
21	210	2104	Sandringham Drive West of Courtice Road	41	1	400	0.10	0	54	1	400	0.14	0
21	210	2105	Highway 2 West of Courtice Road	578	2	1,800	0.32	0	837	2	1,800	0.46	0
21	210	2106	Nash Road West of Courtice Road	3	1	700	0.00	0	7	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	1	1	400	0.00	0	3	1	400	0.01	0
21	211	2111	Pebblestone Road West of Courtice Road	157	1	800	0.20	0	76	1	800	0.10	0
21	211	2112	Taunton Road West of Courtice Road	439	1	1,000	0.44	0	890	1	1,000	0.89	0
21	211	2114	Highway 407 East of Enfield Road	166	2	3,600	0.05	0	654	2	3,600	0.18	0
21	211	2113	Concession 6 West of Courtice Road	9	1	700	0.01	0	114	1	700	0.16	0
22	220	2201	South Service Road West of Holt Road	0	1	500	0.00	0	199	1	500	0.40	0
22	220	2202	Highway 401 West of Holt Road	1,982	3	4,950	0.40	0	4,247	3	4,950	0.86	0
22	220	2203	Baseline Road West of Holt Road	18	1	700	0.03	0	225	1	700	0.32	0
22	220	2204	Bloor Street West of Holt Road	25	1	700	0.04	0	137	1	700	0.20	0
22	220	2205	Highway 2 West of Holt Road	374	2	2,000	0.19	0	1,256	2	2,000	0.63	0
22	220	2206	Nash Road West of Holt Road	0	1	700	0.00	0	6	1	700	0.01	0
23	230	2301	South Service Road East of Holt Road	5	1	500	0.01	0	5	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	1,699	3	4,950	0.34	0	4,359	3	4,950	0.88	0
23	230	2303	Baseline Road West of Green Road	20	1	700	0.03	0	348	1	700	0.50	0
23	230	2304	Highway 2 East of Maple Grove Road	431	2	2,400	0.18	0	1,536	2	2,400	0.64	0
23	230	2305	Nash Road East of Maple Grove Road	0	1	800	0.00	0	31	1	800	0.04	0
24	240	2401	Highway 401 at Bowmanville Creek	1,737	3	4,950	0.35	0	3,669	3	4,950	0.74	0
24	240	2402	Baseline Road at Bowmanville Creek	234	1	700	0.33	0	274	1	700	0.39	0
24	240	2403	Highway 2 at Bowmanville Creek	400	2	1,800	0.22	0	739	2	1,800	0.41	0
24	241	2411	Longworth Avenue East of Regional Road 57	136	1	800	0.17	0	695	1	800	0.87	0
24	241	2412	Concession 3 of Regional Road 57	43	1	600	0.07	0	650	1	600	1.08	1
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	260	1	1,000	0.26	0	687	1	1,000	0.69	0
24	242	2423	Concession 6 West of Regional Road 57	2	1	700	0.00	0	48	1	700	0.07	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	42	1	500	0.08	0	11	1	500	0.02	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	3	1	500	0.01	0	5	1	500	0.01	0
24	242	2429	Highway 407 West of Regional Road 57	111	2	3,600	0.03	0	735	2	3,600	0.20	0
25	250	2501	Highway 401 West of Bennett Road	1,651	3	4,950	0.33	0	2,971	3	4,950	0.60	0
25	250	2502	Baseline Road West of Lambs Road	161	1	700	0.20	0	296	1	700	0.42	0
25	250	2503	Highway 2 West of Lambs Road	88	1	1,000	0.09	0	268	1	1,000	0.27	0
25	251	2511	Concession Street West of Lambs Road	199	1	700	0.28	0	185	1	700	0.26	0
25	251	2512	Concession 3 West of Lambs Road	21	1	800	0.03	0	25	1	800	0.03	0
25	252	2521	Concession 4 West of Lambs Road	3	1	500	0.01	0	0	1	500	0.00	0
25	252	2522	Taunton Road West of Bethesda Road	209	1	1,000	0.21	0	452	1	1,000	0.45	0
25	252	2527	Highway 407 East of Regional Road 57	109	2	3,600	0.03	0	258	2	3,600	0.07	0
25	252	2523	Concession 6 West of Bethesda Road	3	1	700	0.00	0	1	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	3	1	500	0.01	0	1	1	500	0.00	0
25	252	2525	Concession 8 West of Bethesda Road	10	1	700	0.01	0	0	1	700	0.00	0
25	252	2526	Regional Road 20 West of Liberty Street	30	1	1,000	0.03	0	0	1	1,000	0.00	0
26	260	2601	Highway 401 West of Highway 35/115	1,663	3	4,950	0.34	0	2,640	3	4,950	0.53	0
26	260	2602	Highway 2 West of Highway 35/115	53	1	1,000	0.05	0	340	1	1,000	0.34	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	53	1	800	0.07	0	91	1	800	0.11	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	1	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	2	1	500	0.00	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	201	1	1,000	0.20	0	378	1	1,000	0.38	0
26	262	2621	Concession 7 West of Highway 35/115	2	1	500	0.00	0	15	1	500	0.03	0
26	262	2624	Highway 407 West of Highway 35/115	97	2	3,600	0.03	0	236	2	3,600	0.07	0
26	262	2622	Concession 8 West of Highway 35/115	7	1	500	0.01	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	40	1	1,000	0.04	0	0	1	1,000	0.00	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	2	1	500	0.00	0	4	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	1,031	3	4,950	0.21	0	1,030	3	4,950	0.21	0
27	270	2704	Highway 2 West of Clarington East Limit	3	1	1,000	0.00	0	43	1	1,000	0.04	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	0	1	500	0.00	0	1	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	0	1	500	0.00	0	3	1	500	0.01	0
27	270	2708	Ganaraska Road West of Clarington East Limit	21	1	800	0.03	0	85	1	800	0.11	0
30	300	3001	Holt Road North of Highway 401	83	1	700	0.12	0	448	1	700	0.64	0
30	300	3002	Waverly Road/RR57 North of Highway 401	539	2	1,800	0.30	0	1,285	2	1,800	0.71	0
30	300	3003	Liberty Street North of Highway 401	97	1	700	0.14	0	794	1	700	1.19	1
Eastbound/Westbound TOTALS				21,984	113	116,200			46,404	113	116,200		
Northbound/Southbound TOTALS				8,871	99	74,250			18,670	99	74,250		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - PM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31241
NETWORK: 2031 Base Network
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	8,165	14	13,100	0.62	0	4,429	14	13,100	0.34	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	2,446	9	9,000	0.27	0	896	9	9,000	0.10	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	5,961	12	11,800	0.51	0	4,360	12	11,800	0.37	0
211	West of Courtice Road/East of Enfield Road (Pebblestone Road to Concession 6)	1,856	5	6,100	0.30	0	790	5	6,100	0.13	0
220	West of Holt Road (South Service Road to Nash Road)	6,221	9	9,550	0.65	0	2,721	9	9,550	0.28	0
230	East of Maple Grove Road (South Service Road to Nash Road)	6,735	8	9,350	0.72	0	2,548	8	9,350	0.27	0
240	Bowmanville Creek (Highway 401 to Highway 2)	5,833	6	7,450	0.78	0	3,002	6	7,450	0.40	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	1,425	2	1,400	1.02	1	257	2	1,400	0.18	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	1,684	10	8,400	0.20	0	537	10	8,400	0.06	0
250	West of Lambs Road (Highway 401 to Highway 2)	4,184	5	6,650	0.63	0	2,274	5	6,650	0.34	0
251	West of Lambs Road (Concession Street to Concession 3)	210	2	1,500	0.14	0	352	2	1,500	0.23	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	1,009	8	8,000	0.13	0	627	8	8,000	0.08	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	3,576	4	5,950	0.60	0	2,200	4	5,950	0.37	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	437	4	3,100	0.14	0	315	4	3,100	0.10	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	491	5	5,600	0.09	0	350	5	5,600	0.06	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,058	10	9,250	0.11	0	1,497	10	9,250	0.16	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	1,605	5	5,500	0.29	0	290	5	5,500	0.05	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	342	3	1,700	0.20	0	40	3	1,700	0.02	0
102	North of Baseline Road (Green Road to Bennett Road)	3,495	9	5,800	0.60	0	1,346	9	5,800	0.23	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,216	7	4,050	0.30	0	1,591	7	4,050	0.39	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	497	4	2,200	0.23	0	76	4	2,200	0.03	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,922	9	7,800	0.25	0	1,638	9	7,800	0.21	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	193	4	2,000	0.10	0	7	4	2,000	0.00	0
122	North of Highway 2 (Green Road to Lambs Road)	4,084	7	5,150	0.79	0	1,410	7	5,150	0.27	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	830	8	5,400	0.15	0	561	8	5,400	0.10	0
140	North of Taunton Road (Townline Road to East Durham Link)	738	7	6,600	0.11	0	602	7	6,600	0.09	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,403	13	9,300	0.15	0	1,484	13	9,300	0.16	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	2	4	2,200	0.00	0	5	4	2,200	0.00	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	253	5	3,300	0.08	0	25	5	3,300	0.01	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,565	7	8,100	0.19	0	1,303	7	8,100	0.16	0
160	South of Highway 2 (Mill Street)	517	1	700	0.74	0	159	1	700	0.23	0
170	North of Highway 2 (Manvers Road to Arthur Street)	331	2	1,250	0.26	0	70	2	1,250	0.06	0
300	North of Highway 401 (Holt Road to Lambs Road)	2,614	4	3,300	0.79	0	1,131	4	3,300	0.34	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9

Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31241
NETWORK: 2031 Base Network
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Link Level Deficiency Analysis

MSL ID	SL ID	Link Tag	Description	Northbound/Eastbound					Southbound/Westbound				
				PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	229	1	550	0.42	0	7	1	550	0.01	0
10	100	1002	Trulls Road North of Baseline Road	115	1	550	0.21	0	1	1	550	0.00	0
10	100	1003	Courtice Road North of Baseline Road	658	1	800	0.82	0	168	1	800	0.21	0
10	100	1004	East Durham Link North of Baseline Road	604	2	3,600	0.17	0	114	2	3,600	0.03	0
10	101	1011	Solina Road North of Baseline Road	42	1	500	0.08	0	0	1	500	0.00	0
10	101	1012	Holt Road North of Baseline Road	300	1	700	0.43	0	40	1	700	0.06	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	131	1	500	0.26	0	0	1	500	0.00	0
10	102	1022	West Side Drive North of Baseline Road	192	1	400	0.48	0	7	1	400	0.02	0
10	102	1023	Regional Road 57 North of Baseline Road	1,250	2	1,800	0.69	0	778	2	1,800	0.43	0
10	102	1024	Liberty Street South North of Baseline Road	702	1	800	0.88	0	325	1	800	0.41	0
10	102	1025	Simpson Avenue North of Baseline Road	271	1	400	0.68	0	50	1	400	0.12	0
10	102	1026	Haines Street North of Baseline Road	167	1	600	0.28	0	19	1	600	0.03	0
10	102	1027	Lambs Road North of Baseline Road	427	1	700	0.61	0	68	1	700	0.10	0
10	102	1028	Bennett Road North of Baseline Road	356	1	600	0.59	0	98	1	600	0.16	0
11	110	1101	Townline Road South of Highway 2	158	1	700	0.23	0	133	1	700	0.19	0
11	110	1102	Darlington Blvd South of Highway 2	22	1	400	0.05	0	49	1	400	0.12	0
11	110	1103	Prestonvale Road South of Highway 2	278	1	550	0.51	0	551	1	550	1.00	1
11	110	1104	Sandringham Drive South of Highway 2	0	1	400	0.00	0	98	1	400	0.25	0
11	110	1105	Trulls Road South of Highway 2	206	1	700	0.29	0	476	1	700	0.68	0
11	110	1106	Courtice Road South of Highway 2	552	1	800	0.69	0	283	1	800	0.35	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	39	1	500	0.08	0	0	1	500	0.00	0
11	111	1112	Rundle Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	19	1	700	0.03	0	1	1	700	0.00	0
11	111	1114	Maple Grove Road South of Highway 2	438	1	500	0.88	0	75	1	500	0.15	0
12	120	1201	Townline Road North of Highway 2	322	2	1,400	0.23	0	201	2	1,400	0.14	0
12	120	1202	Varcoe Road North of Highway 2	165	1	400	0.41	0	114	1	400	0.29	0
12	120	1203	Centerfield Drive North of Highway 2	84	1	400	0.21	0	178	1	400	0.44	0
12	120	1204	Trulls Road North of Highway 2	319	1	700	0.46	0	449	1	700	0.64	0
12	120	1205	Courtice Road North of Highway 2	650	1	800	0.81	0	484	1	800	0.60	0
12	120	1206	Hancock Road North of Highway 2	120	1	500	0.24	0	11	1	500	0.02	0
12	120	1207	East Durham Link North of Highway 2	262	2	3,600	0.07	0	202	2	3,600	0.06	0
12	121	1211	Solina Road North of Highway 2	44	1	500	0.09	0	2	1	500	0.00	0
12	121	1212	Rundle Road North of Highway 2	4	1	500	0.01	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	27	1	500	0.05	0	0	1	500	0.00	0
12	121	1214	Maple Grove Road North of Highway 2	119	1	500	0.24	0	4	1	500	0.01	0
12	122	1221	Green Road North of Highway 2	390	1	500	0.78	0	110	1	500	0.22	0
12	122	1222	Regional Road 57 North of Highway 2	1,298	2	2,000	0.65	0	712	2	2,000	0.36	0
12	122	1223	Scugog Street North of Church Street	820	1	550	1.49	1	237	1	550	0.43	0
12	122	1224	Liberty Street N North of Church Street	705	1	800	0.88	0	237	1	800	0.30	0
12	122	1225	Mearns Avenue North of Highway 2	456	1	600	0.76	0	46	1	600	0.08	0
12	122	1226	Lambs Road North of Highway 2	415	1	700	0.59	0	68	1	700	0.10	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	53	1	800	0.07	0
13	130	1302	Nash Road South of Nash Road	0	1	500	0.00	0	99	1	500	0.20	0
13	130	1303	Regional Road 57 South of Concession 3	541	1	1,000	0.54	0	298	1	1,000	0.30	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	0	1	400	0.00	0
13	130	1305	Scugog Street South of Concession 3	32	1	600	0.05	0	10	1	600	0.02	0
13	130	1306	Liberty Street N South of Concession 3	209	1	800	0.26	0	51	1	800	0.06	0
13	130	1307	Mearns Avenue South of Concession 3	14	1	600	0.02	0	13	1	600	0.02	0
13	130	1308	Lambs Road South of Concession 3	35	1	700	0.05	0	38	1	700	0.05	0
14	140	1401	Townline Road North of Taunton Road	191	1	500	0.38	0	183	1	500	0.37	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	339	1	1,000	0.34	0	321	1	1,000	0.32	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	76	1	500	0.15	0	36	1	500	0.07	0
14	140	1406	East Durham Link North of Taunton Road	132	2	3,600	0.04	0	63	2	3,600	0.02	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	26	1	400	0.07	0	9	1	400	0.02	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	44	1	700	0.06	0	114	1	700	0.16	0
14	141	14105	Regional Road 57 North of Taunton Road	174	1	1,000	0.17	0	401	1	1,000	0.40	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	21	1	700	0.03	0	4	1	700	0.01	0
14	141	14108	Bethesda Road North of Taunton Road	3	1	800	0.00	0	1	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	7	1	500	0.01	0	5	1	500	0.01	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	7	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	1,120	2	2,800	0.40	0	951	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	1	1	700	0.00	0	5	1	700	0.01	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	84	1	500	0.17	0	2	1	500	0.00	0
15	150	1503	Old Scugog Road North of Regional Road 3	14	1	500	0.03	0	5	1	500	0.01	0
15	150	1504	Regional Road 57 North of Regional Road 3	155	1	1,000	0.16	0	6	1	1,000	0.01	0
15	150	1505	Liberty Street North of Concession 8	0	1	800	0.00	0	12	1	800	0.02	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	0	1	1,000	0.00	0	188	1	1,000	0.19	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	569	2	2,000	0.28	0	306	2	2,000	0.15	0
15	151	1515	Highway 115 South of Boundary Road	996	2	3,600	0.28	0	809	2	3,600	0.22	0
16	160	1601	Mill Street North of Highway 401	517	1	700	0.74	0	159	1	700	0.23	0
17	170	1701	Manvers Road North of Highway 2	264	1	700	0.38	0	48	1	700	0.07	0
17	170	1702	Arthur Street North of Highway 2	67	1	550	0.12	0	22	1	550	0.04	0
20	200	2001	Highway 401 East of Harmony Road	4,492	4	6,600	0.68	0	2,936	4	6,600	0.44	0
20	200	2002	Bingham Gate East of Townline Road	353	1	500	0.71	0	4	1	500	0.01	0
20	200	2003	Gord Vinson Avenue East of Townline Road	334	1	600	0.56	0	175	1	600	0.29	0
20	200	2004	Bloor Road East of Townline Road	655	1	750	0.87	0	296	1	750	0.39	0
20	200	2005	Glenabbey Drive East of Townline Road	415	1	600	0.69	0	5	1	600	0.01	0
20	200	2006	Kingswood Drive East of Townline Road	81	1	600	0.13	0	15	1	600	0.02	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	1,596	2	1,800	0.89	0	890	2	1,800	0.49	0
20	200	2009	Nash Road East of Townline Road	178	1	550	0.32	0	95	1	550	0.17	0
20	200	20010	Lawson Road East of Townline Road	61	1	700	0.09	0	14	1	700	0.02	0

20	201	2011	Pebblestone Road East of Townline Road	299	1	800	0.37	0	92	1	800	0.12	0
20	201	2012	Taunton Road East of Townline Road	763	2	2,000	0.38	0	320	2	2,000	0.16	0
20	201	2013	Concession 6 East of Townline Road	278	1	700	0.40	0	51	1	700	0.07	0
20	201	2017	Highway 407 West of Enfield Road	971	2	3,600	0.27	0	430	2	3,600	0.12	0
20	201	2014	Concession 7 West of Townline Road	25	1	600	0.04	0	1	1	600	0.00	0
20	201	2015	Regional Road 3 East of Townline Road	94	1	800	0.12	0	2	1	800	0.00	0
20	201	2016	Concession 9 East of Townline Road	15	1	500	0.03	0	0	1	500	0.00	0
21	210	2101	Highway 401 West of Courtice Road	4,492	4	6,600	0.68	0	2,936	4	6,600	0.44	0
21	210	2102	Baseline Road West of Courtice Road	138	1	700	0.20	0	196	1	700	0.28	0
21	210	2103	Bloor Street West of Courtice Road	135	1	700	0.19	0	318	1	700	0.45	0
21	210	2108	Meadowglade Road extension West of Courtice Road	51	1	500	0.10	0	144	1	500	0.29	0
21	210	2104	Sandringham Drive West of Courtice Road	62	1	400	0.16	0	95	1	400	0.24	0
21	210	2105	Highway 2 West of Courtice Road	1,070	2	1,800	0.59	0	664	2	1,800	0.37	0
21	210	2106	Nash Road West of Courtice Road	10	1	700	0.01	0	5	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	4	1	400	0.01	0	2	1	400	0.00	0
21	211	2111	Pebblestone Road West of Courtice Road	176	1	800	0.22	0	123	1	800	0.15	0
21	211	2112	Taunton Road West of Courtice Road	722	1	1,000	0.72	0	481	1	1,000	0.48	0
21	211	2114	Highway 407 East of Enfield Road	804	2	3,600	0.22	0	172	2	3,600	0.05	0
21	211	2113	Concession 6 West of Courtice Road	154	1	700	0.22	0	15	1	700	0.02	0
22	220	2201	South Service Road West of Holt Road	211	1	500	0.42	0	0	1	500	0.00	0
22	220	2202	Highway 401 West of Holt Road	4,087	3	4,950	0.83	0	2,135	3	4,950	0.43	0
22	220	2203	Baseline Road West of Holt Road	280	1	700	0.40	0	21	1	700	0.03	0
22	220	2204	Bloor Street West of Holt Road	152	1	700	0.22	0	40	1	700	0.06	0
22	220	2205	Highway 2 West of Holt Road	1,422	2	2,000	0.71	0	524	2	2,000	0.26	0
22	220	2206	Nash Road West of Holt Road	69	1	700	0.10	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	7	1	500	0.01	0	3	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	4,390	3	4,950	0.89	0	1,925	3	4,950	0.39	0
23	230	2303	Baseline Road West of Green Road	458	1	700	0.65	0	4	1	700	0.01	0
23	230	2304	Highway 2 East of Maple Grove Road	1,729	2	2,400	0.72	0	615	2	2,400	0.26	0
23	230	2305	Nash Road East of Maple Grove Road	151	1	800	0.19	0	0	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	4,112	3	4,950	0.83	0	2,119	3	4,950	0.43	0
24	240	2402	Baseline Road at Bowmanville Creek	551	1	700	0.79	0	295	1	700	0.42	0
24	240	2403	Highway 2 at Bowmanville Creek	1,170	2	1,800	0.65	0	588	2	1,800	0.33	0
24	241	2411	Longworth Avenue East of Regional Road 57	833	1	800	1.04	1	197	1	800	0.25	0
24	241	2412	Concession 3 of Regional Road 57	592	1	600	0.99	1	60	1	600	0.10	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	695	1	1,000	0.70	0	319	1	1,000	0.32	0
24	242	2423	Concession 6 West of Regional Road 57	79	1	700	0.11	0	2	1	700	0.00	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	29	1	500	0.06	0	41	1	500	0.08	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	5	1	500	0.01	0	1	1	500	0.00	0
24	242	2429	Highway 407 West of Regional Road 57	875	2	3,600	0.24	0	173	2	3,600	0.05	0
25	250	2501	Highway 401 West of Bennett Road	3,474	3	4,950	0.70	0	2,016	3	4,950	0.41	0
25	250	2502	Baseline Road West of Lambs Road	332	1	700	0.47	0	181	1	700	0.26	0
25	250	2503	Highway 2 West of Lambs Road	378	1	1,000	0.38	0	77	1	1,000	0.08	0
25	251	2511	Concession Street West of Lambs Road	166	1	700	0.24	0	318	1	700	0.45	0
25	251	2512	Concession 3 West of Lambs Road	43	1	800	0.05	0	34	1	800	0.04	0
25	252	2521	Concession 4 West of Lambs Road	0	1	500	0.00	0	4	1	500	0.01	0
25	252	2522	Taunton Road West of Bethesda Road	510	1	1,000	0.51	0	260	1	1,000	0.26	0
25	252	2527	Highway 407 East of Regional Road 57	496	2	3,600	0.14	0	168	2	3,600	0.05	0
25	252	2523	Concession 6 West of Bethesda Road	1	1	700	0.00	0	3	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	2	1	500	0.00	0	3	1	500	0.01	0
25	252	2525	Concession 8 West of Bethesda Road	0	1	700	0.00	0	12	1	700	0.02	0
25	252	2526	Regional Road 20 West of Liberty Street	0	1	1,000	0.00	0	177	1	1,000	0.18	0
26	260	2601	Highway 401 West of Highway 35/115	3,216	3	4,950	0.65	0	2,104	3	4,950	0.43	0
26	260	2602	Highway 2 West of Highway 35/115	360	1	1,000	0.36	0	96	1	1,000	0.10	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	74	1	800	0.09	0	64	1	800	0.08	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	2	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	5	1	500	0.01	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	356	1	1,000	0.36	0	249	1	1,000	0.25	0
26	262	2621	Concession 7 West of Highway 35/115	12	1	500	0.02	0	2	1	500	0.00	0
26	262	2624	Highway 407 West of Highway 35/115	466	2	3,600	0.13	0	159	2	3,600	0.04	0
26	262	2622	Concession 8 West of Highway 35/115	13	1	500	0.03	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	0	1	1,000	0.00	0	188	1	1,000	0.19	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	5	1	500	0.01	0	3	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	906	3	4,950	0.18	0	1,463	3	4,950	0.30	0
27	270	2704	Highway 2 West of Clarington East Limit	51	1	1,000	0.05	0	3	1	1,000	0.00	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	1	1	500	0.00	0	0	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	2	1	500	0.00	0	0	1	500	0.00	0
27	270	2708	Ganaraska Road West of Clarington East Limit	92	1	800	0.11	0	27	1	800	0.03	0
30	300	3001	Holt Road North of Highway 401	549	1	700	0.78	0	94	1	700	0.13	0
30	300	3002	Waverly Road/RR57 North of Highway 401	1,183	2	1,800	0.66	0	692	2	1,800	0.38	0
30	300	3003	Liberty Street North of Highway 401	881	1	800	1.10	1	345	1	800	0.43	0
Eastbound/Westbound TOTALS				51,290	113	116,200			27,155	113	116,200		
Northbound/Southbound TOTALS				21,608	99	74,350			11,737	99	74,350		

Cap = 850
= V/C ratio 0.80 - 0.90
= V/C ratio > 0.90
= Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - AM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31242
NETWORK: 2031 Preferred Alternative A
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	3,587	14	13,100	0.27	0	7,443	14	13,100	0.57	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	707	9	9,000	0.08	0	2,245	9	9,000	0.25	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	3,754	12	11,800	0.32	0	5,812	12	11,800	0.49	0
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	751	5	6,100	0.12	0	1,722	5	6,100	0.28	0
220	West of Holt Road (South Service Road to Nash Road)	2,385	9	9,550	0.25	0	6,156	9	9,550	0.64	0
230	East of Maple Grove Road (South Service Road to Nash Road)	2,153	10	11,050	0.19	0	6,388	10	11,050	0.58	0
240	Bowmanville Creek (Highway 401 to Highway 2)	2,342	6	7,450	0.31	0	4,588	6	7,450	0.62	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	208	3	2,400	0.09	0	1,405	3	2,400	0.59	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	423	10	8,400	0.05	0	1,386	10	8,400	0.16	0
250	West of Lambs Road (Highway 401 to Highway 2)	1,900	5	6,650	0.29	0	3,482	5	6,650	0.52	0
251	West of Lambs Road (Concession Street to Concession 3)	191	2	1,500	0.13	0	248	2	1,500	0.17	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	365	8	8,000	0.05	0	705	8	8,000	0.09	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,715	4	5,950	0.29	0	2,972	4	5,950	0.50	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	258	4	3,100	0.08	0	514	4	3,100	0.17	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	145	5	5,600	0.03	0	220	5	5,600	0.04	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,056	10	9,250	0.11	0	1,166	10	9,250	0.13	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Northbound					Southbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	104	5	5,500	0.02	0	1,204	5	5,500	0.22	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	103	3	1,800	0.06	0	647	3	1,800	0.36	0
102	North of Baseline Road (Green Road to Bennett Road)	978	9	5,800	0.17	0	3,033	9	5,800	0.52	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,072	7	4,050	0.26	0	1,015	7	4,050	0.25	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	124	4	2,300	0.05	0	869	4	2,300	0.38	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,328	9	7,800	0.17	0	1,752	9	7,800	0.22	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	100	5	3,100	0.03	0	919	5	3,100	0.30	0
122	North of Highway 2 (Green Road to Lambs Road)	594	7	5,150	0.12	0	2,755	7	5,150	0.53	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	518	8	5,400	0.10	0	779	8	5,400	0.14	0
140	North of Taunton Road (Townline Road to East Durham Link)	636	7	6,600	0.10	0	580	7	6,600	0.09	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,414	13	9,300	0.15	0	1,221	13	9,300	0.13	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	0	4	2,200	0.00	0	16	4	2,200	0.01	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	23	5	3,300	0.01	0	181	5	3,300	0.05	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,068	7	8,100	0.13	0	1,136	7	8,100	0.14	0
160	South of Highway 2 (Mill Street)	328	1	700	0.47	0	379	1	700	0.54	0
170	North of Highway 2 (Manvers Road to Arthur Street)	55	2	1,250	0.04	0	214	2	1,250	0.17	0
300	North of Highway 401 (Holt Road to Lambs Road)	733	5	4,100	0.18	0	2,746	5	4,100	0.67	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9

Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31242
NETWORK: 2031 Preferred Alternative A
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Link Level Deficiency Analysis

				Northbound/Eastbound					Southbound/Westbound				
MSL ID	SL ID	Link Tag	Description	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	5	1	550	0.01	0	161	1	550	0.29	0
10	100	1002	Trulls Road North of Baseline Road	1	1	550	0.00	0	131	1	550	0.24	0
10	100	1003	Courtice Road North of Baseline Road	59	1	800	0.07	0	675	1	800	0.84	0
10	100	1004	East Durham Link North of Baseline Road	38	2	3,600	0.01	0	237	2	3,600	0.07	0
10	101	1011	Solina Road North of Baseline Road	0	1	500	0.00	0	88	1	500	0.18	0
10	101	1012	Holt Road North of Baseline Road	103	1	800	0.13	0	559	1	800	0.70	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	11	1	500	0.02	0	184	1	500	0.37	0
10	102	1022	West Side Drive North of Baseline Road	34	1	400	0.09	0	191	1	400	0.48	0
10	102	1023	Regional Road 57 North of Baseline Road	498	2	1,800	0.28	0	1,005	2	1,800	0.56	0
10	102	1024	Liberty Street South North of Baseline Road	328	1	800	0.41	0	645	1	800	0.81	0
10	102	1025	Simpson Avenue North of Baseline Road	5	1	400	0.01	0	237	1	400	0.59	0
10	102	1026	Haines Street North of Baseline Road	17	1	600	0.03	0	113	1	600	0.19	0
10	102	1027	Lambs Road North of Baseline Road	50	1	700	0.07	0	382	1	700	0.55	0
10	102	1028	Bennett Road North of Baseline Road	35	1	600	0.06	0	277	1	600	0.46	0
11	110	1101	Townline Road South of Highway 2	88	1	700	0.13	0	122	1	700	0.17	0
11	110	1102	Darlington Blvd South of Highway 2	29	1	400	0.07	0	13	1	400	0.03	0
11	110	1103	Prestonvale Road South of Highway 2	430	1	550	0.78	0	161	1	550	0.29	0
11	110	1104	Sandringham Drive South of Highway 2	42	1	400	0.11	0	1	1	400	0.00	0
11	110	1105	Trulls Road South of Highway 2	324	1	700	0.46	0	174	1	700	0.25	0
11	110	1106	Courtice Road South of Highway 2	158	1	800	0.20	0	544	1	800	0.68	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	0	1	500	0.00	0	55	1	500	0.11	0
11	111	1112	Rundle Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	82	1	800	0.10	0	648	1	800	0.81	0
11	111	1114	Maple Grove Road South of Highway 2	42	1	500	0.08	0	166	1	500	0.33	0
12	120	1201	Townline Road North of Highway 2	111	2	1,400	0.08	0	201	2	1,400	0.14	0
12	120	1202	Varcoe Road North of Highway 2	57	1	400	0.14	0	101	1	400	0.25	0
12	120	1203	Centerfield Drive North of Highway 2	129	1	400	0.32	0	172	1	400	0.43	0
12	120	1204	Trulls Road North of Highway 2	339	1	700	0.48	0	296	1	700	0.42	0
12	120	1205	Courtice Road North of Highway 2	520	1	800	0.65	0	665	1	800	0.83	0
12	120	1206	Hancock Road North of Highway 2	10	1	500	0.02	0	30	1	500	0.06	0
12	120	1207	East Durham Link North of Highway 2	162	2	3,600	0.05	0	286	2	3,600	0.08	0
12	121	1211	Solina Road North of Highway 2	2	1	500	0.00	0	4	1	500	0.01	0
12	121	1212	Rundle Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	90	2	1,600	0.06	0	914	2	1,600	0.57	0
12	121	1214	Maple Grove Road North of Highway 2	9	1	500	0.02	0	1	1	500	0.00	0
12	122	1221	Green Road North of Highway 2	68	1	500	0.14	0	321	1	500	0.64	0
12	122	1222	Regional Road 57 North of Highway 2	143	2	2,000	0.07	0	638	2	2,000	0.32	0
12	122	1223	Scugog Street North of Church Street	173	1	550	0.31	0	553	1	550	1.01	1
12	122	1224	Liberty Street N North of Church Street	113	1	800	0.14	0	559	1	800	0.70	0
12	122	1225	Mearns Avenue North of Highway 2	36	1	600	0.06	0	346	1	600	0.58	0
12	122	1226	Lambs Road North of Highway 2	61	1	700	0.09	0	338	1	700	0.48	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	3	1	500	0.01	0	0	1	500	0.00	0
13	130	1303	Regional Road 57 South of Concession 3	233	1	1,000	0.23	0	472	1	1,000	0.47	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	0	1	400	0.00	0
13	130	1305	Scugog Street South of Concession 3	127	1	600	0.21	0	40	1	600	0.07	0
13	130	1306	Liberty Street N South of Concession 3	118	1	800	0.15	0	239	1	800	0.30	0
13	130	1307	Mearns Avenue South of Concession 3	6	1	600	0.01	0	7	1	600	0.01	0
13	130	1308	Lambs Road South of Concession 3	31	1	700	0.04	0	22	1	700	0.03	0
14	140	1401	Townline Road North of Taunton Road	102	1	500	0.20	0	165	1	500	0.33	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	460	1	1,000	0.46	0	250	1	1,000	0.25	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	35	1	500	0.07	0	63	1	500	0.13	0
14	140	1406	East Durham Link North of Taunton Road	40	2	3,600	0.01	0	102	2	3,600	0.03	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	7	1	400	0.02	0	28	1	400	0.07	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	70	1	700	0.10	0	50	1	700	0.07	0
14	141	14105	Regional Road 57 North of Taunton Road	398	1	1,000	0.40	0	146	1	1,000	0.15	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	2	1	700	0.00	0	33	1	700	0.05	0
14	141	14108	Bethesda Road North of Taunton Road	1	1	800	0.00	0	3	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	6	1	500	0.01	0	9	1	500	0.02	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	5	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	926	2	2,800	0.33	0	952	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	0	1	700	0.00	0	16	1	700	0.02	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	1	1	500	0.00	0	69	1	500	0.14	0
15	150	1503	Old Scugog Road North of Regional Road 3	2	1	500	0.00	0	15	1	500	0.03	0
15	150	1504	Regional Road 57 North of Regional Road 3	9	1	1,000	0.01	0	97	1	1,000	0.10	0
15	150	1505	Liberty Street North of Concession 8	10	1	800	0.01	0	0	1	800	0.00	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	39	1	1,000	0.04	0	0	1	1,000	0.00	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	198	2	2,000	0.10	0	462	2	2,000	0.23	0
15	151	1515	Highway 115 South of Boundary Road	832	2	3,600	0.23	0	673	2	3,600	0.19	0
16	160	1601	Mill Street North of Highway 401	328	1	700	0.47	0	379	1	700	0.54	0
17	170	1701	Manvers Road North of Highway 2	37	1	700	0.05	0	156	1	700	0.22	0
17	170	1702	Arthur Street North of Highway 2	19	1	550	0.03	0	58	1	550	0.11	0
20	200	2001	Highway 401 East of Harmony Road	2,608	4	6,600	0.40	0	4,556	4	6,600	0.69	0
20	200	2002	Bingham Gate East of Townline Road	3	1	500	0.01	0	262	1	500	0.52	0
20	200	2003	Gord Vinson Avenue East of Townline Road	110	1	600	0.18	0	193	1	600	0.32	0
20	200	2004	Bloor Road East of Townline Road	194	1	750	0.26	0	637	1	750	0.85	0
20	200	2005	Glenabbey Drive East of Townline Road	3	1	600	0.01	0	358	1	600	0.60	0
20	200	2006	Kingswood Drive East of Townline Road	7	1	600	0.01	0	65	1	600	0.11	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	616	2	1,800	0.34	0	1,321	2	1,800	0.73	0
20	200	2009	Nash Road East of Townline Road	37	1	550	0.07	0	17	1	550	0.03	0
20	200	20010	Lawson Road East of Townline Road	8	1	700	0.01	0	35	1	700	0.05	0

20	201	2011	Pebblestone Road East of Townline Road	33	1	800	0.04	0	168	1	800	0.21	0
20	201	2012	Taunton Road East of Townline Road	299	2	2,000	0.15	0	785	2	2,000	0.39	0
20	201	2013	Concession 6 East of Townline Road	63	1	700	0.09	0	189	1	700	0.27	0
20	201	2017	Highway 407 West of Enfield Road	309	2	3,600	0.09	0	1,001	2	3,600	0.28	0
20	201	2014	Concession 7 East of Townline Road	1	1	600	0.00	0	20	1	600	0.03	0
20	201	2015	Regional Road 3 East of Townline Road	2	1	800	0.00	0	68	1	800	0.09	0
20	201	2016	Concession 9 East of Townline Road	0	1	500	0.00	0	13	1	500	0.03	0
21	210	2101	Highway 401 West of Courtice Road	2,608	4	6,600	0.40	0	4,556	4	6,600	0.69	0
21	210	2102	Baseline Road West of Courtice Road	138	1	700	0.20	0	102	1	700	0.15	0
21	210	2103	Bloor Street West of Courtice Road	233	1	700	0.33	0	150	1	700	0.21	0
21	210	2108	Meadowglade Road extension West of Courtice Road	134	1	500	0.27	0	52	1	500	0.10	0
21	210	2104	Sandringham Drive West of Courtice Road	41	1	400	0.10	0	54	1	400	0.14	0
21	210	2105	Highway 2 West of Courtice Road	596	2	1,800	0.33	0	888	2	1,800	0.49	0
21	210	2106	Nash Road West of Courtice Road	3	1	700	0.00	0	7	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	1	1	400	0.00	0	3	1	400	0.01	0
21	211	2111	Pebblestone Road West of Courtice Road	141	1	800	0.18	0	88	1	800	0.11	0
21	211	2112	Taunton Road West of Courtice Road	435	1	1,000	0.44	0	871	1	1,000	0.87	0
21	211	2114	Highway 407 East of Enfield Road	166	2	3,600	0.05	0	649	2	3,600	0.18	0
21	211	2113	Concession 6 West of Courtice Road	9	1	700	0.01	0	114	1	700	0.16	0
22	220	2201	South Service Road West of Holt Road	0	1	500	0.00	0	199	1	500	0.40	0
22	220	2202	Highway 401 West of Holt Road	1,866	3	4,950	0.38	0	4,310	3	4,950	0.87	0
22	220	2203	Baseline Road West of Holt Road	18	1	700	0.03	0	226	1	700	0.32	0
22	220	2204	Bloor Street West of Holt Road	25	1	700	0.04	0	255	1	700	0.36	0
22	220	2205	Highway 2 West of Holt Road	477	2	2,000	0.24	0	1,166	2	2,000	0.58	0
22	220	2206	Nash Road West of Holt Road	0	1	700	0.00	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	5	1	500	0.01	0	5	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	1,550	3	4,950	0.31	0	4,037	3	4,950	0.82	0
23	230	2303	Baseline Road West of Green Road	52	1	800	0.06	0	520	1	800	0.65	0
23	230	2304	Highway 2 East of Maple Grove Road	459	2	2,400	0.19	0	1,008	2	2,400	0.42	0
23	230	2306	Longworth Avenue East of Maple Grove Road	87	2	1,600	0.05	0	815	2	1,600	0.51	0
23	230	2305	Nash Road East of Maple Grove Road	0	1	800	0.00	0	3	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	1,712	3	4,950	0.35	0	3,711	3	4,950	0.75	0
24	240	2402	Baseline Road at Bowmanville Creek	245	1	700	0.35	0	225	1	700	0.32	0
24	240	2403	Highway 2 at Bowmanville Creek	385	2	1,800	0.21	0	651	2	1,800	0.36	0
24	241	2411	Longworth Avenue East of Regional Road 57	165	2	1,600	0.10	0	950	2	1,600	0.59	0
24	241	2412	Concession 3 of Regional Road 57	43	1	800	0.05	0	455	1	800	0.57	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	266	1	1,000	0.27	0	667	1	1,000	0.67	0
24	242	2423	Concession 6 West of Regional Road 57	2	1	700	0.00	0	48	1	700	0.07	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	42	1	500	0.08	0	11	1	500	0.02	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	3	1	500	0.01	0	5	1	500	0.01	0
24	242	2429	Highway 407 West of Regional Road 57	110	2	3,600	0.03	0	654	2	3,600	0.18	0
25	250	2501	Highway 401 West of Bennett Road	1,649	3	4,950	0.33	0	2,920	3	4,950	0.59	0
25	250	2502	Baseline Road West of Lambs Road	163	1	700	0.23	0	297	1	700	0.42	0
25	250	2503	Highway 2 West of Lambs Road	89	1	1,000	0.09	0	265	1	1,000	0.27	0
25	251	2511	Concession Street West of Lambs Road	169	1	700	0.24	0	212	1	700	0.30	0
25	251	2512	Concession 3 West of Lambs Road	22	1	800	0.03	0	35	1	800	0.04	0
25	252	2521	Concession 4 West of Lambs Road	3	1	500	0.01	0	0	1	500	0.00	0
25	252	2522	Taunton Road West of Bethesda Road	209	1	1,000	0.21	0	478	1	1,000	0.48	0
25	252	2527	Highway 407 East of Regional Road 57	108	2	3,600	0.03	0	225	2	3,600	0.06	0
25	252	2523	Concession 6 West of Bethesda Road	3	1	700	0.00	0	1	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	3	1	500	0.01	0	1	1	500	0.00	0
25	252	2525	Concession 8 West of Bethesda Road	10	1	700	0.01	0	0	1	700	0.00	0
25	252	2526	Regional Road 20 West of Liberty Street	29	1	1,000	0.03	0	0	1	1,000	0.00	0
26	260	2601	Highway 401 West of Highway 35/115	1,663	3	4,950	0.34	0	2,632	3	4,950	0.53	0
26	260	2602	Highway 2 West of Highway 35/115	52	1	1,000	0.05	0	340	1	1,000	0.34	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	53	1	800	0.07	0	114	1	800	0.14	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	1	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	2	1	500	0.00	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	201	1	1,000	0.20	0	398	1	1,000	0.40	0
26	262	2621	Concession 7 West of Highway 35/115	2	1	500	0.00	0	15	1	500	0.03	0
26	262	2624	Highway 407 West of Highway 35/115	97	2	3,600	0.03	0	206	2	3,600	0.06	0
26	262	2622	Concession 8 West of Highway 35/115	7	1	500	0.01	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	39	1	1,000	0.04	0	0	1	1,000	0.00	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	2	1	500	0.00	0	4	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	1,031	3	4,950	0.21	0	1,030	3	4,950	0.21	0
27	270	2704	Highway 2 West of Clarington East Limit	3	1	1,000	0.00	0	43	1	1,000	0.04	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	0	1	500	0.00	0	1	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	0	1	500	0.00	0	3	1	500	0.01	0
27	270	2708	Canaraska Road West of Clarington East Limit	21	1	800	0.03	0	85	1	800	0.11	0
30	300	3001	Holt Road North of Highway 401	189	2	1,600	0.12	0	905	2	1,600	0.57	0
30	300	3002	Waverly Road/RR57 North of Highway 401	445	2	1,800	0.25	0	950	2	1,800	0.53	0
30	300	3003	Liberty Street North of Highway 401	100	1	700	0.14	0	891	1	700	1.27	1
Eastbound/Westbound TOTALS				21,942	116	118,900			46,452	116	118,900		
Northbound/Southbound TOTALS				9,179	101	76,450			19,446	101	76,450		

Cap = 850
= V/C ratio 0.80 - 0.90
= V/C ratio > 0.90
= Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - PM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31243
NETWORK: 2031 Preferred Alternative A
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	8,183	14	13,100	0.62	0	4,441	14	13,100	0.34	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	2,433	9	9,000	0.27	0	883	9	9,000	0.10	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	5,952	12	11,800	0.50	0	4,369	12	11,800	0.37	0
211	West of Courtice Road/East of Enfield Road (Pebblestone Road to Concession 6)	1,842	5	6,100	0.30	0	780	5	6,100	0.13	0
220	West of Holt Road (South Service Road to Nash Road)	6,290	9	9,550	0.66	0	2,711	9	9,550	0.28	0
230	East of Maple Grove Road (South Service Road to Nash Road)	6,825	10	11,050	0.62	0	2,548	10	11,050	0.23	0
240	Bowmanville Creek (Highway 401 to Highway 2)	5,618	6	7,450	0.75	0	2,948	6	7,450	0.40	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	1,649	3	2,400	0.69	0	311	3	2,400	0.13	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	1,598	10	8,400	0.19	0	538	10	8,400	0.06	0
250	West of Lambs Road (Highway 401 to Highway 2)	4,173	5	6,650	0.63	0	2,336	5	6,650	0.35	0
251	West of Lambs Road (Concession Street to Concession 3)	254	2	1,500	0.17	0	286	2	1,500	0.19	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	978	8	8,000	0.12	0	626	8	8,000	0.08	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	3,588	4	5,950	0.60	0	2,199	4	5,950	0.37	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	445	4	3,100	0.14	0	316	4	3,100	0.10	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	474	5	5,600	0.08	0	350	5	5,600	0.06	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,058	10	9,250	0.11	0	1,497	10	9,250	0.16	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	1,241	5	5,500	0.23	0	147	5	5,500	0.03	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	769	3	1,800	0.43	0	227	3	1,800	0.13	0
102	North of Baseline Road (Green Road to Bennett Road)	3,389	9	5,800	0.58	0	1,297	9	5,800	0.22	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,243	7	4,050	0.31	0	1,498	7	4,050	0.37	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	904	4	2,300	0.39	0	252	4	2,300	0.11	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,875	9	7,800	0.24	0	1,690	9	7,800	0.22	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	1,089	5	3,100	0.35	0	131	5	3,100	0.04	0
122	North of Highway 2 (Green Road to Lambs Road)	3,340	7	5,150	0.65	0	937	7	5,150	0.18	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	857	8	5,400	0.16	0	535	8	5,400	0.10	0
140	North of Taunton Road (Townline Road to East Durham Link)	716	7	6,600	0.11	0	632	7	6,600	0.10	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,433	13	9,300	0.15	0	1,452	13	9,300	0.16	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	2	4	2,200	0.00	0	5	4	2,200	0.00	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	253	5	3,300	0.08	0	25	5	3,300	0.01	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,570	7	8,100	0.19	0	1,304	7	8,100	0.16	0
160	South of Highway 2 (Mill Street)	518	1	700	0.74	0	159	1	700	0.23	0
170	North of Highway 2 (Manvers Road to Arthur Street)	331	2	1,250	0.26	0	68	2	1,250	0.05	0
300	North of Highway 401 (Holt Road to Lambs Road)	2,978	5	4,200	0.71	0	1,317	5	4,200	0.31	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31243
NETWORK: 2031 Preferred Alternative A
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Link Level Deficiency Analysis

MSL ID	SL ID	Link Tag	Description	Northbound/Eastbound					Southbound/Westbound				
				PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	243	1	550	0.44	0	7	1	550	0.01	0
10	100	1002	Trulls Road North of Baseline Road	132	1	550	0.24	0	1	1	550	0.00	0
10	100	1003	Courtice Road North of Baseline Road	664	1	800	0.83	0	98	1	800	0.12	0
10	100	1004	East Durham Link North of Baseline Road	201	2	3,600	0.06	0	41	2	3,600	0.01	0
10	101	1011	Solina Road North of Baseline Road	123	1	500	0.25	0	0	1	500	0.00	0
10	101	1012	Holt Road North of Baseline Road	645	1	800	0.81	0	227	1	800	0.28	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	230	1	500	0.46	0	17	1	500	0.03	0
10	102	1022	West Side Drive North of Baseline Road	195	1	400	0.49	0	4	1	400	0.01	0
10	102	1023	Regional Road 57 North of Baseline Road	1,174	2	1,800	0.65	0	764	2	1,800	0.42	0
10	102	1024	Liberty Street South North of Baseline Road	688	1	800	0.86	0	281	1	800	0.35	0
10	102	1025	Simpson Avenue North of Baseline Road	235	1	400	0.59	0	46	1	400	0.12	0
10	102	1026	Haines Street North of Baseline Road	167	1	600	0.28	0	19	1	600	0.03	0
10	102	1027	Lambs Road North of Baseline Road	448	1	700	0.64	0	68	1	700	0.10	0
10	102	1028	Bennett Road North of Baseline Road	252	1	600	0.42	0	98	1	600	0.16	0
11	110	1101	Townline Road South of Highway 2	155	1	700	0.22	0	135	1	700	0.19	0
11	110	1102	Darlington Blvd South of Highway 2	22	1	400	0.05	0	49	1	400	0.12	0
11	110	1103	Prestonvale Road South of Highway 2	281	1	550	0.51	0	551	1	550	1.00	1
11	110	1104	Sandringham Drive South of Highway 2	0	1	400	0.00	0	98	1	400	0.25	0
11	110	1105	Trulls Road South of Highway 2	223	1	700	0.32	0	454	1	700	0.65	0
11	110	1106	Courtice Road South of Highway 2	562	1	800	0.70	0	211	1	800	0.26	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	40	1	500	0.08	0	0	1	500	0.00	0
11	111	1112	Rundle Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	705	1	800	0.88	0	196	1	800	0.24	0
11	111	1114	Maple Grove Road South of Highway 2	158	1	500	0.32	0	56	1	500	0.11	0
12	120	1201	Townline Road North of Highway 2	322	2	1,400	0.23	0	205	2	1,400	0.15	0
12	120	1202	Varcoe Road North of Highway 2	165	1	400	0.41	0	114	1	400	0.29	0
12	120	1203	Centerfield Drive North of Highway 2	84	1	400	0.21	0	177	1	400	0.44	0
12	120	1204	Trulls Road North of Highway 2	345	1	700	0.49	0	449	1	700	0.64	0
12	120	1205	Courtice Road North of Highway 2	679	1	800	0.85	0	511	1	800	0.64	0
12	120	1206	Hancock Road North of Highway 2	32	1	500	0.06	0	14	1	500	0.03	0
12	120	1207	East Durham Link North of Highway 2	249	2	3,600	0.07	0	220	2	3,600	0.06	0
12	121	1211	Solina Road North of Highway 2	6	1	500	0.01	0	3	1	500	0.01	0
12	121	1212	Rundle Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	1,078	2	1,600	0.67	0	111	2	1,600	0.07	0
12	121	1214	Maple Grove Road North of Highway 2	6	1	500	0.01	0	16	1	500	0.03	0
12	122	1221	Green Road North of Highway 2	359	1	500	0.72	0	94	1	500	0.19	0
12	122	1222	Regional Road 57 North of Highway 2	829	2	2,000	0.41	0	313	2	2,000	0.16	0
12	122	1223	Scugog Street North of Church Street	701	1	550	1.27	1	222	1	550	0.40	0
12	122	1224	Liberty Street N North of Church Street	655	1	800	0.82	0	193	1	800	0.24	0
12	122	1225	Mearns Avenue North of Highway 2	407	1	600	0.68	0	47	1	600	0.08	0
12	122	1226	Lambs Road North of Highway 2	389	1	700	0.56	0	69	1	700	0.10	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	0	1	500	0.00	0	7	1	500	0.01	0
13	130	1303	Regional Road 57 South of Concession 3	492	1	1,000	0.49	0	268	1	1,000	0.27	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	32	1	400	0.08	0
13	130	1305	Scugog Street South of Concession 3	47	1	600	0.08	0	88	1	600	0.15	0
13	130	1306	Liberty Street N South of Concession 3	281	1	800	0.35	0	79	1	800	0.10	0
13	130	1307	Mearns Avenue South of Concession 3	10	1	600	0.02	0	17	1	600	0.03	0
13	130	1308	Lambs Road South of Concession 3	28	1	700	0.04	0	45	1	700	0.06	0
14	140	1401	Townline Road North of Taunton Road	191	1	500	0.38	0	183	1	500	0.37	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	327	1	1,000	0.33	0	330	1	1,000	0.33	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	75	1	500	0.15	0	40	1	500	0.08	0
14	140	1406	East Durham Link North of Taunton Road	123	2	3,600	0.03	0	80	2	3,600	0.02	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	26	1	400	0.07	0	9	1	400	0.02	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	44	1	700	0.06	0	114	1	700	0.16	0
14	141	14105	Regional Road 57 North of Taunton Road	183	1	1,000	0.18	0	368	1	1,000	0.37	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	21	1	700	0.03	0	4	1	700	0.01	0
14	141	14108	Bethesda Road North of Taunton Road	3	1	800	0.00	0	1	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	7	1	500	0.01	0	6	1	500	0.01	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	7	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	1,140	2	2,800	0.41	0	950	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	1	1	700	0.00	0	5	1	700	0.01	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	84	1	500	0.17	0	2	1	500	0.00	0
15	150	1503	Old Scugog Road North of Regional Road 3	14	1	500	0.03	0	5	1	500	0.01	0
15	150	1504	Regional Road 57 North of Regional Road 3	155	1	1,000	0.16	0	6	1	1,000	0.01	0
15	150	1505	Liberty Street North of Concession 8	0	1	800	0.00	0	12	1	800	0.02	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	0	1	1,000	0.00	0	189	1	1,000	0.19	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	574	2	2,000	0.29	0	307	2	2,000	0.15	0
15	151	1515	Highway 115 South of Boundary Road	996	2	3,600	0.28	0	809	2	3,600	0.22	0
16	160	1601	Mill Street North of Highway 401	258	1	700	0.74	0	159	1	700	0.23	0
17	170	1701	Manvers Road North of Highway 2	64	1	700	0.38	0	48	1	700	0.07	0
17	170	1702	Arthur Street North of Highway 2	67	1	550	0.12	0	20	1	550	0.04	0
20	200	2001	Highway 401 East of Harmony Road	4,502	4	6,600	0.68	0	2,958	4	6,600	0.45	0
20	200	2002	Bingham Gate East of Townline Road	355	1	500	0.71	0	4	1	500	0.01	0
20	200	2003	Gord Vinson Avenue East of Townline Road	333	1	600	0.56	0	175	1	600	0.29	0
20	200	2004	Bloor Road East of Townline Road	655	1	750	0.87	0	288	1	750	0.38	0
20	200	2005	Glenabbey Drive East of Townline Road	418	1	600	0.70	0	5	1	600	0.01	0
20	200	2006	Kingswood Drive East of Townline Road	81	1	600	0.13	0	15	1	600	0.02	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	1,601	2	1,800	0.89	0	888	2	1,800	0.49	0
20	200	2009	Nash Road East of Townline Road	177	1	550	0.32	0	95	1	550	0.17	0
20	200	20010	Lawson Road East of Townline Road	60	1	700	0.09	0	14	1	700	0.02	0

20	201	2011	Pebblestone Road East of Townline Road	305	1	800	0.38	0	91	1	800	0.11	0
20	201	2012	Taunton Road East of Townline Road	761	2	2,000	0.38	0	320	2	2,000	0.16	0
20	201	2013	Concession 6 East of Townline Road	278	1	700	0.40	0	51	1	700	0.07	0
20	201	2017	Highway 407 West of Enfield Road	954	2	3,600	0.27	0	419	2	3,600	0.12	0
20	201	2014	Concession 7 West of Townline Road	25	1	600	0.04	0	1	1	600	0.00	0
20	201	2015	Regional Road 3 East of Townline Road	94	1	800	0.12	0	2	1	800	0.00	0
20	201	2016	Concession 9 East of Townline Road	15	1	500	0.03	0	0	1	500	0.00	0
21	210	2101	Highway 401 West of Courtice Road	4,502	4	6,600	0.68	0	2,958	4	6,600	0.45	0
21	210	2102	Baseline Road West of Courtice Road	120	1	700	0.17	0	210	1	700	0.30	0
21	210	2103	Bloor Street West of Courtice Road	133	1	700	0.19	0	319	1	700	0.46	0
21	210	2108	Meadowglade Road extension West of Courtice Road	52	1	500	0.10	0	147	1	500	0.29	0
21	210	2104	Sandringham Drive West of Courtice Road	62	1	400	0.15	0	91	1	400	0.23	0
21	210	2105	Highway 2 West of Courtice Road	1,070	2	1,800	0.59	0	638	2	1,800	0.35	0
21	210	2106	Nash Road West of Courtice Road	10	1	700	0.01	0	5	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	3	1	400	0.01	0	2	1	400	0.00	0
21	211	2111	Pebblestone Road West of Courtice Road	183	1	800	0.23	0	124	1	800	0.15	0
21	211	2112	Taunton Road West of Courtice Road	732	1	1,000	0.73	0	474	1	1,000	0.47	0
21	211	2114	Highway 407 East of Enfield Road	774	2	3,600	0.21	0	172	2	3,600	0.05	0
21	211	2113	Concession 6 West of Courtice Road	154	1	700	0.22	0	11	1	700	0.02	0
22	220	2201	South Service Road West of Holt Road	211	1	500	0.42	0	0	1	500	0.00	0
22	220	2202	Highway 401 West of Holt Road	4,219	3	4,950	0.85	0	2,088	3	4,950	0.42	0
22	220	2203	Baseline Road West of Holt Road	232	1	700	0.33	0	22	1	700	0.03	0
22	220	2204	Bloor Street West of Holt Road	217	1	700	0.31	0	33	1	700	0.05	0
22	220	2205	Highway 2 West of Holt Road	1,410	2	2,000	0.70	0	568	2	2,000	0.28	0
22	220	2206	Nash Road West of Holt Road	1	1	700	0.00	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	1	1	500	0.00	0	3	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	4,158	3	4,950	0.84	0	1,833	3	4,950	0.37	0
23	230	2303	Baseline Road West of Green Road	599	1	800	0.75	0	28	1	800	0.04	0
23	230	2304	Highway 2 East of Maple Grove Road	1,077	2	2,400	0.45	0	575	2	2,400	0.24	0
23	230	2306	Longworth Avenue East of Maple Grove Road	984	2	1,600	0.61	0	108	2	1,600	0.07	0
23	230	2305	Nash Road East of Maple Grove Road	7	1	800	0.01	0	0	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	4,082	3	4,950	0.82	0	2,069	3	4,950	0.42	0
24	240	2402	Baseline Road at Bowmanville Creek	509	1	700	0.73	0	302	1	700	0.43	0
24	240	2403	Highway 2 at Bowmanville Creek	1,027	2	1,800	0.57	0	577	2	1,800	0.32	0
24	241	2411	Longworth Avenue East of Regional Road 57	1,234	2	1,600	0.77	0	254	2	1,600	0.16	0
24	241	2412	Concession 3 of Regional Road 57	414	1	800	0.52	0	57	1	800	0.07	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	666	1	1,000	0.67	0	319	1	1,000	0.32	0
24	242	2423	Concession 6 West of Regional Road 57	79	1	700	0.11	0	3	1	700	0.00	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	29	1	500	0.06	0	41	1	500	0.08	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	5	1	500	0.01	0	1	1	500	0.00	0
24	242	2429	Highway 407 West of Regional Road 57	818	2	3,600	0.23	0	173	2	3,600	0.05	0
25	250	2501	Highway 401 West of Bennett Road	3,425	3	4,950	0.69	0	2,077	3	4,950	0.42	0
25	250	2502	Baseline Road West of Lambs Road	364	1	700	0.52	0	181	1	700	0.26	0
25	250	2503	Highway 2 West of Lambs Road	384	1	1,000	0.38	0	78	1	1,000	0.08	0
25	251	2511	Concession Street West of Lambs Road	204	1	700	0.29	0	258	1	700	0.37	0
25	251	2512	Concession 3 West of Lambs Road	51	1	800	0.06	0	29	1	800	0.04	0
25	252	2521	Concession 4 West of Lambs Road	0	1	500	0.00	0	3	1	500	0.01	0
25	252	2522	Taunton Road West of Bethesda Road	495	1	1,000	0.50	0	259	1	1,000	0.26	0
25	252	2527	Highway 407 East of Regional Road 57	480	2	3,600	0.13	0	168	2	3,600	0.05	0
25	252	2523	Concession 6 West of Bethesda Road	1	1	700	0.00	0	3	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	2	1	500	0.00	0	3	1	500	0.01	0
25	252	2525	Concession 8 West of Bethesda Road	0	1	700	0.00	0	12	1	700	0.02	0
25	252	2526	Regional Road 20 West of Liberty Street	0	1	1,000	0.00	0	177	1	1,000	0.18	0
26	260	2601	Highway 401 West of Highway 35/115	3,220	3	4,950	0.65	0	2,103	3	4,950	0.42	0
26	260	2602	Highway 2 West of Highway 35/115	368	1	1,000	0.37	0	95	1	1,000	0.10	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	97	1	800	0.12	0	65	1	800	0.08	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	2	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	5	1	500	0.01	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	341	1	1,000	0.34	0	249	1	1,000	0.25	0
26	262	2621	Concession 7 West of Highway 35/115	12	1	500	0.02	0	2	1	500	0.00	0
26	262	2624	Highway 407 West of Highway 35/115	450	2	3,600	0.12	0	160	2	3,600	0.04	0
26	262	2622	Concession 8 West of Highway 35/115	12	1	500	0.02	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	0	1	1,000	0.00	0	189	1	1,000	0.19	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	5	1	500	0.01	0	3	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	906	3	4,950	0.18	0	1,463	3	4,950	0.30	0
27	270	2704	Highway 2 West of Clarington East Limit	51	1	1,000	0.05	0	3	1	1,000	0.00	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	1	1	500	0.00	0	0	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	2	1	500	0.00	0	0	1	500	0.00	0
27	270	2708	Canaraska Road West of Clarington East Limit	92	1	800	0.11	0	27	1	800	0.03	0
30	300	3001	Holt Road North of Highway 401	1,070	2	1,600	0.67	0	291	2	1,600	0.18	0
30	300	3002	Waverly Road/RR57 North of Highway 401	1,058	2	1,800	0.59	0	681	2	1,800	0.38	0
30	300	3003	Liberty Street North of Highway 401	850	1	800	1.86	1	345	1	800	0.43	0
Eastbound/Westbound TOTALS				51,360	116	118,900			27,140	116	118,900		
Northbound/Southbound TOTALS				22,508	101	76,550			11,677	101	76,550		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - AM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31244
NETWORK: 2031 Preferred Alternative B
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	3,587	14	13,100	0.27	0	7,455	14	13,100	0.57	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	708	9	9,000	0.08	0	2,233	9	9,000	0.25	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	3,753	12	11,800	0.32	0	5,823	12	11,800	0.49	0
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	752	5	6,100	0.12	0	1,711	5	6,100	0.28	0
220	West of Holt Road (South Service Road to Nash Road)	2,383	9	9,550	0.25	0	6,148	9	9,550	0.64	0
230	East of Maple Grove Road (South Service Road to Nash Road)	2,152	10	11,050	0.19	0	6,381	10	11,050	0.58	0
240	Bowmanville Creek (Highway 401 to Highway 2)	2,341	6	7,450	0.31	0	4,594	6	7,450	0.62	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	208	3	2,400	0.09	0	1,404	3	2,400	0.59	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	425	10	8,400	0.05	0	1,394	10	8,400	0.17	0
250	West of Lambs Road (Highway 401 to Highway 2)	1,900	5	6,650	0.29	0	3,488	5	6,650	0.52	0
251	West of Lambs Road (Concession Street to Concession 3)	191	2	1,500	0.13	0	247	2	1,500	0.16	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	366	8	8,000	0.05	0	700	8	8,000	0.09	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,715	4	5,950	0.29	0	2,978	4	5,950	0.50	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	258	4	3,100	0.08	0	506	4	3,100	0.16	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	147	5	5,600	0.03	0	223	5	5,600	0.04	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,056	10	9,250	0.11	0	1,166	10	9,250	0.13	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Northbound					Southbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	104	5	5,500	0.02	0	1,214	5	5,500	0.22	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	102	3	1,800	0.06	0	671	3	1,800	0.37	0
102	North of Baseline Road (Green Road to Bennett Road)	982	9	5,800	0.17	0	3,012	9	5,800	0.52	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,074	7	4,050	0.27	0	990	7	4,050	0.24	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	124	5	3,100	0.04	0	928	5	3,100	0.30	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,308	9	7,800	0.17	0	1,744	9	7,800	0.22	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	99	5	3,100	0.03	0	911	5	3,100	0.29	0
122	North of Highway 2 (Green Road to Lambs Road)	594	7	5,150	0.12	0	2,753	7	5,150	0.53	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	529	8	5,400	0.10	0	572	8	5,400	0.11	0
140	North of Taunton Road (Townline Road to East Durham Link)	635	7	6,600	0.10	0	577	7	6,600	0.09	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,414	13	9,300	0.15	0	1,219	13	9,300	0.13	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	0	4	2,200	0.00	0	16	4	2,200	0.01	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	23	5	3,300	0.01	0	181	5	3,300	0.05	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,069	7	8,100	0.13	0	1,136	7	8,100	0.14	0
160	South of Highway 2 (Mill Street)	328	1	700	0.47	0	379	1	700	0.54	0
170	North of Highway 2 (Manvers Road to Arthur Street)	55	2	1,250	0.04	0	214	2	1,250	0.17	0
300	North of Highway 401 (Holt Road to Lambs Road)	736	5	4,100	0.18	0	2,746	5	4,100	0.67	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31244
NETWORK: 2031 Preferred Alternative B
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Link Level Deficiency Analysis

				Northbound/Eastbound					Southbound/Westbound				
MSL ID	SL ID	Link Tag	Description	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	6	1	550	0.01	0	172	1	550	0.31	0
10	100	1002	Trulls Road North of Baseline Road	1	1	550	0.00	0	131	1	550	0.24	0
10	100	1003	Courtice Road North of Baseline Road	60	1	800	0.07	0	675	1	800	0.84	0
10	100	1004	East Durham Link North of Baseline Road	38	2	3,600	0.01	0	237	2	3,600	0.07	0
10	101	1011	Solina Road North of Baseline Road	0	1	500	0.00	0	89	1	500	0.18	0
10	101	1012	Holt Road North of Baseline Road	102	1	800	0.13	0	582	1	800	0.73	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	11	1	500	0.02	0	167	1	500	0.33	0
10	102	1022	West Side Drive North of Baseline Road	35	1	400	0.09	0	193	1	400	0.48	0
10	102	1023	Regional Road 57 North of Baseline Road	501	2	1,800	0.28	0	998	2	1,800	0.55	0
10	102	1024	Liberty Street South North of Baseline Road	328	1	800	0.41	0	643	1	800	0.80	0
10	102	1025	Simpson Avenue North of Baseline Road	5	1	400	0.01	0	239	1	400	0.60	0
10	102	1026	Haines Street North of Baseline Road	17	1	600	0.03	0	113	1	600	0.19	0
10	102	1027	Lambs Road North of Baseline Road	50	1	700	0.07	0	382	1	700	0.55	0
10	102	1028	Bennett Road North of Baseline Road	35	1	600	0.06	0	277	1	600	0.46	0
11	110	1101	Townline Road South of Highway 2	87	1	700	0.12	0	117	1	700	0.17	0
11	110	1102	Darlington Blvd South of Highway 2	29	1	400	0.07	0	13	1	400	0.03	0
11	110	1103	Prestonvale Road South of Highway 2	429	1	550	0.78	0	144	1	550	0.26	0
11	110	1104	Sandringham Drive South of Highway 2	42	1	400	0.11	0	1	1	400	0.00	0
11	110	1105	Trulls Road South of Highway 2	328	1	700	0.47	0	174	1	700	0.25	0
11	110	1106	Courtice Road South of Highway 2	159	1	800	0.20	0	540	1	800	0.68	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	0	1	500	0.00	0	55	1	500	0.11	0
11	111	1112	Rundie Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	7	1	500	0.01	0	92	1	500	0.18	0
11	111	1114	Maple Grove Road South of Highway 2	118	2	1,600	0.07	0	781	2	1,600	0.49	0
12	120	1201	Townline Road North of Highway 2	111	2	1,400	0.08	0	199	2	1,400	0.14	0
12	120	1202	Varcoe Road North of Highway 2	57	1	400	0.14	0	101	1	400	0.25	0
12	120	1203	Centerfield Drive North of Highway 2	129	1	400	0.32	0	172	1	400	0.43	0
12	120	1204	Trulls Road North of Highway 2	339	1	700	0.48	0	296	1	700	0.42	0
12	120	1205	Courtice Road North of Highway 2	516	1	800	0.64	0	665	1	800	0.83	0
12	120	1206	Hancock Road North of Highway 2	10	1	500	0.02	0	25	1	500	0.05	0
12	120	1207	East Durham Link North of Highway 2	147	2	3,600	0.04	0	286	2	3,600	0.08	0
12	121	1211	Solina Road North of Highway 2	2	1	500	0.00	0	9	1	500	0.02	0
12	121	1212	Rundie Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1214	Maple Grove Road North of Highway 2	97	2	1,600	0.06	0	902	2	1,600	0.56	0
12	122	1221	Green Road North of Highway 2	68	1	500	0.14	0	321	1	500	0.64	0
12	122	1222	Regional Road 57 North of Highway 2	142	2	2,000	0.07	0	637	2	2,000	0.32	0
12	122	1223	Scugog Street North of Church Street	173	1	550	0.31	0	553	1	550	1.00	1
12	122	1224	Liberty Street N North of Church Street	113	1	800	0.14	0	559	1	800	0.70	0
12	122	1225	Mearns Avenue North of Highway 2	36	1	600	0.06	0	346	1	600	0.58	0
12	122	1226	Lambs Road North of Highway 2	61	1	700	0.09	0	338	1	700	0.48	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	5	1	500	0.01	0	0	1	500	0.00	0
13	130	1303	Regional Road 57 South of Concession 3	234	1	1,000	0.23	0	264	1	1,000	0.26	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	0	1	400	0.00	0
13	130	1305	Scugog Street South of Concession 3	132	1	600	0.22	0	40	1	600	0.07	0
13	130	1306	Liberty Street N South of Concession 3	121	1	800	0.15	0	240	1	800	0.30	0
13	130	1307	Mearns Avenue South of Concession 3	6	1	600	0.01	0	7	1	600	0.01	0
13	130	1308	Lambs Road South of Concession 3	31	1	700	0.04	0	21	1	700	0.03	0
14	140	1401	Townline Road North of Taunton Road	102	1	500	0.20	0	165	1	500	0.33	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	474	1	1,000	0.47	0	247	1	1,000	0.25	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	35	1	500	0.07	0	63	1	500	0.13	0
14	140	1406	East Durham Link North of Taunton Road	25	2	3,600	0.01	0	101	2	3,600	0.03	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	7	1	400	0.02	0	28	1	400	0.07	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	70	1	700	0.10	0	50	1	700	0.07	0
14	141	14105	Regional Road 57 North of Taunton Road	398	1	1,000	0.40	0	147	1	1,000	0.15	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	2	1	700	0.00	0	33	1	700	0.05	0
14	141	14108	Bethesda Road North of Taunton Road	1	1	800	0.00	0	3	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	6	1	500	0.01	0	9	1	500	0.02	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	5	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	926	2	2,800	0.33	0	949	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	0	1	700	0.00	0	16	1	700	0.02	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	1	1	500	0.00	0	68	1	500	0.14	0
15	150	1503	Old Scugog Road North of Regional Road 3	2	1	500	0.00	0	15	1	500	0.03	0
15	150	1504	Regional Road 57 North of Regional Road 3	9	1	1,000	0.01	0	97	1	1,000	0.10	0
15	150	1505	Liberty Street North of Concession 8	10	1	800	0.01	0	0	1	800	0.00	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	40	1	1,000	0.04	0	0	1	1,000	0.00	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	198	2	2,000	0.10	0	463	2	2,000	0.23	0
15	151	1515	Highway 115 South of Boundary Road	832	2	3,600	0.23	0	673	2	3,600	0.19	0
16	160	1601	Mill Street North of Highway 401	328	1	700	0.47	0	379	1	700	0.54	0
17	170	1701	Manvers Road North of Highway 2	37	1	700	0.05	0	156	1	700	0.22	0
17	170	1702	Arthur Street North of Highway 2	19	1	550	0.03	0	58	1	550	0.11	0
20	200	2001	Highway 401 East of Harmony Road	2,611	4	6,600	0.40	0	4,571	4	6,600	0.69	0
20	200	2002	Bingham Gate East of Townline Road	3	1	500	0.01	0	264	1	500	0.53	0
20	200	2003	Gord Vinson Avenue East of Townline Road	110	1	600	0.18	0	191	1	600	0.32	0
20	200	2004	Bloor Road East of Townline Road	194	1	750	0.26	0	641	1	750	0.85	0
20	200	2005	Glenabbey Drive East of Townline Road	3	1	600	0.01	0	355	1	600	0.59	0
20	200	2006	Kingswood Drive East of Townline Road	7	1	600	0.01	0	65	1	600	0.11	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	613	2	1,800	0.34	0	1,316	2	1,800	0.73	0
20	200	2009	Nash Road East of Townline Road	37	1	550	0.07	0	17	1	550	0.03	0
20	200	20010	Lawson Road East of Townline Road	8	1	700	0.01	0	35	1	700	0.05	0

20	201	2011	Pebblestone Road East of Townline Road	35	1	800	0.04	0	150	1	800	0.19	0
20	201	2012	Taunton Road East of Townline Road	300	2	2,000	0.15	0	789	2	2,000	0.39	0
20	201	2013	Concession 6 East of Townline Road	61	1	700	0.09	0	189	1	700	0.27	0
20	201	2017	Highway 407 West of Enfield Road	309	2	3,600	0.09	0	1,004	2	3,600	0.28	0
20	201	2014	Concession 7 West of Townline Road	1	1	600	0.00	0	20	1	600	0.03	0
20	201	2015	Regional Road 3 East of Townline Road	2	1	800	0.00	0	68	1	800	0.09	0
20	201	2016	Concession 9 East of Townline Road	0	1	500	0.00	0	13	1	500	0.03	0
21	210	2101	Highway 401 West of Courtice Road	2,611	4	6,600	0.40	0	4,571	4	6,600	0.69	0
21	210	2102	Baseline Road West of Courtice Road	148	1	700	0.21	0	102	1	700	0.15	0
21	210	2103	Bloor Street West of Courtice Road	223	1	700	0.32	0	170	1	700	0.24	0
21	210	2108	Meadowglade Road extension West of Courtice Road	134	1	500	0.27	0	51	1	500	0.10	0
21	210	2104	Sandringham Drive West of Courtice Road	41	1	400	0.10	0	55	1	400	0.14	0
21	210	2105	Highway 2 West of Courtice Road	592	2	1,800	0.33	0	864	2	1,800	0.48	0
21	210	2106	Nash Road West of Courtice Road	3	1	700	0.00	0	7	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	1	1	400	0.00	0	3	1	400	0.01	0
21	211	2111	Pebblestone Road West of Courtice Road	143	1	800	0.18	0	81	1	800	0.10	0
21	211	2112	Taunton Road West of Courtice Road	433	1	1,000	0.43	0	879	1	1,000	0.88	0
21	211	2114	Highway 407 East of Enfield Road	166	2	3,600	0.05	0	637	2	3,600	0.18	0
21	211	2113	Concession 6 West of Courtice Road	9	1	700	0.01	0	114	1	700	0.16	0
22	220	2201	South Service Road West of Holt Road	0	1	500	0.00	0	199	1	500	0.40	0
22	220	2202	Highway 401 West of Holt Road	1,865	3	4,950	0.38	0	4,312	3	4,950	0.87	0
22	220	2203	Baseline Road West of Holt Road	18	1	700	0.03	0	226	1	700	0.32	0
22	220	2204	Bloor Street West of Holt Road	25	1	700	0.04	0	289	1	700	0.41	0
22	220	2205	Highway 2 West of Holt Road	475	2	2,000	0.24	0	1,122	2	2,000	0.56	0
22	220	2206	Nash Road West of Holt Road	0	1	700	0.00	0	1	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	5	1	500	0.01	0	5	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	1,550	3	4,950	0.31	0	4,024	3	4,950	0.81	0
23	230	2303	Baseline Road West of Green Road	51	1	800	0.06	0	511	1	800	0.64	0
23	230	2304	Highway 2 East of Maple Grove Road	460	2	2,400	0.19	0	1,034	2	2,400	0.43	0
23	230	2306	Longworth Avenue East of Maple Grove Road	86	2	1,600	0.05	0	802	2	1,600	0.50	0
23	230	2305	Nash Road East of Maple Grove Road	0	1	800	0.00	0	5	1	800	0.01	0
24	240	2401	Highway 401 at Bowmanville Creek	1,712	3	4,950	0.35	0	3,717	3	4,950	0.75	0
24	240	2402	Baseline Road at Bowmanville Creek	245	1	700	0.35	0	224	1	700	0.32	0
24	240	2403	Highway 2 at Bowmanville Creek	385	2	1,800	0.21	0	652	2	1,800	0.36	0
24	241	2411	Longworth Avenue East of Regional Road 57	164	2	1,600	0.10	0	943	2	1,600	0.59	0
24	241	2412	Concession 3 of Regional Road 57	44	1	800	0.05	0	461	1	800	0.58	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	267	1	1,000	0.27	0	673	1	1,000	0.67	0
24	242	2423	Concession 6 West of Regional Road 57	2	1	700	0.00	0	48	1	700	0.07	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	43	1	500	0.09	0	11	1	500	0.02	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	3	1	500	0.01	0	5	1	500	0.01	0
24	242	2429	Highway 407 West of Regional Road 57	110	2	3,600	0.03	0	657	2	3,600	0.18	0
25	250	2501	Highway 401 West of Bennett Road	1,649	3	4,950	0.33	0	2,925	3	4,950	0.59	0
25	250	2502	Baseline Road West of Lambs Road	163	1	700	0.23	0	297	1	700	0.42	0
25	250	2503	Highway 2 West of Lambs Road	89	1	1,000	0.09	0	265	1	1,000	0.27	0
25	251	2511	Concession Street West of Lambs Road	168	1	700	0.24	0	212	1	700	0.30	0
25	251	2512	Concession 3 West of Lambs Road	22	1	800	0.03	0	35	1	800	0.04	0
25	252	2521	Concession 4 West of Lambs Road	3	1	500	0.01	0	0	1	500	0.00	0
25	252	2522	Taunton Road West of Bethesda Road	209	1	1,000	0.21	0	470	1	1,000	0.47	0
25	252	2527	Highway 407 East of Regional Road 57	108	2	3,600	0.03	0	227	2	3,600	0.06	0
25	252	2523	Concession 6 West of Bethesda Road	3	1	700	0.00	0	1	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	3	1	500	0.01	0	1	1	500	0.00	0
25	252	2525	Concession 8 West of Bethesda Road	10	1	700	0.01	0	0	1	700	0.00	0
25	252	2526	Regional Road 20 West of Liberty Street	30	1	1,000	0.03	0	0	1	1,000	0.00	0
26	260	2601	Highway 401 West of Highway 35/115	1,663	3	4,950	0.34	0	2,638	3	4,950	0.53	0
26	260	2602	Highway 2 West of Highway 35/115	53	1	1,000	0.05	0	340	1	1,000	0.34	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	53	1	800	0.07	0	114	1	800	0.14	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	1	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	2	1	500	0.00	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	201	1	1,000	0.20	0	390	1	1,000	0.39	0
26	262	2621	Concession 7 West of Highway 35/115	2	1	500	0.00	0	15	1	500	0.03	0
26	262	2624	Highway 407 West of Highway 35/115	97	2	3,600	0.03	0	209	2	3,600	0.06	0
26	262	2622	Concession 8 West of Highway 35/115	7	1	500	0.01	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	40	1	1,000	0.04	0	0	1	1,000	0.00	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	2	1	500	0.00	0	4	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	1,031	3	4,950	0.21	0	1,030	3	4,950	0.21	0
27	270	2704	Highway 2 West of Clarington East Limit	3	1	1,000	0.00	0	43	1	1,000	0.04	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	0	1	500	0.00	0	1	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	0	1	500	0.00	0	3	1	500	0.01	0
27	270	2708	Canaraska Road West of Clarington East Limit	21	1	800	0.03	0	85	1	800	0.11	0
30	300	3001	Holt Road North of Highway 401	189	2	1,600	0.12	0	920	2	1,600	0.58	0
30	300	3002	Waverly Road/RR57 North of Highway 401	448	2	1,800	0.25	0	934	2	1,800	0.52	0
30	300	3003	Liberty Street North of Highway 401	99	1	700	0.14	0	891	1	700	1.27	1
Eastbound/Westbound TOTALS				21,942	116	118,900			46,453	116	118,900		
Northbound/Southbound TOTALS				9,177	102	77,250			19,263	102	77,250		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - PM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31245
NETWORK: 2031 Preferred Alternative B
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	8,200	14	13,100	0.63	0	4,442	14	13,100	0.34	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	2,415	9	9,000	0.27	0	882	9	9,000	0.10	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	5,968	12	11,800	0.51	0	4,368	12	11,800	0.37	0
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	1,825	5	6,100	0.30	0	781	5	6,100	0.13	0
220	West of Holt Road (South Service Road to Nash Road)	6,293	9	9,550	0.66	0	2,708	9	9,550	0.28	0
230	East of Maple Grove Road (South Service Road to Nash Road)	6,817	10	11,050	0.62	0	2,546	10	11,050	0.23	0
240	Bowmanville Creek (Highway 401 to Highway 2)	5,630	6	7,450	0.76	0	2,995	6	7,450	0.40	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	1,644	3	2,400	0.69	0	263	3	2,400	0.11	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	1,606	10	8,400	0.19	0	539	10	8,400	0.06	0
250	West of Lambs Road (Highway 401 to Highway 2)	4,175	5	6,650	0.63	0	2,335	5	6,650	0.35	0
251	West of Lambs Road (Concession Street to Concession 3)	251	2	1,500	0.17	0	287	2	1,500	0.19	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	979	8	8,000	0.12	0	627	8	8,000	0.08	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	3,587	4	5,950	0.60	0	2,198	4	5,950	0.37	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	445	4	3,100	0.14	0	316	4	3,100	0.10	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	475	5	5,600	0.08	0	350	5	5,600	0.06	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,058	10	9,250	0.11	0	1,497	10	9,250	0.16	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	1,235	5	5,500	0.22	0	149	5	5,500	0.03	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	802	3	1,800	0.45	0	160	3	1,800	0.09	0
102	North of Baseline Road (Green Road to Bennett Road)	3,377	9	5,800	0.58	0	1,361	9	5,800	0.23	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,228	7	4,050	0.30	0	1,504	7	4,050	0.37	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	959	5	3,100	0.31	0	188	5	3,100	0.06	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,870	9	7,800	0.24	0	1,668	9	7,800	0.21	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	1,085	5	3,100	0.35	0	82	5	3,100	0.03	0
122	North of Highway 2 (Green Road to Lambs Road)	3,329	7	5,150	0.65	0	985	7	5,150	0.19	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	849	8	5,400	0.16	0	694	8	5,400	0.13	0
140	North of Taunton Road (Townline Road to East Durham Link)	716	7	6,600	0.11	0	631	7	6,600	0.10	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,433	13	9,300	0.15	0	1,450	13	9,300	0.16	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	2	4	2,200	0.00	0	5	4	2,200	0.00	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	253	5	3,300	0.08	0	25	5	3,300	0.01	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,569	7	8,100	0.19	0	1,304	7	8,100	0.16	0
160	South of Highway 2 (Mill Street)	517	1	700	0.74	0	159	1	700	0.23	0
170	North of Highway 2 (Manvers Road to Arthur Street)	331	2	1,250	0.26	0	68	2	1,250	0.05	0
300	North of Highway 401 (Holt Road to Lambs Road)	2,998	5	4,200	0.71	0	1,265	5	4,200	0.30	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31245
NETWORK: 2031 Preferred Alternative B
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Link Level Deficiency Analysis

MSL ID	SL ID	Link Tag	Description	Northbound/Eastbound					Southbound/Westbound				
				PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	245	1	550	0.44	0	7	1	550	0.01	0
10	100	1002	Trulls Road North of Baseline Road	131	1	550	0.24	0	1	1	550	0.00	0
10	100	1003	Courtice Road North of Baseline Road	664	1	800	0.83	0	99	1	800	0.12	0
10	100	1004	East Durham Link North of Baseline Road	195	2	3,600	0.05	0	41	2	3,600	0.01	0
10	101	1011	Solina Road North of Baseline Road	136	1	500	0.27	0	0	1	500	0.00	0
10	101	1012	Holt Road North of Baseline Road	666	1	800	0.83	0	160	1	800	0.20	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	231	1	500	0.46	0	17	1	500	0.03	0
10	102	1022	West Side Drive North of Baseline Road	196	1	400	0.49	0	5	1	400	0.01	0
10	102	1023	Regional Road 57 North of Baseline Road	1,151	2	1,800	0.64	0	778	2	1,800	0.43	0
10	102	1024	Liberty Street South North of Baseline Road	491	1	800	0.86	0	320	1	800	0.40	0
10	102	1025	Simpson Avenue North of Baseline Road	239	1	400	0.60	0	55	1	400	0.14	0
10	102	1026	Haines Street North of Baseline Road	165	1	600	0.27	0	19	1	600	0.03	0
10	102	1027	Lambs Road North of Baseline Road	449	1	700	0.64	0	68	1	700	0.10	0
10	102	1028	Bennett Road North of Baseline Road	255	1	600	0.42	0	98	1	600	0.16	0
11	110	1101	Townline Road South of Highway 2	146	1	700	0.21	0	135	1	700	0.19	0
11	110	1102	Darlington Blvd South of Highway 2	22	1	400	0.05	0	49	1	400	0.12	0
11	110	1103	Prestonvale Road South of Highway 2	277	1	550	0.50	0	549	1	550	1.00	1
11	110	1104	Sandringham Drive South of Highway 2	0	1	400	0.00	0	98	1	400	0.25	0
11	110	1105	Trulls Road South of Highway 2	222	1	700	0.32	0	459	1	700	0.66	0
11	110	1106	Courtice Road South of Highway 2	560	1	800	0.70	0	213	1	800	0.27	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	40	1	500	0.08	0	0	1	500	0.00	0
11	111	1112	Rundie Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	104	1	500	0.21	0	87	1	500	0.17	0
11	111	1114	Maple Grove Road South of Highway 2	816	2	1,600	0.51	0	101	2	1,600	0.06	0
12	120	1201	Townline Road North of Highway 2	324	2	1,400	0.23	0	205	2	1,400	0.15	0
12	120	1202	Varcoe Road North of Highway 2	165	1	400	0.41	0	114	1	400	0.29	0
12	120	1203	Centerfield Drive North of Highway 2	84	1	400	0.21	0	177	1	400	0.44	0
12	120	1204	Trulls Road North of Highway 2	345	1	700	0.49	0	449	1	700	0.64	0
12	120	1205	Courtice Road North of Highway 2	679	1	800	0.85	0	507	1	800	0.63	0
12	120	1206	Hancock Road North of Highway 2	32	1	500	0.06	0	14	1	500	0.03	0
12	120	1207	East Durham Link North of Highway 2	241	2	3,600	0.07	0	201	2	3,600	0.06	0
12	121	1211	Solina Road North of Highway 2	6	1	500	0.01	0	2	1	500	0.00	0
12	121	1212	Rundie Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	1	1	500	0.00	0	0	1	500	0.00	0
12	121	1214	Maple Grove Road North of Highway 2	1,078	2	1,600	0.67	0	80	2	1,600	0.05	0
12	122	1221	Green Road North of Highway 2	362	1	500	0.72	0	94	1	500	0.19	0
12	122	1222	Regional Road 57 North of Highway 2	808	2	2,000	0.40	0	313	2	2,000	0.16	0
12	122	1223	Scugog Street North of Church Street	704	1	550	1.28	1	222	1	550	0.40	0
12	122	1224	Liberty Street N North of Church Street	653	1	800	0.82	0	240	1	800	0.30	0
12	122	1225	Mearns Avenue North of Highway 2	410	1	600	0.68	0	47	1	600	0.08	0
12	122	1226	Lambs Road North of Highway 2	391	1	700	0.56	0	69	1	700	0.10	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	0	1	500	0.00	0	12	1	500	0.02	0
13	130	1303	Regional Road 57 South of Concession 3	478	1	1,000	0.48	0	424	1	1,000	0.42	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	32	1	400	0.08	0
13	130	1305	Scugog Street South of Concession 3	47	1	600	0.08	0	90	1	600	0.15	0
13	130	1306	Liberty Street N South of Concession 3	285	1	800	0.36	0	77	1	800	0.10	0
13	130	1307	Mearns Avenue South of Concession 3	10	1	600	0.02	0	17	1	600	0.03	0
13	130	1308	Lambs Road South of Concession 3	28	1	700	0.04	0	41	1	700	0.06	0
14	140	1401	Townline Road North of Taunton Road	191	1	500	0.38	0	182	1	500	0.36	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	328	1	1,000	0.33	0	347	1	1,000	0.35	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	75	1	500	0.15	0	40	1	500	0.08	0
14	140	1406	East Durham Link North of Taunton Road	122	2	3,600	0.03	0	62	2	3,600	0.02	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	26	1	400	0.07	0	9	1	400	0.02	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	44	1	700	0.06	0	114	1	700	0.16	0
14	141	14105	Regional Road 57 North of Taunton Road	185	1	1,000	0.18	0	367	1	1,000	0.37	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	21	1	700	0.03	0	4	1	700	0.01	0
14	141	14108	Bethesda Road North of Taunton Road	3	1	800	0.00	0	1	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	7	1	500	0.01	0	6	1	500	0.01	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	7	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	1,139	2	2,800	0.41	0	950	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	1	1	700	0.00	0	5	1	700	0.01	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	84	1	500	0.17	0	2	1	500	0.00	0
15	150	1503	Old Scugog Road North of Regional Road 3	14	1	500	0.03	0	5	1	500	0.01	0
15	150	1504	Regional Road 57 North of Regional Road 3	155	1	1,000	0.16	0	6	1	1,000	0.01	0
15	150	1505	Liberty Street North of Concession 8	0	1	800	0.00	0	12	1	800	0.02	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	0	1	1,000	0.00	0	189	1	1,000	0.19	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	574	2	2,000	0.29	0	306	2	2,000	0.15	0
15	151	1515	Highway 115 South of Boundary Road	996	2	3,600	0.28	0	809	2	3,600	0.22	0
16	160	1601	Mill Street North of Highway 401	517	1	700	0.74	0	159	1	700	0.23	0
17	170	1701	Manvers Road North of Highway 2	264	1	700	0.38	0	48	1	700	0.07	0
17	170	1702	Arthur Street North of Highway 2	67	1	550	0.12	0	20	1	550	0.04	0
20	200	2001	Highway 401 East of Harmony Road	4,522	4	6,600	0.69	0	2,963	4	6,600	0.45	0
20	200	2002	Bingham Gate East of Townline Road	355	1	500	0.71	0	4	1	500	0.01	0
20	200	2003	Gord Vinson Avenue East of Townline Road	332	1	600	0.55	0	174	1	600	0.29	0
20	200	2004	Bloor Road East of Townline Road	661	1	750	0.88	0	288	1	750	0.38	0
20	200	2005	Glenabbey Drive East of Townline Road	422	1	600	0.70	0	5	1	600	0.01	0
20	200	2006	Kingswood Drive East of Townline Road	81	1	600	0.13	0	15	1	600	0.02	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	1,588	2	1,800	0.88	0	884	2	1,800	0.49	0
20	200	2009	Nash Road East of Townline Road	178	1	550	0.32	0	95	1	550	0.17	0
20	200	20010	Lawson Road East of Townline Road	61	1	700	0.09	0	14	1	700	0.02	0

20	201	2011	Pebblestone Road East of Townline Road	295	1	800	0.37	0	89	1	800	0.11	0
20	201	2012	Taunton Road East of Townline Road	755	2	2,000	0.38	0	321	2	2,000	0.16	0
20	201	2013	Concession 6 East of Townline Road	278	1	700	0.40	0	51	1	700	0.07	0
20	201	2017	Highway 407 West of Enfield Road	953	2	3,600	0.26	0	419	2	3,600	0.12	0
20	201	2014	Concession 7 West of Townline Road	25	1	600	0.04	0	1	1	600	0.00	0
20	201	2015	Regional Road 3 East of Townline Road	94	1	800	0.12	0	2	1	800	0.00	0
20	201	2016	Concession 9 East of Townline Road	15	1	500	0.03	0	0	1	500	0.00	0
21	210	2101	Highway 401 West of Courtice Road	4,522	4	6,600	0.69	0	2,963	4	6,600	0.45	0
21	210	2102	Baseline Road West of Courtice Road	121	1	700	0.17	0	212	1	700	0.30	0
21	210	2103	Bloor Street West of Courtice Road	148	1	700	0.21	0	316	1	700	0.45	0
21	210	2108	Meadowglade Road extension West of Courtice Road	51	1	500	0.10	0	146	1	500	0.29	0
21	210	2104	Sandringham Drive West of Courtice Road	62	1	400	0.15	0	91	1	400	0.23	0
21	210	2105	Highway 2 West of Courtice Road	1,051	2	1,800	0.58	0	633	2	1,800	0.35	0
21	210	2106	Nash Road West of Courtice Road	10	1	700	0.01	0	5	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	4	1	400	0.01	0	2	1	400	0.00	0
21	211	2111	Pebblestone Road West of Courtice Road	173	1	800	0.22	0	123	1	800	0.15	0
21	211	2112	Taunton Road West of Courtice Road	743	1	1,000	0.74	0	475	1	1,000	0.48	0
21	211	2114	Highway 407 East of Enfield Road	755	2	3,600	0.21	0	172	2	3,600	0.05	0
21	211	2113	Concession 6 West of Courtice Road	154	1	700	0.22	0	11	1	700	0.02	0
22	220	2201	South Service Road West of Holt Road	211	1	500	0.42	0	0	1	500	0.00	0
22	220	2202	Highway 401 West of Holt Road	4,246	3	4,950	0.86	0	2,092	3	4,950	0.42	0
22	220	2203	Baseline Road West of Holt Road	217	1	700	0.31	0	22	1	700	0.03	0
22	220	2204	Bloor Street West of Holt Road	249	1	700	0.36	0	33	1	700	0.05	0
22	220	2205	Highway 2 West of Holt Road	1,364	2	2,000	0.68	0	561	2	2,000	0.28	0
22	220	2206	Nash Road West of Holt Road	5	1	700	0.01	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	1	1	500	0.00	0	3	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	4,125	3	4,950	0.83	0	1,877	3	4,950	0.38	0
23	230	2303	Baseline Road West of Green Road	598	1	800	0.75	0	29	1	800	0.04	0
23	230	2304	Highway 2 East of Maple Grove Road	1,103	2	2,400	0.46	0	578	2	2,400	0.24	0
23	230	2306	Longworth Avenue East of Maple Grove Road	978	2	1,600	0.61	0	59	2	1,600	0.04	0
23	230	2305	Nash Road East of Maple Grove Road	12	1	800	0.02	0	0	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	4,075	3	4,950	0.82	0	2,114	3	4,950	0.43	0
24	240	2402	Baseline Road at Bowmanville Creek	521	1	700	0.74	0	305	1	700	0.44	0
24	240	2403	Highway 2 at Bowmanville Creek	1,034	2	1,800	0.57	0	577	2	1,800	0.32	0
24	241	2411	Longworth Avenue East of Regional Road 57	1,232	2	1,600	0.77	0	205	2	1,600	0.13	0
24	241	2412	Concession 3 of Regional Road 57	412	1	800	0.52	0	58	1	800	0.07	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	676	1	1,000	0.68	0	320	1	1,000	0.32	0
24	242	2423	Concession 6 West of Regional Road 57	79	1	700	0.11	0	3	1	700	0.00	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	29	1	500	0.06	0	41	1	500	0.08	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	5	1	500	0.01	0	1	1	500	0.00	0
24	242	2429	Highway 407 West of Regional Road 57	817	2	3,600	0.23	0	173	2	3,600	0.05	0
25	250	2501	Highway 401 West of Bennett Road	3,421	3	4,950	0.69	0	2,076	3	4,950	0.42	0
25	250	2502	Baseline Road West of Lambs Road	367	1	700	0.52	0	181	1	700	0.26	0
25	250	2503	Highway 2 West of Lambs Road	387	1	1,000	0.39	0	78	1	1,000	0.08	0
25	251	2511	Concession Street West of Lambs Road	203	1	700	0.29	0	258	1	700	0.37	0
25	251	2512	Concession 3 West of Lambs Road	47	1	800	0.06	0	29	1	800	0.04	0
25	252	2521	Concession 4 West of Lambs Road	0	1	500	0.00	0	3	1	500	0.01	0
25	252	2522	Taunton Road West of Bethesda Road	495	1	1,000	0.49	0	259	1	1,000	0.26	0
25	252	2527	Highway 407 East of Regional Road 57	481	2	3,600	0.13	0	169	2	3,600	0.05	0
25	252	2523	Concession 6 West of Bethesda Road	1	1	700	0.00	0	3	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	2	1	500	0.00	0	3	1	500	0.01	0
25	252	2525	Concession 8 West of Bethesda Road	0	1	700	0.00	0	12	1	700	0.02	0
25	252	2526	Regional Road 20 West of Liberty Street	0	1	1,000	0.00	0	177	1	1,000	0.18	0
26	260	2601	Highway 401 West of Highway 35/115	3,216	3	4,950	0.65	0	2,103	3	4,950	0.42	0
26	260	2602	Highway 2 West of Highway 35/115	371	1	1,000	0.37	0	95	1	1,000	0.10	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	97	1	800	0.12	0	65	1	800	0.08	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	2	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	5	1	500	0.01	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	341	1	1,000	0.34	0	249	1	1,000	0.25	0
26	262	2621	Concession 7 West of Highway 35/115	12	1	500	0.02	0	2	1	500	0.00	0
26	262	2624	Highway 407 West of Highway 35/115	451	2	3,600	0.13	0	160	2	3,600	0.04	0
26	262	2622	Concession 8 West of Highway 35/115	12	1	500	0.02	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	0	1	1,000	0.00	0	189	1	1,000	0.19	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	5	1	500	0.01	0	3	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	906	3	4,950	0.18	0	1,463	3	4,950	0.30	0
27	270	2704	Highway 2 West of Clarington East Limit	51	1	1,000	0.05	0	3	1	1,000	0.00	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	1	1	500	0.00	0	0	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	2	1	500	0.00	0	0	1	500	0.00	0
27	270	2708	Canaraska Road West of Clarington East Limit	92	1	800	0.11	0	27	1	800	0.03	0
30	300	3001	Holt Road North of Highway 401	1,107	2	1,600	0.69	0	227	2	1,600	0.14	0
30	300	3002	Waverly Road/RR57 North of Highway 401	1,046	2	1,800	0.58	0	695	2	1,800	0.39	0
30	300	3003	Liberty Street North of Highway 401	845	1	800	1.86	1	343	1	800	0.43	0
Eastbound/Westbound TOTALS				51,367	116	118,900			27,136	116	118,900		
Northbound/Southbound TOTALS				22,552	102	77,350			11,696	102	77,350		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - AM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31246
NETWORK: 2031 Preferred Alternative C
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	3,584	14	13,100	0.27	0	7,453	14	13,100	0.57	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	711	9	9,000	0.08	0	2,237	9	9,000	0.25	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	3,750	12	11,800	0.32	0	5,821	12	11,800	0.49	0
211	West of Courtice Road/East of Enfield Road (Pebblstone Road to Concession 6)	755	5	6,100	0.12	0	1,714	5	6,100	0.28	0
220	West of Holt Road (South Service Road to Nash Road)	2,385	9	9,550	0.25	0	6,176	9	9,550	0.65	0
230	East of Maple Grove Road (South Service Road to Nash Road)	2,153	10	11,050	0.19	0	6,408	10	11,050	0.58	0
240	Bowmanville Creek (Highway 401 to Highway 2)	2,336	7	8,150	0.29	0	4,617	7	8,150	0.57	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	208	3	2,400	0.09	0	1,396	3	2,400	0.58	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	423	10	8,400	0.05	0	1,367	10	8,400	0.16	0
250	West of Lambs Road (Highway 401 to Highway 2)	2,129	6	7,350	0.29	0	3,767	6	7,350	0.51	0
251	West of Lambs Road (Concession Street to Concession 3)	216	2	1,500	0.14	0	234	2	1,500	0.16	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	368	8	8,000	0.05	0	686	8	8,000	0.09	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	1,715	4	5,950	0.29	0	2,994	4	5,950	0.50	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	258	4	3,100	0.08	0	498	4	3,100	0.16	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	148	5	5,600	0.03	0	217	5	5,600	0.04	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,056	10	9,250	0.11	0	1,166	10	9,250	0.13	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Northbound					Southbound				
		AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	105	5	5,500	0.02	0	1,223	5	5,500	0.22	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	104	3	1,800	0.06	0	664	3	1,800	0.37	0
102	North of Baseline Road (Green Road to Bennett Road)	1,087	10	6,700	0.16	0	3,038	10	6,700	0.45	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,073	7	4,050	0.26	0	1,015	7	4,050	0.25	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	125	4	2,300	0.05	0	898	4	2,300	0.39	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,340	9	7,800	0.17	0	1,752	9	7,800	0.22	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	101	5	3,100	0.03	0	945	5	3,100	0.30	0
122	North of Highway 2 (Green Road to Lambs Road)	595	7	5,150	0.12	0	2,866	7	5,150	0.56	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	517	8	5,400	0.10	0	572	8	5,400	0.11	0
140	North of Taunton Road (Townline Road to East Durham Link)	648	7	6,600	0.10	0	573	7	6,600	0.09	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,410	13	9,300	0.15	0	1,233	13	9,300	0.13	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	0	4	2,200	0.00	0	16	4	2,200	0.01	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	23	5	3,300	0.01	0	181	5	3,300	0.05	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,071	7	8,100	0.13	0	1,137	7	8,100	0.14	0
160	South of Highway 2 (Mill Street)	327	1	700	0.47	0	400	1	700	0.57	0
170	North of Highway 2 (Manvers Road to Arthur Street)	55	2	1,250	0.04	0	214	2	1,250	0.17	0
300	North of Highway 401 (Holt Road to Lambs Road)	990	6	5,000	0.20	0	3,084	6	5,000	0.62	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31246
NETWORK: 2031 Preferred Alternative C
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: AM Peak Hour

Link Level Deficiency Analysis

				Northbound/Eastbound					Southbound/Westbound				
MSL ID	SL ID	Link Tag	Description	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	AM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	5	1	550	0.01	0	169	1	550	0.31	0
10	100	1002	Trulls Road North of Baseline Road	1	1	550	0.00	0	131	1	550	0.24	0
10	100	1003	Courtice Road North of Baseline Road	61	1	800	0.08	0	678	1	800	0.85	0
10	100	1004	East Durham Link North of Baseline Road	38	2	3,600	0.01	0	245	2	3,600	0.07	0
10	101	1011	Solina Road North of Baseline Road	0	1	500	0.00	0	89	1	500	0.18	0
10	101	1012	Holt Road North of Baseline Road	104	1	800	0.13	0	574	1	800	0.72	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	1	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	11	1	500	0.02	0	170	1	500	0.34	0
10	102	1022	West Side Drive North of Baseline Road	34	1	400	0.09	0	194	1	400	0.49	0
10	102	1023	Regional Road 57 North of Baseline Road	601	2	1,800	0.33	0	961	2	1,800	0.53	0
10	102	1024	Liberty Street South North of Baseline Road	180	1	800	0.22	0	483	1	800	0.60	0
10	102	1025	Simpson Avenue North of Baseline Road	9	1	400	0.02	0	175	1	400	0.44	0
10	102	1026	Haines Street North of Baseline Road	13	1	600	0.02	0	50	1	600	0.08	0
10	102	1027	Lambs Road North of Baseline Road	81	2	1,600	0.05	0	867	2	1,600	0.54	0
10	102	1028	Bennett Road North of Baseline Road	157	1	600	0.26	0	137	1	600	0.23	0
11	110	1101	Townline Road South of Highway 2	89	1	700	0.13	0	121	1	700	0.17	0
11	110	1102	Darlington Blvd South of Highway 2	29	1	400	0.07	0	13	1	400	0.03	0
11	110	1103	Prestonvale Road South of Highway 2	428	1	550	0.78	0	164	1	550	0.30	0
11	110	1104	Sandringham Drive South of Highway 2	42	1	400	0.11	0	1	1	400	0.00	0
11	110	1105	Trulls Road South of Highway 2	326	1	700	0.47	0	174	1	700	0.25	0
11	110	1106	Courtice Road South of Highway 2	159	1	800	0.20	0	542	1	800	0.68	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	0	1	500	0.00	0	55	1	500	0.11	0
11	111	1112	Rundle Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	82	1	800	0.10	0	658	1	800	0.82	0
11	111	1114	Maple Grove Road South of Highway 2	43	1	500	0.09	0	185	1	500	0.37	0
12	120	1201	Townline Road North of Highway 2	112	2	1,400	0.08	0	196	2	1,400	0.14	0
12	120	1202	Varcoe Road North of Highway 2	57	1	400	0.14	0	101	1	400	0.25	0
12	120	1203	Centerfield Drive North of Highway 2	128	1	400	0.32	0	172	1	400	0.43	0
12	120	1204	Trulls Road North of Highway 2	339	1	700	0.48	0	296	1	700	0.42	0
12	120	1205	Courtice Road North of Highway 2	523	1	800	0.65	0	665	1	800	0.83	0
12	120	1206	Hancock Road North of Highway 2	10	1	500	0.02	0	30	1	500	0.06	0
12	120	1207	East Durham Link North of Highway 2	171	2	3,600	0.05	0	291	2	3,600	0.08	0
12	121	1211	Solina Road North of Highway 2	2	1	500	0.00	0	4	1	500	0.01	0
12	121	1212	Rundle Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	90	2	1,600	0.06	0	938	2	1,600	0.59	0
12	121	1214	Maple Grove Road North of Highway 2	9	1	500	0.02	0	2	1	500	0.00	0
12	122	1221	Green Road North of Highway 2	68	1	500	0.14	0	321	1	500	0.64	0
12	122	1222	Regional Road 57 North of Highway 2	143	2	2,000	0.07	0	601	2	2,000	0.30	0
12	122	1223	Scugog Street North of Church Street	172	1	550	0.31	0	549	1	550	1.00	1
12	122	1224	Liberty Street N North of Church Street	115	1	800	0.14	0	555	1	800	0.69	0
12	122	1225	Mearns Avenue North of Highway 2	36	1	600	0.06	0	330	1	600	0.55	0
12	122	1226	Lambs Road North of Highway 2	61	1	700	0.09	0	510	1	700	0.73	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	3	1	500	0.01	0	0	1	500	0.00	0
13	130	1303	Regional Road 57 South of Concession 3	238	1	1,000	0.24	0	263	1	1,000	0.26	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	0	1	400	0.00	0
13	130	1305	Scugog Street South of Concession 3	129	1	600	0.21	0	40	1	600	0.07	0
13	130	1306	Liberty Street N South of Concession 3	119	1	800	0.15	0	247	1	800	0.31	0
13	130	1307	Mearns Avenue South of Concession 3	6	1	600	0.01	0	7	1	600	0.01	0
13	130	1308	Lambs Road South of Concession 3	22	1	700	0.03	0	15	1	700	0.02	0
14	140	1401	Townline Road North of Taunton Road	102	1	500	0.20	0	165	1	500	0.33	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	463	1	1,000	0.46	0	248	1	1,000	0.25	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	35	1	500	0.07	0	63	1	500	0.13	0
14	140	1406	East Durham Link North of Taunton Road	49	2	3,600	0.01	0	96	2	3,600	0.03	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	7	1	400	0.02	0	28	1	400	0.07	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	70	1	700	0.10	0	50	1	700	0.07	0
14	141	14105	Regional Road 57 North of Taunton Road	394	1	1,000	0.39	0	146	1	1,000	0.15	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	2	1	700	0.00	0	35	1	700	0.05	0
14	141	14108	Bethesda Road North of Taunton Road	1	1	800	0.00	0	3	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	6	1	500	0.01	0	15	1	500	0.03	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	4	1	500	0.01	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	926	2	2,800	0.33	0	957	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	0	1	700	0.00	0	16	1	700	0.02	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	1	1	500	0.00	0	69	1	500	0.14	0
15	150	1503	Old Scugog Road North of Regional Road 3	2	1	500	0.00	0	14	1	500	0.03	0
15	150	1504	Regional Road 57 North of Regional Road 3	9	1	1,000	0.01	0	97	1	1,000	0.10	0
15	150	1505	Liberty Street North of Concession 8	10	1	800	0.01	0	0	1	800	0.00	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	42	1	1,000	0.04	0	0	1	1,000	0.00	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	198	2	2,000	0.10	0	464	2	2,000	0.23	0
15	151	1515	Highway 115 South of Boundary Road	832	2	3,600	0.23	0	673	2	3,600	0.19	0
16	160	1601	Mill Street North of Highway 401	327	1	700	0.47	0	400	1	700	0.57	0
17	170	1701	Manvers Road North of Highway 2	37	1	700	0.05	0	156	1	700	0.22	0
17	170	1702	Arthur Street North of Highway 2	18	1	550	0.03	0	58	1	550	0.11	0
20	200	2001	Highway 401 East of Harmony Road	2,602	4	6,600	0.39	0	4,558	4	6,600	0.69	0
20	200	2002	Bingham Gate East of Townline Road	3	1	500	0.01	0	262	1	500	0.52	0
20	200	2003	Gord Vinson Avenue East of Townline Road	110	1	600	0.18	0	193	1	600	0.32	0
20	200	2004	Bloor Road East of Townline Road	194	1	750	0.26	0	639	1	750	0.85	0
20	200	2005	Glenabbey Drive East of Townline Road	3	1	600	0.01	0	359	1	600	0.60	0
20	200	2006	Kingswood Drive East of Townline Road	7	1	600	0.01	0	65	1	600	0.11	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	619	2	1,800	0.34	0	1,325	2	1,800	0.74	0
20	200	2009	Nash Road East of Townline Road	37	1	550	0.07	0	17	1	550	0.03	0
20	200	20010	Lawson Road East of Townline Road	8	1	700	0.01	0	35	1	700	0.05	0

20	201	2011	Pebblestone Road East of Townline Road	39	1	800	0.05	0	167	1	800	0.21	0
20	201	2012	Taunton Road East of Townline Road	299	2	2,000	0.15	0	775	2	2,000	0.39	0
20	201	2013	Concession 6 East of Townline Road	61	1	700	0.09	0	187	1	700	0.27	0
20	201	2017	Highway 407 West of Enfield Road	309	2	3,600	0.09	0	1,006	2	3,600	0.28	0
20	201	2014	Concession 7 East of Townline Road	1	1	600	0.00	0	20	1	600	0.03	0
20	201	2015	Regional Road 3 East of Townline Road	2	1	800	0.00	0	68	1	800	0.09	0
20	201	2016	Concession 9 East of Townline Road	0	1	500	0.00	0	13	1	500	0.03	0
21	210	2101	Highway 401 West of Courtice Road	2,602	4	6,600	0.39	0	4,558	4	6,600	0.69	0
21	210	2102	Baseline Road West of Courtice Road	146	1	700	0.21	0	102	1	700	0.15	0
21	210	2103	Bloor Street West of Courtice Road	225	1	700	0.32	0	149	1	700	0.21	0
21	210	2108	Meadowglade Road extension West of Courtice Road	135	1	500	0.27	0	53	1	500	0.11	0
21	210	2104	Sandringham Drive West of Courtice Road	41	1	400	0.10	0	54	1	400	0.14	0
21	210	2105	Highway 2 West of Courtice Road	598	2	1,800	0.33	0	895	2	1,800	0.50	0
21	210	2106	Nash Road West of Courtice Road	3	1	700	0.00	0	7	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	1	1	400	0.00	0	3	1	400	0.01	0
21	211	2111	Pebblestone Road West of Courtice Road	146	1	800	0.18	0	87	1	800	0.11	0
21	211	2112	Taunton Road West of Courtice Road	434	1	1,000	0.43	0	865	1	1,000	0.87	0
21	211	2114	Highway 407 East of Enfield Road	166	2	3,600	0.05	0	649	2	3,600	0.18	0
21	211	2113	Concession 6 West of Courtice Road	9	1	700	0.01	0	113	1	700	0.16	0
22	220	2201	South Service Road West of Holt Road	0	1	500	0.00	0	198	1	500	0.40	0
22	220	2202	Highway 401 West of Holt Road	1,861	3	4,950	0.38	0	4,294	3	4,950	0.87	0
22	220	2203	Baseline Road West of Holt Road	18	1	700	0.03	0	227	1	700	0.32	0
22	220	2204	Bloor Street West of Holt Road	26	1	700	0.04	0	269	1	700	0.38	0
22	220	2205	Highway 2 West of Holt Road	481	2	2,000	0.24	0	1,187	2	2,000	0.59	0
22	220	2206	Nash Road West of Holt Road	0	1	700	0.00	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	5	1	500	0.01	0	5	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	1,542	3	4,950	0.31	0	3,973	3	4,950	0.80	0
23	230	2303	Baseline Road West of Green Road	55	1	800	0.07	0	554	1	800	0.69	0
23	230	2304	Highway 2 East of Maple Grove Road	464	2	2,400	0.19	0	1,032	2	2,400	0.43	0
23	230	2306	Longworth Avenue East of Maple Grove Road	87	2	1,600	0.05	0	841	2	1,600	0.53	0
23	230	2305	Nash Road East of Maple Grove Road	0	1	800	0.00	0	3	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	1,593	3	4,950	0.32	0	3,274	3	4,950	0.66	0
24	240	2402	Baseline Road at Bowmanville Creek	350	2	1,400	0.25	0	774	2	1,400	0.55	0
24	240	2403	Highway 2 at Bowmanville Creek	393	2	1,800	0.22	0	569	2	1,800	0.32	0
24	241	2411	Longworth Avenue East of Regional Road 57	165	2	1,600	0.10	0	947	2	1,600	0.59	0
24	241	2412	Concession 3 of Regional Road 57	43	1	800	0.05	0	449	1	800	0.56	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	266	1	1,000	0.27	0	664	1	1,000	0.66	0
24	242	2423	Concession 6 West of Regional Road 57	2	1	700	0.00	0	47	1	700	0.07	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	42	1	500	0.08	0	11	1	500	0.02	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	3	1	500	0.01	0	5	1	500	0.01	0
24	242	2429	Highway 407 West of Regional Road 57	110	2	3,600	0.03	0	641	2	3,600	0.18	0
25	250	2501	Highway 401 West of Bennett Road	1,593	3	4,950	0.32	0	3,274	3	4,950	0.66	0
25	250	2502	Baseline Road West of Lambs Road	185	2	1,400	0.13	0	187	2	1,400	0.13	0
25	250	2503	Highway 2 West of Lambs Road	352	1	1,000	0.35	0	306	1	1,000	0.31	0
25	251	2511	Concession Street West of Lambs Road	200	1	700	0.29	0	208	1	700	0.30	0
25	251	2512	Concession 3 West of Lambs Road	16	1	800	0.02	0	26	1	800	0.03	0
25	252	2521	Concession 4 West of Lambs Road	3	1	500	0.01	0	0	1	500	0.00	0
25	252	2522	Taunton Road West of Bethesda Road	209	1	1,000	0.21	0	469	1	1,000	0.47	0
25	252	2527	Highway 407 East of Regional Road 57	108	2	3,600	0.03	0	215	2	3,600	0.06	0
25	252	2523	Concession 6 West of Bethesda Road	3	1	700	0.00	0	1	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	3	1	500	0.01	0	1	1	500	0.00	0
25	252	2525	Concession 8 West of Bethesda Road	10	1	700	0.01	0	0	1	700	0.00	0
25	252	2526	Regional Road 20 West of Liberty Street	32	1	1,000	0.03	0	0	1	1,000	0.00	0
26	260	2601	Highway 401 West of Highway 35/115	1,648	3	4,950	0.33	0	2,704	3	4,950	0.55	0
26	260	2602	Highway 2 West of Highway 35/115	67	1	1,000	0.07	0	291	1	1,000	0.29	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	54	1	800	0.07	0	112	1	800	0.14	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	1	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	2	1	500	0.00	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	201	1	1,000	0.20	0	383	1	1,000	0.38	0
26	262	2621	Concession 7 West of Highway 35/115	2	1	500	0.00	0	15	1	500	0.03	0
26	262	2624	Highway 407 West of Highway 35/115	97	2	3,600	0.03	0	202	2	3,600	0.06	0
26	262	2622	Concession 8 West of Highway 35/115	7	1	500	0.01	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	42	1	1,000	0.04	0	0	1	1,000	0.00	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	2	1	500	0.00	0	4	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	1,031	3	4,950	0.21	0	1,030	3	4,950	0.21	0
27	270	2704	Highway 2 West of Clarington East Limit	3	1	1,000	0.00	0	43	1	1,000	0.04	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	0	1	500	0.00	0	1	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	0	1	500	0.00	0	3	1	500	0.01	0
27	270	2708	Canaraska Road West of Clarington East Limit	21	1	800	0.03	0	85	1	800	0.11	0
30	300	3001	Holt Road North of Highway 401	195	2	1,600	0.12	0	956	2	1,600	0.60	0
30	300	3002	Waverly Road/RR57 North of Highway 401	576	2	1,800	0.32	0	1,329	2	1,800	0.74	0
30	300	3004	Lambs Road North of Highway 401	219	2	1,600	0.14	0	799	2	1,600	0.50	0
Eastbound/Westbound TOTALS				22,197	118	120,300			46,751	118	120,300		
Northbound/Southbound TOTALS				9,571	103	78,250			19,810	103	78,250		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Clarington TMP
Screenline Deficiency Analysis - PM Peak Hour




HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31247
NETWORK: 2031 Preferred Alternative C
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Eastbound/Westbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
200	East of Clarington West Border (Highway 401 to Lawson Road)	8,169	14	13,100	0.62	0	4,430	14	13,100	0.34	0
201	East of Clarington West Border (Pebblestone Road to Concession 9)	2,451	9	9,000	0.27	0	895	9	9,000	0.10	0
210	West of Courtice Road (Highway 401 to George Reynolds Drive)	5,940	12	11,800	0.50	0	4,364	12	11,800	0.37	0
211	West of Courtice Road/East of Enfield Road (Pebblestone Road to Concession 6)	1,860	5	6,100	0.30	0	788	5	6,100	0.13	0
220	West of Holt Road (South Service Road to Nash Road)	6,293	9	9,550	0.66	0	2,687	9	9,550	0.28	0
230	East of Maple Grove Road (South Service Road to Nash Road)	6,820	10	11,050	0.62	0	2,515	10	11,050	0.23	0
240	Bowmanville Creek (Highway 401 to Highway 2)	5,678	7	8,150	0.70	0	2,938	7	8,150	0.36	0
241	East of Regional Road 57 (Longworth Avenue to Concession 3)	1,572	3	2,400	0.65	0	314	3	2,400	0.13	0
242	West of Regional Road 57 (Concession 4 to Boundary Road)	1,608	10	8,400	0.19	0	570	10	8,400	0.07	0
250	West of Lambs Road (Highway 401 to Highway 2)	4,484	6	7,350	0.61	0	2,654	6	7,350	0.36	0
251	West of Lambs Road (Concession Street to Concession 3)	234	2	1,500	0.16	0	251	2	1,500	0.17	0
252	West of Bethesda Road (Concession 4 to Regional Road 20)	972	8	8,000	0.12	0	628	8	8,000	0.08	0
260	West of Highway 35/115 (Highway 401 to Highway 2)	3,601	4	5,950	0.61	0	2,199	4	5,950	0.37	0
261	East of Darlington Clarke Townline (Concession 3 to Taunton Road)	442	4	3,100	0.14	0	316	4	3,100	0.10	0
262	West of Highway 35/115 (Concession 7 to Regional Road 20)	471	5	5,600	0.08	0	351	5	5,600	0.06	0
270	West of Clarington East Boundary (Lakeshore Road to Ganaraska Road)	1,058	10	9,250	0.11	0	1,497	10	9,250	0.16	0

Northbound/Southbound Screenline Deficiency Analysis

SL ID	Screenline	Eastbound					Westbound				
		PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
100	North of Baseline Road (Prestonvale Road to East Durham Link)	1,259	5	5,500	0.23	0	144	5	5,500	0.03	0
101	North of Baseline Road (Solina Road to Maple Grove Road)	798	3	1,800	0.44	0	272	3	1,800	0.15	0
102	North of Baseline Road (Green Road to Bennett Road)	3,433	10	6,700	0.51	0	1,419	10	6,700	0.21	0
110	South of Highway 2 (Townline Road to Hancock Road)	1,238	7	4,050	0.31	0	1,498	7	4,050	0.37	0
111	South of Highway 2 (Solina Road to Maple Grove Road)	950	4	2,300	0.41	0	301	4	2,300	0.13	0
120	North of Highway 2 (Townline Road to East Durham Link)	1,855	9	7,800	0.24	0	1,705	9	7,800	0.22	0
121	North of Highway 2 (Solina Road to Maple Grove Road)	1,149	5	3,100	0.37	0	133	5	3,100	0.04	0
122	North of Highway 2 (Green Road to Lambs Road)	3,466	7	5,150	0.67	0	945	7	5,150	0.18	0
130	South of Nash Road/Concession Road (Green Road to Lambs Road)	871	8	5,400	0.16	0	669	8	5,400	0.12	0
140	North of Taunton Road (Townline Road to East Durham Link)	691	7	6,600	0.10	0	641	7	6,600	0.10	0
141	North of Taunton Road (Holt Road to Highway 35/115)	1,463	13	9,300	0.16	0	1,457	13	9,300	0.16	0
142	North of Taunton Road (Jewel Road to Shiloh Road)	2	4	2,200	0.00	0	5	4	2,200	0.00	0
150	North of Regional Road 3 (Townline Road to Liberty Street)	253	5	3,300	0.08	0	25	5	3,300	0.01	0
151	South of Clarington North Border (Darlington-Clarke Townline to Highway 35/115)	1,574	7	8,100	0.19	0	1,304	7	8,100	0.16	0
160	South of Highway 2 (Mill Street)	513	1	700	0.73	0	166	1	700	0.24	0
170	North of Highway 2 (Manvers Road to Arthur Street)	331	2	1,250	0.26	0	68	2	1,250	0.05	0
300	North of Highway 401 (Holt Road to Lambs Road)	3,343	6	5,000	0.67	0	1,461	6	5,000	0.29	0

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required
 Cap Thres % 0.9




Clarington TMP
Deficiency Analysis - Link Level

HORIZON YEAR: 2031
LAND USE: Updated 2031 Clarington Land Use
SCENARIO: 31247
NETWORK: 2031 Preferred Alternative C
TRANSIT: Moderate Transit Scenario (Clarington 5.5% TMS)
TIME: PM Peak Hour

Link Level Deficiency Analysis

MSL ID	SL ID	Link Tag	Description	Northbound/Eastbound					Southbound/Westbound				
				PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required	PM Peak Hour Volumes	Number of Lanes	Total Capacity	V/C Ratio	Lanes Required
10	100	1001	Prestonvale Road North of Baseline Road	242	1	550	0.44	0	7	1	550	0.01	0
10	100	1002	Trulls Road North of Baseline Road	131	1	550	0.24	0	1	1	550	0.00	0
10	100	1003	Courtice Road North of Baseline Road	664	1	800	0.83	0	94	1	800	0.12	0
10	100	1004	East Durham Link North of Baseline Road	223	2	3,600	0.06	0	42	2	3,600	0.01	0
10	101	1011	Solina Road North of Baseline Road	133	1	500	0.27	0	0	1	500	0.00	0
10	101	1012	Holt Road North of Baseline Road	665	1	800	0.83	0	272	1	800	0.34	0
10	101	1013	Maple Grove Road North of Baseline Road	0	1	500	0.00	0	0	1	500	0.00	0
10	102	1021	Green Road North of Baseline Road	243	1	500	0.49	0	17	1	500	0.03	0
10	102	1022	West Side Drive North of Baseline Road	198	1	400	0.50	0	5	1	400	0.01	0
10	102	1023	Regional Road 57 North of Baseline Road	1,013	2	1,800	0.56	0	769	2	1,800	0.43	0
10	102	1024	Liberty Street South North of Baseline Road	545	1	800	0.68	0	228	1	800	0.28	0
10	102	1025	Simpson Avenue North of Baseline Road	219	1	400	0.55	0	51	1	400	0.13	0
10	102	1026	Haines Street North of Baseline Road	60	1	600	0.10	0	17	1	600	0.03	0
10	102	1027	Lambs Road North of Baseline Road	1,028	2	1,600	0.64	0	125	2	1,600	0.08	0
10	102	1028	Bennett Road North of Baseline Road	127	1	600	0.21	0	207	1	600	0.35	0
11	110	1101	Townline Road South of Highway 2	155	1	700	0.22	0	132	1	700	0.19	0
11	110	1102	Darlington Blvd South of Highway 2	22	1	400	0.05	0	49	1	400	0.12	0
11	110	1103	Prestonvale Road South of Highway 2	280	1	550	0.51	0	550	1	550	1.00	1
11	110	1104	Sandringham Drive South of Highway 2	0	1	400	0.00	0	98	1	400	0.25	0
11	110	1105	Trulls Road South of Highway 2	222	1	700	0.32	0	457	1	700	0.65	0
11	110	1106	Courtice Road South of Highway 2	560	1	800	0.70	0	211	1	800	0.26	0
11	110	1107	Hancock Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1111	Solina Road South of Highway 2	39	1	500	0.08	0	0	1	500	0.00	0
11	111	1112	Rundie Road South of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
11	111	1113	Holt Road South of Highway 2	699	1	800	0.87	0	245	1	800	0.31	0
11	111	1114	Maple Grove Road South of Highway 2	211	1	500	0.42	0	56	1	500	0.11	0
12	120	1201	Townline Road North of Highway 2	319	2	1,400	0.23	0	202	2	1,400	0.14	0
12	120	1202	Varcoe Road North of Highway 2	165	1	400	0.41	0	114	1	400	0.29	0
12	120	1203	Centerfield Drive North of Highway 2	84	1	400	0.21	0	177	1	400	0.44	0
12	120	1204	Trulls Road North of Highway 2	343	1	700	0.49	0	449	1	700	0.64	0
12	120	1205	Courtice Road North of Highway 2	685	1	800	0.86	0	510	1	800	0.64	0
12	120	1206	Hancock Road North of Highway 2	32	1	500	0.06	0	14	1	500	0.03	0
12	120	1207	East Durham Link North of Highway 2	227	2	3,600	0.06	0	238	2	3,600	0.07	0
12	121	1211	Solina Road North of Highway 2	6	1	500	0.01	0	3	1	500	0.01	0
12	121	1212	Rundie Road North of Highway 2	0	1	500	0.00	0	0	1	500	0.00	0
12	121	1213	Holt Road North of Highway 2	1,100	2	1,600	0.69	0	114	2	1,600	0.07	0
12	121	1214	Maple Grove Road North of Highway 2	42	1	500	0.08	0	16	1	500	0.03	0
12	122	1221	Green Road North of Highway 2	359	1	500	0.72	0	94	1	500	0.19	0
12	122	1222	Regional Road 57 North of Highway 2	715	2	2,000	0.36	0	314	2	2,000	0.16	0
12	122	1223	Scugog Street North of Church Street	717	1	550	1.30	1	235	1	550	0.43	0
12	122	1224	Liberty Street N North of Church Street	681	1	800	0.85	0	177	1	800	0.22	0
12	122	1225	Mearns Avenue North of Highway 2	452	1	600	0.75	0	50	1	600	0.08	0
12	122	1226	Lambs Road North of Highway 2	542	1	700	0.77	0	76	1	700	0.11	0
13	130	1301	Green Road South of Nash Road	0	1	800	0.00	0	0	1	800	0.00	0
13	130	1302	Nash Road South of Nash Road	0	1	500	0.00	0	8	1	500	0.02	0
13	130	1303	Regional Road 57 South of Concession 3	499	1	1,000	0.50	0	424	1	1,000	0.42	0
13	130	1304	W Scugog Lane South of Concession 3	0	1	400	0.00	0	12	1	400	0.03	0
13	130	1305	Scugog Street South of Concession 3	44	1	600	0.07	0	88	1	600	0.15	0
13	130	1306	Liberty Street N South of Concession 3	294	1	800	0.37	0	79	1	800	0.10	0
13	130	1307	Mearns Avenue South of Concession 3	10	1	600	0.02	0	17	1	600	0.03	0
13	130	1308	Lambs Road South of Concession 3	25	1	700	0.04	0	40	1	700	0.06	0
14	140	1401	Townline Road North of Taunton Road	191	1	500	0.38	0	185	1	500	0.37	0
14	140	1402	Langmaid Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1403	Enfield Road North of Taunton Road	324	1	1,000	0.32	0	322	1	1,000	0.32	0
14	140	1404	Washington Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	140	1405	Solina Road North of Taunton Road	44	1	500	0.09	0	36	1	500	0.07	0
14	140	1406	East Durham Link North of Taunton Road	131	2	3,600	0.04	0	99	2	3,600	0.03	0
14	141	14101	Holt Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14102	McCallum Street North of Taunton Road	26	1	400	0.07	0	9	1	400	0.02	0
14	141	14103	King Lane North of Taunton Road	0	1	400	0.00	0	0	1	400	0.00	0
14	141	14104	Old Scugog Road North of Taunton Road	44	1	700	0.06	0	114	1	700	0.16	0
14	141	14105	Regional Road 57 North of Taunton Road	206	1	1,000	0.21	0	374	1	1,000	0.37	0
14	141	14106	Middle Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14107	Liberty Street N North of Taunton Road	21	1	700	0.03	0	4	1	700	0.01	0
14	141	14108	Bethesda Road North of Taunton Road	3	1	800	0.00	0	1	1	800	0.00	0
14	141	14110	Darlington Clarke Townline North of Taunton Road	5	1	500	0.01	0	6	1	500	0.01	0
14	141	14111	Leskard Road North of Taunton Road	0	1	500	0.00	0	0	1	500	0.00	0
14	141	14112	Best Road North of Taunton Road	10	1	500	0.02	0	0	1	500	0.00	0
14	141	14113	Highway 35/115 North of Taunton Road	1,147	2	2,800	0.41	0	950	2	2,800	0.34	0
14	142	1421	Jewel Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1422	Henry Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
14	142	1423	Newtonville Road South of Ganaraska Road	1	1	700	0.00	0	5	1	700	0.01	0
14	142	1424	Shiloh Road South of Ganaraska Road	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1501	Townline Road North of Regional Road 3	0	1	500	0.00	0	0	1	500	0.00	0
15	150	1502	Enfield Road North of Regional Road 3	84	1	500	0.17	0	2	1	500	0.00	0
15	150	1503	Old Scugog Road North of Regional Road 3	14	1	500	0.03	0	5	1	500	0.01	0
15	150	1504	Regional Road 57 North of Regional Road 3	155	1	1,000	0.16	0	6	1	1,000	0.01	0
15	150	1505	Liberty Street North of Concession 8	0	1	800	0.00	0	12	1	800	0.02	0
15	151	1511	Darlington Clarke Townline South of Boundary Road	0	1	1,000	0.00	0	189	1	1,000	0.19	0
15	151	1512	Mosport Road South of Boundary Road	0	1	500	0.00	0	0	1	500	0.00	0
15	151	1513	Best Road South of Boundary Road	0	1	1,000	0.00	0	0	1	1,000	0.00	0
15	151	1514	Highway 35 South of Boundary Road	579	2	2,000	0.29	0	307	2	2,000	0.15	0
15	151	1515	Highway 115 South of Boundary Road	996	2	3,600	0.28	0	809	2	3,600	0.22	0
16	160	1601	Mill Street North of Highway 401	513	1	700	0.73	0	166	1	700	0.24	0
17	170	1701	Manvers Road North of Highway 2	264	1	700	0.38	0	48	1	700	0.07	0
17	170	1702	Arthur Street North of Highway 2	67	1	550	0.12	0	20	1	550	0.04	0
20	200	2001	Highway 401 East of Harmony Road	4,490	4	6,600	0.68	0	2,936	4	6,600	0.44	0
20	200	2002	Bingham Gate East of Townline Road	355	1	500	0.71	0	4	1	500	0.01	0
20	200	2003	Gord Vinson Avenue East of Townline Road	333	1	600	0.56	0	174	1	600	0.29	0
20	200	2004	Bloor Road East of Townline Road	658	1	750	0.88	0	288	1	750	0.38	0
20	200	2005	Glenabbey Drive East of Townline Road	417	1	600	0.69	0	5	1	600	0.01	0
20	200	2006	Kingswood Drive East of Townline Road	81	1	600	0.13	0	15	1	600	0.02	0
20	200	2007	Kingsway Gate East of Townline Road	0	1	400	0.00	0	0	1	400	0.00	0
20	200	2008	Highway 2 East of Townline Road	1,599	2	1,800	0.89	0	898	2	1,800	0.50	0
20	200	2009	Nash Road East of Townline Road	178	1	550	0.32	0	95	1	550	0.17	0
20	200	20010	Lawson Road East of Townline Road	60	1	700	0.09	0	14	1	700	0.02	0

20	201	2011	Pebblestone Road East of Townline Road	296	1	800	0.37	0	96	1	800	0.12	0
20	201	2012	Taunton Road East of Townline Road	779	2	2,000	0.39	0	329	2	2,000	0.16	0
20	201	2013	Concession 6 East of Townline Road	278	1	700	0.40	0	51	1	700	0.07	0
20	201	2017	Highway 407 West of Enfield Road	964	2	3,600	0.27	0	416	2	3,600	0.12	0
20	201	2014	Concession 7 West of Townline Road	25	1	600	0.04	0	1	1	600	0.00	0
20	201	2015	Regional Road 3 East of Townline Road	94	1	800	0.12	0	2	1	800	0.00	0
20	201	2016	Concession 9 East of Townline Road	15	1	500	0.03	0	0	1	500	0.00	0
21	210	2101	Highway 401 West of Courtice Road	4,490	4	6,600	0.68	0	2,936	4	6,600	0.44	0
21	210	2102	Baseline Road West of Courtice Road	122	1	700	0.17	0	209	1	700	0.30	0
21	210	2103	Bloor Street West of Courtice Road	136	1	700	0.19	0	316	1	700	0.45	0
21	210	2108	Meadowglade Road extension West of Courtice Road	52	1	500	0.10	0	147	1	500	0.29	0
21	210	2104	Sandringham Drive West of Courtice Road	63	1	400	0.16	0	92	1	400	0.23	0
21	210	2105	Highway 2 West of Courtice Road	1,066	2	1,800	0.59	0	657	2	1,800	0.37	0
21	210	2106	Nash Road West of Courtice Road	10	1	700	0.01	0	5	1	700	0.01	0
21	210	2107	George Reynolds Drive West of Courtice Road	3	1	400	0.01	0	2	1	400	0.00	0
21	211	2111	Pebblestone Road West of Courtice Road	174	1	800	0.22	0	124	1	800	0.15	0
21	211	2112	Taunton Road West of Courtice Road	738	1	1,000	0.74	0	477	1	1,000	0.48	0
21	211	2114	Highway 407 East of Enfield Road	796	2	3,600	0.22	0	172	2	3,600	0.05	0
21	211	2113	Concession 6 West of Courtice Road	153	1	700	0.22	0	15	1	700	0.02	0
22	220	2201	South Service Road West of Holt Road	211	1	500	0.42	0	0	1	500	0.00	0
22	220	2202	Highway 401 West of Holt Road	4,160	3	4,950	0.84	0	2,036	3	4,950	0.41	0
22	220	2203	Baseline Road West of Holt Road	215	1	700	0.31	0	22	1	700	0.03	0
22	220	2204	Bloor Street West of Holt Road	239	1	700	0.34	0	32	1	700	0.05	0
22	220	2205	Highway 2 West of Holt Road	1,466	2	2,000	0.73	0	597	2	2,000	0.30	0
22	220	2206	Nash Road West of Holt Road	1	1	700	0.00	0	0	1	700	0.00	0
23	230	2301	South Service Road East of Holt Road	1	1	500	0.00	0	3	1	500	0.01	0
23	230	2302	Highway 401 East of Holt Road	4,061	3	4,950	0.82	0	1,768	3	4,950	0.36	0
23	230	2303	Baseline Road West of Green Road	636	1	800	0.80	0	31	1	800	0.04	0
23	230	2304	Highway 2 East of Maple Grove Road	1,071	2	2,400	0.45	0	603	2	2,400	0.25	0
23	230	2306	Longworth Avenue East of Maple Grove Road	1,043	2	1,600	0.65	0	110	2	1,600	0.07	0
23	230	2305	Nash Road East of Maple Grove Road	8	1	800	0.01	0	0	1	800	0.00	0
24	240	2401	Highway 401 at Bowmanville Creek	3,678	3	4,950	0.74	0	2,005	3	4,950	0.41	0
24	240	2402	Baseline Road at Bowmanville Creek	979	2	1,400	0.70	0	348	2	1,400	0.25	0
24	240	2403	Highway 2 at Bowmanville Creek	1,021	2	1,800	0.57	0	585	2	1,800	0.32	0
24	241	2411	Longworth Avenue East of Regional Road 57	1,194	2	1,600	0.75	0	256	2	1,600	0.16	0
24	241	2412	Concession 3 of Regional Road 57	377	1	800	0.47	0	58	1	800	0.07	0
24	242	2421	Concession 4 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2422	Taunton Road West of Regional Road 57	665	1	1,000	0.67	0	319	1	1,000	0.32	0
24	242	2423	Concession 6 West of Regional Road 57	79	1	700	0.11	0	35	1	700	0.05	0
24	242	2424	Concession 7 West of Regional Road 57	0	1	600	0.00	0	0	1	600	0.00	0
24	242	2425	Regional Road 3 West of Regional Road 57	29	1	500	0.06	0	41	1	500	0.08	0
24	242	2426	Concession 9 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2427	Concession 10 West of Regional Road 57	0	1	500	0.00	0	0	1	500	0.00	0
24	242	2428	Boundary Road West of Regional Road 57	5	1	500	0.01	0	1	1	500	0.00	0
24	242	2429	Highway 407 West of Regional Road 57	829	2	3,600	0.23	0	173	2	3,600	0.05	0
25	250	2501	Highway 401 West of Bennett Road	3,678	3	4,950	0.74	0	2,005	3	4,950	0.41	0
25	250	2502	Baseline Road West of Lambs Road	394	2	1,400	0.28	0	178	2	1,400	0.13	0
25	250	2503	Highway 2 West of Lambs Road	411	1	1,000	0.41	0	471	1	1,000	0.47	0
25	251	2511	Concession Street West of Lambs Road	187	1	700	0.27	0	225	1	700	0.32	0
25	251	2512	Concession 3 West of Lambs Road	46	1	800	0.06	0	25	1	800	0.03	0
25	252	2521	Concession 4 West of Lambs Road	0	1	500	0.00	0	3	1	500	0.01	0
25	252	2522	Taunton Road West of Bethesda Road	491	1	1,000	0.49	0	259	1	1,000	0.26	0
25	252	2527	Highway 407 East of Regional Road 57	477	2	3,600	0.13	0	169	2	3,600	0.05	0
25	252	2523	Concession 6 West of Bethesda Road	1	1	700	0.00	0	3	1	700	0.00	0
25	252	2524	Concession 7 West of Bethesda Road	2	1	500	0.00	0	3	1	500	0.01	0
25	252	2525	Concession 8 West of Bethesda Road	0	1	700	0.00	0	12	1	700	0.02	0
25	252	2526	Regional Road 20 West of Liberty Street	0	1	1,000	0.00	0	178	1	1,000	0.18	0
26	260	2601	Highway 401 West of Highway 35/115	3,269	3	4,950	0.66	0	2,083	3	4,950	0.42	0
26	260	2602	Highway 2 West of Highway 35/115	332	1	1,000	0.33	0	116	1	1,000	0.12	0
26	261	2611	Concession 3 East of Darlington Clarke Townline	98	1	800	0.12	0	64	1	800	0.08	0
26	261	2612	Concession 4 East of Darlington Clarke Townline	1	1	800	0.00	0	2	1	800	0.00	0
26	261	2613	Concession 5 East of Darlington Clarke Townline	5	1	500	0.01	0	1	1	500	0.00	0
26	261	2614	Taunton Road East of Darlington Clarke Townline	338	1	1,000	0.34	0	249	1	1,000	0.25	0
26	262	2621	Concession 7 West of Highway 35/115	12	1	500	0.02	0	2	1	500	0.00	0
26	262	2624	Highway 407 West of Highway 35/115	448	2	3,600	0.12	0	160	2	3,600	0.04	0
26	262	2622	Concession 8 West of Highway 35/115	12	1	500	0.02	0	0	1	500	0.00	0
26	262	2623	Regional Road 20 West of Highway 35	0	1	1,000	0.00	0	189	1	1,000	0.19	0
27	270	2701	Lakeshore Road West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2702	Concession 1 West of Clarington East Limit	5	1	500	0.01	0	3	1	500	0.01	0
27	270	2703	Highway 401 West of Clarington East Limit	906	3	4,950	0.18	0	1,463	3	4,950	0.30	0
27	270	2704	Highway 2 West of Clarington East Limit	51	1	1,000	0.05	0	3	1	1,000	0.00	0
27	270	2705	Concession 3 West of Clarington East Limit	0	1	500	0.00	0	0	1	500	0.00	0
27	270	2706	Concession 4 West of Clarington East Limit	1	1	500	0.00	0	0	1	500	0.00	0
27	270	2707	Concession 5 West of Clarington East Limit	2	1	500	0.00	0	0	1	500	0.00	0
27	270	2708	Canaraska Road West of Clarington East Limit	92	1	800	0.11	0	27	1	800	0.03	0
30	300	3001	Holt Road North of Highway 401	1,132	2	1,600	0.71	0	326	2	1,600	0.20	0
30	300	3002	Waverly Road/RR57 North of Highway 401	1,324	2	1,800	0.74	0	697	2	1,800	0.39	0
30	300	3004	Lambs Road North of Highway 401	887	2	1,600	0.55	0	437	2	1,600	0.27	0
Eastbound/Westbound TOTALS				51,652	118	120,300			27,395	118	120,300		
Northbound/Southbound TOTALS				23,189	103	78,250			12,212	103	78,250		

Cap = 850
 = V/C ratio 0.80 - 0.90
 = V/C ratio > 0.90
 = Extra Lanes Required

Cap Threshold % 0.9

Appendix D

Total Volume and Volume to Capacity Ratio Network Plots



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PLOT:

Sc 31240: 2031 Base Network
AM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PLOT:

Sc 31241: 2031 Base Network
PM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND
— V/C Ratio 0.80 – 0.90
— V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31240: 2031 Base Network
AM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND
— V/C Ratio 0.80 – 0.90
— V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31241: 2031 Base Network
PM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PLOT:

Sc 31242: 2031 Preferred Alternative A
AM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31243: 2031 Preferred Alternative A
PM Peak Hour Auto Volumes (Moderate Transit)

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- V/C Ratio 0.80 – 0.90
- V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31242: 2031 Preferred Alternative A
AM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND
— V/C Ratio 0.80 – 0.90
— V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31243: 2031 Preferred Alternative A
PM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:

Clarington
Leading the Way

PROJECT:

Clarington TMP

PLOT:

Sc 31244: 2031 Preferred Alternative B
AM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31245: 2031 Preferred Alternative B
PM Peak Hour Auto Volumes (Moderate Transit)

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- V/C Ratio 0.80 – 0.90
- V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31244: 2031 Preferred Alternative B
AM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- V/C Ratio 0.80 – 0.90
- V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31245: 2031 Preferred Alternative B
PM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:



PROJECT:

Clarington TMP

PLOT:

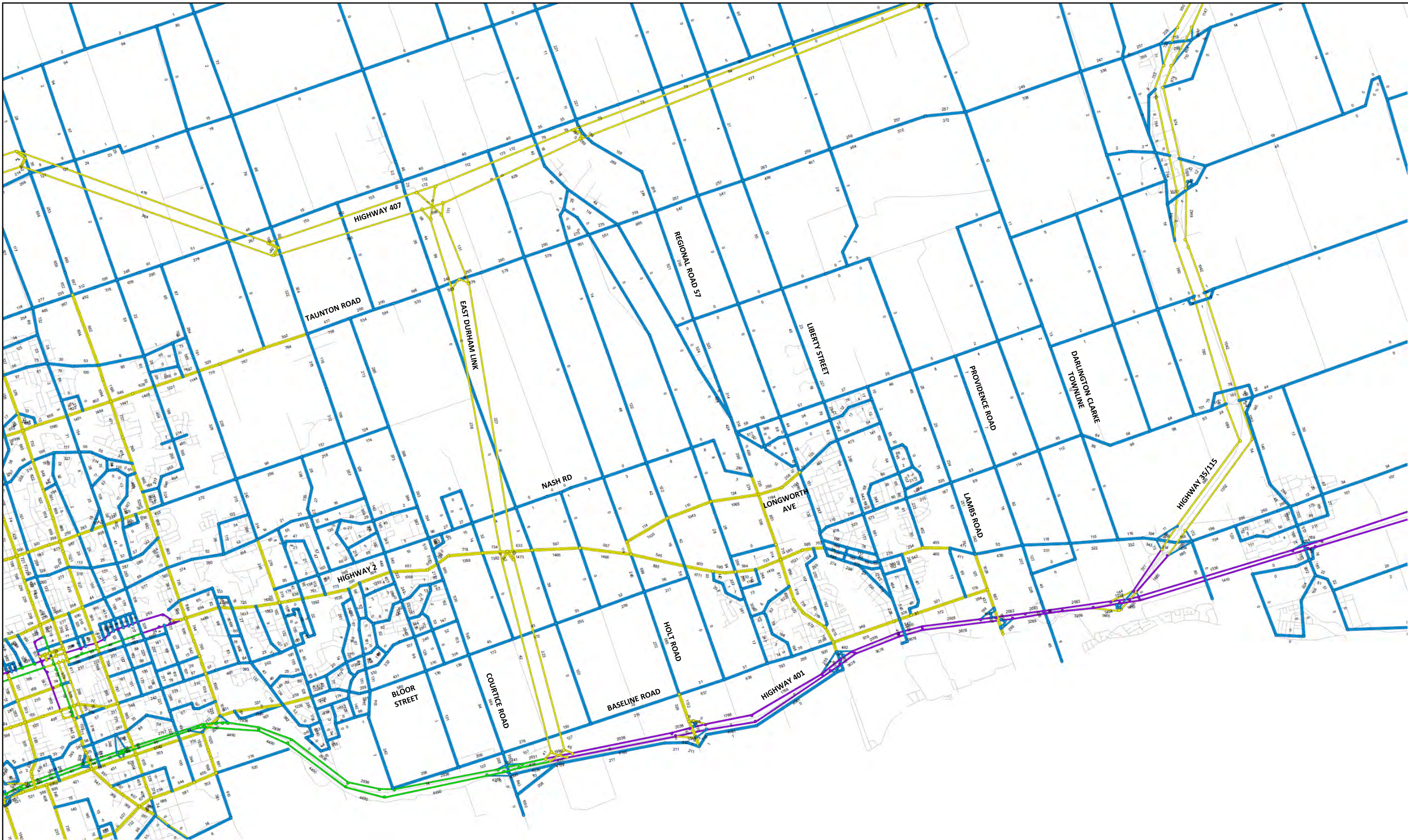
Sc 31246: 2031 Preferred Alternative C
AM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- 2 Lanes (2-way)
- 4 Lanes (2-way)
- 6 Lanes (2-way)
- 8 Lanes (2-way)
- 10 Lanes (2-way)

CLIENT:

Clarington
Leading the Way

PROJECT:

Clarington TMP

PLOT:

Sc 31247: 2031 Preferred Alternative C
PM Peak Hour Auto Volumes (Moderate Transit)

PROJECT No.:

60264232

MAP:

2



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND
— V/C Ratio 0.80 – 0.90
— V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington Tmp

PROJECT No.:

60264232

PLOT:

Sc 31246: 2031 Preferred Alternative C
AM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

1



AECOM Canada Ltd.
300 Water St., Whitby, ON
Canada L1N 9J2
T 905.668.9363 F 905.668.0221

LEGEND

- V/C Ratio 0.80 – 0.90
- V/C Ratio > 0.90

CLIENT:



PROJECT:

Clarington TMP

PROJECT No.:

60264232

PLOT:

Sc 31247: 2031 Preferred Alternative C
PM Peak Hour V/C Ratio Plot (Moderate Transit)

MAP:

2

Appendix E

Intersection Analysis

- **TMC Data**
- **Synchro and Sim Traffic Reports**
- **Screenline Growth Rates**
- **Signal Warrant Analysis**

15 MIN REPORT

Count ID: 9,953

PRESTONVALE RD @ REGIONAL HIGHWAY 2

Municipality: Clarington

Date: 31-Oct-2012

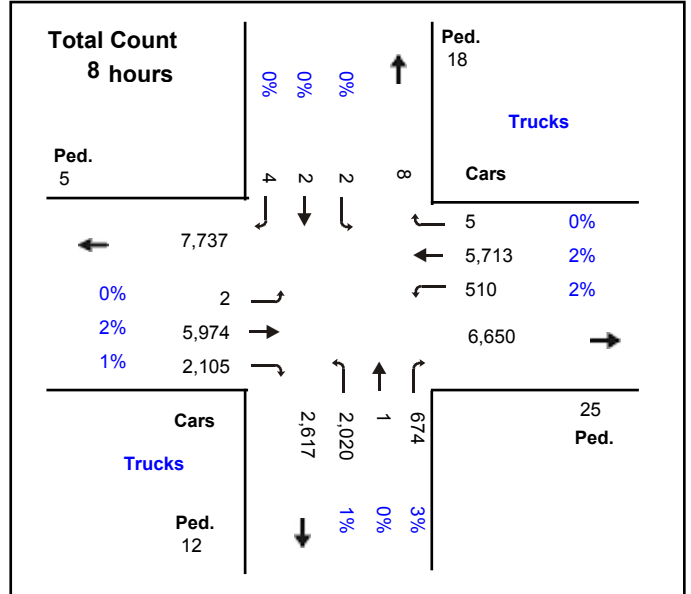
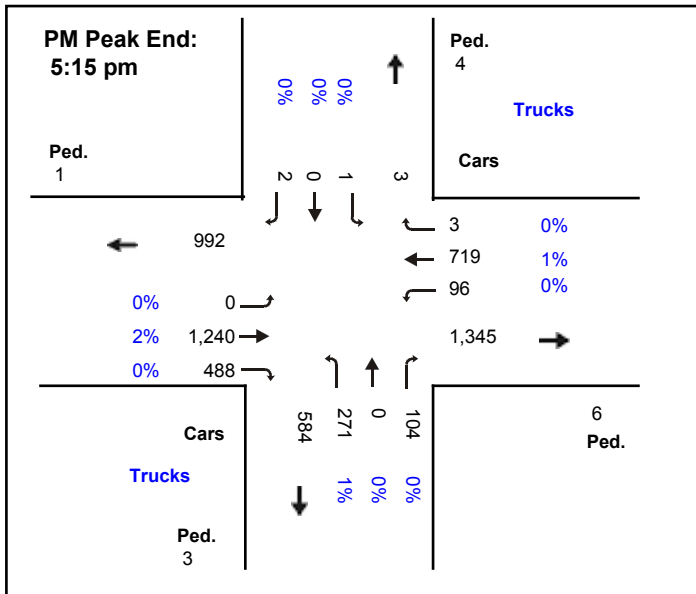
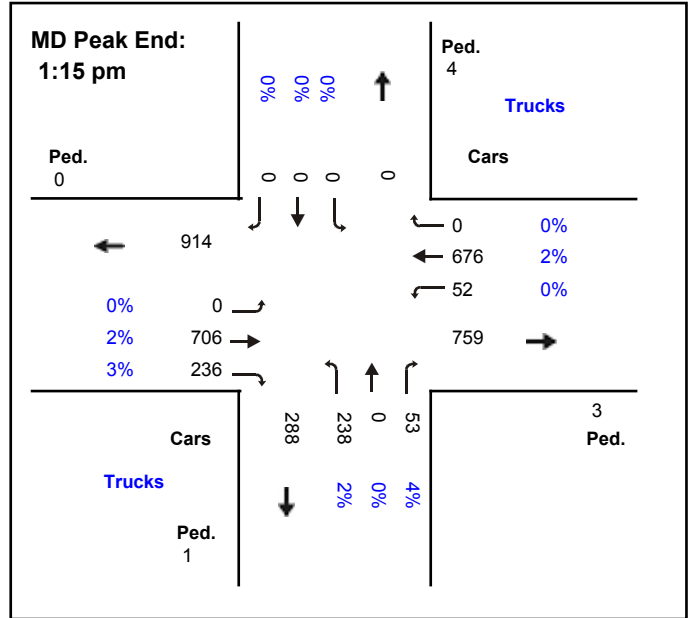
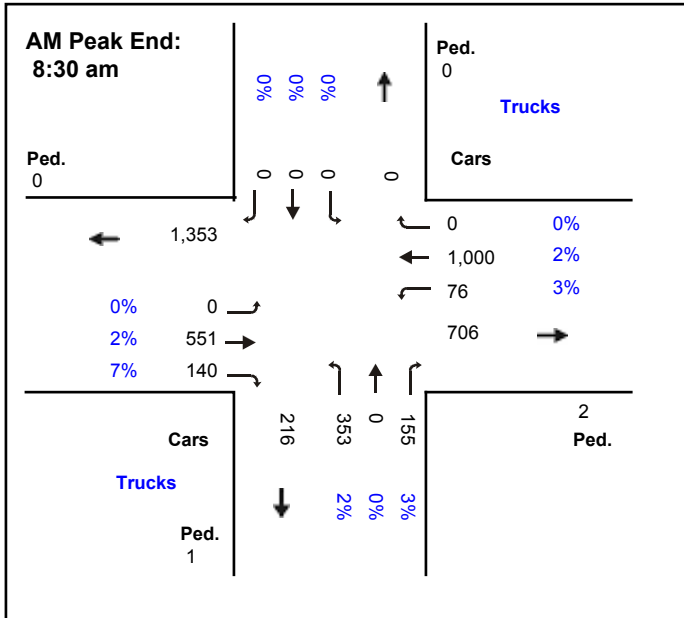
NORTH APPROACH										EAST APPROACH										SOUTH APPROACH										WEST APPROACH										
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Total									
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right											
Period1																																								
6:15	0	0	1	0	0	0	0	0	0	2	70	0	0	3	0	0	0	0	0	0	0	22	0	4	0	0	0	0	0	43	5	0	2	0	0	0	0	0	152	
6:30	0	0	0	0	0	0	0	0	0	0	102	0	0	1	0	0	0	0	0	0	1	35	0	7	1	0	0	0	0	54	11	0	2	0	0	0	0	0	214	
6:45	0	0	0	0	0	0	0	0	0	2	145	0	0	4	0	0	0	0	0	0	0	37	0	3	1	0	0	0	0	64	10	0	0	0	0	0	0	0	266	
7:00	0	0	0	0	0	0	0	0	0	5	126	0	0	2	0	0	0	0	0	0	0	46	0	10	0	0	0	0	0	76	22	0	3	0	0	0	0	0	292	
7:15	0	0	0	0	0	0	0	0	0	7	149	0	0	4	0	0	0	0	0	0	0	53	0	8	0	0	0	0	0	70	23	0	4	2	0	0	0	0	320	
7:30	0	0	0	0	0	0	0	0	0	4	190	0	0	5	0	0	0	0	0	0	0	64	0	16	1	0	1	0	0	75	24	0	2	1	0	0	0	0	383	
7:45	0	0	0	0	0	0	0	0	0	11	231	0	0	2	0	0	0	0	0	0	1	102	0	16	2	0	0	0	0	120	27	0	1	3	0	0	0	0	516	
8:00	0	0	0	0	0	0	0	0	0	13	242	0	2	4	0	0	0	0	0	0	0	93	0	49	1	0	2	0	0	145	26	0	1	3	0	0	0	0	582	
8:15	0	0	0	0	0	0	0	0	0	30	242	0	0	3	0	0	0	0	0	0	0	77	0	54	2	0	3	0	0	142	33	0	7	2	0	0	0	0	595	
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8:45	0	0	0	0	0	0	0	0	0	9	248	0	0	3	0	0	0	0	0	0	2	70	0	24	1	0	1	0	0	112	40	0	3	3	0	0	0	0	516	
9:00	0	0	0	0	0	0	0	0	0	27	217	0	1	8	0	0	0	0	0	0	0	74	0	18	2	0	2	0	0	116	64	0	5	2	0	0	0	0	536	
Period2																																								
11:45	0	0	0	0	0	0	0	0	1	10	180	0	0	4	0	0	0	0	0	0	0	54	0	18	1	0	0	0	0	181	47	0	7	1	0	0	0	0	505	
12:00	0	0	0	0	0	0	0	0	1	18	167	0	0	4	0	0	0	0	0	0	0	47	0	22	0	0	1	0	0	156	51	0	3	0	0	0	0	1	471	
12:15	0	0	0	0	0	0	0	0	1	7	167	0	1	8	0	0	0	0	0	0	1	54	0	13	1	0	1	0	0	176	44	0	2	2	0	0	0	0	479	
12:30	0	0	0	0	0	0	0	0	1	11	174	0	0	2	0	0	0	0	0	0	0	45	0	17	0	0	1	0	0	180	62	0	0	1	0	0	0	0	494	
12:45	0	0	0	0	0	0	0	0	0	12	148	0	0	3	0	0	0	0	0	0	0	56	0	11	3	0	0	0	0	180	59	0	6	0	0	0	0	0	479	
13:00	0	0	0	0	0	0	0	0	1	10	153	0	0	6	0	0	0	0	0	0	2	66	0	11	2	0	0	0	0	149	56	0	3	2	0	0	0	0	461	
13:15	0	0	0	0	0	0	0	0	2	19	186	0	0	4	0	0	0	0	0	0	1	66	0	12	0	0	1	0	0	186	53	0	2	3	0	0	0	0	535	
13:30	0	0	0	0	0	0	0	0	0	5	163	0	0	1	0	0	0	0	0	0	0	44	0	15	0	0	4	0	0	190	63	0	2	0	0	0	0	1	489	
Period3																																								
15:15	0	0	0	0	0	0	0	0	0	27	192	0	0	2	0	0	0	0	0	0	0	51	0	24	0	0	0	0	0	238	78	0	3	0	0	0	0	1	618	
15:30	0	0	0	0	0	0	0	0	0	16	169	2	2	6	0	0	0	0	0	0	1	53	0	18	1	0	0	0	0	251	95	0	4	1	0	0	0	0	620	
15:45	0	1	0	0	0	0	0	0	2	19	173	0	1	4	0	0	0	0	0	0	2	81	0	25	2	0	1	0	0	266	88	0	2	2	0	0	0	0	669	
16:00	0	1	0	0	0	0	0	0	3	18	166	0	0	5	0	0	0	0	0	0	1	102	1	30	2	0	1	0	0	265	107	0	8	0	0	0	0	1	711	
16:15	0	0	0	0	0	0	0	0	1	27	164	0	0	1	0	0	0	0	0	0	0	83	0	27	1	0	0	0	0	264	107	0	7	0	0	0	0	0	683	
16:30	0	0	1	0	0	0	0	0	0	22	179	1	0	1	0	0	0	0	0	0	0	63	0	38	1	0	0	0	0	314	130	0	7	1	0	0	0	0	759	
16:45	0	0	0	0	0	0	0	0	0	24	183	0	0	2	0	0	0	0	0	0	4	71	0	21	1	0	0	0	0	305	122	0	6	0	0	0	0	0	740	
17:00	1	0	1	0	0	0	0	0	2	26	188	2	0	1	0	0	0	0	0	0	1	74	0	26	0	0	0	0	0	311	113	0	3	0	0	0	0	1	751	
17:15	0	0	0	0	0	0	0	0	2	24	164	0	0	1	0	0	0	0	0	0	1	61	0	19	0	0	0	0	0	291	122	0	3	0	0	0	0	0	688	
17:30	0	0	0	0	0	0	0	0	0	29	157	0	0	0	0	0	0	0	0	0	2	66	0	26	1	0	0	0	1	288	143	0	4	0	0	0	0	0	718	
17:45	0	0	0	0	0	0	0	0	1	28	145	0	1	2	0	0	0	0	0	0	1	53	0	19	0	0	0	0	0	281	105	0	2	0	0	0	0	0	638	
18:00	1	0	1	0	0	0	0	0	0	20	160	0	0	1	0	0	0	0	0	0	0	54	0	23	0	0	0	0	1	243	100	0	3	0	0	0	0	0	607	



PRESTONVALE RD @ REGIONAL HIGHWAY 2
Clarington

Count Date: 31-Oct-2012

Count Day: Wednesday



TMC Tabular Report

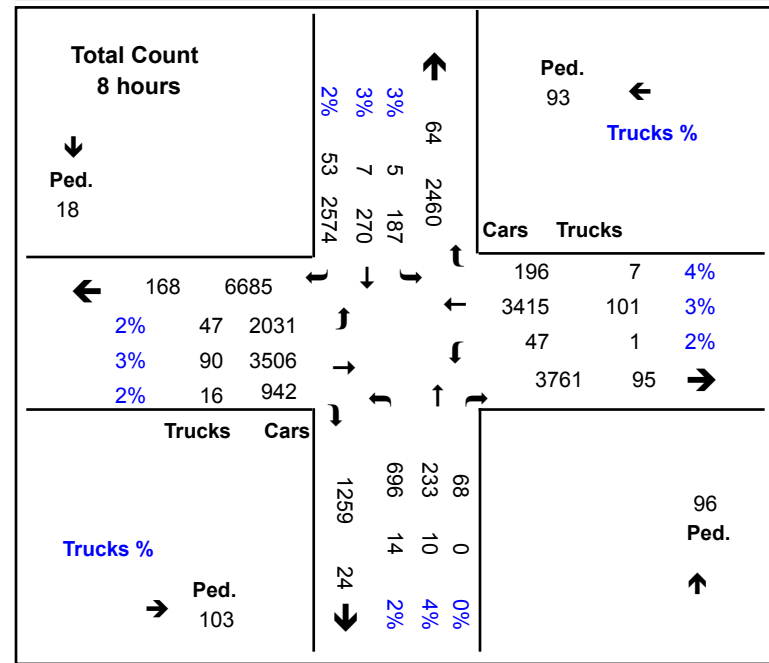
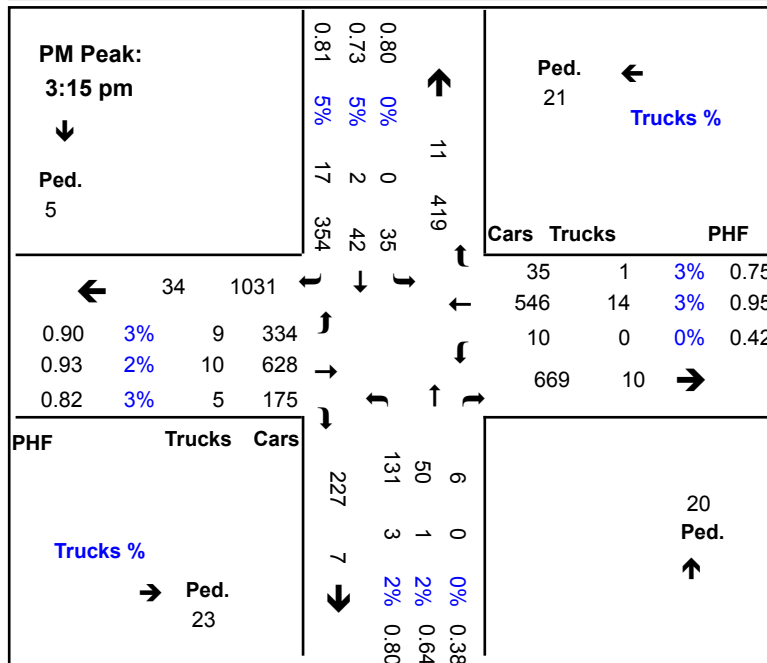
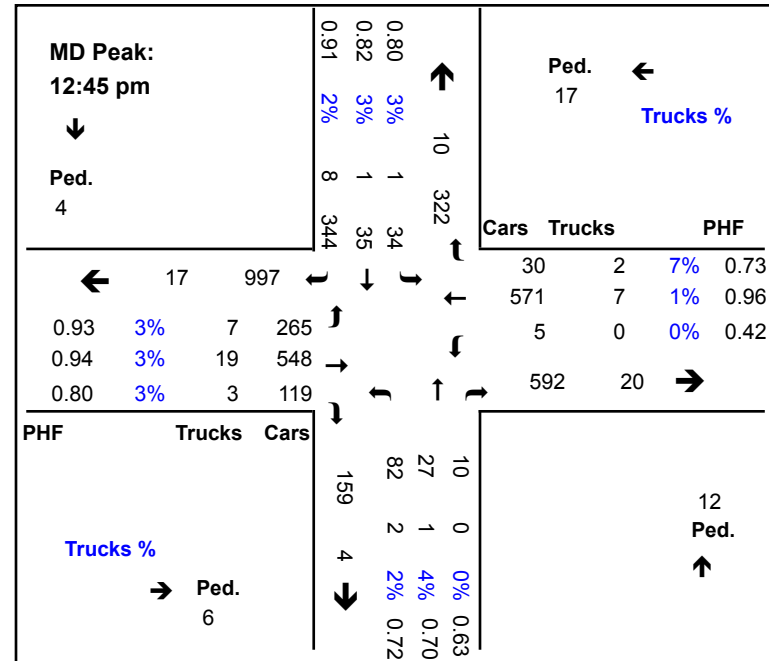
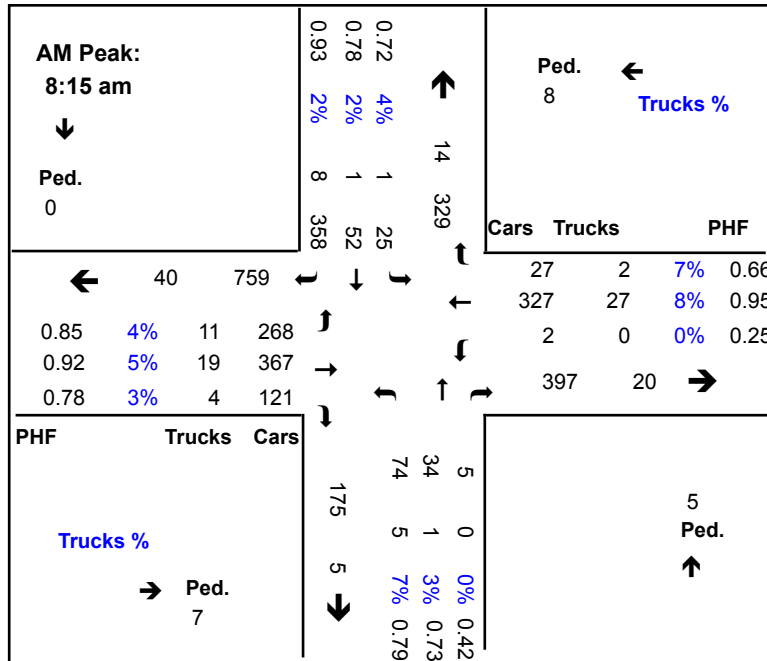
KING ST W @ SCUGOG ST

TMC No. : 0702200000

Intersection ID : 4517

Count ID: 28912013136

Count Date: 5/16/2013



Count Date: 5/16/2013

TMC 15 Min Report

KING ST W @ SCUGOG ST

	NORTH APPROACH												EAST APPROACH												SOUTH APPROACH												WEST APPROACH												
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Total								
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right										
Period 1																																																	
6:15	0	5	36	1	0	1	0	0	0	1	1	23	1	0	3	0	0	0	0	0	2	2	0	0	0	0	0	0	0	7	18	5	0	1	0	0	0	0	107										
6:30	0	3	39	0	0	1	0	0	0	2	0	27	3	0	1	0	0	0	0	0	8	0	0	0	0	0	0	0	8	24	15	1	1	0	0	0	0	1	134										
6:45	0	5	64	0	0	1	0	0	0	1	0	39	0	0	2	0	0	0	0	2	3	2	0	1	0	0	0	0	19	40	8	0	1	0	0	0	0	0	190										
7:00	1	6	45	0	0	0	0	0	0	2	0	35	1	0	9	0	0	0	0	1	6	4	1	1	2	0	0	0	13	39	20	1	0	0	0	0	0	0	187										
7:15	1	5	51	0	0	1	0	0	0	0	0	38	2	0	3	0	0	0	0	1	7	4	0	0	0	0	0	0	22	44	4	0	1	0	0	0	0	0	185										
7:30	1	4	71	0	0	1	0	0	0	1	0	48	2	0	3	0	0	0	0	0	11	2	0	0	0	0	0	0	18	43	15	2	1	0	0	0	0	1	226										
7:45	3	3	98	0	0	3	0	0	0	0	0	66	0	0	2	0	0	0	0	2	16	4	0	0	0	0	0	0	30	47	13	1	5	0	0	0	0	0	294										
8:00	3	5	94	0	0	3	0	0	0	0	0	62	1	0	5	0	0	0	0	4	10	1	1	0	0	0	0	6	40	87	28	3	10	0	0	0	0	0	363										
8:15	8	15	97	1	1	1	0	0	0	3	0	75	11	0	9	0	0	0	0	1	15	7	0	1	0	0	0	0	59	75	30	1	10	0	0	0	0	0	421										
8:30	9	17	91	0	0	1	0	0	0	3	0	85	3	0	4	2	0	0	0	3	23	10	0	2	0	0	0	0	73	99	38	4	6	2	0	0	0	0	0	477									
8:45	2	10	84	0	0	4	0	0	0	1	0	82	6	0	6	0	0	0	0	1	17	6	3	1	0	0	0	0	57	92	21	3	3	1	0	0	0	0	0	401									
9:00	6	10	86	0	0	2	0	0	0	1	2	85	7	0	8	0	0	0	0	0	19	11	2	1	1	0	0	0	78	101	32	3	0	1	0	0	0	0	0	459									
Period 2																																																	
11:45	17	6	78	1	1	0	0	0	0	3	1	143	10	0	4	0	0	0	0	2	17	7	4	2	0	0	0	5	52	130	32	2	1	0	0	0	0	2	520										
12:00	6	6	81	1	0	2	0	0	0	4	15	132	9	1	5	0	0	0	0	3	24	10	2	0	1	0	10	59	130	23	1	4	0	0	0	0	0	0	529										
12:15	6	7	79	0	0	1	0	0	0	9	6	165	7	0	3	1	0	0	0	3	28	18	3	0	1	0	5	47	131	21	2	0	0	0	0	0	0	0	543										
12:30	9	6	70	0	0	1	0	0	0	6	1	142	7	0	1	0	0	0	0	3	27	6	4	0	1	0	5	54	118	43	1	2	2	0	0	0	0	0	509										
12:45	11	6	81	0	0	2	0	0	0	6	1	149	8	0	1	1	0	0	0	1	29	9	4	0	1	0	0	68	142	37	3	2	1	0	0	0	0	0	563										
13:00	8	8	94	0	1	3	0	0	0	4	3	137	10	0	3	1	0	0	0	0	11	7	2	2	0	0	0	0	61	142	32	1	9	1	0	0	0	0	540										
13:15	8	10	92	1	0	2	0	0	0	2	0	142	8	0	2	0	0	0	0	6	23	6	0	0	0	0	0	6	66	123	30	0	4	0	0	0	0	2	533										
13:30	7	11	77	0	0	1	0	0	0	5	1	136	4	0	1	0	0	0	0	5	19	5	4	0	0	0	0	70	132	20	3	4	1	0	0	0	2	508											
Period 3																																																	
15:15	10	12	70	0	0	4	0	0	0	7	0	140	12	0	5	0	0	0	0	4	35	15	1	1	0	0	4	71	143	43	4	3	2	0	0	0	3	589											
15:30	5	9	112	0	0	3	0	0	0	2	6	142	11	0	5	0	0	0	0	6	40	20	0	2	0	0	8	95	151	54	0	4	1	0	0	0	0	0	676										
15:45	11	8	96	0	0	3	0	0	0	7	1	144	7	0	3	1	0	0	0	7	34	7	1	0	1	0	9	87	170	33	2	1	0	0	0	0	0	0	633										
16:00	9	13	76	0	2	7	0	0	0	5	3	120	5	0	1	0	0	0	0	3	22	8	4	0	0	0	2	81	164	45	3	2	2	0	0	0	2	579											
16:15	1	10	75	0	1	1	0	0	0	4	0	112	10	0	0	1	0	0	0	7	20	4	5	0	0	0	12	79	144	28	0	1	1	0	0	0	1	517											
16:30	7	11	76	0	1	0	0	0	0	0	0	121	12	0	2	0	0	0	0	5	23	5	3	0	0	0	8	93	131	33	0	4	0	0	0	0	2	537											
16:45	3	6	118	0	0	1	0	0	0	2	1	133	11	0	0	0	0	0	0	2	37	4	3	0	0	0	0	110	154	41	3	1	0	0	0	0	0	630											
17:00	8	12	89	0	0	0	0	0	0	2	3	160	4	0	4	0	0	0	0	2	23	12	8	0	0	0	3	103	159	40	0	1	0	0	0	0	1	634											
17:15	4	10	86	0	0	2	0	0	0	4	1	142	6	0	3	0	0	0	0	8	45	16	3	0	0	0	1	109	143	38	1	1	1	0	0	0	0	0	624										
17:30	9	9	87	0	0	0	0	0	0	3	1	102	4	0	1	0	0	0	0	5	22	5	2	0	0	0	0	97	129	44	1	1	0	0	0	0	0	0	522										
17:45	10	4	79	0	0	1	0	0	0	3	0	163	8	0	2	0	0	0	0	6	53	8	1	0	0	0	3	91	145	44	1	2	0	0	0	0	1	625											
18:00	4	18	102	0	0	0	0	0	0	0	0	125	6	0	0	0	0	0	0	3	27	8	7	0	2	0	3	114	116	32	0	4	0	0	0	0	0	0	571										
18:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	8											

TMC Tabular Report

REGIONAL RD 57 @ CONCESSION RD 3

TMC No. : 0570700000

Intersection ID : 3423

Count ID: 25132013107

Count Date: 4/17/2013

AM Peak: 7:30 am ↓ Ped. 0				Ped. ← 2 Trucks %			
0.00	0.68	0.92	0.00	18	251	13	41
0.00	12%	5%	0%	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
PHF	Trucks	Cars					
Trucks %							
→	Ped.						
0							
				61	1	2%	0.86
				0	0	0%	0.00
				141	8	6%	0.83
				79	5		
				38	0	0%	0.53
				190	17	9%	0.92
				0	0	0%	0.00
				418	21		
				0			
				Ped.			
				↑			

MD Peak: 12:00 pm ↓ Ped. 0				Ped. ← 1 Trucks %			
0.00	0.73	0.90	0.00	14	215	15	26
0.00	12%	8%	0%	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
PHF	Trucks	Cars					
Trucks %							
→	Ped.						
0							
				40	1	3%	0.64
				0	0	0%	0.00
				52	4	8%	0.78
				83	5		
				57	2	4%	0.82
				175	13	7%	0.96
				0	0	0%	0.00
				232	19		
				1			
				Ped.			
				↑			

PM Peak: 5:15 pm ↓ Ped. 0				Ped. ← 1 Trucks %			
0.00	0.87	0.95	0.00	6	303	9	80
0.00	0%	3%	0%	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
PHF	Trucks	Cars					
Trucks %							
→	Ped.						
0							
				56	1	2%	0.68
				0	0	0%	0.00
				76	2	3%	0.81
				169	2		
				89	2	2%	0.81
				247	5	2%	0.94
				0	0	0%	0.00
				370	11		
				0			
				Ped.			
				↑			

Total Count 8 hours ↓ Ped. 0				Ped. ← 13 Trucks %			
0.00	0.86	0.95	0.00	86	1909	88	1842
0.00	5%	5%	0%	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
0.00	0.00	0.00	0.00	0	0	0	0
PHF	Trucks	Cars					
Trucks %							
→	Ped.						
0							
				351	17	5%	
				0	0	0%	
				583	25	4%	
				829	31		
				472	14	3%	
				1558	69	4%	
				0	0	0%	
				2425	113		
				4			
				Ped.			
				↑			

Count Date: 4/17/2013

TMC 15 Min Report

REGIONAL RD 57 @ CONCESSION RD 3

	NORTH APPROACH												EAST APPROACH												SOUTH APPROACH												WEST APPROACH												
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Total								
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right										
Period 1																																																	
6:15	2	31	0	0	4	0	0	0	0	0	13	0	6	0	0	0	0	0	0	0	0	0	20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77								
6:30	0	42	0	0	1	0	0	0	0	0	20	0	2	0	0	1	0	0	0	0	0	0	19	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89								
6:45	3	52	0	0	1	0	0	0	0	1	18	0	12	0	0	0	0	0	0	0	0	0	20	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116								
7:00	4	58	0	0	2	0	0	0	0	0	16	0	9	0	0	0	0	0	0	0	0	0	26	18	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136								
7:15	5	48	0	0	2	0	0	0	0	2	26	0	15	2	0	0	0	0	0	0	0	0	47	7	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157								
7:30	9	58	0	0	3	0	0	0	0	0	35	0	16	2	0	0	0	0	0	0	0	0	52	6	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185								
7:45	7	72	0	1	2	0	0	0	0	2	36	0	18	1	0	0	0	0	0	0	0	0	50	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197								
8:00	13	70	0	4	6	0	0	0	0	0	28	0	13	2	0	0	0	0	0	0	0	0	41	18	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199								
8:15	12	77	0	0	2	0	0	0	0	0	42	0	14	3	0	1	0	0	0	0	0	0	47	9	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213								
8:30	5	51	0	0	5	0	0	0	0	0	24	0	13	0	0	2	0	0	0	1	0	0	46	19	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	169								
8:45	14	55	0	2	1	0	0	0	0	0	29	0	13	2	0	1	0	0	0	0	0	0	45	13	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177								
9:00	7	54	0	2	5	0	0	0	0	1	22	0	11	0	0	2	0	0	0	0	0	0	35	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148								
Period 2																																																	
11:45	10	39	0	0	1	0	0	0	0	0	13	0	7	1	0	1	0	0	0	0	0	0	27	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112								
12:00	9	45	0	1	4	0	0	0	0	0	17	0	16	1	0	0	0	0	0	0	0	0	46	18	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160								
12:15	5	52	0	2	2	0	0	0	0	0	17	0	8	1	0	0	0	0	0	0	0	0	44	18	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151								
12:30	6	41	0	0	3	0	0	0	0	1	8	0	10	2	0	0	0	0	0	1	0	0	42	12	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132								
12:45	6	42	0	0	6	0	0	0	0	0	10	0	6	0	0	1	0	0	0	0	0	0	43	9	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	127								
13:00	5	45	0	1	3	0	0	0	0	0	8	0	7	1	0	1	0	0	0	0	0	0	32	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111								
13:15	8	38	0	0	1	0	0	0	0	0	11	0	11	1	0	0	0	0	0	0	0	0	55	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137								
13:30	7	45	0	0	5	0	0	0	0	0	10	0	6	0	0	0	0	0	0	0	0	0	42	14	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131								
Period 3																																																	
15:15	19	45	0	1	3	0	0	0	0	0	10	0	9	1	0	0	0	0	0	0	0	0	63	31	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	186								
15:30	17	67	0	0	1	0	0	0	0	0	13	0	11	1	0	2	0	0	0	0	0	0	61	25	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203								
15:45	12	73	0	0	2	0	0	0	0	1	20	0	10	1	0	1	0	0	0	1	0	0	62	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	202								
16:00	16	59	0	1	2	0	0	0	0	3	13	0	9	0	0	1	0	0	0	0	0	0	74	17	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	197								
16:15	11	63	0	0	3	0	0	0	0	1	10	0	12	0	0	0	0	0	0	1	0	0	73	20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	196								
16:30	24	87	0	0	3	0	0	0	0	0	11	0	10	0	0	1	0	0	0	0	0	0	60	15	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	214								
16:45	15	74	0	1	5	0	0	0	0	0	15	0	10	1	0	0	0	0	0	0	0	0	75	17	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	219								
17:00	26	65	0	1	1	0	0	0	0	0	12	0	11	0	0	1	0	0	0	0	0	0	64	24	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	207								
17:15	21	72	0	0	2	0	0	0	0	0	16	0	12	2	0	0	0	0	0	0	0	0	62	28	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217								
17:30	16	80	0	0	0	0	0	0	0	0	24	0	9	0	0	0	0	0	0	0	0	0	63	17	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211								
17:45	20	73	0	0	5	0	0	0	0	1	16	0	15	0	0	0	0	0	0	0	0	0	66	20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	218								
18:00	23	69	0	0	2	0	0	0	0	0	20	0	20	0	0	1	0	0	0	0	0	0	56	24	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	216								
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									

TMC Tabular Report

REGIONAL RD 57 @ CONCESSION RD 3

TMC No. : 0570700000

Intersection ID : 3423

Count ID: 25132013253

Count Date: 9/10/2013

AM Peak: 7:30 am ↓ Ped. 0				Ped. ← 0 Trucks %			
0.00	0%	0	0	42	252	Cars	PHF
0.60	28%	13	47	47	8	17%	0.86
0.85	9%	28	300	0	0	0%	0.00
0.00	0%	0	0	118	9	8%	0.93
0.00	0%	0	0	108	13		
PHF	Trucks	Cars		0	Ped.		
Trucks %				↑			
→	Ped.						
0							
0.00	0%	0	0	61	0	0%	0.69
0.00	0%	0	0	205	34	17%	0.84
0.00	0%	0	0	0	0	0%	0.00
0.00	0%	0	0	418	37		

MD Peak: 12:45 pm ↓ Ped. 0				Ped. ← 0 Trucks %			
0.00	0%	0	0	32	212	Cars	PHF
0.73	29%	10	34	40	6	15%	0.68
0.80	21%	43	207	0	0	0%	0.00
0.00	0%	0	0	55	6	11%	0.64
0.00	0%	0	0	91	14		
PHF	Trucks	Cars		2	Ped.		
Trucks %				↑			
→	Ped.						
0							
0.00	0%	0	0	57	4	7%	0.69
0.00	0%	0	0	172	26	15%	0.90
0.00	0%	0	0	0	0	0%	0.00
0.00	0%	0	0	262	49		

PM Peak: 5:15 pm ↓ Ped. 0				Ped. ← 0 Trucks %			
0.00	0%	0	0	6	325	Cars	PHF
0.79	0%	0	82	46	4	9%	0.78
0.89	4%	13	300	0	0	0%	0.00
0.00	0%	0	0	95	6	6%	0.90
0.00	0%	0	0	196	2		
PHF	Trucks	Cars		4	Ped.		
Trucks %				↑			
→	Ped.						
0							
0.00	0%	0	0	114	2	2%	0.81
0.00	0%	0	0	279	2	1%	0.91
0.00	0%	0	0	0	0	0%	0.00
0.00	0%	0	0	395	19		

Total Count 8 hours ↓ Ped. 0				Ped. ← 1 Trucks %			
0.00	0%	0	0	204	1931	Cars	PHF
0.14%	53	383	335	41	12%		
0.13%	241	1829	0	0	0%		
0.00	0	0	589	46	8%		
0.00	0	0	955	80			
PHF	Trucks	Cars		9	Ped.		
Trucks %				↑			
→	Ped.						
0							
0.00	0%	0	0	572	27	5%	
0.00	0%	0	0	1596	163	10%	
0.00	0%	0	0	0	0	0%	
0.00	0%	0	0	2418	287		

TMC 15 Min Report























REGIONAL RD 57 @ CONCESSION RD 3

	NORTH APPROACH												EAST APPROACH												SOUTH APPROACH												WEST APPROACH												
Time	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	Total								
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right										
Period 1																																																	
6:15	2	45	0	0	3	0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	0	0	23	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98								
6:30	4	43	0	0	1	0	0	0	0	0	14	0	6	1	0	0	0	0	0	0	0	30	6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107								
6:45	3	43	0	0	5	0	0	0	0	0	16	0	15	1	0	0	0	0	0	0	0	32	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132								
7:00	6	47	0	0	7	0	0	0	0	0	16	0	8	2	0	1	0	0	0	0	0	37	25	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156								
7:15	11	57	0	2	12	0	0	0	0	0	22	0	12	0	0	0	0	0	0	0	0	48	8	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182								
7:30	18	63	0	7	3	0	0	0	0	0	30	0	13	2	0	0	0	0	0	0	0	57	10	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209								
7:45	8	76	0	1	5	0	0	0	0	0	30	0	13	1	0	1	0	0	0	0	0	60	22	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228								
8:00	6	82	0	2	15	0	0	0	0	0	32	0	11	2	0	5	0	0	0	0	0	44	20	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225								
8:15	15	79	0	3	5	0	0	0	0	0	26	0	10	4	0	2	0	0	0	0	0	44	9	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208								
8:30	5	47	0	1	9	0	0	0	0	1	18	0	17	5	0	1	0	0	0	0	1	61	18	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193								
8:45	8	45	0	2	13	0	0	0	0	0	24	0	13	0	0	4	0	0	0	0	0	49	15	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182								
9:00	9	61	0	3	4	0	0	0	0	0	25	0	9	1	0	2	0	0	0	0	2	46	9	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179								
Period 2																																																	
11:45	1	43	0	1	7	0	0	0	0	0	8	0	5	2	0	2	0	0	0	0	0	40	9	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126								
12:00	16	38	0	2	8	0	0	0	0	0	17	0	7	1	0	1	0	0	0	0	0	36	18	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151								
12:15	9	30	0	0	11	0	0	0	0	0	9	0	10	2	0	2	0	0	0	0	0	29	16	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	123								
12:30	3	43	0	4	13	0	0	0	0	0	19	0	9	0	0	0	0	0	0	0	0	31	16	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144								
12:45	8	67	0	2	11	0	0	0	0	0	10	0	7	0	0	1	0	0	0	0	0	45	6	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168								
13:00	8	42	0	4	11	0	0	0	0	0	20	0	9	4	0	2	0	0	0	2	0	39	21	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169								
13:15	12	44	0	3	8	0	0	0	0	0	12	0	15	1	0	2	0	0	0	0	0	43	19	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167								
13:30	6	53	0	1	13	0	0	0	0	0	12	0	9	1	0	1	0	0	0	0	0	45	11	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156								
Period 3																																																	
15:15	14	49	0	4	6	0	0	0	0	0	10	0	9	2	0	0	0	0	0	0	0	47	24	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174								
15:30	8	47	0	1	6	0	0	0	0	0	21	0	6	1	0	2	0	0	0	0	0	52	20	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171								
15:45	26	62	0	2	10	0	0	0	0	0	20	0	14	1	0	3	0	0	0	0	0	63	13	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	223								
16:00	13	53	0	1	13	0	0	0	0	0	12	0	14	2	0	3	0	0	0	0	0	70	30	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	214								
16:15	14	58	0	1	8	0	0	0	0	0	13	0	13	1	0	1	0	0	0	0	0	60	21	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197								
16:30	16	65	0	2	7	0	0	0	0	0	15	0	10	2	0	1	0	0	0	0	0	68	26	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217								
16:45	22	72	0	1	9	0	0	0	0	0	12	0	9	1	0	0	0	0	0	0	0	65	23	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221								
17:00	31	76	0	3	5	0	0	0	0	0	16	0	12	0	0	0	0	0	0	0	0	53	22	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	221								
17:15	20	63	0	0	1	0	0	0	0	0	17	0	8	3	0	0	0	0	0	0	0	75	35	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	223								
17:30	26	84	0	0	1	0	0	0	0	0	27	0	9	1	0	2	0	0	0	0	0	74	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	254								
17:45	21	69	0	0	7	0	0	0	0	0	25	0	14	0	0	1	0	0	0	0	0	75	22	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237								
18:00	14	83	0	0	4	0	0	0	0	0	26	0	14	2	0	1	0	0	0	4	0	55	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	230									
18:00	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3										

HCM Signalized Intersection Capacity Analysis

3: Highway 2 & Prestonvale Road























4/24/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1240	488	96	719	3	271	0	104	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7	6.7	6.7	6.2	6.2			6.2	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.85			0.91	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)		3579	1633	1825	3614	1633	1807	1633			1720	
Flt Permitted		1.00	1.00	0.12	1.00	1.00	0.76	1.00			0.95	
Satd. Flow (perm)		3579	1633	230	3614	1633	1438	1633			1669	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1292	508	100	749	3	282	0	108	1	0	2
RTOR Reduction (vph)	0	0	162	0	0	1	0	30	0	0	1	0
Lane Group Flow (vph)	0	1292	346	100	749	2	282	78	0	0	2	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		41.8	41.8	41.8	41.8	41.8	28.4	28.4			28.4	
Effective Green, g (s)		41.8	41.8	41.8	41.8	41.8	28.4	28.4			28.4	
Actuated g/C Ratio		0.50	0.50	0.50	0.50	0.50	0.34	0.34			0.34	
Clearance Time (s)		6.7	6.7	6.7	6.7	6.7	6.2	6.2			6.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		1800	821	116	1818	821	491	558			570	
v/s Ratio Prot		0.36			0.21			0.05				
v/s Ratio Perm			0.21	c0.43		0.00	c0.20				0.00	
v/c Ratio		0.72	0.42	0.86	0.41	0.00	0.57	0.14			0.00	
Uniform Delay, d1		16.1	13.0	18.1	12.9	10.3	22.4	18.9			18.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		1.4	0.4	44.0	0.2	0.0	4.8	0.5			0.0	
Delay (s)		17.5	13.4	62.1	13.1	10.3	27.2	19.4			18.0	
Level of Service		B	B	E	B	B	C	B			B	
Approach Delay (s)		16.3			18.8			25.1			18.0	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM Average Control Delay		18.1			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		83.1			Sum of lost time (s)			12.9				
Intersection Capacity Utilization		77.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: King Street & Scugog Street











6/4/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	343	638	180	10	560	36	134	51	6	35	44	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93		1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00		0.96	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.98		1.00	0.87	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1883	1475		3482		1785	1842		1751	1558	
Flt Permitted	0.25	1.00	1.00		0.94		0.29	1.00		0.72	1.00	
Satd. Flow (perm)	459	1883	1475		3273		542	1842		1321	1558	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	693	196	11	609	39	146	55	7	38	48	403
RTOR Reduction (vph)	0	0	97	0	6	0	0	5	0	0	250	0
Lane Group Flow (vph)	373	693	99	0	653	0	146	57	0	38	201	0
Confl. Peds. (#/hr)	21		23	23		21	5		20	20		5
Heavy Vehicles (%)	3%	2%	3%	0%	3%	3%	2%	2%	0%	0%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt		Perm	Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	35.6	35.6	35.6		20.8		23.5	23.5		23.5	23.5	
Effective Green, g (s)	35.6	35.6	35.6		20.8		23.5	23.5		23.5	23.5	
Actuated g/C Ratio	0.50	0.50	0.50		0.30		0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	451	951	745		966		181	614		440	519	
v/s Ratio Prot	c0.14	0.37						0.03			0.13	
v/s Ratio Perm	c0.28		0.07		0.20		c0.27			0.03		
v/c Ratio	0.83	0.73	0.13		0.68		0.81	0.09		0.09	0.39	
Uniform Delay, d1	12.1	13.7	9.3		21.9		21.4	16.2		16.1	18.0	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.8	2.8	0.1		1.9		30.7	0.3		0.4	2.2	
Delay (s)	23.9	16.5	9.3		23.8		52.1	16.5		16.5	20.2	
Level of Service	C	B	A		C		D	B		B	C	
Approach Delay (s)		17.6			23.8			41.5			19.9	
Approach LOS		B			C			D			B	
Intersection Summary												
HCM Average Control Delay			21.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			70.5				Sum of lost time (s)			8.7		
Intersection Capacity Utilization			102.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: CR3 & RR57























4/16/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	78	57	252	91	80	303
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.68	0.94	0.81	0.87	0.95
Hourly flow rate (vph)	96	84	268	112	92	319
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	827	324			380	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	827	324			380	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	88			92	
cM capacity (veh/h)	314	717			1189	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	180	380	92	319		
Volume Left	96	0	92	0		
Volume Right	84	112	0	0		
cSH	425	1700	1189	1700		
Volume to Capacity	0.42	0.22	0.08	0.19		
Queue Length 95th (m)	15.7	0.0	1.9	0.0		
Control Delay (s)	19.6	0.0	8.3	0.0		
Lane LOS	C		A			
Approach Delay (s)	19.6	0.0	1.9			
Approach LOS	C					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization		41.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

3: Highway 2 & Prestonvale Road























4/24/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1670	657	129	865	4	299	0	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	6.7	6.7	6.7	6.2	6.2			6.2	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.85			0.90	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)		3579	1633	1825	3614	1633	1807	1633			1705	
Flt Permitted		1.00	1.00	0.08	1.00	1.00	0.76	1.00			0.96	
Satd. Flow (perm)		3579	1633	157	3614	1633	1436	1633			1662	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1740	684	134	901	4	311	0	120	1	0	3
RTOR Reduction (vph)	0	0	148	0	0	1	0	10	0	0	2	0
Lane Group Flow (vph)	0	1740	536	134	901	3	311	110	0	0	2	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		49.1	49.1	49.1	49.1	49.1	28.0	28.0			28.0	
Effective Green, g (s)		49.1	49.1	49.1	49.1	49.1	28.0	28.0			28.0	
Actuated g/C Ratio		0.55	0.55	0.55	0.55	0.55	0.31	0.31			0.31	
Clearance Time (s)		6.7	6.7	6.7	6.7	6.7	6.2	6.2			6.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		1953	891	86	1972	891	447	508			517	
v/s Ratio Prot		0.49			0.25			0.07				
v/s Ratio Perm			0.33	c0.86		0.00	c0.22				0.00	
v/c Ratio		0.89	0.60	1.56	0.46	0.00	0.70	0.22			0.00	
Uniform Delay, d1		18.1	13.8	20.4	12.4	9.3	27.3	22.9			21.4	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		5.6	1.2	300.1	0.2	0.0	8.7	1.0			0.0	
Delay (s)		23.7	15.0	320.5	12.5	9.3	35.9	23.9			21.4	
Level of Service		C	B	F	B	A	D	C			C	
Approach Delay (s)		21.2			52.3			32.6			21.4	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM Average Control Delay			30.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			1.25									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.9			
Intersection Capacity Utilization			92.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: King Street & Scugog Street











6/4/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	948	267	10	560	36	180	69	8	35	44	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.92		1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.98		1.00	0.87	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	1883	1453		3481		1785	1842		1734	1556	
Flt Permitted	0.25	1.00	1.00		0.71		0.28	1.00		0.70	1.00	
Satd. Flow (perm)	474	1883	1453		2474		524	1842		1282	1556	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	1030	290	11	609	39	196	75	9	38	48	403
RTOR Reduction (vph)	0	0	124	0	5	0	0	5	0	0	263	0
Lane Group Flow (vph)	554	1030	166	0	654	0	196	79	0	38	188	0
Confl. Peds. (#/hr)	21		23	23		21	5		20	20		5
Heavy Vehicles (%)	3%	2%	3%	0%	3%	3%	2%	2%	0%	0%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt		Perm	Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	47.3	47.3	47.3		29.3		31.3	31.3		31.3	31.3	
Effective Green, g (s)	47.3	47.3	47.3		29.3		31.3	31.3		31.3	31.3	
Actuated g/C Ratio	0.53	0.53	0.53		0.33		0.35	0.35		0.35	0.35	
Clearance Time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	464	990	764		805		182	641		446	541	
v/s Ratio Prot	c0.20	0.55						0.04			0.12	
v/s Ratio Perm	c0.43		0.11		0.26		c0.37			0.03		
v/c Ratio	1.19	1.04	0.22		0.81		1.08	0.12		0.09	0.35	
Uniform Delay, d1	16.0	21.4	11.4		27.8		29.4	20.0		19.7	21.8	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	106.8	39.7	0.1		6.3		88.7	0.4		0.4	1.8	
Delay (s)	122.8	61.0	11.6		34.1		118.0	20.4		20.1	23.5	
Level of Service	F	E	B		C		F	C		C	C	
Approach Delay (s)		71.6			34.1			88.7			23.3	
Approach LOS		E			C			F			C	
Intersection Summary												
HCM Average Control Delay			58.4				HCM Level of Service			E		
HCM Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			8.7		
Intersection Capacity Utilization			121.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: CR3 & RR57

























4/16/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	78	57	208	135	119	367
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.81	0.68	0.94	0.81	0.87	0.95
Hourly flow rate (vph)	96	84	221	167	137	386
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	964	305			388	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	305			388	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	61	89			88	
cM capacity (veh/h)	249	735			1182	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	180	388	137	386		
Volume Left	96	0	137	0		
Volume Right	84	167	0	0		
cSH	360	1700	1182	1700		
Volume to Capacity	0.50	0.23	0.12	0.23		
Queue Length 95th (m)	20.4	0.0	3.0	0.0		
Control Delay (s)	24.6	0.0	8.4	0.0		
Lane LOS	C		A			
Approach Delay (s)	24.6	0.0	2.2			
Approach LOS	C					
Intersection Summary						
Average Delay		5.1				
Intersection Capacity Utilization		43.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

3: Highway 2 & Prestonvale Road























4/16/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1670	657	129	865	4	299	0	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0	6.0	6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.85			0.90	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)		3579	1633	1825	3614	1633	1807	1633			1705	
Flt Permitted		1.00	1.00	0.08	1.00	1.00	0.76	1.00			0.96	
Satd. Flow (perm)		3579	1633	149	3614	1633	1436	1633			1651	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1740	684	134	901	4	311	0	120	1	0	3
RTOR Reduction (vph)	0	0	149	0	0	1	0	72	0	0	2	0
Lane Group Flow (vph)	0	1740	535	134	901	3	311	48	0	0	2	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		47.6	47.6	55.6	55.6	55.6	22.0	22.0			22.0	
Effective Green, g (s)		47.6	47.6	55.6	55.6	55.6	22.0	22.0			22.0	
Actuated g/C Ratio		0.53	0.53	0.62	0.62	0.62	0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		1901	868	167	2243	1013	353	401			405	
v/s Ratio Prot		c0.49		c0.04	0.25			0.03				
v/s Ratio Perm			0.33	0.46		0.00	c0.22				0.00	
v/c Ratio		0.92	0.62	0.80	0.40	0.00	0.88	0.12			0.00	
Uniform Delay, d1		19.2	14.6	18.6	8.6	6.5	32.5	26.3			25.5	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		7.3	1.3	23.5	0.1	0.0	25.6	0.6			0.0	
Delay (s)		26.5	16.0	42.2	8.7	6.5	58.1	26.9			25.5	
Level of Service		C	B	D	A	A	E	C			C	
Approach Delay (s)		23.5			13.0			49.4			25.5	
Approach LOS		C			B			D			C	
Intersection Summary												
HCM Average Control Delay			23.6				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			89.6				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			89.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: King Street & Scugog Street

6/4/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	948	267	10	560	36	180	69	8	35	44	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00		0.99	1.00		0.96	1.00	1.00
Frt	1.00	1.00	0.85		0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1766	1883	1465		3482		1777	1843		1744	1830	1525
Flt Permitted	0.27	1.00	1.00		0.93		0.73	1.00		0.70	1.00	1.00
Satd. Flow (perm)	504	1883	1465		3247		1357	1843		1290	1830	1525
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	1030	290	11	609	39	196	75	9	38	48	403
RTOR Reduction (vph)	0	0	110	0	5	0	0	5	0	0	0	308
Lane Group Flow (vph)	554	1030	180	0	654	0	196	79	0	38	48	95
Confl. Peds. (#/hr)	21		23	23		21	5		20	20		5
Heavy Vehicles (%)	3%	2%	3%	0%	3%	3%	2%	2%	0%	0%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	2	2	0	0	0	0	0	0
Turn Type	pm+pt		Perm	Perm			Perm			Perm		Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6			8			4		4
Actuated Green, G (s)	49.4	49.4	49.4		27.2		18.7	18.7		18.7	18.7	18.7
Effective Green, g (s)	49.4	49.4	49.4		27.2		18.7	18.7		18.7	18.7	18.7
Actuated g/C Ratio	0.62	0.62	0.62		0.34		0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	3.0	5.7	5.7		5.7		5.7	5.7		5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	618	1170	910		1111		319	434		303	430	359
v/s Ratio Prot	0.22	c0.55						0.04			0.03	
v/s Ratio Perm	c0.34		0.12		0.20		c0.14			0.03		0.06
v/c Ratio	0.90	0.88	0.20		0.59		0.61	0.18		0.13	0.11	0.26
Uniform Delay, d1	12.0	12.6	6.5		21.5		27.2	24.3		24.0	23.9	24.8
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.6	8.0	0.1		0.8		8.6	0.9		0.9	0.5	1.8
Delay (s)	27.6	20.5	6.6		22.3		35.7	25.2		24.8	24.4	26.6
Level of Service	C	C	A		C		D	C		C	C	C
Approach Delay (s)		20.5			22.3			32.6			26.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			22.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			79.5				Sum of lost time (s)			11.4		
Intersection Capacity Utilization			97.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

SimTraffic Simulation Summary

3: King Street & Scugog Street

6/4/2014

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	3:57	3:57	3:57	3:57
End Time	5:00	5:00	5:00	5:00
Total Time (min)	63	63	63	63
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intvl	1	1	1	1
Vehs Entered	2451	2393	2351	2399
Vehs Exited	2429	2387	2342	2386
Starting Vehs	22	18	23	20
Ending Vehs	44	24	32	33
Denied Entry Before	7	0	3	3
Denied Entry After	2	1	1	1
Travel Distance (km)	632	620	609	620
Travel Time (hr)	31.4	29.7	28.9	30.0
Total Delay (hr)	15.0	13.7	13.2	13.9
Total Stops	1771	1612	1596	1662
Fuel Used (l)	92.7	90.0	87.6	90.1

Interval #0 Information Seeding

Start Time	3:57
End Time	4:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2451	2393	2351	2399
Vehs Exited	2429	2387	2342	2386
Starting Vehs	22	18	23	20
Ending Vehs	44	24	32	33
Denied Entry Before	7	0	3	3
Denied Entry After	2	1	1	1
Travel Distance (km)	632	620	609	620
Travel Time (hr)	31.4	29.7	28.9	30.0
Total Delay (hr)	15.0	13.7	13.2	13.9
Total Stops	1771	1612	1596	1662
Fuel Used (l)	92.7	90.0	87.6	90.1

Queuing and Blocking Report

3: King Street & Scugog Street

6/4/2014

Intersection: 3: Int

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	LT	TR	L	TR	L	TR
Maximum Queue (m)	74.8	119.7	16.4	54.1	56.8	44.6	21.8	18.3	97.3
Average Queue (m)	36.3	52.2	2.4	28.3	31.6	20.3	7.9	4.6	37.6
95th Queue (m)	65.3	94.0	10.3	44.1	48.3	38.2	17.8	12.5	75.6
Link Distance (m)		125.6	125.6	114.8	114.8		95.4		125.3
Upstream Blk Time (%)		0							
Queuing Penalty (veh)		0							
Storage Bay Dist (m)	60.0					35.0		45.0	
Storage Blk Time (%)	1	2				2			7
Queuing Penalty (veh)	7	8				1			2

Network Summary

Network wide Queuing Penalty: 19

SimTraffic Simulation Summary

3: King Street & Scugog Street

6/4/2014

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	3:57	3:57	3:57	3:57
End Time	5:00	5:00	5:00	5:00
Total Time (min)	63	63	63	63
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intvl	1	1	1	1
Vehs Entered	2724	2711	2665	2699
Vehs Exited	2713	2717	2649	2693
Starting Vehs	33	38	32	33
Ending Vehs	44	32	48	40
Denied Entry Before	24	18	1	14
Denied Entry After	388	370	340	365
Travel Distance (km)	705	703	687	698
Travel Time (hr)	231.2	225.8	197.5	218.2
Total Delay (hr)	213.1	207.6	179.8	200.2
Total Stops	2322	2308	2091	2240
Fuel Used (l)	271.4	267.0	240.2	259.5

Interval #0 Information Seeding

Start Time	3:57
End Time	4:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2724	2711	2665	2699
Vehs Exited	2713	2717	2649	2693
Starting Vehs	33	38	32	33
Ending Vehs	44	32	48	40
Denied Entry Before	24	18	1	14
Denied Entry After	388	370	340	365
Travel Distance (km)	705	703	687	698
Travel Time (hr)	231.2	225.8	197.5	218.2
Total Delay (hr)	213.1	207.6	179.8	200.2
Total Stops	2322	2308	2091	2240
Fuel Used (l)	271.4	267.0	240.2	259.5

Queuing and Blocking Report

3: King Street & Scugog Street

6/4/2014

Intersection: 3: Int

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	LT	TR	L	TR	L	TR
Maximum Queue (m)	75.0	133.8	55.0	71.1	75.1	44.7	81.7	18.1	112.8
Average Queue (m)	63.6	116.6	4.6	35.6	38.5	27.8	14.3	5.1	41.9
95th Queue (m)	87.6	161.0	27.4	59.1	64.1	45.4	45.0	13.4	84.0
Link Distance (m)		125.6	125.6	114.8	114.8		95.4		125.3
Upstream Blk Time (%)		12	0				0		0
Queuing Penalty (veh)		0	0				0		0
Storage Bay Dist (m)	60.0					35.0		45.0	
Storage Blk Time (%)	15	15				6	0		6
Queuing Penalty (veh)	144	76				5	0		2

Network Summary

Network wide Queuing Penalty: 227

SimTraffic Simulation Summary

3: King Street & Scugog Street

6/4/2014

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	3:57	3:57	3:57	3:57
End Time	5:00	5:00	5:00	5:00
Total Time (min)	63	63	63	63
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intvls	1	1	1	1
Vehs Entered	2801	2808	2768	2791
Vehs Exited	2792	2798	2777	2790
Starting Vehs	30	25	30	28
Ending Vehs	39	35	21	30
Denied Entry Before	18	7	2	9
Denied Entry After	294	200	197	230
Travel Distance (km)	724	724	718	722
Travel Time (hr)	169.0	127.6	124.4	140.4
Total Delay (hr)	150.7	109.2	106.2	122.0
Total Stops	1686	1746	1556	1660
Fuel Used (l)	219.4	184.4	180.2	194.7

Interval #0 Information Seeding

Start Time	3:57
End Time	4:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2801	2808	2768	2791
Vehs Exited	2792	2798	2777	2790
Starting Vehs	30	25	30	28
Ending Vehs	39	35	21	30
Denied Entry Before	18	7	2	9
Denied Entry After	294	200	197	230
Travel Distance (km)	724	724	718	722
Travel Time (hr)	169.0	127.6	124.4	140.4
Total Delay (hr)	150.7	109.2	106.2	122.0
Total Stops	1686	1746	1556	1660
Fuel Used (l)	219.4	184.4	180.2	194.7

Queuing and Blocking Report

3: King Street & Scugog Street

6/4/2014

Intersection: 3: Int

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	TR	L	TR	L	T	R
Maximum Queue (m)	74.8	132.9	22.4	49.8	56.8	44.7	75.7	21.5	27.4	33.7
Average Queue (m)	43.7	80.5	6.7	28.2	30.0	30.1	21.4	6.6	8.3	3.0
95th Queue (m)	73.2	141.7	14.9	44.1	49.2	48.4	58.5	15.3	20.5	21.9
Link Distance (m)		128.3	128.3	114.8	114.8		95.4		127.9	
Upstream Blk Time (%)		3					0			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	60.0					35.0		45.0		60.0
Storage Blk Time (%)	1	7				11	0			
Queuing Penalty (veh)	5	37				8	1			

Network Summary

Network wide Queuing Penalty: 52

Clarington TMP
Screenline Growth Rates for Intersection Operational Analysis

Scenario Definitions:
11036: 2011 Base Network - PM Peak Hour
31241: 2031 Base Network - PM Peak Hour

Screenline Summary (2011 to 2031)

Screenline	Eastbound/Northbound			Westbound/Southbound		
	2011 Volumes	2031 Volumes	Annual Growth Rate	2011 Volumes	2031 Volumes	Annual Growth Rate
COURTICE						
South of Highway 2						
Townline Road South of Highway 2	140	159	0.6%	3	129	20.7%
Darlington Boulevard South of Highway 2	12	22	3.1%	63	49	-1.2%
Prestonvale Road South of Highway 2	309	279	-0.5%	459	553	0.9%
Sandringham Drive South of Highway 2	8	0	-100.0%	8	98	13.3%
Trulls Road South of Highway 2	240	206	-0.8%	385	475	1.1%
Courtice Road South of Highway 2	466	549	0.8%	308	325	0.3%
Total Screenline Volume	1,175	1,215	0.2%	1,226	1,629	1.4%
West of Prestonvale Road						
McLean Road West of Prestonvale Road	-	2	-	-	16	-
Islay Court West of Prestonvale Road	-	136	-	-	14	-
Nash Road West of Prestonvale Road	255	165	-2.2%	61	60	-0.1%
Highway 2 West of Prestonvale Road	1,450	1,535	0.3%	985	771	-1.2%
Glenabbey Drive West of Prestonvale Road	125	199	2.4%	38	15	-4.5%
Meadowglade Road West of Prestonvale Road	95	380	7.2%	44	182	7.4%
Bloor Street West of Prestonvale Road	321	548	2.7%	205	231	0.6%
Total Screenline Volume	2,246	2,965	1.4%	1,333	1,289	-0.2%
East of Prestonvale Road						
McLean Drive East of Prestonvale Road	-	2	-	-	16	-
Islay Court East of Prestonvale Road	-	136	-	-	14	-
Nash Road East of Prestonvale Road	255	165	-2.2%	61	60	-0.1%
Highway 2 East of Prestonvale Road	1,141	1,279	0.6%	827	788	-0.2%
Claret Road East of Prestonvale Road	324	322	0.0%	114	51	-3.9%
Glenabbey Drive East of Prestonvale Road	-	64	-	-	0	-
Meadowglade Road East of Prestonvale Road	-	332	-	-	136	-
Bloor Street East of Prestonvale Road	331	578	2.8%	282	435	2.2%
Total Screenline Volume	2,051	2,878	1.7%	1,284	1,500	0.8%
BOWMANVILLE						
North of Concession Road 3/Nash Road						
Green Road North of Nash Road	0	0	-	0	0	-
Old Scugog Road North of Concession Road 3	0	0	-	0	0	-
Regional Road 57 North of Concession Road 3	314	267	-0.8%	361	553	2.2%
Middle Road North of Concession Road 3	0	0	-	0	0	-
Liberty Street North of Concession Road 3	205	215	0.2%	89	19	-7.4%
Total Screenline Volume	519	482	-0.4%	450	572	1.2%
South of Concession Road 3/Nash Road						
Green Road South of Nash Road	0	0	-	0	54	-
Nash Road South of Nash Road	13	0	-100.0%	35	101	5.4%
Regional Road 57 South of Concession Road 3	358	541	2.1%	334	299	-0.6%
N Scugog Court South of Concession Road 3	19	17	-0.6%	69	153	4.1%
W Scugog Line South of Concession Road 3	0	0	-	0	0	-
Scugog Street South of Concession Road 3	42	32	-1.4%	36	10	-6.2%
Liberty Street South of Concession Road 3	306	186	-2.5%	164	51	-5.7%
Total Screenline Volume	738	776	0.3%	638	668	0.2%
East of Regional Road 57						
Concession Road 3 East of Regional Road 57	207	587	5.3%	137	60	-4.0%
Longworth Avenue East of Regional Road 57	546	839	2.2%	192	197	0.1%
Highway 2 East of Regional Road 57	1,011	1,217	0.9%	723	595	-1.0%
Total Screenline Volume	1,764	2,643	2.0%	1,052	852	-1.0%
East of Scugog Street						
Concession Road 3 East of Scugog Street	80	155	3.4%	66	63	-0.2%
Bons Avenue East of Scugog Street	0	0	-	0	0	-
Longworth Avenue East of Scugog Street	294	356	1.0%	71	56	-1.2%
Concession Street East of Scugog Street	385	463	0.9%	172	102	-2.6%
Wellington Street East of Scugog Street	13	24	3.1%	119	99	-0.9%
Highway 2 East of Scugog Street	364	534	1.9%	397	386	-0.1%
Queen Street East of Scugog Street	168	272	2.4%	166	109	-2.1%
Total Screenline Volume	1,304	1,804	1.6%	991	815	-1.0%
North of Highway 2						
Green Road North of Highway 2	15	394	17.8%	36	110	5.7%
Regional Road 57 North of Highway 2	819	1,298	2.3%	479	715	2.0%
Scugog Street North of Highway 2	621	724	0.8%	338	211	-2.3%
Liberty Street North of Highway 2	651	634	-0.1%	446	217	-3.5%
Total Screenline Volume	2,106	3,050	1.9%	1,299	1,253	-0.2%
South of Highway 2						
Green Road South of Highway 2	66	149	4.2%	128	335	4.9%
Clarington Boulevard South of Highway 2	103	344	6.2%	38	148	7.0%
Regional Road 57 South of Highway 2	760	1,036	1.6%	676	744	0.5%
Roenigk Drive South of Highway 2	214	313	1.9%	250	110	-4.0%
Scugog Street South of Highway 2	166	109	-2.1%	168	272	2.4%
Liberty Street South of Highway 2	633	641	0.1%	457	283	-2.4%
Total Screenline Volume	1,942	2,592	1.5%	1,717	1,892	0.5%

Appendix F

Road Network Cost Tables

Clarington TMP
Implementation Strategy

Capital Project Types & Unit Costs (inflated to 2014)

Source: Development Charges Background Study, APPENDIX, Hemson Consulting Ltd., June 2010

Inflation Rate (2010 to 2014): 7.93% (according to Bank of Canada)

Source: <http://www.bankofcanada.ca/rates/related/inflation-calculator/>

		Unit Costs / m								
Project Type	Project Description	Road Construction	Storm Drainage	Sidewalk Construction	Streetlight Construction	Utility Works	Streetscape Work	Signals / Intersections	Structure Works	Signals / Int Price
Road Works										
1.1	Semi Urban to Urban Collector	\$1,348.61	\$666.99	\$225.14	\$65.66	\$120.02	\$209.43	\$0.00	\$0.00	\$0.00
1.2	Rural to Urban Collector	\$2,029.90	\$698.16	\$227.55	\$65.66	\$145.01	\$64.28	\$0.00	\$0.00	\$0.00
1.3	Collector Road Widening	\$561.30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
1.4	Semi Urban to Urban Local Residential	\$1,370.35	\$766.93	\$267.50	\$0.00	\$51.73	\$8.54	\$0.00	\$0.00	\$0.00
1.5	Urban Local Reconstruction	\$1,295.78	\$397.98	\$262.88	\$0.00	\$56.98	\$45.83	\$0.00	\$0.00	\$0.00
1.6	Widening of Rural to Urban Collector	\$694.91	\$993.36	\$163.48	\$65.66	\$0.00	\$33.21	\$33.21	\$33.21	\$27,461.06
1.7	Rural to Half Urban Collector	\$1,197.83	\$382.09	\$113.78	\$65.66	\$145.01	\$32.14	\$0.00	\$0.00	\$0.00
1.8	New Urban Collector	\$1,723.88	\$401.74	\$259.79	\$301.73	\$16.03	\$106.88	\$0.00	\$0.00	\$0.00
1.9	Road Oversizing	\$380.95	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
1.99	Rural Upgrade	\$397.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
1.31	Road Widening - 2 to 4 Lanes*	\$4,633.43	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
1.32	Road Widening - 4 to 6 Lanes*	\$5,432.12	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sidewalk Works										
2.1	Fill Ditch and Pour Curb to Construct Sidewalk	\$0.00	\$0.00	\$704.84	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2.2	Pour Curb and Grade to Construct Sidewalk	\$0.00	\$0.00	\$341.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2.3	Tie Sidewalk into existing Cross Section	\$0.00	\$0.00	\$191.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2.4	Fill Ditch and Pour Curb to Construct Multi Use 3.0m Path	\$0.00	\$0.00	\$818.62	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Street Lighting works										
3.1	Lighting for Urban Arterial Road (both sides - 50 m spacing)	\$0.00	\$0.00	\$0.00	\$216.36	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
3.2	Decorative Street ighting (double hung in median - 50 m spacing)	\$0.00	\$0.00	\$0.00	\$468.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
3.3	Decorative Street Lighting (both side - 35 m space)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.4	Lighting for Collector Road (single side - 50 m spacing)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.5	Lighting for Rural Arterial Road (single side - 50 m spacing)	\$0.00	\$0.00	\$0.00	\$109.62	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
3.6	Lighting on Exisitng HP's for Arterial Road (one side - 70 m spacing)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.7	Walkway Lighting (one side - 30 m spacing)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intersection/Rail Crossing										
4.1	Intersection (at Highway Ramp)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$172,526.25	\$0.00	\$226,653.00
4.2	Intersection (Urban)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$317,448.30	\$0.00	\$317,448.30
4.3	Intersection (Rural)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$230,035.00	\$0.00	\$230,035.00
4.4	Railroad Crossing	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$535,987.40	\$0.00	\$535,987.40
Bridge Structure Works										
5.1	Structure - Rail Underpass - Collector/Arterial (14 m ultimate width)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,372,916.76	\$0.00
5.2	Structure - Rail Overpass - Collector/Arterial (14 m ultimate width)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8,634,400.00	\$0.00
5.3	Structure - Creek Crossing - Major (collector/arterial road, 3 span)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,577,952.03	\$0.00
5.4	Structure - Creek Crossing - Minor (local or rural road, single span)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$934,015.13	\$0.00
Streetscape Works										
6.11	Townline Rd to Darlington Blvd, Courtice	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$716.74	\$0.00	\$0.00	\$0.00
6.12	Darlington Blvd to Centerfield Dr, Courtice	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$860.34	\$0.00	\$0.00	\$0.00
6.13	Farewell Creek Bridge (Centerfield to Prestonvale Rd), Courtice	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,678.02	\$0.00	\$0.00	\$0.00
6.14	Prestonvale Rd to Trulls Rd, Courtice	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,021.36	\$0.00	\$0.00	\$0.00

[illegible]

Clarington TMP
Implementation Strategy

Road Network Improvements Cost Estimate
Capital Project Types & Unit Costs (2010)

Source: Development Charges Background Study, APPENDIX, Hemson Consulting Ltd., June 2010

Community	Road	Location	Project Type	Project Type (code)	Length (km)	Road Construction	Storm Drainage	Sidewalk Construction	Streetlight Construction	Utility Works	Streetscape Work	Signals / Intersections	Structure Works	Signals / Int Price
Short Term (0-10 years)														
Bowmanville	Highway 2/King St	at Scugog St	Operational Improvement	1.31	0.02	\$46,334	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Baseline Rd	Lambs Rd to Holt Rd	Upgrade Standards	1.2	5.79	\$11,753,131	\$4,042,344	\$1,317,538	\$380,154	\$839,613	\$372,170	\$0	\$0	\$0
Bowmanville	Concession Rd 3	North Scugog St to Regional Rd 57	Realignment	1.8	0.05	\$86,194	\$20,087	\$12,989	\$15,086	\$801	\$5,344	\$0	\$0	\$0
Bowmanville	Concession Rd 3	Mearns Rd to Regional Rd 57	Upgrade Standards	1.4	2.47	\$3,384,752	\$1,894,309	\$660,715	\$0	\$127,763	\$21,097	\$0	\$0	\$0
Bowmanville	Concession Rd 3	at Regional Rd 57	Intersection Reconstruction	4.2	-	0	0	0	0	0	0	0	0	\$317,448
Medium Term														
Bowmanville	Longworth Ave	Scugog St to Regional Rd 57	Widening to 4 lanes	1.31	0.85	\$3,938,420	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Longworth Ave Extension (a)	Regional Rd 57 to Holt Rd	New Arterial 4 lanes	1.8	2.52	\$4,344,189	\$1,012,396	\$654,670	\$760,357	\$40,389	\$269,343	\$0	\$0	\$0
Bowmanville	Longworth Ave Extension (a)	Regional Rd 57 to Holt Rd	New Arterial 4 lanes	1.8	1.69	\$2,913,365	\$678,948	\$439,044	\$509,922	\$27,087	\$180,631	\$0	\$0	\$0
Bowmanville	Holt Rd*	Longworth Ave Extension (a) to Highway 2	Widening to 4 lanes	1.31	0.24	\$1,112,024	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Holt Rd*	Highway 2 to Bloor St	Upgrade Standards	1.2	0.71	\$1,441,230	\$495,693	\$161,563	\$46,617	\$102,958	\$45,637	\$0	\$0	\$0
Bowmanville	Holt Rd	Bloor St to Baseline Rd	Upgrade Standards	1.2	1.94	\$3,938,009	\$1,354,430	\$441,455	\$127,375	\$281,321	\$124,699	\$0	\$0	\$0
Bowmanville	Holt Rd	Baseline Rd to South of Highway 401	Widening to 4 lanes	1.31	1.00	\$4,633,435	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Maple Grove Rd**	Longworth Ave Extension (b) to Bloor St	Widening to 4 lanes	1.31	1.12	\$5,189,447	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Bloor St***	Maple Grove Rd to Holt Rd	Upgrade Standards	1.2	0.82	\$1,664,519	\$572,491	\$186,594	\$53,839	\$118,909	\$52,708	\$0	\$0	\$0
Bowmanville	Baseline Rd***	Lambs Rd to Waverly St	Widening to 4 lanes	1.31	2.90	\$13,436,961	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bowmanville	Lambs Rd***	Highway 2 to Baseline Rd	Widening to 4 lanes	1.31	0.67	\$3,104,401	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Clarington TMP
Implementation Strategy

Road Network Improvements Cost Estimate
Capital Project Types & Unit Costs (2010)

Source: Development Charges Background Study, APPENDIX, Hemson Consulting Ltd., June 2010

Community	Road	Location	Project Type	Project Type (code)	Length (km)	EA Process	Land Purchase	Total Gross	Notes
Bowmanville	Highway 2/King St	at Scugog St	Operational Improvement	1.31	0.02	0	0	\$46,334	Assumed cost is 1/2 the cost of an urban widening, for right turn lane
Bowmanville	Baseline Rd	Lambs Rd to Holt Rd	Upgrade Standards	1.2	5.79	0	0	\$18,704,951	
Bowmanville	Concession Rd 3	North Scugog St to Regional Rd 57	Realignment	1.8	0.05	0	0	\$140,503	Confirm cost, has already been priced
Bowmanville	Concession Rd 3	Mearns Rd to Regional Rd 57	Upgrade Standards	1.4	2.47	0	0	\$6,088,636	Confirm cost, has already been priced
Bowmanville	Concession Rd 3	at Regional Rd 57	Intersection Reconstruction	4.2	-	0	0	\$317,448	Confirm cost, has already been priced
Medium Term									
Bowmanville	Longworth Ave	Scugog St to Regional Rd 57	Widening to 4 lanes	1.31	0.85	0	0	\$3,938,420	Confirm widening unit costs
Bowmanville	Longworth Ave Extension (a)	Regional Rd 57 to Holt Rd	New Arterial 4 lanes	1.8	2.52	0	0	\$7,081,344	
Bowmanville	Longworth Ave Extension (a)	Regional Rd 57 to Holt Rd	New Arterial 4 lanes	1.8	1.69	0	0	\$4,748,997	
Bowmanville	Holt Rd*	Longworth Ave Extension (a) to Highway 2	Widening to 4 lanes	1.31	0.24	0	0	\$1,112,024	Confirm widening unit costs
Bowmanville	Holt Rd*	Highway 2 to Bloor St	Upgrade Standards	1.2	0.71	0	0	\$2,293,699	
Bowmanville	Holt Rd	Bloor St to Baseline Rd	Upgrade Standards	1.2	1.94	0	0	\$6,267,289	
Bowmanville	Holt Rd	Baseline Rd to South of Highway 401	Widening to 4 lanes	1.31	1.00	0	0	\$4,633,435	Confirm widening unit costs
Bowmanville	Maple Grove Rd**	Longworth Ave Extension (b) to Bloor St	Widening to 4 lanes	1.31	1.12	0	0	\$5,189,447	Confirm widening unit costs
Bowmanville	Bloor St**	Maple Grove Rd to Holt Rd	Upgrade Standards	1.2	0.82	0	0	\$2,649,060	
Bowmanville	Baseline Rd***	Lambs Rd to Waverly St	Widening to 4 lanes	1.31	2.90	0	0	\$13,436,961	Confirm widening unit costs
Bowmanville	Lambs Rd***	Highway 2 to Baseline Rd	Widening to 4 lanes	1.31	0.67	0	0	\$3,104,401	Confirm widening unit costs