DURHAM REGION

DURHAM TRANSPORTATION MASTER PLAN 2017

DECEMBER 2017

moving
connecting
growing

Durham Transportation Master Plan

Executive Summary

Introduction

The Durham Transportation Master Plan (TMP) is a strategic planning document that defines the policies, programs and infrastructure modifications needed to manage anticipated transportation demands to the year 2031 and beyond, and to support the development pattern designated in the Regional Official Plan. The plan represents a major update to the 2005 TMP and builds on the foundation set by several key documents including the 2010 Long Term Transit Strategy, 2012 Regional Cycling Plan, and the 2016 Durham Region Transit (DRT) Five Year Service Strategy.

The TMP is a multi-modal plan focusing on all modes of transportation, including walking, cycling, public transit, autos and goods movement.

Plan Development

Preparation of the TMP followed the master planning process defined in the Municipal Class Environmental Assessment (EA). The work completed in preparing the TMP is consistent with the first two phases of the Class EA planning and design process for the proposed Regional Road projects. Project-specific investigations are required to satisfy EA requirements before implementation of each individual project.

In keeping with the principles of environmental assessment, the TMP featured a high degree of public and stakeholder involvement. This included three rounds of public open houses, a public opinion survey, a project website, periodic newsletters and a Stakeholder Advisory Committee (SAC). Two rounds of individual meetings were also held with staff of each area municipality.

Future Conditions

The Region's growth forecast for the year 2031, as per the Regional Official Plan, is for a population of 960,000 and employment of 350,000. These forecasts are consistent with the Province's initial 2031 growth targets in the Growth Plan for the Greater Golden Horseshoe (2006). Since that time, the province has amended its growth targets for 2031 and the amended population and employment forecasts for Durham Region are 970,000 and 360,000, respectively.

Based on the Regional Official Plan forecasts, the Region's population and employment will grow by 49% and 55%, respectively, resulting in corresponding increases in travel demand. This represents a steady

growth of trips to 2031 generally consistent with historical trip growth. As population and employment increases in the Region, a greater proportion of trips will start and end within Durham. By 2031, it is projected that almost 60% of morning peak trips will remain within the Region. This change in travel patterns will require a more focused emphasis on transportation improvements to address shorter and more localized trip patterns, including targeted road capacity expansion, enhanced transit services and improved walking and cycling facilities.

Guiding Principles and Strategic Directions

The following seven principles are integral to the plan and reflect the "vision" for Durham Region. Three of the principles summarize the overarching goals of this plan ("why"), and the remaining four summarize broad approaches to achieve those goals ("how").

WHY

- Healthy communities
- Economic prosperity
- Environmental protection

HOW

- A focus on users
- Connectivity
- Collaboration and leadership
- Innovation

These principles are addressed by seven key directions, which serve as the framework for the TMP's policies, strategies and actions, as follows:

- Direction 1: Strengthen the bond between land use and transportation
- Direction 2: Elevate the role of integrated public transit including Rapid Transit
- Direction 3: Make walking and cycling more practical and attractive
- Direction 4: Optimize road infrastructure and operation
- Direction 5: Promote sustainable travel choices
- Direction 6: Improve goods movement to support economic development
- Direction 7: Invest strategically in the transportation system

The Plan

The Transportation Master Plan is structured around the seven key directions.

Land Use and Transportation

Land use patterns have a strong influence on travel such as the number of trips taken and mode choice. The reverse is also true, since transportation systems have a direct impact on the type, scale and location of development that occurs. Policies in the TMP are designed to support the overall objectives of the Regional Official Plan to facilitate compact, mixed land use patterns and pedestrian-friendly design that will encourage the use of sustainable modes. This requires that transportation facilities and services promote healthy community design and offer a growing number of residents and businesses practical and efficient mobility options for trips to work, school and other destinations across Durham Region.

Key actions recommended in the TMP to support Direction #1: Strengthen the bond between land use and transportation, are as follows.

- Develop Travel Demand Management (TDM) development guidelines and apply them in the planning and design of new neighbourhoods, development sites and roadway corridors to improve connectivity to the transportation network and offer improved options for transit, walking and cycling.
- Work with area municipalities to adopt Transit Oriented Development (TOD) Guidelines and to apply TOD principles in the planning and design of new developments in Centres, Corridors and rapid transit station areas.

Public Transit

Since the completion of the last TMP, Durham Region has seen the amalgamation of individual transit services into a Regional service and introduction of DRT's PULSE rapid, high frequency service, as well as continued improvements in GO Transit's rail service on the Lakeshore East corridor. Over the next 15-20 years, as the Region grows and intensifies, there is an opportunity for transit to take on a much greater role in meeting travel demand needs by offering a more reliable and competitive alternative to auto travel. New technologies, including demand responsive transit, offer the potential to extend the reach of transit to lower density and rural communities. At the same time, the introduction of 15-minute electrified GO rail service on the Lakeshore line and extension of GO Rail to Bowmanville will greatly enhance transit capacity across the Region.

Key actions recommended in the TMP to support Direction #2: Elevate the role of integrated public transit including rapid transit, are as follows and as illustrated on Maps 1a and 1b:

- Continue expansion of Bus Rapid Transit (BRT) in the Regional Highway 2 corridor from the Toronto boundary to Downtown Oshawa.
- Implement BRT on Simcoe Street in Oshawa between the future Central Oshawa GO Station and Highway 407, including re-purposing an existing traffic lane in each direction to exclusive transit use south of Conlin Road.

- Implement a High Frequency Network that includes transit priority measures and buses operating in High Occupancy Vehicle (HOV) lanes on key corridors.
- Designate Other Transit Spines to facilitate service to rural communities.
- Promote transit-supportive development in areas served by the recommended Higher-Order Transit network.
- Introduce and expand demand-responsive services in rural areas, and consider expanding these services into other low demand areas of the Region.

Walking and Cycling

As the Region grows and intensifies, active transportation (walking and cycling) will become the mode of choice for more people. Achieving greater levels of active transportation is essential to addressing a number of strategic goals of the Region from promoting healthy neighbourhoods to addressing climate change. Supporting active travel is a cost-effective population wide approach to increasing physical activity levels and improving health. Active travelers get more daily physical activity contributing to the recommended levels of moderate to vigorous physical activity for each day. The TMP recognizes the challenges of a two-tiered region and the fact that area municipalities are responsible for many aspects of walking and cycling. As a result, the TMP proposes a targeted approach to accelerating the implementation of the Regional Cycling Plan, in partnership with area municipalities.

Key actions recommended in the TMP to support Direction #3: Make walking and cycling more practical and attractive, are as follows:

- Integrate the Primary Cycling Network (PCN) of the 2012 Regional Cycling Plan (RCP), the Regional Trail Network and the Greenbelt Cycling Route into the TMP.
- Prioritize continuous routes within the PCN by identifying Short-Term Cycling Routes (Maps 3a and 3b) to be implemented within 10 years.
- Consider stand-alone infill projects to complete critical links in the Short-Term Cycling Routes in the Region's annual Regional Road Program Capital Budget and Nine Year Forecast process.
- Support planning and design for walking and cycling through the development review process and implementation of design and policy documents.
- Provide enhanced active transportation promotion and improved route mapping.

Roads

Durham Region has a well-developed road network that has supported growth and development in the Region over the last several decades.

Looking to the future, improvements to transit, walking and cycling and associated modal shifts will allow the Region to focus on more strategic road improvements to manage congestion. However, there will still be a need for expanded road capacity to serve major growth areas. In addition to identifying road expansion needs for 2031 and beyond, the TMP places a strong emphasis on actions and policies to move towards a complete streets framework, which can improve the safety and comfort of all road users in consideration of different road functions and contexts.

Key actions recommended in the TMP to support Direction #4: Optimize road infrastructure and operation, are as follows:

- Continue expansion of the Regional road network to serve planned growth to 2031 (Maps 4a and 4b) while facilitating expansion of Higher-Order Transit through the introduction of HOV lanes in key corridors.
- Protect corridors for additional road expansion to serve expected growth beyond 2031 (Maps 5a and 5b).
- Incorporate a complete streets approach into the planning, design, operation and maintenance of Regional roads
- Continue measures to optimize traffic operations and the safety of all users on the Regional road network, including application of existing and emerging technologies such as connected vehicles, autonomous vehicles, and smart phone technology.
- Provide wider partially paved shoulders for Regional roads in rural areas as part of construction, reconstruction and rehabilitation projects to improve road safety for all road users.

Travel Choices

Improving mobility choices is a fundamental goal of the TMP. Providing individuals with a range of safe and accessible travel options supports social equity, public health, compact development, liveability (including age-friendly communities) and the environment. A key element of Travel Choices also includes Transportation Demand Management (TDM). TDM measures are designed to engage with travellers, and offer information, incentives and assistance to make choices that truly work best for them.

Key actions recommended in the TMP to support Direction #5: Promote sustainable travel choices, including walking, cycling, transit and carpooling, are as follows:

- Expand the reach and effectiveness of Smart Commute Durham.
- Enhance promotion to improve awareness and use of sustainable travel modes.
- Create a travel demand management (TDM)-supportive development strategy to help ensure that new developments are planned and designed to support transit, active transportation and carpooling.

Goods Movement

Supporting reliable and efficient movement of goods within and through Durham Region is a critical role for the transportation system. The Region's goods movement network includes Provincial highways, Regional roads, area municipal roads, railways, an airport and harbours. An effective and multi-modal goods movement system is one of the key features of the Region which has and will continue to attract business and investment.

Key actions recommended in the TMP to support Direction #6: Improve goods movement to support economic development, are as follows:

- Create or update design standards and planning guidelines to better accommodate the needs of goods movement.
- Mitigate the impacts of goods movement on communities through land use planning and traffic management measures.
- Collaborate with other levels of government and industry to improve understanding of freight activity and implement plans for goods movement infrastructure.
- Add the Bayly/Victoria/Bloor Street corridor and connecting routes to the Region's existing Strategic Goods Movement Network to facilitate freight movement through the lakefront industrial areas, including connecting to the Port of Oshawa via Farewell Street (Map 6).

Implementation

One of the most important obligations for the TMP is to ensure that future investment priorities are aligned with the overall transportation directions for the Region. The TMP has placed a strong emphasis on costing the major infrastructure investments that will be required for roads, transit and cycling. It has also provided an estimate of the on-going operations and maintenance costs that the Region will need to take on as a result of the proposed road expansion projects. The estimated costs for the proposed transportation networks to the year 2031 are approximately $1.25 billion in Regional road infrastructure, $585 million for transit infrastructure and $38 million in Regional cycling infrastructure (all costs in 2015 dollars). Costs for projects beyond 2031 have only been considered in broad terms for the purpose of assessing their feasibility.

Key actions recommended in the TMP to support Direction #7: Invest strategically in the transportation system, are as follows:

- Implement the recommended road, transit and cycling projects using a phased approach, subject to review and approval through the annual Regional Financial and Business Planning process.
- Pursue additional sustainable funding from provincial and federal governments.
- Monitor and report on the outcomes of the TMP's recommended actions.

Summary of Recommended Actions

Successful implementation of the TMP will ultimately depend on the co-operation and active participation of many stakeholders, including area municipalities; the provincial government; local agencies, boards and commissions; the private sector; the business community; and local citizens. The TMP provides a framework for co-operation among these stakeholders, but is not binding upon any party other than The Regional Municipality of Durham. However, the Region will use the TMP to guide its input into the activities of others, and will seek to implement the TMP's recommendations through its review of local official plans, development applications and other such initiatives.

The following table provides a summary of the recommended actions contained within this TMP along with key departments involved and external stakeholders.

Regular monitoring of the TMP will allow for an ongoing assessment of its effectiveness and provide an indication of the need for its review. Additionally, through the Region's municipal comprehensive Official Plan review process, the assumptions of the TMP can be revisited and the need for an update can be considered.

	Action	Lead department or division	Supporting department or division	Key external stakeholders
Direction 1: Strengthen the bond between land use and transportation				
Goal: Neighbourhoods and employment areas will offer multi-modal options				
1	Develop TDM development guidelines and a checklist for reviewing new development.	Planning	Works, DRT, Health	Area municipalities, developers
2	Apply a more rigorous review of site design in the development review process, with a focus on pedestrian, cycling and transit access.	Planning	Works, DRT, Health	Area municipalities
Goal: Key nodes and corridors will feature transit-oriented development				
3	Develop Transit Oriented Development (TOD) Guidelines, in consultation with the area municipalities and other stakeholders.	Planning	Works, DRT	Area municipalities, developers
4	Work with the area municipalities to develop a Regional TOD Strategy for lands in Centres and along Regional Corridors, as well as selected rapid transit stations, where there is significant opportunity for new development or intensification.	Planning	Works, DRT, Finance	Area municipalities, developers
5	Implement a TOD checklist for development review to support intensification, particularly in existing centres and corridors, and shape growth in new or emerging centres and corridors.	Planning	Works, DRT	Area municipalities

	Action	Lead department or division	Supporting department or division	Key external stakeholders
Direction 2: Elevate the role of integrated public transit including rapid transit				
Goal: Transit will be convenient and reliable across the Region				
6	Regularly publish a Five Year Service Strategy for Durham Region Transit that will identify planned changes to transit routes and other service characteristics.	DRT	Planning, Finance	
7	In the Region's urbanized areas, continue to provide service to as many residences and workplaces as possible by aiming to provide area coverage within a 400 metre (5 minute) walk of peak transit stops.	DRT	Planning	
8	When expanding service into rural parts of Durham Region, consider introducing new demand-responsive services, or expanding the service area of existing nearby demand-responsive routes.	DRT	Finance	
9	Assess the feasibility of early service agreements for new developments, including both the longer-term ridership benefits and costs to developers and DRT.	DRT	Planning, Finance	Area municipalities
10	Undertake regular reviews of DRT Guiding Principles and Service Design Guidelines to better inform planning and operational decisions as the Region's urban areas develop.	DRT	Planning, Finance	
11	On proposed High Frequency Network (HFN) routes, where short headways will enable customers to rely on transit for spontaneous travel, the service guideline for minimum headways should be given higher priority than service guidelines for passenger boardings, when conflicts arise.	DRT	Finance	
12	As part of the process of developing the DRT Five Year Service Strategy, continue to assess the transit fleet needs for the upcoming five-year period and prepare a fleet expansion plan as needed.	DRT	Finance	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
13	Identify transit station and terminal needs, including needs for upgrades to existing facilities and physical footprint and operational parameters for future facilities, as early as possible in the planning process to enable protection of land and permit long term financial planning.	DRT	Finance, Planning, Works	
14	Identify new operations and maintenance facility needs to support service expansion as early as possible in the planning process, to enable protection of land and financial resources required for timely delivery and permit long term financial planning.	DRT	Finance	
15	Identify and implement transit priority measures such as transit signal priority and queue jump lanes that reduce transit delay and travel time variability at key locations that are identified through the DRT Five Year Service Strategy. Priority will be given to Rapid Transit corridors (in the short term prior the implementation of dedicated lanes) and HFN corridors, as well as to mitigating the effects of construction projects on transit service costs and reliability.	DRT	Works, Finance	
16	Strongly encourage Metrolinx to implement the recommendations of the GO Station Access Study to improve walking and cycling access conditions to GO stations, in collaboration with area municipalities.	Planning, Works	DRT	Area municipalities, Metrolinx
Goal: Higher Order Transit will connect major destinations				
17	Designate the transit corridors in the ROP, as shown on the Higher Order Transit Network map (Maps 1a and 1b); protect the required rights-of-way; conduct required environmental assessments and functional design studies; and implement the proposed Rapid Transit and High Frequency Network.	Planning	Works, DRT, Finance	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
18	Work with Metrolinx to ensure the successful implementation of Regional Express Rail (RER), which includes 15-minute electrified service to Oshawa by 2024-25, and to relocate the primary Lakeshore East GO Rail service from the current Oshawa GO station to the Central Oshawa Station and connect with the Downtown Oshawa Urban Growth Centre.	Planning	DRT, Finance	Metrolinx
19	Work with Metrolinx to update and provide station infrastructure that will support effective local transit service with the introduction of GO RER service on the Lakeshore East corridor, as well as the extension of GO Rail service to Bowmanville.	DRT	Works, Planning, Finance	Metrolinx
20	Continue to work with the Province to advocate for the extension of GO Rail service to Seaton to better serve future residents of the North Pickering area.	Planning	DRT, Finance	Metrolinx
21	Protect existing railway corridors to allow for future implementation of regional passenger rail service, including the CP Rail Havelock Subdivision through the future Pickering Airport area to Peterborough and the Metrolinx Uxbridge Subdivision from the Lincolnville GO Station to Uxbridge.	Planning		
22	Work with area municipalities to enable and encourage more intensive, compact land uses within an 800 metre (10 minute) walk of rapid transit, HFN corridors, stations and terminals.	Planning		Area municipalities
23	As part of the next stage of rapid transit planning, develop guidelines for walking and cycling access to rapid transit stations and major stops on HFN corridors, considering the character and quality of access routes and amenities both on and off Regional lands and availability of funding. Guidelines should also describe how walking and cycling access needs should be considered in the Priority Neighbourhoods identified by the Durham Region Health Department.	DRT	Planning, Works, Health, Finance	Area municipalities

	Action	Lead department or division	Supporting department or division	Key external stakeholders
24	As Rapid Transit corridors are planned and implemented, apply the walking and cycling access guidelines to all rapid transit stops.	DRT	Planning, Works	Area municipalities
25	Work with area municipalities to systematically review walking and cycling access to existing major stops on HFN corridors, identify upgrades and plan their implementation.	DRT	Planning, Finance	Area municipalities
Goal: Transit will offer a superior user experience				
26	Work with Regional stakeholders, Metrolinx and area municipalities to develop Transit Stop Design Guidelines related to the planning and design of transit infrastructure.	DRT	Works, Planning, Finance	Area municipalities, Metrolinx
27	Review and research how the demand-response service model for rural areas can be expanded to supplement and provide transit services in other low demand areas, subject to availability of funding. Develop a flexible delivery model that can leverage traditional and new mobility service providers.	DRT	Finance	
28	Leverage new and cost effective mobility services and technologies that have the potential to support and complement DRT's route network by addressing the "last mile" needs of transit riders.	DRT	Finance	
29	Develop and implement a consistent transit signage and wayfinding strategy that improves travel information and customer experience.	DRT	Finance	Metrolinx
30	Continue to work with Metrolinx, York Region Transit and the Toronto Transit Commission to develop a GTHA-wide fare integration policy.	DRT	Finance	Metrolinx, YRT, TTC
Direction 3: Make walking and cycling more practical and attractive				
Goal: A comprehensive Region-wide cycling network will connect people to destinations with safe and comfortable facilities supporting both utilitarian and recreational cycling.				
31	Continue to implement and maintain the designated Primary Cycling Network (PCN) as the long term cycling network for the Region, in accordance with the funding formula approved by Regional Council.	Works	Finance	Area municipalities

	Action	Lead department or division	Supporting department or division	Key external stakeholders
32	Review and update the PCN, as approved by Regional Council in the Regional Cycling Plan and integrated into the TMP, on a regular basis, in consultation with the area municipalities, cycling groups and other stakeholders.	Planning	Works, Finance, Health	Area municipalities, Waterfront Regeneration Trust, Parks Canada
33	Continue to work with area municipalities to implement the Regional Trail Network (RTN). This includes on-going input from the Durham Trails Coordinating Committee (DTCC) to inform priorities and identify partnership opportunities. Explore opportunities to identify and improve trails to promote active transportation, as appropriate for the context.	Planning/ DTCC	Economic Development and Tourism, Health	Area municipalities, Parks Canada, conservation authorities
Goal: Cycling routes that provide access to major destinations, improve network connectivity, and enhance Regional cycling tourism will be prioritized to provide a cohesive network over a shorter-term horizon				
34	Include the identified infill connections within Regional rights-of-way in the Region's annual Regional Road Program Capital Budget and Nine Year Forecast process for consideration and prioritization with other transportation projects as part of the Region's annual business planning and budget process.	Works	Finance	
35	Seek collaboration with provincial and federal partners to advance the implementation of the key infill connections within the Primary Cycling Network beyond the capital program, as well as connecting routes between the Waterfront Trail and Greenbelt Cycling Route, in partnership with area municipalities and other agencies.	Planning	Works, Finance	Area municipalities, Waterfront Regeneration Trust, MTO, federal government
Goal: Built environments will support walking and cycling				
36	Work with the area municipalities to protect for the Primary Cycling Network (PCN) and, where feasible, have sections of cycling facilities implemented through the development review process for any roadways identified in the Region's PCN.	Planning	Works	Area municipalities, developers

Action		Lead department or division	Supporting department or division	Key external stakeholders
37	Reference cycling and pedestrian facilities in more detail throughout Regional design and policy documents. The updated Arterial Corridor Guidelines developed within the scope of the TMP will be refined to show how the Regional Cycling Plan impacts the street typologies, particularly for cycling-supportive streets. The updated guidelines should be reflected in the Regional Official Plan, particularly Schedule E – Table E7, which should be expanded to provide a more detailed description of cycling facilities.	Works	Planning	
38	Address pedestrian and cycling access across and through intersections by considering design features such as enhanced pavement markings, bike boxes or other cycling infrastructure, physical modifications such as curb extensions, pedestrian and cycling-friendly signal timing and lighting, as appropriate and feasible in the context of the project. These features will be prioritized where significant numbers of pedestrians and cyclists can reasonably be expected.	Works	Finance	Area municipalities
39	Work with the area municipalities, developers and other stakeholders as appropriate to enhance the walking and cycling environment through streetscaping measures along Regional roads, such as street trees, public art and/or amenities as appropriate, feasible and subject to availability of funding.	Works	DRT, Finance	Area municipalities, developers
40	Consider providing priority maintenance along Regional road corridors with on-road cycling facilities that form part of the Primary Cycling Network to promote year-round cycling.	Works	Finance	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
Goal: Walking and cycling to transit will be easier				
41	Continue to promote high quality walking and cycling connections to major transit facilities, in cooperation with the area municipalities.	Planning	DRT	Area municipalities, Metrolinx
42	Collaborate with the area municipalities and Metrolinx to explore the feasibility of providing secure bicycle parking at major transit hubs and public bike share systems where local interest is expressed.	Planning	DRT, Finance	Area municipalities, Metrolinx
Goal: Programs will motivate Durham residents to walk and cycle				
43	Continue to promote walking and cycling through the Smart Commute Durham program.	Planning	Corporate Communications	
44	Continue to act in a Regional coordination role to promote and publish cycling materials Region-wide through the Cycle Durham website and on-going communication strategy.	Planning	Corporate Communications, Economic Development and Tourism	
45	Prepare a Region-wide cycling map with municipal and non-profit partners. The accuracy of existing data will be verified with each municipality and updated on an annual basis to provide a complete Regional database of cycling networks.	Planning	Works	Area municipalities, Waterfront Regeneration Trust
Direction 4: Optimize road infrastructure and operation				
Goal: Regional roads will be continuous and connected				
46	Update Schedule E – Table E7 of the Regional Official Plan to include new criteria for Type "T" arterials that correspond to the Rapid Transit network and High Frequency Bus in HOV lane corridors. The Type "T" designation would be applied in addition to the base arterial road classification. The desirable right-of-way width for these corridors would be 45 metres, except in constrained built-up/ heritage areas. Specific characteristics will be defined through the Arterial Corridor Guidelines.	Planning	Works	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
47	Update Schedule C - Map C1 and Map C2 of the Regional Official Plan to include recommended network changes identified in the TMP.	Planning		
48	Advise the area municipalities of the network changes recommended through the TMP regarding the designation of specific arterial roads.	Planning		
49	Introduce a new Future Regional Road Right-of-Way Protection schedule to the Regional Official Plan specifying ultimate right-of-way widths that can be acquired under the Planning Act through development applications. This map will generally be based on needs beyond 2031 and may be refined through future study.	Planning	Works	
50	In coordination with the area municipalities, undertake feasibility studies for the following road links: Ravenshoe Road extension to Highway 7 at Highway 12, Clements Road Connection across Duffins Creek, Consumers Drive extension connection to Laval Drive, Shirley Road, extension and Courtice/Enfield Road connection.	Works	Planning, Finance	Area municipalities, MTO, York Region
Goal: Regional roads will serve all modes and users				
51	Apply a complete streets approach for road planning, design, operation and maintenance, where a complete streets approach includes consideration of the needs of all travel modes as appropriate and feasible within the context of each project.	Works	Finance	
52	Develop a formal framework and use Multi-modal Level of Service (MMLOS) approaches to assess road designs and allocate right-of-way, and promote the use of this concept for transportation impact studies submitted as part of development applications.	Works	Planning	Area municipalities

	Action	Lead department or division	Supporting department or division	Key external stakeholders
53	Update and adopt the Arterial Corridor Guidelines, to reflect complete streets principles and recent best practices for design, particularly for transit and cycling facilities.	Works	Planning, DRT	
54	Encourage and support efforts by area municipalities to develop and adopt complete streets policies.	Planning	Works	Area municipalities
55	Provide paved shoulders as part of all future rural Regional road construction, rehabilitation and resurfacing projects, except where an engineering assessment determines that it is not technically and economically feasible to do so. Develop and adopt Regional standards for the design and construction of paved shoulders on rural Regional roads.	Works	Finance	
Goal: Regional roads will grow with the Region				
56	Subject to annual review through the Asset Management and Transportation Servicing and Financing Studies, and approval of the related budgets, continue to develop and maintain the Regional road network in a manner that ensures a safe, connective and sustainable network.	Works	Finance	
57	Petition the Ministry of Transportation to improve the capacity of Highway 401 through widening, upgrading existing interchanges identified on Maps 4a and 4b, and implementing HOV lanes.	Works	Planning	MTO
58	Petition the Ministry of Transportation to implement the future freeway interchanges in Durham Region, as identified on Maps 4a and 4b.	Works	Planning	MTO, 407 ETR
59	Work with the Ministry of Transportation to establish Emergency Detour Routes for Highways 35/115, 407, 412 and 418 that identify suitable alternative routes in the event of an unplanned freeway closure.	Works	Planning	Area municipalities, MTO

	Action	Lead department or division	Supporting department or division	Key external stakeholders
60	Work with the Region of York and City of Toronto to accelerate the widening of Steeles Avenue for vehicular, transit and HOV capacity.	Works	Planning	York Region, City of Toronto
61	Continue to support a transportation asset management program that enables the existing and future transportation infrastructure to be maintained in a state of good repair and optimize rehabilitation investments, while not compromising on safety and level of service.	Works	Finance	
Goal: Road operations will support a better quality of life				
62	Develop and implement a Strategic Road Safety Action Plan which will focus on reducing fatalities and personal injury collisions, promoting safer walking and cycling and reducing the number of intersection-related collisions.	Works	DRPS, Finance, Health	Area municipalities, OPP, MTO
63	Work with the Durham Regional Police Service and other stakeholders to reinforce the benefits of safe driving and to combat distracted and impaired driving.	Works	DRPS, Finance, Health	
64	Continue to implement intersection modifications on an annual basis to reduce congestion due to bottlenecks and improve safety for all users.	Works	Finance	
65	Engage the railway companies proactively to gain their support, including financial, for improving the safety of railway crossings of Regional roads, including construction of grade separations where conflict warrants have been established.	Works	Finance	CNR, CPR, Metrolinx
66	Address and leverage existing and emerging cost-effective technologies, such as connected vehicles, autonomous vehicles and smart phone technology, in transportation systems management.	Works	Finance	
67	Continue to implement measures from the Region's Traffic Management Guide for Hamlets to address traffic management issues in hamlets and other built-up rural areas.	Works		

	Action	Lead department or division	Supporting department or division	Key external stakeholders
68	In consultation with the Ministry of the Environment and Climate Change, adopt a regional approach for air quality assessments as opposed to conducting assessments on an individual project basis.	Works	Regional Chair/ CAO's Office	MOECC
69	Apply best practices for designing and adapting transportation infrastructure to better respond to climate extremes and climate change and mitigate stormwater run-off.	Works	Regional Chair / CAO's Office, Finance	MOECC, MTO, municipalities, conservation authorities
Direction 5: Promote sustainable travel choices				
Goal: Smart Commute Durham will increase its reach and effectiveness				
70	Evaluate the benefits and costs of providing individualized marketing and other innovative new services to Smart Commute Durham members, and if favourable then recommend demonstration projects to Regional Council through the annual business planning and budget process. Continually scan for best practices that could be adapted from other jurisdictions.	Planning	DRT, Finance	
71	Continue to lead by example by implementing targeted TDM initiatives for Region of Durham employees.	Planning	DRT, Finance	
Goal: Residents will make sustainable travel choices more often				
72	Create and promote an accessible online clearinghouse for practical information on travel choices in Durham Region that serves a wide range of travellers, modes and trip purposes.	Planning		
73	Create and maintain a Regional cycling map, in printed and/or online format that identifies cycling facility types, road safety hotspots, steep hills, transit hubs and other information of concern to potential cyclists.	Planning	Finance	
74	Work with partners to develop and implement a program that promotes travel choices through events such as Bike Month, Walk to School Month and Carpool Week. Integrate positive multi-modal messages into Regional communications on infrastructure, health, recreation and other public services.	Planning	Health, Corporate Communications, Finance	School boards, Metrolinx

	Action	Lead department or division	Supporting department or division	Key external stakeholders
75	Develop, test and deliver a targeted, sustained program of individualized marketing that supports public awareness and use of Regional facilities and services for active transportation, transit and carpooling. Maximize effectiveness and efficiency by applying best practices developed through experience elsewhere in the GTHA.	Planning	Corporate Communications, Finance	
76	Work with partners to develop an Active School Travel Strategy to guide planning and programs across Durham Region.	Planning	Health, Works	Area municipalities, school boards
77	Regularly review the need and opportunity for additional rural and small urban community commuter lots.	Planning	Works, DRT	Metrolinx
78	Develop an Electric Vehicle Strategy for the Region, in cooperation with industry, including consideration of potential partnership and funding opportunities from provincial or other agency programs.	Regional Chair/CAO's Office	Finance	UOIT
Goal: New development will support sustainable travel choices				
79	Create a TDM-supportive development strategy, in partnership with the area municipalities, that would require new developments to support transit, active transportation and carpooling. Actions could include reviewing and updating zoning by-laws and development agreement checklists, and requiring certain development applications to identify travel behaviour targets and the actions required to achieve them. Implementation of the strategy would benefit from tools and events to share information with municipal staff members, developers and consultants, and to discuss their questions and concerns.	Planning	Works, DRT, Health	Area municipalities, developers

	Action	Lead department or division	Supporting department or division	Key external stakeholders
80	Create guidelines that support a Regional parking strategy for strategic nodes and corridors, in partnership with the area municipalities. Actions could include amendments to zoning by-laws (e.g., to reduce parking minimums, set maximums and allow shared parking), identifying parking supply caps for key districts, and studying the feasibility and benefits of public parking authorities.	Planning	Finance	Area municipalities
Direction 6: Improve goods movement to support economic development				
Goal: The built environment will support goods movement				
81	Add the following routes to the Strategic Goods Movement Network, designated in the Regional Official Plan: Bayly Street/ Victoria Street/Bloor Street from Brock Road to Courtice Road; Courtice Road from Bloor Street to Highway 401; the southerly extension of routes on Brock Road, Lake Ridge Road and Thickson Road from Highway 401 to the proposed Bayly/Victoria/Bloor route; and Farewell Street between Bloor Street and the Port of Oshawa; northerly extension of the route on Harmony Road to Highway 407; and Highway 7 from York Durham Line to Highway 7/12 then continuing on Winchester Road to Thickson Road.	Planning		
82	Regularly review and update the Strategic Goods Movement Network in consultation with the area municipalities and key stakeholders.	Planning	Works, Finance	Area municipalities
83	Implement and promote the Strategic Goods Movement Network by identifying and planning for removal of barriers (e.g., load restrictions, turning radii, height requirements, pavement condition) as part of Regional road expansion and rehabilitation projects, signing preferred truck routes, disseminating information on the network, and avoiding by-law restrictions to truck movement on preferred routes.	Works	Finance	

Action		Lead department or division	Supporting department or division	Key external stakeholders
84	Develop criteria for evaluating land use plans from a goods movement perspective to minimize conflicts between truck traffic generated by employment areas and adjacent communities.	Planning	Works	Area municipalities
85	Implement measures from the Traffic Management Guideline for Hamlets to address the impacts of truck traffic in hamlets and small communities in rural areas through the Regional Road Program Capital Budget and Nine Year Forecast and rehabilitation programs.	Works	Finance	
86	Create standards for access and loading for different land use types, including considering freight centres to support industrial areas, off-street neighbourhood loading facilities for commercial developments in downtown areas, and on-street loading bays in specific areas that otherwise cannot accommodate off-street loading. Work collaboratively with the area municipalities to develop and implement these standards.	Planning	Works	Area municipalities
87	Develop criteria for evaluating transportation initiatives from a goods movement perspective.	Planning	Works	
88	Review and update road design standards as needed to provide an acceptable and cost effective level of service for goods movement on Regional roads.	Works	Finance	
89	Protect rights-of-way to provide for safe and efficient truck connectivity to existing and future intermodal facilities, and improve connectivity between modes.	Works		
90	Design new or reconstructed Regional arterials linking employment areas with Highway 401 and Highway 407 to accommodate Long Combination Vehicles (LCVs), where feasible.	Works		
91	Identify and promote potential locations for inter-modal transfer facilities to enable more use of rail and other modes.	Works	Economic Development and Tourism	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
92	Work with special industries and national bodies for targeted and effective use of existing special intermodal facilities, such as the Oshawa Executive Airport and the Port of Oshawa.	Economic Development and Tourism		Oshawa Port Authority, Oshawa Executive Airport
93	Work with the area municipalities to plan for efficient truck access to current and future intermodal hubs, including zoning and land use planning, as well as physical infrastructure such as turning lanes, turning radii, conditions of railway grade crossings and connectivity to the freeway system.	Works	Planning	Area municipalities
Goal: Collaboration will inform and support shared solutions				
94	Initiate a Durham Regional freight forum, with participation from all levels of government that have jurisdiction within the Region, industry "thought leaders," major carriers and port authorities. The purpose of the forum is to identify specific goods movement issues and to find ways to address them in partnership, acting as a coalition of "goods movement champions" and addressing opportunities and challenges. The freight forum would focus on Durham-specific issues. It would coordinate with broader GTHA initiatives, such as the Southern Ontario Gateway Council, Metrolinx, and other governments/ agencies to promote effective goods movement throughout the GTHA.	Planning	Works, Economic Development and Tourism, Finance	Area municipalities, Metrolinx, MTO
95	Develop a goods movement communication strategy that engages and educates the public and elected officials. Communicate the importance of integrating consideration of goods movement into all aspects of Regional business, identifying barriers in the existing network and promoting a consistent and supportive road network for goods movement.	Planning	Economic Development and Tourism, Corporate Communications, Finance	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
96	Work with private industry and national bodies to expand international processing abilities, including encouraging freight-related industries, such as third party logistics providers and bonded warehouses.	Economic Development and Tourism	Finance	
97	Work with all levels of government and the private sector to ensure that plans for goods movement address the entire route ('shelf to shelf') to maximize efficiency.	Economic Development and Tourism	Finance	
98	Work with the province and adjacent regions to normalize weight and size requirements and work with local industries to identify ways to provide infrastructure to meet specific needs.	Economic Development and Tourism	Works, Finance	MTO
Goal: Freight information will support policies, plans and practices				
99	Create a common set of metrics and collect data to measure performance.	Planning	Works, Finance	
100	Conduct or participate in goods movement surveys and other data collection initiatives to improve understanding of the structure and nature of freight activity.	Planning	Works, Finance	
101	Work with other governments in the GTHA to develop a GTHA-wide initiative for multi-modal freight data collection.	Planning	Works	Metrolinx, MTO
102	Work with MTO and the Federal government to produce and release regular goods movement data to facilitate planning and avoid duplication of resources.	Planning	Works	MTO, Transport Canada
103	Ensure the Region has the data, tools, and knowledge to fully participate in super-regional, Provincial, and national efforts (such as the ongoing Continental Gateway initiative) to invigorate the rail network and capitalize on Durham's geographic advantage to become a new rail hub for service to and from eastern Ontario.	Planning	Economic Development and Tourism	Transport Canada, CNR, CPR

	Action	Lead department or division	Supporting department or division	Key external stakeholders
104	Monitor and promote technologies that can reduce drayage times, avoid congestion, and disseminate information (e.g., E-seals, radio frequency identification, traffic and wait time information for drivers), and investigate the use of new cost-effective technologies on Regional facilities (e.g., through traffic control systems).	Works		
Direction 7: Goal Invest strategically in the transportation system				
Goal: Phased transportation investments will support Regional objectives				
105	Subject to annual review and approval through Servicing and Financing Studies and the related budgets, develop the Regional road, transit and cycling networks in a phased approach as recommended to accommodate travel demand growth.	Works	DRT, Finance	
Goal: A life-cycle approach will optimize total costs				
106	Continue to plan growth and asset management related infrastructure investments, including modifications, in a manner that recognizes implications for service level standards, operating and maintenance practices and life cycle costs.	Works	DRT, Finance	
Goal: Transportation funding will be adequate, stable and predictable				
107	Work with Provincial and Federal Governments to maximize senior government grant funding opportunities to obtain sustainable, dedicated funding sources for financing transportation infrastructure and services.	Finance	DRT, Works, Office of the Regional Chair/ CAO	MTO, federal government
Goal: Performance measurement will support evaluation and updates				
108	Develop and conduct a Region-wide transportation monitoring program, and report progress to Regional Council on a regular basis.	Planning	Works, DRT	

	Action	Lead department or division	Supporting department or division	Key external stakeholders
109	Support new and on-going data collection initiatives critical to monitoring transportation conditions and predicting future needs, including: • Census of Canada Journey to Work/ Place of Work data; • Transportation Tomorrow Survey; • Cordon Count Program; • MTO Travel Time Survey; and • Region of Durham Walking Network Database.	Planning	Works, DRT	Census of Canada, MTO
110	Conduct future reviews of the Transportation Master Plan in conjunction with a comprehensive review of the Regional Official Plan.	Works	Planning	
111	Consider the relevant recommended actions of the Transportation Master Plan in a future transportation-related amendment of the Regional Official Plan.	Planning		

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Appendix A: Proposed Changes to Official Plan Schedule C

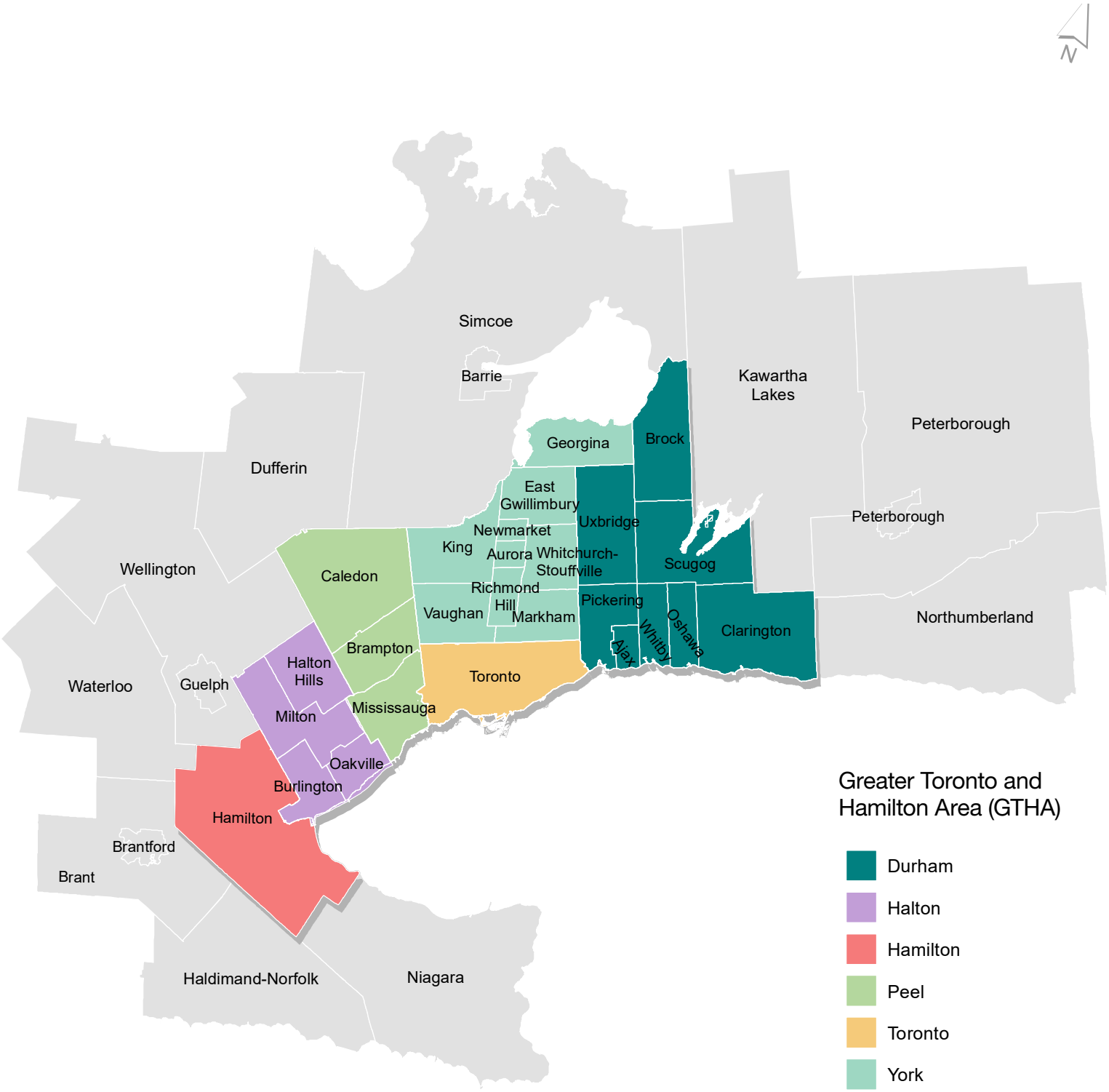
Appendix B: Proposed Regional Road Intersection Modification Projects

Appendix C: Proposed Regional Road Expansion Projects

CHAPTER 1

ABOUT THIS PLAN

Exhibit 1.1: Regional Municipality of Durham and its Area Municipalities in the Greater Toronto and Hamilton Area and Greater Golden Horseshoe



1 About This Plan

1.1 Purpose and Scope

The Regional Municipality of Durham is currently the fourth most populous region in the Greater Toronto and Hamilton Area (GTHA) with approximately 663,460 people. By 2031, Durham Region's population will approach 1 million people, making it one of the fastest growing communities in Canada.

The Region was formed in 1974 by the Province of Ontario as a new level of regional government. It is located on the eastern end of the GTHA, and is bordered to the west by the City of Toronto and York Region, to the east by Northumberland County and the City of Kawartha Lakes, to the north by Lake Simcoe and Simcoe County, and to the south by Lake Ontario as shown in Exhibit 1.1.

With Durham Region poised for continued growth, there is a need to ensure that the transportation system continues to provide for the safe, efficient and reliable movement of people and goods in a sustainable manner. The provision of an effective transportation system will be key to maintaining Durham Region's quality of life and creating the type of community and economy envisioned by the Strategic Plan and the Regional Official Plan (ROP), Regional Council's principal policy documents.

The Durham Transportation Master Plan (TMP) is a strategic planning document designed to identify the transportation facilities and services required to meet these future challenges. The TMP defines the policies, programs and infrastructure modifications needed to manage anticipated transportation demands to the year 2031 and beyond, and to support the development pattern designated in the ROP. The plan represents a major update to the 2005 TMP and builds on the foundation set by several key documents including the 2010 Long Term Transit Strategy, 2012 Regional Cycling Plan, and the 2016 Durham Region Transit (DRT) Five Year Service Strategy.

The TMP is a multi-modal plan focusing on all modes of transportation, including walking, cycling, public transit, auto and goods movement.

The TMP serves a number of purposes which are to:

- review progress since the 2005 TMP in order to highlight and assess areas of progress and areas needing review;
- update the Region's travel demand forecasting tools to reflect the most recent population and employment forecasts;
- set the overall vision for the transportation system, which in turn informs the development of strategies and actions required to achieve this overall vision; and
- identify transportation projects to meet Durham Region's future needs.

The actions recommended in the TMP represent the stated intentions of Regional Council, and will guide investment and policy decisions. However, the TMP only provides a "blueprint" for future action and will need to be implemented through several mechanisms further discussed in Chapter 9, including:

- **Development Charge By-laws, Annual Servicing and Financing Studies, Annual Current and Capital Budgets and Longer-term Financial Forecasts** – These financial documents identify and provide the necessary resources to implement the recommended programs and infrastructure modifications, along with funding opportunities from provincial and federal governments.
- **Amendments to the Regional Official Plan (ROP)** – Elements of the TMP need to be incorporated into the ROP as planning policy to ensure implementation through local official plans and the review and approval of development applications.
- **Implementation Strategies and Action Plans** – The scope, timeframe and resource requirements for the recommended major initiatives need to be further detailed.
- **Environmental Assessments** – Prior to proceeding with Regional Road modification projects, the Region must carry out Class Environmental Assessment (EA) studies to complete the planning and design process initiated through this Plan. This is necessary to satisfy provincial and federal statutory requirements.
- **Guideline Documents** – Guidelines, such as those setting design standards and recommended operating and maintenance procedures, are needed to provide further implementation detail.

Certain assumptions underlying the TMP may prove imprecise over time due to changing conditions. Although the Plan is flexible enough to accommodate minor deviations, the Region will need to periodically review and update the document. Ideally, this would be linked to the statutory five-year reviews of the ROP. The Region may amend the TMP in the intervening period to incorporate substantive changes resulting from the ROP review process or other major initiatives, but on-going updates are not contemplated.

Successful implementation of the TMP will ultimately depend on the co-operation and active participation of many stakeholders, including area municipalities; the provincial government; local agencies, boards and commissions; the private sector; the business community; and local citizens. The TMP provides a framework for co-operation among these stakeholders, but is not binding upon any party other than The Regional Municipality of Durham. However, the Region will use the TMP to guide its input into the activities of others, and will seek to implement the TMP's recommendations through its review of local official plans, development applications and other such initiatives.

1.2 Process

1.2.1 TMP DEVELOPMENT

The development of the TMP was structured around four main phases:

- **Phase 1** focused on collection and analysis of background information and development of Guiding Principles and Directions for the study. This phase of the study was completed with endorsement of the Guiding Principles and Directions by Joint Committee on May 21, 2015 (Report #2015-J-29), and by Regional Council on June 3, 2015.
- **Phase 2** focused on the development and assessment of alternative approaches to meeting the Region's transportation needs and accommodating planned population and employment growth in Durham Region through the 2031 horizon year. Alternative road and higher-order transit network scenarios were modelled using the Durham Region Transportation Planning Model (DRTPM). A technical assessment of model results, in the context of the approved Principles and Directions and input received from stakeholders and the public during the first phase of the study, determined that a balanced approach combining significant transit modifications with strategic road network expansion would best serve Durham Region's future transportation needs. Draft networks were presented to Joint Committee on May 26, 2016 (Report #2016-J-13).
- **Phase 3** included additional modelling and technical analysis to further develop this preferred approach into draft recommended 2031 networks for roads, Higher-Order Transit and Short-Term Cycling Routes. Phase 3 work included the development of cost estimates for infrastructure modifications and a prioritization framework. An information report on policies and network costs was provided to Regional Council on December 9, 2016 (Report 2016-INFO-45)
- **Phase 4** included the development of a Draft TMP and the Final TMP as presented herein. The Draft TMP was presented to Committee of the Whole on June 7, 2017 (Report #2017-COW-134). All stakeholders and members of the public in the study mailing list were invited to review the Draft TMP and submit comments by September 30, 2017. The comments received were reviewed, and changes were incorporated into the TMP as appropriate to address them. The Final TMP was endorsed by Committee of the Whole on December 6, 2017 (Report #2017-COW-268) and by Regional Council on December 13, 2017.

1.2.2 ENGAGEMENT

Throughout the development of the TMP, there has been a high level of public engagement. The engagement process provided a variety of opportunities and methods for citizens to provide their input, suggestions, and feedback. Public input was sought at different stages of plan development including the development of the Transportation Guiding Principles and Directions, draft strategies, as well as during the development of the draft networks. Further information on the public engagement process and citizen feedback is available in Background Report A: Consultation and Engagement Summary Report. Key activities are summarized below.

PUBLIC OPINION SURVEY

As part of the TMP, a telephone survey of 500 residents 18 years or older from across Durham Region was conducted in fall 2014. The purpose of this survey was to gauge public opinion on various transportation issues facing Durham Region. Survey questions focused on the residents' satisfaction with the transportation system, attitudes toward potential modifications to the system, preferred prioritization of issues, and attitudes toward land use and built form as it relates to the transportation network. Local and regional transit, auto, cycling, and walking modes were all considered in the survey.

Top issues revealed by the survey included a desire for increased transit frequency (DRT and GO) and growing concerns over congestion. Approximately 80% of respondents indicated that congestion is a serious issue. At the same time, 73% of residents want car usage reduced, mostly to ease congestion and improve public health. A detailed analysis of the public opinion survey results is provided in Background Report B: Public Opinion Survey Results.

PUBLIC INFORMATION CENTRES

A number of Public Information Centre (PIC) open house events were held throughout the TMP planning process. An initial series of open house events was held in November 2014 as part of the TMP launch, which provided an opportunity for the public to provide input on key priorities and their vision for transportation in 2031. The second series of PICs, held in June 2016, comprised a mix of public open house and outreach events which presented the draft Guiding Principles and Directions and potential major networks enhancements. Residents were also asked to provide input and feedback on key opportunities by mode. The third and final series of PIC open houses was held in January 2017 to present the final draft networks and key recommended actions by mode.

ONLINE ENGAGEMENT

A project website (www.durham.ca/tmp) was maintained throughout the duration of the TMP. The website provided an opportunity for on-line comment through a dedicated e-mail address (tmp@durham.ca) and access to interim reports. Input was also posted via Twitter and Facebook through the Region's corporate accounts.

STAKEHOLDER ADVISORY COMMITTEE

A Stakeholder Advisory Committee (SAC) was established to provide technical input and guidance to the TMP. The committee included representatives from area municipalities, technical agencies, business organizations and regional advisory groups. The SAC met a total of four times at key points in the study.

INDIGENOUS COMMUNITIES

First Nations representatives were notified of the TMP and invited to participate on the SAC. A separate meeting was held with representatives of the Mississaugas of Scugog Island First Nation.

AREA MUNICIPALITIES

In addition to participation on the SAC, key representatives from municipal planning and engineering departments of the eight area municipalities were consulted throughout the TMP through one-on-one meetings. Two rounds of meetings were held with area municipal staff, one round at the start of the TMP to gather input on key issues and one round to discuss the draft networks.

1.2.3 ENVIRONMENTAL ASSESSMENT

Environmental Assessment legislation requires the Region to identify and mitigate impacts of transportation construction projects on all aspects of the environment. All projects identified in the TMP are subject to various EA legislation and processes including:

- *Ontario Environmental Assessment Act, 1990*
- *Ontario Regulation 231/08 - Transit Project Assessment Process, 2008*
- *Municipal Engineers Association (MEA) Municipal Class Environmental Assessment, October 2000 (Class EA, amended 2007, 2011 and 2013)*
- *Canadian Environmental Assessment Act, 2012 (CEAA)*

Provincial legislation requires roadway modification projects to follow the Class EA process. All major road projects are subject to a requirement to complete a Class EA or Individual EA if one has not yet been completed. Transit infrastructure is subject to the provisions of O.Reg. 231/08 and, if not considered exempt under this regulation, must follow the Transit Project Assessment Process. A transit project may proceed under the Class EA if the Region chooses to use this process and provides required notification to the Ontario Ministry of the Environment and Climate Change. Any project involving federal land or funding is subject to the requirements of the CEAA.

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

The MEA Municipal Class EA document identifies a number of approaches to conduct a Master Plan. This TMP has followed the Municipal Class EA Master Plan process, and specifically Approach #1 where the Master Plan is prepared at the conclusion of Phases 1 and 2 of the Municipal Class EA process. Under this approach, the Master Plan becomes the basis for, and is used in support of, future investigations for the specific Schedule B and Schedule C projects identified within it. Schedule B projects would require the preparation of and filing of a Project File for public review while Schedule C projects would have to fulfil Phases 3 and 4 of the EA process prior to filing an Environmental Study Report (ESR) for public review.

Appendix C includes a description of the EA status of the identified road and rapid transit infrastructure projects. Project sheets for each infrastructure project describing its impacts and the rationale for the preferred alternative are included in a standalone report. The TMP and its background technical reports will become supporting documents for future EA work.

A significant amount of effort has gone into ensuring that the TMP addresses EA planning principles. Project specific information is summarized on project sheets for each proposed capital project, including the project need and justification, alternatives considered, the preferred alternative, summary of the existing environment and potential impacts to sensitive environmental features. Integral to this has been the consideration of natural environmental factors at the broader network planning level and at the more detailed project specific level.

1.3 What's Inside

This document is structured into the following chapters:

Chapter 2 – Strategic Framework – this chapter provides information regarding the key background and supporting documents that shape the TMP, describes the current state of Durham Region's transportation networks and performance and presents a forecast of future transportation conditions based on 2031 population and employment forecasts.

Chapter 3 – Land Use and Transportation – this chapter describes actions to achieve Direction #1: Strengthen the bond between land use and transportation.

Chapter 4 – Public Transit – this chapter describes actions to achieve Direction #2: Elevate the role of integrated public transit including rapid transit.

Chapter 5 – Walking and Cycling – this chapter describes actions to achieve Direction #3: Make walking and cycling more practical and attractive.

Chapter 6 – Roads – this chapter describes actions to achieve Direction #4: Optimize Road infrastructure and operation.

Chapter 7 – Travel Choices – this chapter describes actions to achieve Direction #5: Promote sustainable travel choices.

Chapter 8 – Goods Movement – this chapter describes actions to achieve Direction #6: Improve goods movement to support economic development.

Chapter 9 – Implementation – this chapter describes actions to achieve Direction #7: Invest strategically in the transportation system.

Supporting the main TMP are several background reports, as referenced in the relevant sections herein.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CHAPTER 2

STRATEGIC FRAMEWORK

2 Strategic Framework

2.1 Policy Context

The TMP supports and is guided by an overarching policy framework consisting of policies and initiatives laid out by the federal, provincial, and regional governments, as well as those of the area municipalities within Durham Region.

2.1.1 PROVINCIAL AND FEDERAL INITIATIVES

PROVINCIAL POLICY STATEMENT (2014)

Ontario's Provincial Policy Statement applies province-wide, setting a vision for livable and resilient communities through supportive built environments and the long-term management of land and resources. It details policies related to land use and transportation planning, and envisions land use patterns that promote active transportation and public transit over other travel modes.

GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE (2006)

The Province of Ontario directs transportation and land use planning for Durham Region and a large surrounding area through the Growth Plan for the Greater Golden Horseshoe. Schedule 3 of the plan provides a population and employment forecast of 960,000 residents and 350,000 jobs in Durham Region in the year 2031, which form the basis of the transportation and land use recommendations in the TMP.

The plan also describes how land use should be planned to support transit and active transportation modes, and it envisions transit-supportive communities, mixed-use development, and pedestrian-friendly urban areas. It describes policies for optimizing existing infrastructure, planning new transportation corridors, moving people, and transporting goods. The plan gives priority to public transit when planning transportation infrastructure, and envisions the use of transit infrastructure to shape growth and land use.

In June 2013, the Growth Plan for the Greater Golden Horseshoe was consolidated to incorporate Amendments 1 and 2. Amendment 1 (released in January 2012) added policies, schedules and definitions for the Simcoe Sub-area, and Amendment 2 (released in June 2013) extended the plan's population and employment forecasts to 2041.

CO-ORDINATED PROVINCIAL PLAN REVIEW (2017)

A review of the Growth Plan for the Greater Golden Horseshoe, as required by legislation, began in 2015. The province has taken a coordinated approach to reviewing the Growth Plan along with the Greenbelt Plan, Oak Ridges Moraine Conservation Plan, and Niagara Escarpment Plan. Together, these four plans manage regional growth, protect agricultural lands and the natural

environment, reduce greenhouse gas emissions and support economic development. In July 2017, the updated versions of these plans came into effect. The Region will initiate a municipal comprehensive review of the Regional Official Plan starting in early 2018.

GREATER GOLDEN HORSESHOE TRANSPORTATION PLAN (UNDERWAY)

The Ministry of Transportation (MTO) is undertaking a transportation study to develop a long-term multi-modal transportation plan for the Greater Golden Horseshoe. The work will advance multi-modal transportation planning in the region and provide planning direction to transportation agencies and service providers for all modes, including highways, railways, regional transit systems, cycling and walking. The planning study is anticipated to be completed in early 2019. As part of the transportation plan, MTO will review the provincial high-occupancy vehicle lane network, and further assess the feasibility of high-occupancy toll lanes, and related policies in the Greater Golden Horseshoe.

CLIMATE CHANGE ACTION PLAN (2016)

The Ministry of the Environment and Climate Change (MOECC) released a Climate Change Action Plan in June 2016. The Action Plan detailed initiatives that the province will undertake to complement the long-term vision set in the Climate Change Strategy to meet greenhouse gas pollution reduction targets.

The transportation sector produces more than one-third of the greenhouse gas emissions in Ontario. The Action Plan includes actions to reduce emissions from existing vehicles, promote adoption of non-polluting vehicles, and support cycling and transit.

GREENBELT PLAN (2005)

The Greenbelt Plan is one of the Province's cornerstone land use planning documents for the Greater Golden Horseshoe (GGH). It protects the agricultural land base, sensitive ecological features, and a range of recreational and tourism land uses in the GGH by defining areas where urbanization should not occur. The Greenbelt is an integral part of the urban structure of Durham Region: about 80% of the roughly 250,000 hectares that make up Durham Region fall within the Greenbelt.

OAK RIDGES MORAINE CONSERVATION PLAN (2002)

The Oak Ridges Moraine Conservation Plan was established by the Provincial Oak Ridges Moraine Conservation Act enacted in 2001 and provides land use and resource management direction for the lands within the Moraine. The intent of this plan is to protect the ecological and hydrological integrity of the Moraine, and defines the policy requirements for any developments near the natural features in the moraine. New transportation infrastructure is permitted in the Moraine under the strict conditions provided in Section 41 of the plan.

METROLINX REGIONAL TRANSPORTATION PLAN (THE BIG MOVE, 2008)

The Metrolinx Board adopted the first Regional Transportation Plan for the Greater Toronto and Hamilton Area (GTHA), called The Big Move, in 2008. This plan describes a common vision for a more coordinated, efficient and sustainable transportation system throughout the GTHA, supported by ten core strategies. While the plan includes all transportation modes, transit is the central focus and some 350 km of new rapid transit infrastructure recommended in the plan is currently operating, under construction, or has committed funding. This includes important corridors in Durham Region such as Bus Rapid Transit on Highway 2, electrified high-capacity Regional Express Rail on the Lakeshore East GO Rail line, and the extension of inter-regional rail service from Oshawa to Bowmanville.

In 2015, Metrolinx started a legislated review of The Big Move in accordance with the Metrolinx Act. A draft of the updated Regional Transportation Plan was released in September 2017 and is expected to be approved by the end of the year.

CENTRAL PICKERING DEVELOPMENT PLAN (2006)

In the 1970s, the federal government acquired lands in north Pickering for the development of a new major international airport to serve the Greater Golden Horseshoe. Also in the early 1970s, lands in Central Pickering and in adjacent Markham were assembled by the province with the intent to develop a new community in conjunction with federal plans for the airport.

In 2001, as part of Ontario's strategy to protect environmentally sensitive lands on the Oak Ridges Moraine (ORM), private landowners on the ORM in Richmond Hill and Uxbridge reached a general agreement to exchange their lands for provincially-owned lands in Central Pickering (approximately 520 hectares), which was signed in early September 2004. With this agreement in place, the province began work on the Central Pickering Development Plan (CPDP), which was undertaken pursuant to the provisions of the Ontario Planning and Development Act to establish the province's plan for the development of the Seaton Community. In May 2006, the CPDP was approved by the province, and the Regional Official Plan and City of Pickering Official Plan were subsequently brought into conformity with the CPDP. In 2016, the remainder of developable lands in Seaton that was not transferred to the private landowners, including the employment lands along the Highway 407 corridor, were initiated for sale by the Province for development.

The CPDP has forecasted a population of 61,000 and 30,500 jobs within the Seaton Community by 2031, with an ultimate population of 70,000 and 35,000 jobs.

The Region completed its Class EA for Regional Services for the Central Pickering Development Plan to identify Regional water, wastewater, transportation, and transit infrastructure to service the Seaton lands in September 2014. The analysis supporting this TMP considered the needs for Seaton within the broader context of the transportation needs of the entire Region.

POTENTIAL PICKERING AIRPORT

In 1972, the federal government acquired lands in north Pickering for the development of a new major international airport to serve the Greater Golden Horseshoe. The timing of the potential Pickering Airport is uncertain, but development is anticipated between 2027 and 2037 based on the 2011 Needs Assessment Study released by Transport Canada. One of the impacts of the airport will be its effect as a catalyst for the development of employment lands in Durham Region. The airport lands are considered in this TMP as part of the beyond 2031 scenario. It is expected that when the federal government announces its decision on the Pickering Airport further studies to identify the transportation infrastructure to support growth in this area will be undertaken.

2.1.2 REGIONAL POLICY FRAMEWORK

DURHAM REGION STRATEGIC PLAN (2015-2019)

The Strategic Plan outlines the long-term vision for Durham Region and describes goals and objectives that guide the Regional government in achieving that vision. The plan is based on the following four themes:

- **Economic Growth, Diversification, and Local Employment**: Strengthen the economy and promote more local employment;
- **Population, Health, and Quality of Life**: Maintain and improve the health of our community and build a regional community that is inclusive, cohesive, and welcoming;
- **Organizational Health and Service Excellence**: Deliver exceptional municipal services through strategic, compassionate and innovative leadership; and
- **Healthy Environment and Sustainable Communities**: Protect, enhance and restore the natural environment and build resilient, safe communities that are supported by reliable, affordable transportation systems and services.

This TMP provides actionable recommendations for transportation and land use policies and infrastructure that support these themes and move the Region towards its vision.

DURHAM REGIONAL OFFICIAL PLAN

The Regional Official Plan (ROP, 2015 consolidation) guides Durham's growth and development to 2031, and is required by the Provincial Planning Act. The ROP aligns with and supports the goals of the Province's Growth Plan for the Greater Golden Horseshoe, and lays out the Region's policies for achieving key objectives such as healthy and complete communities, protection of the natural environment, and development of Durham Region's economic potential. The TMP builds on the ROP's land use and transportation framework by providing additional detail on a number of its policies, and by identifying the facilities and services required to support Durham Region's future development pattern and growth targets.

DURHAM REGION – DEVELOPMENT CHARGES BY-LAWS

The Regional Residential and Non-residential Development Charges by-law (#16-2013) and Regional Transit Development Charge by-law (#47-2012 as amended) enables the Region to capture the growth-related share of capital modification costs from new development. Development charges are an important source of revenue for the Region, and are fundamental to the timely implementation of the Plan.

The 2013 by-law is based on the growth projections prepared for the most recent ROP update. The proposed Regional road modifications outlined in Chapter 9 of the TMP provide the basis for the next update of the roads-related DC by-law, which is anticipated in 2018.

As the current DC by-law for transit services expires at the end of 2017, a Background Study to update the by-law was completed in September 2017 and addresses the proposed transit improvements presented in Chapter 4 of the TMP.

2005 TRANSPORTATION MASTER PLAN

Developed through an initiative referred to as the Durham Mobility Study, the 2005 Durham Region TMP provided a foundation for comprehensive transportation planning in Durham Region through the year 2021. Public consultation conducted during the development of that plan revealed that Durham Region's residents were concerned about continued automobile dependence and the potential impact on the environment and the economy. The plan therefore recommended policies and actions to make public transit, walking and cycling more attractive alternatives for trips in Durham Region. Through implementing many of those recommendations, the Region has made significant progress toward developing an efficient, integrated transportation system that serves all residents throughout the eight area municipalities.

With a new 2031 horizon, this TMP builds on the principles of the previous one, updating policies and actions in some areas and describing new ones to address the transportation and land use issues facing Durham Region.

OTHER REGIONAL INITIATIVES

The 2010 Long Term Transit Strategy (LTTS) described a vision for public transit in Durham Region. It presented a comprehensive long-range vision of the Region's rapid transit network and identified major transit corridors and service levels for higher order service throughout Durham Region. The LTTS provided valuable input to the development of the 2031 transit network proposed in this TMP.

Plans for stronger walking and cycling networks in Durham Region have also been advanced with the development of the 2012 Regional Cycling Plan, the 2015 Regional Trails Network and 2012 Regional Trails Guide. The Region has been actively expanding the primary cycling network to link major centres, intermodal facilities, and destinations.

Other key Regional initiatives include the Intelligent Transportation Systems Strategic Plan and Strategic Road Safety Action Plan.

2.1.3 AREA MUNICIPAL OFFICIAL PLANS AND TRANSPORTATION MASTER PLANS

In preparation of the Durham TMP, Official Plans for each of the area municipalities were reviewed, along with the Transportation Master Plans which are available for Ajax, Whitby, Oshawa and Clarington. Additionally, secondary plans of major, emerging development areas were also reviewed.

2.2 Current Conditions

2.2.1 LAND USE

As the eastern-most municipality in the GTHA, Durham Region is part of one of the fastest-growing urban areas in North America. Between 2001 and 2011, Durham Region's population increased by 20% from 527,000 to 633,000 residents and the number of jobs increased by 18% from 190,000 to 225,500 jobs. Exhibit 2.1 shows population and employment growth trends by area municipality.

About 90% of Durham Region's residents and a similar share of the jobs are in the highly urbanized lakeshore municipalities of Pickering, Ajax, Whitby, Oshawa, and Clarington. Industrial plants, distribution centres, and major office developments employ significant numbers of residents in these municipalities, particularly along the Highway 401 corridor. Oshawa is the most populous area municipality with 155,800 residents in 2011 but Ajax and Whitby have had very rapid growth between 2001 and 2011. The population of Ajax increased by 49%, from 76,700 to 114,100 residents, and that of Whitby increased by 40%, from 90,900 to 127,000 residents, during the period.

The other 10% of residents and jobs are located in the more rural northern municipalities of Uxbridge, Scugog, and Brock where several urban areas and hamlets and villages are distributed across a large area that is mostly covered by the Greenbelt. Of the 250,000 hectares that make up Durham Region, about 80% is within the protected area of the Greenbelt. Aggregate production and agricultural land uses are common in these municipalities.

Exhibit 2.1: Population and Employment by Municipality

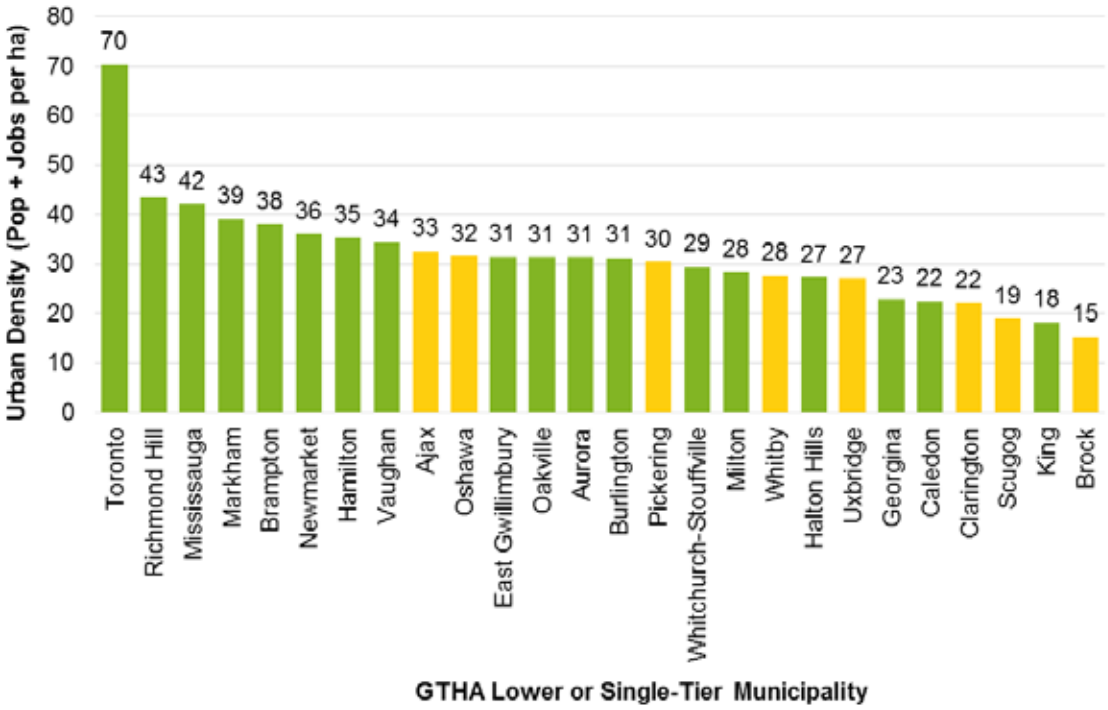
	Population			Employment		
Municipality	**2001**	**2011**	**% Growth**	**2001**	**2011**	**% Growth**
Ajax	76,700	114,100	49%	25,300	34,800	38%
Brock	12,600	11,800	-6%	4,100	4,000	-2%
Clarington	72,600	88,000	21%	17,700	22,600	28%
Oshawa	144,600	155,800	8%	63,400	68,300	8%
Pickering	90,600	92,400	2%	34,700	41,200	19%
Scugog	21,000	22,600	8%	6,800	8,000	18%
Uxbridge	18,100	21,500	19%	5,200	6,100	17%
Whitby	90,900	127,000	40%	32,800	40,700	24%
Durham	**527,000**	**633,100**	**20%**	**190,000**	**225,500**	**19%**

Source: 2001 Population – Region of Durham Commissioner's Report #2009-P-58, Monitoring of Growth Trends;
2011 Population – Region of Durham Commissioner's Report #2016-P-14, Monitoring of Growth Trends, February 2016;
2001 Employment – Region of Durham, Growing Durham Study – Appendix B;
2011 Employment – Region of Durham Commissioner's Report #2008-P-98, Growth Plan Implementation Study – Phase 5 Final Recommended Growth Scenario and Policy Directions Report.

Note: Population figures include an estimate for Census undercount. Employment figures include persons who work at home and with no fixed place of work. Numbers may not add up due to rounding.

Given the diverse land uses, urban densities—the number of people and jobs per hectare in the urbanized area—vary across Durham Region. The average urban density in Durham Region was 28 people and jobs per hectare in 2011. Exhibit 2.2 shows that urban areas such as Oshawa and Ajax are much more densely developed than those of Clarington, Scugog and Brock. This TMP therefore proposes a transportation network that provides higher capacity transit and road networks in the lakeshore municipalities, along with land use policies and actions to help alleviate congestion. In rural areas where capacity is less of an issue, the TMP focuses on modifications for safety, connectivity, agricultural and goods movements and reducing the impacts of truck traffic on rural communities.

Exhibit 2.2: Average urban density in GTHA municipalities in 2011



Note: Based on urban density in areas with at least 10 people and jobs per hectare and therefore excludes rural areas.

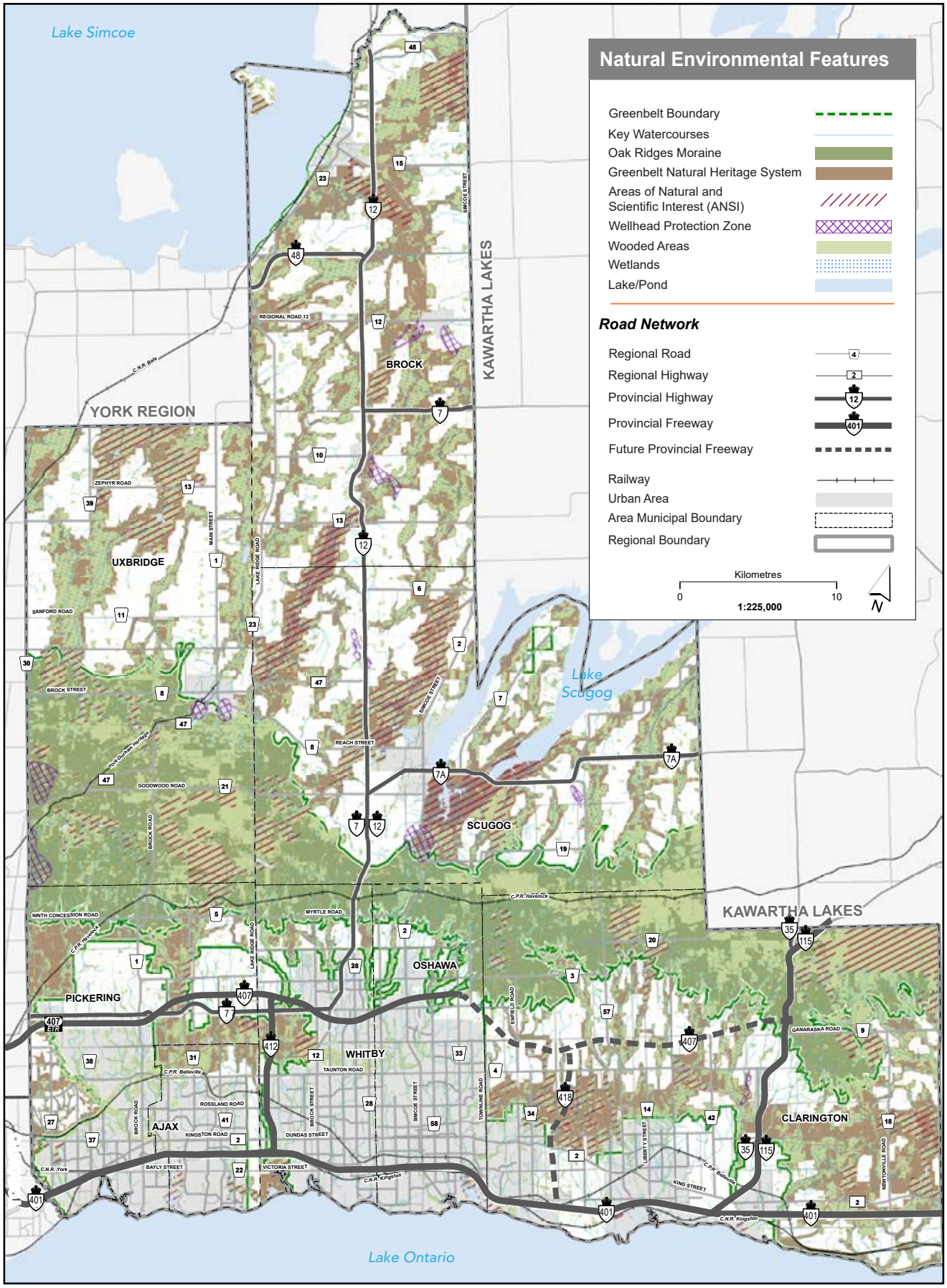
Source: IBI Group based on Statistics Canada 2011 Census and 2011 National Household Survey

2.2.2 NATURAL ENVIRONMENT

Durham Region has many natural heritage features. They include the Oak Ridges Moraine, the Greenbelt and numerous Areas of Natural and Scientific Interest (ANSIs), Environmentally Sensitive Areas (ESAs), lakes, watercourses, wetlands and woodlots (refer to Exhibit 2.3). Further maps showing the Regional greenlands system, key hydrologic features, woodlands, wellhead protection areas, Oak Ridges Moraine aquifer vulnerability areas and watershed boundaries, as well as agricultural and rural areas, are included in the Regional Official Plan. These maps were referenced in the development of this TMP as part of the needs and justification process to identify potential impacts to the natural heritage system.

It is noted that the Province is in the process of updating the Regional Natural Heritage System mapping for the Greater Golden Horseshoe.

Exhibit 2.3: Natural Environment Features



2.2.3 JURISDICTIONAL SCOPE

The transportation system in Durham Region falls within three government jurisdictions and is operated by both private and public sector organizations.

The freeway network, which includes Highway 401, Highway 407 east of Brock Road, Highway 412, Highway 418, and Highway 35/115 are managed by the province through the Ministry of Transportation. West of Brock Road, Highway 407 is owned by the 407 Express Toll Route (ETR) Concession Company Limited. Highway 12, Highway 7/7A and Highway 48 west of Highway 12 are also under provincial jurisdiction. The province is also responsible for inter-regional passenger bus and rail services, which are operated by Metrolinx as GO Transit.

Regional roads are the responsibility of the Region of Durham, which owns the land within the rights-of-way. However, the provision of sidewalks and boulevard infrastructure (e.g. multi-use paths and pedestrian amenities) is the responsibility of the area municipalities, as specified in the Municipal Act (S.O. 2001, c.25, s.55). The Region is responsible for constructing on-road paved shoulders on Regional roads in the rural areas that are on the Regional Cycling Plan (RCP) and for providing the base platform on Regional roads for multi-use paths that are in the RCP in the urban areas. The Region is also responsible for providing local public transit through Durham Region Transit (DRT), which serves all area municipalities.

The eight area municipalities have jurisdiction over all other local public roads in Durham and are responsible for providing the related sidewalks and boulevard infrastructure in addition to the sidewalks along Regional roads. Area municipalities are also responsible for roadway lighting. Off-road pedestrian and cycling facilities such as trails and multi-use paths are also maintained by area municipalities. The area municipalities are responsible for providing the top asphalt for multi-use paths on Regional roads that are on the RCP's Primary Cycling Network in the urban areas where the Region has provided the base platform.

Other transportation infrastructure and services in Durham Region include the following:

- Oshawa Executive Airport – Owned and operated by the City of Oshawa;
- Port of Oshawa – Under federal jurisdiction and operated by the Oshawa Port Authority;
- Freight Rail Lines – CN Rail and CP Rail own and operate the freight rail lines in Durham Region.
- VIA Rail – Under federal jurisdiction, VIA operates passenger train service through Durham on the CN Rail line, which forms part of the Windsor-Quebec City corridor. VIA Rail has a station in Oshawa, at the same location as the Oshawa GO Station.
- Several marinas on Lake Ontario, Lake Scugog, and Lake Simcoe, which are operated by area municipalities or the private sector.

- Greyhound Bus Canada – serves intercity travel to Toronto, Montreal and Ottawa, with a terminal in Downtown Oshawa (shared with GO Buses) and stops in Ajax, Whitby and Bowmanville.

This TMP focuses on elements that fall under Regional jurisdiction but also outlines policies and actions for areas where the Region should work with other jurisdictions to improve transportation and land use in Durham.

2.2.4 THE TRANSPORTATION SYSTEM

The current road network, by jurisdiction, within Durham Region is shown in Exhibit 2.4. The east-west transportation corridors in the lakeshore municipalities are the most heavily used components of the system, and provide inter-regional connections between Durham Region and the GTHA to the west and Port Hope and Kawartha Lakes to the east.

Highway 401 and the 407 ETR are critical components of the network. Highway 401 is a key passenger and freight vehicle route, connecting Durham Region's industrial and distribution centres to markets in the Greater Golden Horseshoe and beyond. In 2011, an average of over 250,000 vehicles crossed the Toronto-Durham boundary each weekday[1], most of which used Highway 401. Since the extension of 407 ETR to Brock Road in Pickering in 2001, Highway 407 has helped to alleviate congestion on Highway 401 but the more direct route to Toronto offered by Highway 401 and the absence of tolls continues to make it the more popular option. Many segments of Highway 401 in Pickering, Ajax and Whitby are operating at capacity during peak periods. In June 2016, the extension of Highway 407 from Brock Road in Pickering to Harmony Road in Oshawa, and the Highway 412 link to Highway 401, were opened to traffic, providing a new high-capacity tolled route for east-west travel in Durham Region. Tolls came into effect on the Highway 407 extension and Highway 412 in February 2017.

Highway 12 is the primary north-south corridor connecting Durham Region's northern municipalities to the lakeshore, while Highways 7/7A and 48 provide east-west connections between the northern municipalities and neighbouring areas.

DRT provides public transit throughout Durham Region. DRT operates 70 local bus routes, many of which are anchored by the four GO stations and are scheduled to provide quick transfers to and from GO Rail. Some services also operate in the northern municipalities and Clarington to connect travellers to employment nodes, post-secondary institutions, and commercial areas. DRT's PULSE rapid, high frequency service, launched in June 2013, operates on Highway 2 between Oshawa and Pickering parallel to the GO Rail and Highway 401 corridors, with continuing service to Scarborough in Toronto. Exhibit 2.5 shows the current public transit system in Durham Region.

1 Source: Data Management Group, GTA Cordon Count Program – Transportation Trends 2001-2011

Exhibit 2.4: Existing Road Network by Jurisdiction (2017)

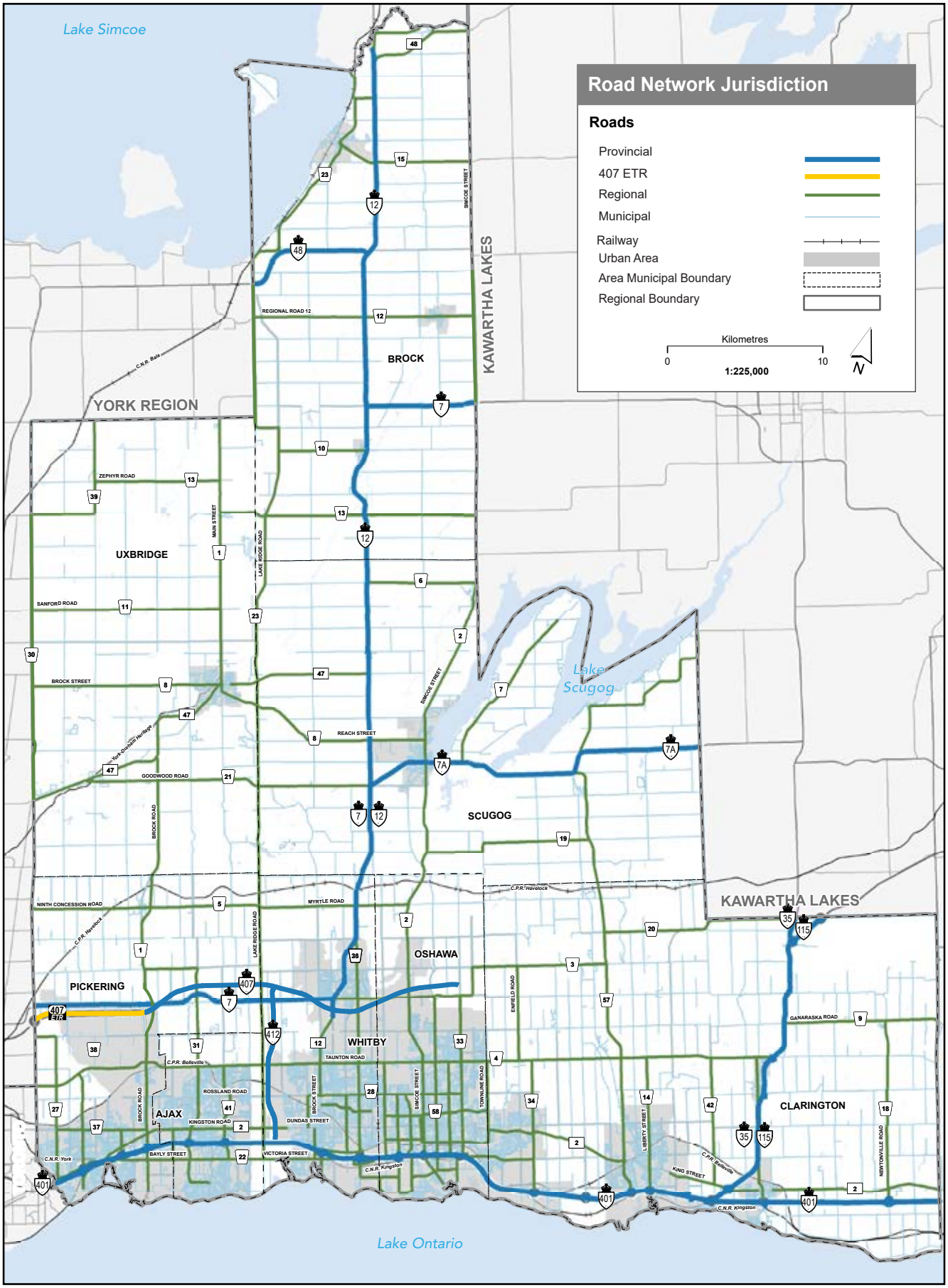
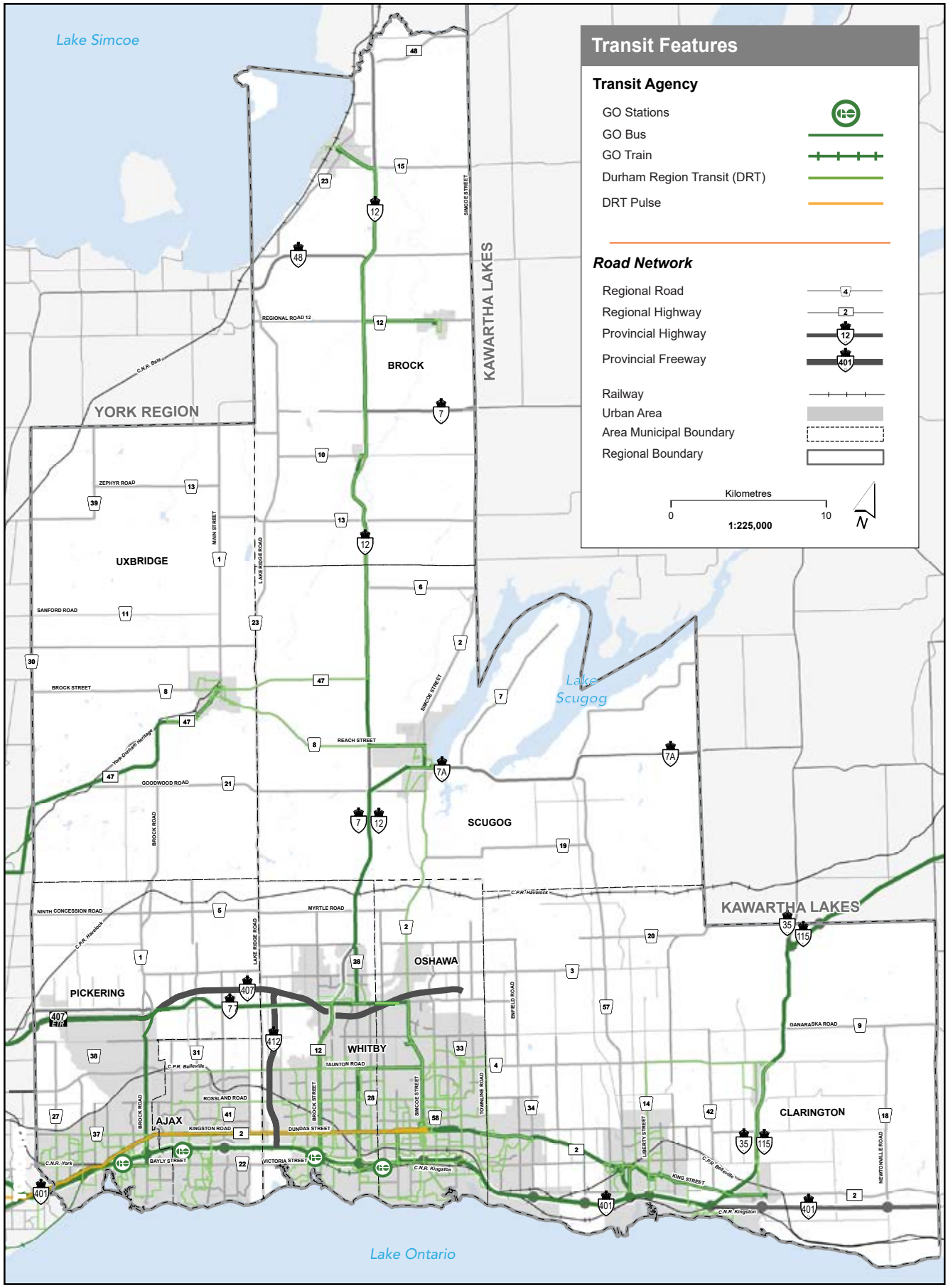


Exhibit 2.5: Existing Transit Network



Running parallel to Highway 401, the GO Rail Lakeshore East line runs from Union Station in Toronto to Oshawa GO Station, with stations in Pickering, Ajax, and Whitby. GO Transit operates this line and the stations along it. Large commuter parking lots and structures exist at each of the four GO stations, providing approximately 11,000 permanent parking spaces combined.[2] The Lakeshore East line is the second most heavily used inter-regional rail line in the GTHA, carrying 52,000 passengers on an average weekday in 2014.[3] The four GO stations also serve as terminals for several GO Bus routes that provide service within Durham Region, as well as inter-regional services to York Region, Toronto, and Peterborough.

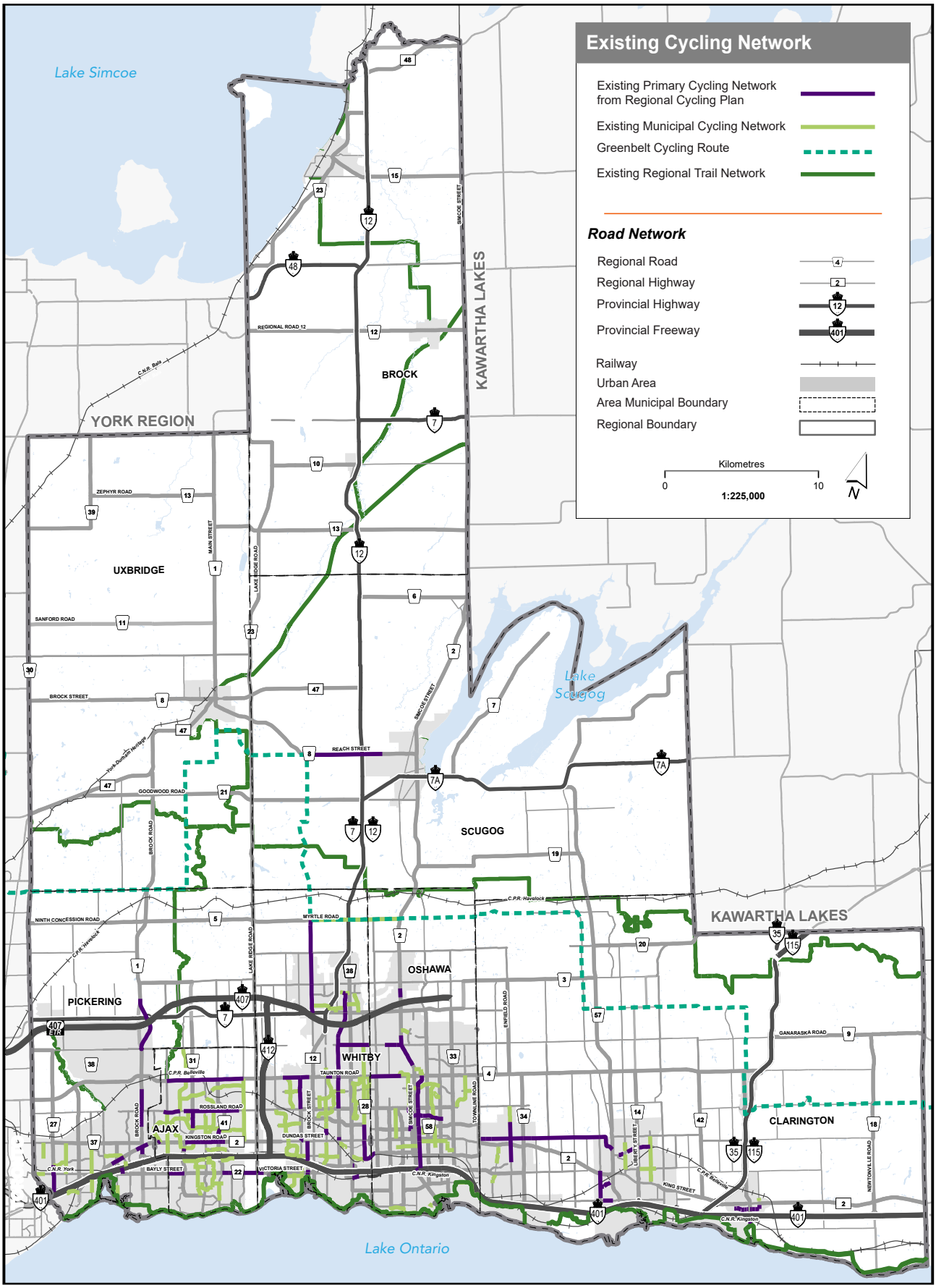
The pedestrian network is extensive in the urban areas of Durham Region, where most major roads have sidewalks on both sides or a combination of sidewalk and multi-use paths. In hamlets and other rural settlement areas, paved shoulders or walkways are more common along roadways than sidewalks. However, there are gaps in this pedestrian network, particularly in newly developed neighbourhoods and in some rural areas where pedestrians must walk on the gravel shoulders.

The existing cycling network is shown on Exhibit 2.6. The cycling network on Regional roads has grown quickly over the last few years, from 18.7 km in 2012 when the Regional Cycling Plan was introduced, to 39.1 km as of October 2016. About 24 km of this cycling network is along multi-use paths.

2 Source: GO Transit Stations webpage (http://www.gotransit.com/publicroot/en/travelling/citylocations.aspx)

3 Source: Metrolinx, September 5, 2014 Board Meeting Presentation

Exhibit 2.6: Existing Cycling and Trails Network

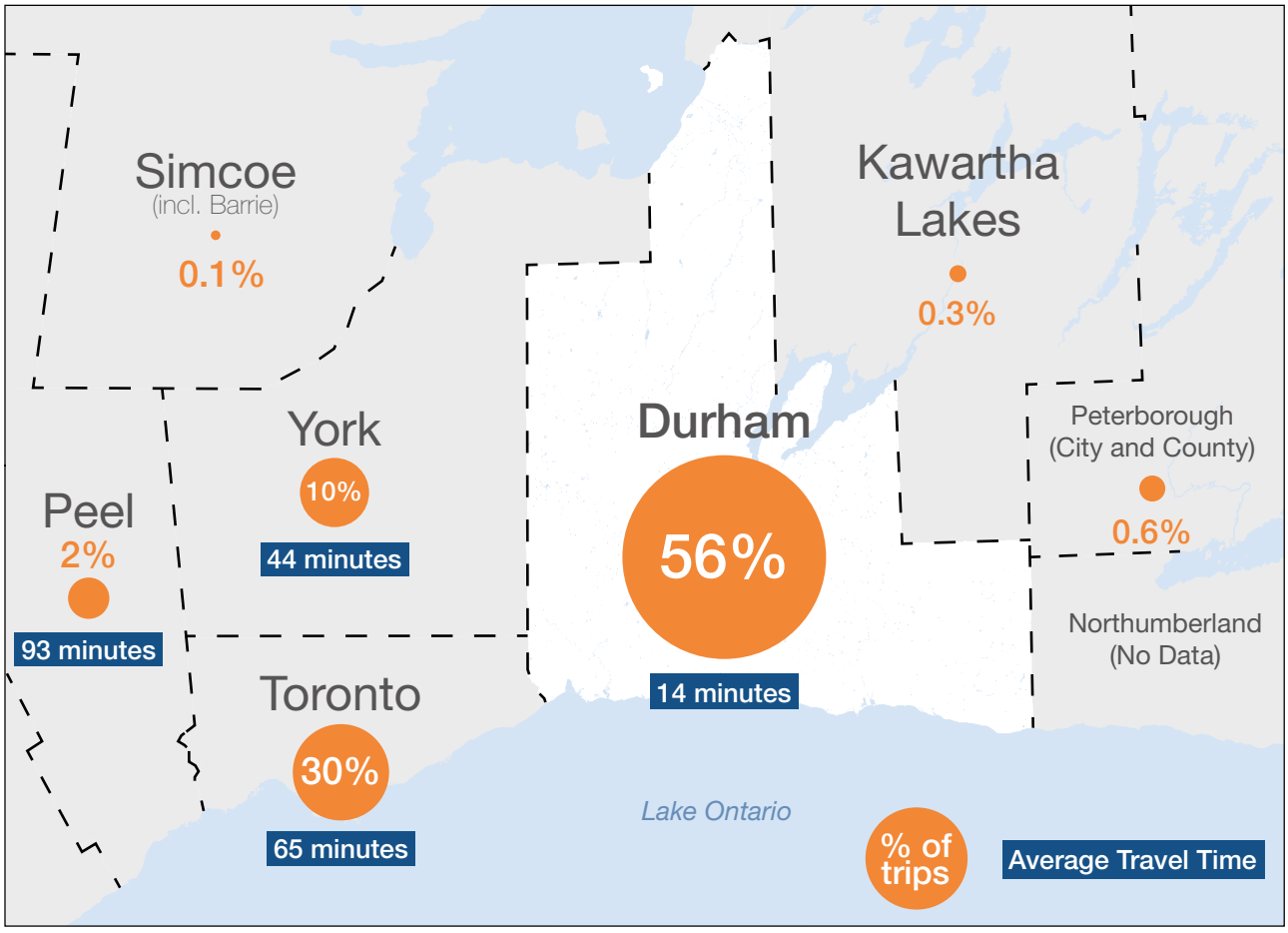


2.2.5 PASSENGER TRAVEL TRENDS

OUT-COMMUTING

The growth in the number of daily trips made by residents of Durham Region has paralleled population growth, increasing by 20% from 1.1 million trips in 2001 to 1.3 million trips in 2011.[4] Exhibit 2.7 shows that in the 6:30 a.m. to 9:30 a.m. peak period, 56% of the 126,000 work trips (about 71,000) stayed within the Region while 30% ended in Toronto and 10% were destined for York Region.

Exhibit 2.7: Map showing the proportion of morning peak period work trips made by Durham Region residents destined to Durham and neighbouring municipalities in 2011



4 Source: 2011 Transportation Tomorrow Survey

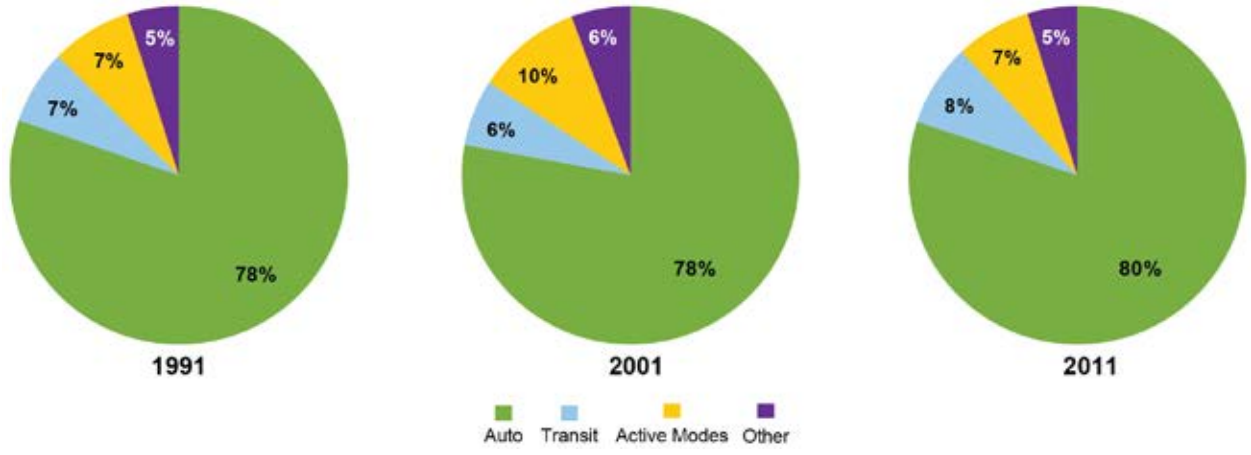
These statistics have remained unchanged since 2001, indicating a somewhat stable pattern of out-commuting by Durham Region residents. This level of self-containment of work trips puts Durham around the average for GTHA municipalities—ahead of York and Halton, which had 50% and 45% self-containment in 2011 respectively, but behind Peel and Toronto with 62% and 82% respectively.

MODE SHARES

Mode shares for trips by residents of Durham Region have been generally stable since 1991. Exhibit 2.8 shows that 80% of all trips were made by car in the morning peak period in 2011, with transit and active modes (i.e. walking and cycling) at 8% and 7% respectively. Transit (DRT plus GO) mode shares in the urbanized lakeshore municipalities of Pickering, Ajax, Whitby, and Oshawa were around 10% in 2011 compared to an average of about 1% in the more rural and northern municipalities. However, throughout Durham Region, the car is by far the dominant mode. The higher density of DRT and GO Transit service in the urbanized south explains in part why transit mode shares are higher there.

Similar to other Regions in the GTHA, Durham Region has seen a significant increase in transit mode shares for trips to Downtown Toronto as a result of increasing traffic congestion in Toronto and improved GO Rail service to Union Station. Approximately 73% of trips between Durham Region and Downtown Toronto were on transit in 2011, up from 65% in 2001. However, in 2011, trips to Downtown Toronto only represented 6% of all trips originating in Durham Region. In contrast, the large market for trips within Durham Region has shown little movement from auto to transit between 2001 and 2011.

Exhibit 2.8: Mode share of trips by Durham Region residents in the 6:30 AM to 9:30 AM peak period, 1991-2011



Source: 1991-2011 Transportation Tomorrow Surveys

CAR OWNERSHIP

Household car ownership is an important factor in a person's choice of what mode to use for a given trip. If persons have access to a car, they are far more likely to use it. In Durham Region, the average number of cars per household increased slightly from 1.7 in 2001 to 1.8 in 2011[5] as the share of households with two or more vehicles increased from 60% to 63% in that period.

The share of youth aged 16-24 with a driver's licence has decreased steadily from 82% in 1991 to 71% in 2011. A similar trend has been observed in other GTHA municipalities as more young adults are choosing to live a car-free lifestyle.

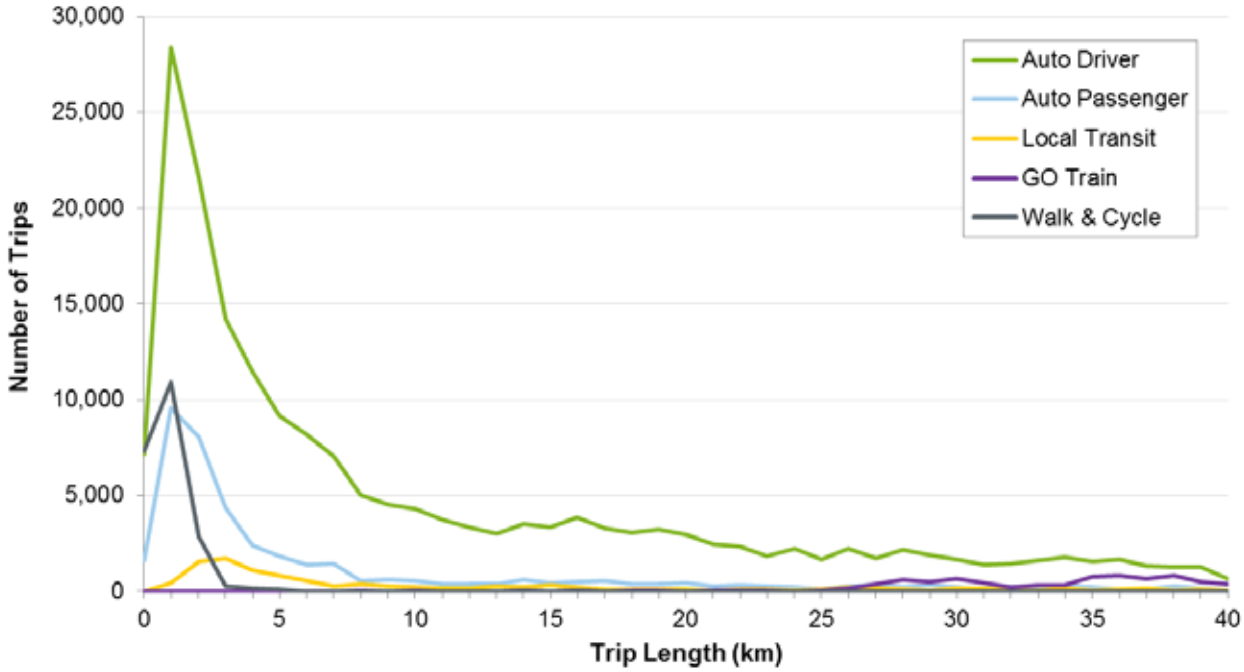
TRIP LENGTHS

The average length of a trip made by Durham Region residents in the 6:30 a.m. to 9:30 a.m. peak period was 13.6 km in 2011, virtually unchanged since 2001. The average work trip in the morning peak period, however, was 21.1 km long in 2011, up from 20.3 km in 2001 and 17.9 km in 1991. Residents in the northern municipalities of Brock, Uxbridge, and Scugog on average travelled 24.6 km to work compared to 20.7 km for residents of the lakeshore municipalities.

Exhibit 2.9 illustrates the number of trips of varying lengths made by Durham Region residents by various modes in 2011. Most notable in the exhibit is the large number of short auto trips. In the morning peak period 75% of trips that are 2 km or less—a distance that can usually be travelled by walking or cycling—are made by car. Similar observations have been made in other parts of the GTHA and highlights that there may be opportunities to encourage more residents to switch from auto to active modes for some of their trips.

5 Source: 2001 and 2011 Transportation Tomorrow Surveys

Exhibit 2.9: Trip length and number of trips made by Durham Region residents in the morning peak period, 2011



Source: 2011 Transportation Tomorrow Survey.

PUBLIC TRANSIT TRAVEL

DRT has done well to increase transit ridership since it was founded in 2006. Between 2005 (just before amalgamation of local transit agencies to form DRT) and 2015, ridership increased from about 6.9 million annual trips to 10.4 million trips. While there was been a slight decrease in ridership between 2014 and 2015, the long term trend from 2005 has outpaced population growth, resulting in an increase in ridership per capita from 13.8 to 19.6. Stronger integration of routes, better connections between the area municipalities and introduction of PULSE service on the Highway 2 corridor have all contributed to this growth.

GO Transit has also experienced increased ridership, primarily on the Lakeshore East GO Rail line for trips to and from Downtown Toronto as mentioned previously.

2.2.6 GOODS MOVEMENT

Durham Region is a major generator and attractor of goods movement trips. In addition to the road network for truck movements, Durham Region is served by three strategic rail lines running east/west, including an intermodal rail terminal located adjacent to the General Motors plant east of Thornton Road in Oshawa; the Oshawa Executive Airport which is available for smaller air freight shipments such as auto parts; and two marine harbours, Oshawa and Bowmanville. The Bowmanville port facility is operated by St. Mary's Cement and is the major port in the Great Lakes Region for coal coke and petroleum coke, as well as cement. The Port of Oshawa is a growing facility serving a variety of users and products including salt, potash, steel and increasingly locally grown agricultural products.

In terms of truck movements, the most common commodities moved on the provincial highway network are food, manufactured products, minerals, chemicals and wood products. The movement of aggregates is also a significant generator of truck traffic on Regional roads. These movements tend to be from local pits and quarries to construction sites within the GTHA, or from pits and quarries located north and east of Durham to local or regional destinations.

Other infrastructure that transports commodities through Durham Region includes the TransCanada pipeline (natural gas), Enbridge Line 9B (oil) and various hydro corridors (electricity). This infrastructure plays an important role in goods movement, but is not the focus of the TMP.

2.2.7 EMERGENCY MANAGEMENT, PREPAREDNESS AND RESPONSE

Responding to large-scale events and major emergencies to keep the public safe involves deployment of emergency responders and resources from around Durham Region. In many instances the response strategy is to reroute traffic and evacuate the public away from affected areas while giving responders increased access to the event location. Special traffic signal timing plans, electronic signage, emergency responders and public information messages assist in coordinating these movements.

The TMP recognizes that the Region's Hazard Identification and Risk Assessment (HIRA) has identified a transportation emergency as a potential emergency event. The HIRA also indicates that severe weather events can have a widespread negative impact on the community, as well as hampering emergency responders due to road network accessibility. Durham Region must do all that it can to ensure its transportation system can meet the daily demands placed on it by police, paramedics and local fire departments, as well as during major emergencies.

During many major emergencies there is a possibility of a community evacuation. This is particularly apparent during a nuclear emergency, where large numbers of residents and business employees would need to be evacuated away from the area surrounding the Darlington or Pickering Nuclear Power Stations.

With these considerations in mind, the transportation network should endeavor to have:

- robust infrastructure;
- flexibility in response to accommodate any situation, in any location at any given time;
- coordination by a system that is connected and strong; and
- interoperability between the respective agencies and organizations involved in an emergency response.

Commitment to these goals by responsible Regional departments and transportation stakeholders is key to ensuring a strong and effective emergency transportation platform that is able to handle the incidents that arise daily, but can also adapt and be responsive to large-scale events and major emergencies that may also occur.

2.3 Future Conditions

2.3.1 FORECASTED POPULATION AND EMPLOYMENT

For the purpose of characterizing growth trends, 2011 is used as the base year. This is the most recent year for which complete land use, travel survey and demographic data is available (at the time of this report only population and dwelling count data was available from the 2016 Census). However, for the purpose of examining existing road network and transit network performance, the travel demand model was calibrated to represent 2012 conditions as the base year.

Forecasts indicate that Durham Region will continue its strong growth through the year 2031. Exhibit 2.10 shows forecasted population and employment by area municipality through the year 2031 in the ROP, and highlights that Durham Region is expected to add about 316,000 residents (a 49% increase) and 124,000 jobs (a 55% increase) between 2011 and 2031. Generally, the lakeshore municipalities will see the fastest growth, with Pickering forecast to see the most dramatic increase largely due to the development of the planned Seaton community. However, it should be noted that 2016 population figures, based on the Region's monitoring of growth trends and the release of Census population and dwelling counts, are significantly lower (approximately 50,000) than the forecasts in the ROP. In part, this is due to the assumed timing of certain development areas coming "on-stream" by 2016 in the ROP (e.g., parts of Seaton, West Whitby, Kedron), which are only currently in or nearing the construction phase.

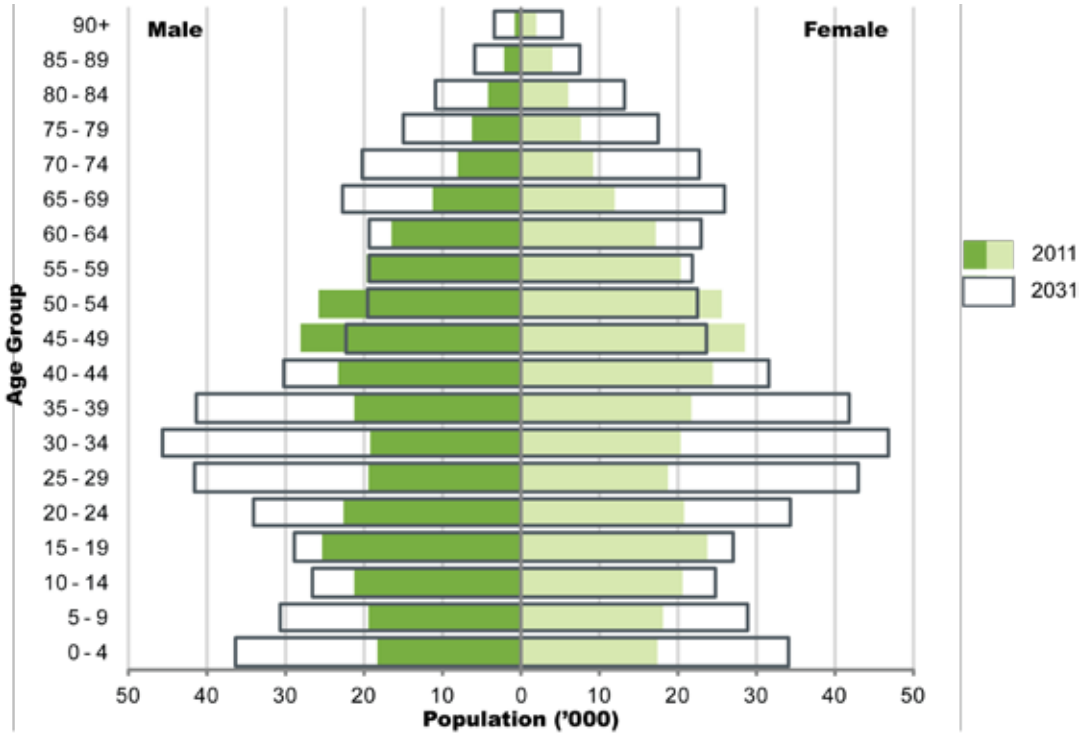
Exhibit 2.10: Forecasted population and employment in Durham Region, 2011-2031

		Ajax	Brock	Clarington	Oshawa	Pickering	Scugog	Uxbridge	Whitby	Durham Region
2011	**Population**	114,100	11,800	88,000	155,800	92,400	22,600	21,500	127,000	**633,100**
	Employment	34,800	4,000	22,600	68,300	41,200	8,000	6,100	40,700	**225,500**
2016	**Population**	126,000	13,000	97,000	165,000	141,000	23,000	23,000	141,000	**729,000**
	Employment	41,000	4,000	27,000	75,000	55,000	8,000	7,000	48,000	**265,000**
2021	**Population**	132,000	13,000	108,000	175,000	178,000	23,000	24,000	157,000	**810,000**
	Employment	46,000	5,000	32,000	85,000	68,000	9,000	8,000	57,000	**309,000**
2026	**Population**	136,000	13,000	127,000	184,000	204,000	24,000	26,000	179,000	**895,000**
	Employment	49,000	5,000	36,000	87,000	74,000	9,000	9,000	65,000	**333,000**
2031	**Population**	138,000	14,000	140,000	197,000	226,000	25,000	27,000	193,000	**960,000**
	Employment	49,000	5,000	38,000	91,000	77,000	9,000	9,000	71,000	**350,000**
Jobs per Resident	**2011**	0.32	0.33	0.26	0.44	0.37	0.35	0.29	0.33	**0.35**
	2031	0.36	0.36	0.27	0.46	0.34	0.36	0.33	0.37	**0.36**
% Change	**Population**	24%	17%	59%	28%	105%	9%	29%	54%	**49%**
	Employment	40%	25%	65%	34%	88%	13%	50%	73%	**55%**

Source: Durham Regional Official Plan (2015 consolidation), except 2011 figures from Exhibit 2.1.
Note: 2031 forecasts are consistent with the 2006 Growth Plan but have not been updated to reflect Amendment 2 or 2017 Growth Plan forecasts. Population figures include an estimate for Census undercount. Employment figures include persons who work at home and with no fixed place of work. Numbers may not add up due to rounding.

As with many Canadian jurisdictions, Durham Region's population is forecast to age between 2011 and 2031. In that period, the share of the population in Durham Region aged 65 years and older is projected to increase from 12% to 18%. Exhibit 2.11 illustrates the age distribution in 2011 and 2031 and shows that alongside the growth in the senior population, the 25-39 age group is also poised for significant growth. Forecasts indicate that this cohort will make up 40% of Durham Region's population in 2031, compared to 34% in 2011.

Exhibit 2.11: Age distribution of population in Durham Region, 2011 and 2031



Source: Hemson Consulting – Greater Golden Horseshoe Growth Forecasts to 2041, Technical Report (2012)

Two important implications that informed the development of the TMP emerge from this analysis:

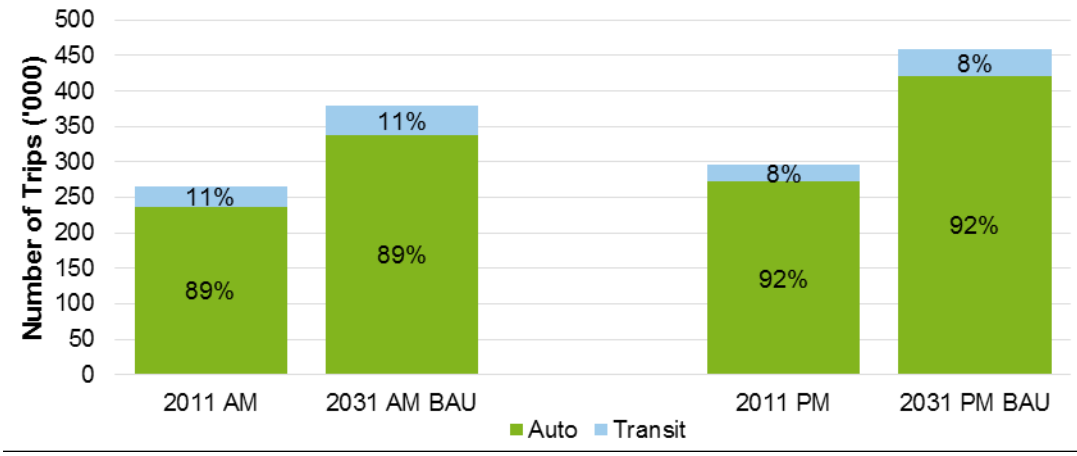
- As the senior population grows, the Region will face increasing pressure to provide efficient and convenient transportation alternatives, particularly in more rural communities that have little public transit service today.
- The strong growth in the working-age population will challenge the Region to provide alternatives to the car in many urban areas, as well as higher capacity road networks in some areas, to facilitate significant increases in the number of daily work trips.

2.3.2 FUTURE TRAVEL DEMAND

Forecasts of travel demand were prepared for a "business as usual" Base Network scenario and an Enhanced Network scenario. The Base Network scenario represents the continuation of current trends and committed investments as detailed in the Regional Road Program Capital Budget and Nine Year Forecast, the DRT 2013 Five Year Transit Service Plan and Metrolinx's committed rapid transit modifications. The BAU scenario also includes First Wave projects, referred to by Metrolinx as transit projects committed in terms of funding or already in progress, such as the Eglinton Light Rail Transit line and extension of VIVA rapidways in York Region. The Highway 2 BRT (Scarborough Centre to Downtown Oshawa) initiative is considered a Next Wave project by Metrolinx, which are planned to be funded within the next 10-15 years. However, $82.3 million in infrastructure funding towards construction of the BRT lanes in Pickering and Ajax at key intersection areas along Highway 2 (Phase 1 BRT), and supporting infrastructure for the DRT PULSE service, was provided by the province through MoveOntario 2020 Quick Win funding.

Under the Base Network scenario, the growth in trips between 2011 and 2031 is comparable to the forecast growth in population and employment. Exhibit 2.12 shows that the number of motorized trips made in the 6:30 a.m. to 9:30 a.m. peak period from or within Durham is projected to increase by 42% from 266,000 in 2011 to 379,000 in 2031. The number of motorized trips in the 3:30 p.m. to 6:30 p.m. peak period to or within Durham is also forecast to rise substantially, increasing by 55% from 296,000 to 458,700. While the rate of growth of transit trips is slightly faster than that for auto trips, the forecast indicates that there will still be about 10 times as many auto trips as transit trips in Durham Region in 2031.

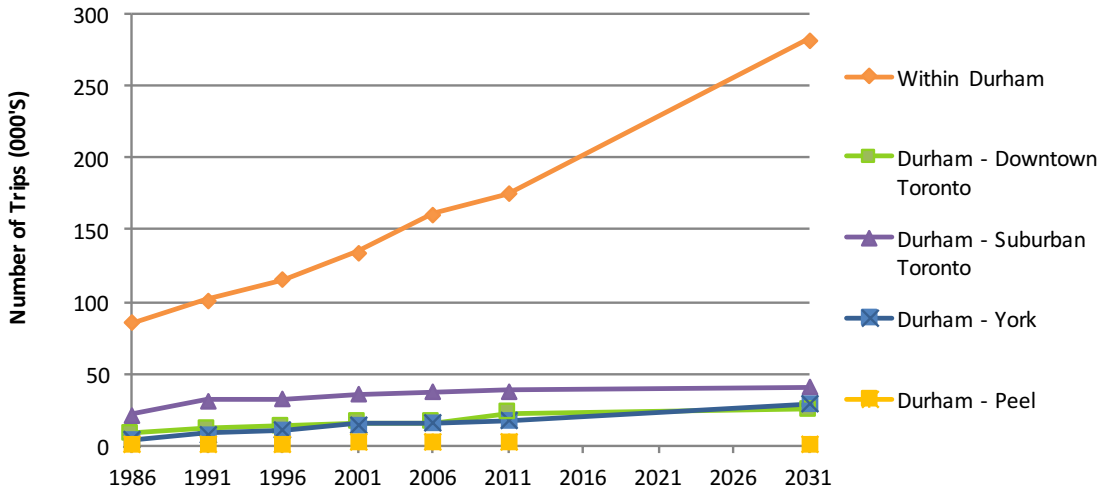
Exhibit 2.12: Number of motorized trips from Durham Region in the AM peak period, and trips to Durham Region in the PM peak period, 2011 and 2031



Source: Durham Region Transportation Planning Model

Exhibit 2.13 shows the growth in travel demand in the morning peak period in the five key travel markets in Durham Region between 1986 and 2031. The exhibit shows that internal trips within Durham Region have consistently been the largest and fastest growing market, a trend that is forecast to continue. Between 2011 and 2031, the forecast indicates that there will be a 54% increase in internal trips made in the morning peak period. This is in line with the stable activity rate discussed in the previous section: as more jobs emerge in Durham Region, residents should have opportunities to work closer to home rather than commuting to neighbouring municipalities.

Exhibit 2.13: Trips Starting in Durham Region by Destination



Source: 1986-2011 TTS, 2031 Durham Region Transportation Planning Model
Note: Excludes walking, cycling and school bus modes.

Given the high auto mode shares projected for Durham Region, a key focus of this TMP is to identify networks that provide improved options for walking, cycling and transit. However, it recognizes that automobile travel will continue to influence network needs to 2031 and beyond.

2.3.3 TRANSPORTATION NETWORK ALTERNATIVES

The development of road, transit and cycling networks followed an iterative approach that considered many inputs, including the following:

- Existing network level of service
- Public and stakeholder input on key issues and opportunities
- Forecasts of future travel demands and network implications
- Recommendations from key studies completed by the Region, as well as other levels of government including the Ministry of Transportation and Metrolinx
- Strategic Plan and Official Plan policies, including policies related to growth, intensification and transit-oriented development
- Technical analysis of alternative future scenarios including a Base Network scenario and an Enhanced Network scenario
- Analysis of the need and justification of specific infrastructure modifications, including a coordinated examination of road, transit and cycling modifications

Further details on these inputs are provided in the following background reports under separate cover:

- Background Report C: Existing Conditions Report
- Background Report E: Higher-Order Transit Strategy Development Report
- Background Report F: Road Network Development Report
- Background Report H: Durham Region Transportation Planning Model Documentation

This TMP considered two high-level network scenarios to accommodate the transportation needs and opportunities of Durham Region in 2031: a Base Network and an Enhanced Network. The Base Network includes committed and funded projects by the Region, the Province or other agencies as summarized in Exhibit 2.14.

Exhibit 2.14: 2031 Base Network Assumptions

Regional/Local Roads	• Roads with construction activities in the Region of Durham 2015 Regional Road Program Capital Budget and Nine Year Forecast • Road modifications in York, Peel, Toronto in most recent capital plans • Known area municipal road modifications on key corridors as gathered from municipal TMPs
Provincial Roads	• Modifications listed in MTO Southern Ontario Highways Program 2012 and 2014
Durham Region Transit	• DRT modifications between 2012 and 2013 • 2018 Base service plan in DRT 2013-2018 Five Year Service Plan • Highway 2 Phase 1 BRT, and supporting infrastructure for the DRT PULSE • York Region 2015 10 year roads and transit construction program • Local route changes in Peel and Toronto to accommodate new Regional transit projects
Metrolinx	• Metrolinx First Wave* Projects, including: - VivaNext Rapidway on Yonge Street and Highway 7 in York Region - GO Rail Richmond Hill extension to Gormley in York Region - Sheppard East Rapid Transit

* Source: 2015-2020 Metrolinx Five Year Strategy. Excludes projects outside of the model area (Halton, Hamilton, etc.)

The Enhanced Network scenario was developed to represent a high level of infrastructure investment. This scenario includes projects identified in previous studies and plans such as the 2013 Development Charge Study, the Long Term Transit Strategy (LTTS) and Regional transit projects identified by Metrolinx for the Next Wave of funding. Key assumptions for the Enhanced Network are provided in Exhibit 2.15.

Exhibit 2.15: 2031 Enhanced Network Assumptions

Regional/Local Roads	• 2031 Base Network, plus: • 2028 Regional Road Network, which also includes modifications for several local arterial roads, based on the 2013 Development Charge Background Study
Provincial Roads	• 2031 Base Network, plus: • Future Highway 401 Widenings and • Interchange modifications, as identified in Provincial Class EA studies for Highway 401
Durham Region Transit	• 2031 Base Network, plus: • 2018 Enhanced service plan in DRT 2013-2018 Five Year Plan • Alternative E in Durham LTTS, which assumes major transit enhancements such as rapid transit on Highway 2, Simcoe Street, Taunton Road, Whites Road, Brock Road, Salem Road-Harwood Avenue, Brock Street and portions of Highway 7. • Local route changes in York, Peel, and Toronto to accommodate new regional transit projects
Metrolinx	• 2031 Base Network, plus: • Metrolinx Next Wave* Projects, including GO Rail Lakeshore East extension to Bowmanville

* Source: 2015-2020 Metrolinx Five Year Strategy. Excludes projects outside of the model area (Halton, Hamilton, etc.)

Traffic forecasts were developed for each of the network scenarios using the Durham Region Transportation Planning Model. The travel demand forecasts and the resulting network performance, along with sensitivity tests on key network elements, were used in the assessment of network modifications. The individual project reviews were then used to develop the proposed 2031 network.

The lower transit investment under the Base Network would result in lower transit ridership and higher auto use when compared to the Enhanced Network. The limited road network expansion under the Base Network compared to the
Enhanced Network would also result in roadway congestion in many areas. Corridors running parallel to Highway 401 would be congested, and the congestion would divert traffic further north to alternative corridors such as Taunton Road, Highway 407 and Highway 7. Overall, the Base Network does not meet the needs for anticipated growth to 2031.

The Enhanced Network results in higher transit mode shares than the Base Network, but not to a significant degree given the greater road capacity also available. Transit levels of capacity is greater than what is required. In particular, many of the higher-order transit corridors identified in the LTTS did not achieve sufficient ridership levels to justify implementation by 2031.

Assessment of these network scenarios served to inform the development of the 2031 Preferred Network that represents a hybrid of the two scenarios in terms of road, transit, and active transportation networks. The components of the Preferred Network for each mode are discussed in the following chapters.

2.3.4 PROJECTED OUTCOMES OF 2031 PREFERRED NETWORK

The TMP acknowledges that it would not be sustainable for the Region to construct additional roadway capacity to keep pace with the strong population and employment growth forecast to occur. The 2031 Preferred Network therefore proposes balanced modifications to the transit, road, and active transportation networks that address the projected travel demand in Durham Region.

Mobility

Implementation of the 2031 Preferred Network as well as the policies and programs in the TMP would have a noticeable impact on mobility in Durham Region. Exhibit 2.16 shows the changes in key mobility indicators between the 2011 existing conditions and the forecast conditions with the Preferred Network. The exhibit shows that the Preferred Network scenario consisting of significant transit improvements with strategic road network expansion would yield mobility improvements compared to the "business-as-usual" Base Network scenario in several areas:

- While the number of trips will increase by 43%, vehicle-kilometres travelled (VKT) will only increase by 37%, helping to reduce the negative environmental impacts of the transportation network;
- Vehicle-hours travelled (VHT) will also increase more slowly than total trips due to fewer delays on the road network.

By alleviating some of the congestion forecast for key corridors, the Preferred Network would also improve travel times for goods movement, an important component of the Regional economy.

Exhibit 2.16: Mobility outcomes of the 2031 Preferred Network in the morning peak period

Indicator	Measurement Period	2011 Existing Conditions	2031 Preferred Network	Change	% Change
Population		633,100	960,000	326,900	49%
Employment		225,500	350,000	142,500	55%
Auto Trips (Origin in Durham)	Peak Period	236,950	333,250	96,300	41%
Transit Trip (Origin in Durham)	Peak Period	28,470	46,200	17,730	62%
Total Trips	Peak Period	265,420	379,450	114,030	43%
Transit Share of Motorized Trips	Peak Period	**10.7%**	**12.2%**	**1.4%**	**14%**
Lane-km Durham - Freeways	-	590	1,050	470	80%
Lane-km Durham - Roads	-	6,170	6,700	530	9%
Total Lane-km	-	6,750	7,750	1,000	15%
VKT Durham - Freeways	Peak Hour	463,740	629,720	165,980	36%
VKT Durham - Roads	Peak Hour	611,980	840,150	228,170	37%
Total VKT	Peak Hour	**1,075,720**	**1,469,870**	**394,150**	**37%**
VHT Durham - Freeways	Peak Hour	5,990	7,310	1,330	22%
VHT Durham - Roads	Peak Hour	11,260	16,630	5,370	48%
Total VHT	Peak Hour	**17,240**	**23,940**	**6,700**	**39%**
DRT Boardings	Peak Period	18,290	51,420	33,140	181%
DRT Passenger km	Peak Period	79,740	287,210	207,470	260%
DRT Passenger hours	Peak Period	2,980	10,670	7,690	258%
GO Boardings	Peak Period	17,420	23,790	6,370	37%

VKT – vehicle-km travelled
VHT – vehicle-hour travelled
Source: Durham Region Transportation Planning Model

Implications for the environment

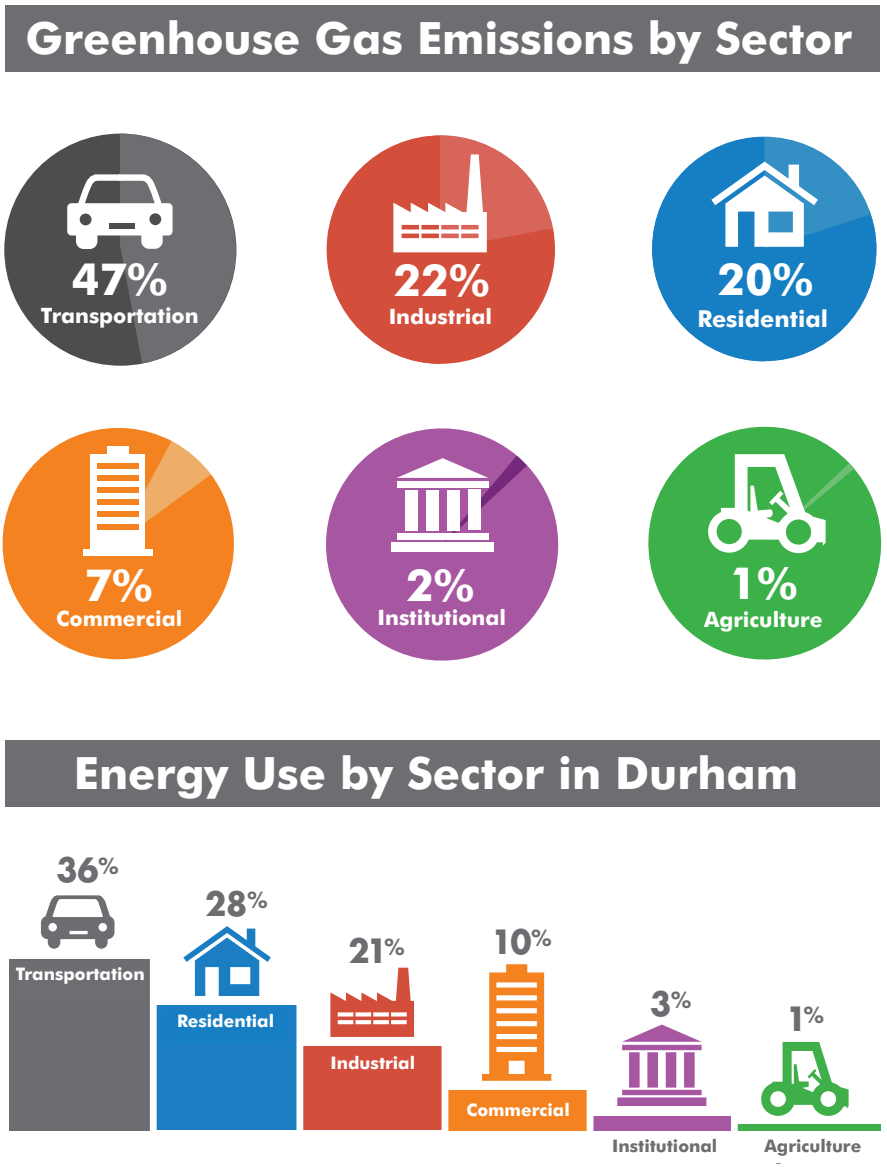
Transportation represents the largest source of energy consumption and greenhouse gas emissions in Durham Region, accounting for almost half of all GHG emissions produced from all sources, as shown on Exhibit 2.17. In addition to minimizing impacts on the natural environment, reducing emissions and energy use is a key priority for the Region.

The 2031 Preferred Network proposes new infrastructure and expanded network elements in several areas of Durham Region, which should have positive environmental and community impacts. While automobile emissions per capita are expected to decline in the future due to improved vehicle technology and the emergence of electric vehicles, the 2031

Preferred Network should also reduce potential emissions by offering an attractive alternative to the private car. Further, the actions proposed in the TMP are aimed to encourage walking and cycling for short trips, shifting some demand away from motorized travel.

Overall, the network elements, policies, and programs proposed by the TMP focus on optimizing the existing system to reduce the need for additional infrastructure.

Exhibit 2.17: Energy Use and Greenhouse Gas Emissions in Durham Region (2015)



Source: Data from Durham Community Energy Plan, Baseline Energy Study for 2015, Final Report, May 2017

2.3.5 MODE SHARE TARGETS

Mode share targets are an important tool for influencing decisions about future land use plans and transportation investments. As shown in Exhibit 2.18, based on the Durham Region Transportation Planning Model (which assigns motorized trips only), transit mode share is projected to increase from 10.7% in 2011 to 12.2% in 2031 under the Preferred Network scenario. In order to provide greater clarity for future planning decisions, mode share targets were further developed for each mode and geographic area taking into consideration future land use density and access to transit.

On a Region-wide basis, these individual targets will realize an a.m. peak sustainable mode share (walking, cycling, transit and auto passenger) of 37%. Comparatively, the existing sustainable mode share is 30%.

Exhibit 2.18: Modal Share Targets

Land Use Category	Mode	2011 Mode Share	Target 2031 Mode Share
Urban Growth Centre	Auto (driver)	68%	56%
	Auto (passenger)	15%	12%
	Transit (DRT and GO)	11%	20%
	Walk and Cycle	5%	12%
	Sustainable Modes	**32%**	**44%**
Rapid Transit Corridors	Auto (driver)	67%	58%
	Auto (passenger)	14%	12%
	Transit (DRT and GO)	11%	20%
	Walk and Cycle	8%	10%
	Sustainable Modes	**33%**	**42%**
Existing Urban Areas - South Durham	Auto (driver)	69%	65%
	Auto (passenger)	15%	13%
	Transit (DRT and GO)	8%	12%
	Walk and Cycle	8%	10%
	Sustainable Modes	**31%**	**35%**
New Urban Areas - South Durham	Auto (driver)	-	62%
	Auto (passenger)	-	13%
	Transit (DRT and GO)	-	15%
	Walk and Cycle	-	10%
	Sustainable Modes	**-**	**38%**
Rest of Durham Region	Auto (driver)	81%	72%
	Auto (passenger)	13%	15%
	Transit (DRT and GO)	2%	7%
	Walk and Cycle	4%	6%
	Sustainable Modes	**19%**	**28%**

Note: Numbers may not add to 100% due to rounding

Source: 2011 Data – Transportation Tomorrow Survey (TTS)

2.3.6 TRANSPORTATION AND CLIMATE CHANGE

Climate change is expected to increase the frequency and intensity of some extreme weather events. In response, both globally and locally, several initiatives are being undertaken to mitigate the human activities that contribute to greenhouse gas emissions and to adapt to future climate conditions.

Many of the impacts of ongoing climate changes on transportation systems have already manifested. These include:

- Increased travel disruptions due to flooding, and winter storms.
- Increased maintenance requirements for roads and stormwater structures due to intense rainfall events.
- Increased pavement damage from higher temperatures and shifting winter shoulder periods.

To prepare Durham for changing climate conditions, the Durham Region Roundtable on Climate Change was established in 2008 to study the future climate and develop a community climate mitigation and adaptation plan. The climate projection study shows that Durham Region may face a future (2040-49) where the climate may be:

- Warmer: a potential 4°C average temperature increase.
- Wetter: a potential 50% increase in the one day maximum rainfall.
- Wilder: a potential 15% increase in the potential for violent storms.

Based on these climate projections and further studies, a number of potential mitigation and adaptation programs have been recommended for the transportation sector amongst others. These programs were put forward for integration into the business planning cycles and the risk management, asset management, and financial planning process.

Durham Community Climate Change Local Action Plan (2012)

The goal of the Durham Community Climate Change Local Action Plan is to reduce greenhouse gas (GHG) emissions from transportation in Durham Region. In 2015, the transportation sector contributed about 47% of the Region's GHG emissions. The Region aims to reduce GHG emissions by:

- Promoting low GHG emission transportation options that are appealing to the public.
- Improving and integrating public transit services.
- Adopting innovative and intermodal transportation technologies, best practices and policies.

Durham Community Climate Change Adaptation Plan (2016)

The goal of the Region's adaptation plan is to improve the adaptive capacity of the Region's transportation infrastructure for projected climate conditions to prevent or reduce travel disruptions. The Region recommended the following adaptation programs to improve the resilience of the transportation infrastructure:

Road Embankment Program

Road embankment is the stable base that supports the road to carry vehicular traffic. Changing climate conditions, including more frequent and extreme storm events, are expected to undermine this base resulting in shorter life span and increased maintenance work.

Suggested measures to address future storm impacts on road embankments include:

- Identifying and improving the adaptive capacity of emergency and transit corridors.
- Engineering more stable embankments (e.g., flatter slopes, stabilized shoulders, vegetated and reinforced embankments).
- Implementing preventive maintenance along drainage flow paths before major storm events.
- Sourcing best practices for maintenance of embankments and shoulders.

Adaptive Culverts and Bridges Program

Culverts and bridges maintain the continuity of water courses under roads, trails and other transportation corridors. They are designed to perform satisfactorily over a range of storm averages and extremes and may fail if they are subjected to above-design storm events resulting in potential road and embankment washouts.

Suggested measures to address future storm impacts on culverts and bridges include:

- Improving the adaptive capacity of the existing storm structures.
- Implementing sustainable (e.g., Low-Impact Development and green infrastructure) measures to reduce the severity of storm event impacts on stormwater infrastructure.
- Modifying inspection and maintenance practices to proactively accommodate future storm intensities.
- Training municipal operations and depot staff in emergency preparedness and response measures.

Resilient Asphalt Program

Asphalt pavement is composed of aggregates and asphalt cement that are designed to perform over a range of temperatures. At higher temperatures, the pavement softens and becomes more susceptible to rutting and cracks. Changing climate conditions including extended and extreme hot periods are expected to weaken the asphalt pavement resulting in shorter life span and increased maintenance work.

Suggested measures to address the extreme heat impact to asphalt pavement include:

- Using resilient asphalt that can tolerate extreme heat.
- Using alternative pavement surfaces such as concrete at critical locations like intersections and bus bays.
- Using light colored asphalt pavement to reduce heat absorption.
- Increasing urban tree cover to reduce heat impact.

2.4 Principles and Directions

2.4.1 GUIDING PRINCIPLES

The following seven principles are integral to this plan, and reflect the Vision for Durham Region. The guiding principles and directions were endorsed by Regional Council in May 2015, and they form the basis for developing strategies, policies and actions for the TMP. Three of the principles summarize the overarching goals of this plan (or the *why*: healthy communities, economic prosperity and environmental protection) while the remaining four summarize broad cross-cutting approaches to achieving those goals (or the *how*: a focus on users, connectivity, innovation, and collaboration and leadership).

WHY

Healthy communities

Durham Region recognizes that the impacts of transportation on health are clearer than ever, and the TMP will strive to maximize the health benefits of safer roads, physical activity, and cleaner air. It will also increase access to health care by improving the availability of affordable, accessible travel modes like walking, cycling and transit.

Economic prosperity

Durham Region will attract business investment and support job growth by offering a transportation system that works smoothly. As the GTHA grows more congested, employers want to locate in communities with a range of efficient and healthy travel options that are valued by today's workers.

Environmental protection

Durham Region will minimize the impacts of transportation on the global climate, regional air quality, and local ecosystems. The Region will apply progressive approaches to infrastructure planning and design to shift demand to more efficient travel modes, bring trip origins and destinations closer together, and encourage the use of cleaner vehicles and fuels.

HOW

A focus on users

Durham Region's transportation system will support a variety of users and lifestyles in its urban, suburban and rural communities. While prioritizing both efficiency and sustainability, it will continue to offer choices that reflect the diverse needs of individuals of all ages and abilities, families of many kinds, and businesses of any size.

Connectivity

The Region's transportation network will offer direct, continuous routes for transit, car, and active transportation users, as well as for goods movement. It will also offer convenience for those transferring from one mode to another or moving between facilities and services of the different jurisdictions that serve Durham Region.

Collaboration and leadership

Durham Region will represent and defend the interests of area residents and businesses as it works with key provincial and municipal partners to reach shared objectives. As it promotes a shift to more efficient and sustainable travel choices, the Region will lead by example to motivate others.

Innovation

Durham Region will remain alert to emerging issues and changing trends that present new challenges or impact its chosen solutions. It will consider the benefits of new materials and technologies, monitor the experiences of its peers, test new products and ideas, and adopt those that prove successful.

2.4.2 STRATEGIC DIRECTIONS

The following seven directions serve as the framework for this plan's policies, strategies and actions.

STRENGTHEN THE BOND BETWEEN LAND USE AND TRANSPORTATION

Durham Region will deliver a transportation system that supports, and is supported by, current and future development, consistent with provincial legislation and policy, and in collaboration with area municipalities. It will provide a growing number of residents and businesses with practical and efficient mobility options for trips to work, school, and other destinations across Durham Region. Compact, mixed land use patterns and pedestrian-friendly design will encourage the use of sustainable modes. Transportation facilities and services will promote healthy community design and, by prioritizing more efficient travel choices, will mitigate the impacts of intensification on congestion.

ELEVATE THE ROLE OF INTEGRATED PUBLIC TRANSIT INCLUDING RAPID TRANSIT

Durham Region will continue to emphasize transit's role in building a healthier and more inclusive community, and in developing stronger urban centres and corridors. Further development of rapid transit services within Durham Region will make transit more competitive compared to the car, and will be complemented by improved access to transit by foot and bicycle. Seamless integration of service across Durham Region's boundaries will be pursued through stronger partnerships with GO Transit, York Region Transit, and the Toronto Transit Commission. The goal will be to significantly increase transit's share of travel for commuting during peak periods, and for many other trip purposes during off-peak periods. Transit services will become more reliable, and advanced technologies will support new fare, security and customer information strategies.

MAKE WALKING AND CYCLING MORE PRACTICAL AND ATTRACTIVE

Durham Region will work towards shifting more short trips from cars to either foot or bike by collaborating with area municipalities to improve the connectivity, continuity, comfort, convenience and safety of walking and cycling routes. Significant growth in active transportation levels is both desirable and achievable and residents will find it easier to move within, through and between neighbourhoods without getting behind the wheel. The many residents of all ages and abilities who do not drive will enjoy greater opportunity through improved access to their daily destinations as well as to public transit services. Cycling routes that improve area municipal connectivity, are key commuter routes, or enhance Regional cycling tourism will be prioritized.

OPTIMIZE ROAD INFRASTRUCTURE AND OPERATION

Durham Region will manage congestion levels through a proactive combination of capacity, design, and operational strategies that can reduce the impact of bottlenecks and discontinuities, improve safety for all road users, and be adaptive to climate change challenges. The use of "complete street" approaches can extract the maximum public benefit from road facilities. When integrated into street planning, design, construction, operation and maintenance processes, complete street concepts can improve the safety and comfort of all road users—especially pedestrians and cyclists, but also transit riders, car and truck drivers, and emergency service providers. A connected, efficient network of complete streets can create an optimal balance of mobility choices, while maintaining the integrity of emergency routes. The important role of Regional roads in serving public transit and enabling the movement of goods across the GTHA will be preserved through right-of-way allocation, operational prioritization and advanced technologies.

PROMOTE SUSTAINABLE TRAVEL CHOICES

Durham Region will pursue a number of approaches to maximize the return on investment in facilities and services for walking, cycling, public transit and carpooling. Those modes provide a suite of alternatives to driving and enable a variety of healthy, independent lifestyles for people—including children, youth, seniors and adults with disabilities—who cannot or choose not to operate their own car. Transportation demand management (TDM) measures engage with travellers, and offer information, incentives and assistance to make choices that work best for individual needs and preferences. TDM-supportive features in new developments, like parking for bicycles and carpooling, enable more sustainable choices and can be fostered through planning approval processes. In collaboration with the area municipalities, the Region can also implement parking management approaches that lead to a more efficient balance between car travel and more sustainable modes.

IMPROVE GOODS MOVEMENT TO SUPPORT ECONOMIC DEVELOPMENT

Durham Region will ensure that its transportation network makes adequate provision for the needs of all modes of goods movement, including road, air, rail, marine, and intermodal. Providing efficient, continuous, and connected goods movement is integral to Durham Region's economic competitiveness and growth, including the growth of traditional and emerging agricultural industries in rural communities. Durham Region's ports, freight terminals, and airports are key nodes in the broader transportation network that supports and connects businesses with markets across the GTHA, the province, and the country. The Region will work with all levels of government and other stakeholders to maintain and strengthen goods movement networks and policies.

INVEST STRATEGICALLY IN THE TRANSPORTATION SYSTEM

Durham Region will work with federal, provincial and area municipal governments, as well as Metrolinx, to coordinate transportation investments and maximize overall benefits. The full life cycle of infrastructure and asset management programs will measure and forecast the implications of capital spending on future operational requirements. Investments will be guided by evidence-based decision making, considering financial and economic measures related to the performance of the transportation system, the needs and behaviours of its users, and the outcomes on many aspects of life and business in Durham Region.

CHAPTER 3

LAND USE AND TRANSPORTATION

3 Land Use and Transportation

3.1 Strategic Direction 1: Strengthen the bond between land use and transportation

Durham Region will deliver a transportation system that supports, and is supported by, current and future development, consistent with Provincial legislation and policy, and in collaboration with area municipalities. It will provide a growing number of residents and businesses with practical and efficient mobility options for trips to work, school, and other destinations across Durham Region. Compact, mixed land use patterns and pedestrian-friendly design will encourage the use of sustainable modes. Transportation facilities and services will promote healthy community design and, by prioritizing more efficient travel choices, will mitigate the impacts of intensification on congestion.

3.2 Background

Land use patterns have a strong influence on travel, such as the number of trips taken and mode choice. The reverse is also true, since transportation systems have a direct impact on the type, scale, and location of development that occurs.

The Canadian Institute of Planners recognizes the link between planning and the health of our communities. Its Healthy Communities Practice Guide points out that denser, more transit-friendly, and walkable neighbourhoods promote more physically active and sustainable lifestyles. Similarly, the medical officers of health in the GTHA also recognize this critical link between community design and the health of residents and communities as a whole in their report, Improving Health by Design in the Greater Toronto-Hamilton Area.

The lower demand for motorized trips that results from compact urban form is also important in reducing air pollution and greenhouse gas emissions. Not only does this improve public health due to lower incidence of respiratory illness, it also helps to slow the pace of climate change. Compact land uses also reduce the need for new transportation infrastructure in greenfield areas, preserving more of the natural waterways and forested areas and helping to mitigate some of the impacts of climate change, such as increased incidence and intensity of flooding.

Providing residents with a range of transportation choices is also integral to economic sustainability. Making efficient use of existing transportation corridors and infrastructure by promoting intensification along multi-modal corridors, and prioritization of transit and active modes, allows municipalities to better allocate resources to achieve their developmental objectives.

3.3 Progress and Opportunities

At the provincial level, the link between transportation and land use planning is made through the Growth Plan for the Greater Golden Horseshoe (2017). Section 2.2.1 of the Growth Plan, Managing Growth, describes how land use will be planned to support transit and active transportation modes. Specifically, the plan envisions designing transit-supportive communities, encouraging mixed-use development and building pedestrian-friendly urban areas.

Sections 3.2.2 through 3.2.4 of the Growth Plan include policies for optimizing existing infrastructure, planning new transportation corridors, moving people and transporting goods. These policies complement those in Section 2.2.1 by outlining how transportation planning will be undertaken. The plan prioritizes public transit in transportation infrastructure planning and envisions the use of transit infrastructure to shape growth and land use. The Growth Plan also speaks to the importance of planning for a mix of housing types, including affordable housing, on major transit corridors and near major transit stations to both support transit ridership and provide access to good transit for people without access to a private vehicle.

The 2014 Provincial Policy Statement also links land use and transportation planning (Sections 1.6.7 and 1.6.8). Specifically, Section 1.6.7.4 envisions land use patterns that minimize the length and number of vehicle trips and promote active transportation and public transit.

The Ministry of Transportation for Ontario (MTO), in its Transit Supportive Guidelines (2012), provides a collection of land use planning guidelines to assist in implementing the vision of the Growth Plan for the Greater Golden Horseshoe and the 2014 Provincial Policy Statement.

The land use and transportation planning policies in Durham Region are generally consistent with the Provincial policies and guidelines discussed previously. Policy 8.2.1 of the Regional Official Plan (ROP) promotes transit-supportive development of urban areas through compact urban forms. Directive language is used and the wording aligns with the Provincial policies.

Many of the key tools for enabling the integration of transportation and land use were developed as part of the 2010 Long Term Transit Strategy (LTTS). These tools included:

- Transit Oriented Development (TOD) Strategy, which describes how transit-supportive land use planning envisioned by the ROP could be accommodated throughout Durham Region and outlines strategies for development along rapid transit corridors;
- 39 TOD Places which identified places with the highest potential for specific TOD guidelines to be adopted; and
- T Street Guidelines, which recommended transit supportive design elements within higher order transit corridors to support TOD.

Through these components of the LTTS, a strong policy framework in Durham Region has been examined that supports strengthening the bond between land use and transportation. However, further actions need to be taken to put these policies into action and make them part of day-to-day decisions on development.

GOAL

NEIGHBOURHOODS AND EMPLOYMENT AREAS WILL OFFER MULTI-MODAL OPTIONS

3.4 Goals and Actions

3.4.1 NEW DEVELOPMENTS

With a projected growth in population of almost 50% and higher rates of employment growth, one of the most impactful ways to increase the use of sustainable modes is through the design of new communities. This includes ensuring new neighbourhoods provide direct, safe and accessible connections to existing transportation networks (e.g., bike routes, transit) and protecting for future neighbourhoods and employment areas to connect to these networks.

As referenced further under Sections 7.4.10 and 7.4.11, this includes working with developers to plan, design and implement facilities to support active transportation for all ages and abilities, as well as transit. It also includes ensuring that parking provision, particularly for mixed use and employment areas, is consistent with mode share targets.

Since many land development regulations and approvals (e.g., parking provision) fall under the jurisdiction of area municipalities, it is important that the Region continue to work with municipalities to jointly influence development through education, regulatory measures and updated guidelines.

3.4.2 COMPLETE STREETS

"Complete streets" policies and practices integrate the needs of all road users in right-of-way planning, design, construction, operation and maintenance. They are typically intended to ensure the appropriate consideration and accommodation of walking, bicycling, public transit and goods movement, as well as the community context.[6] All new neighbourhoods and employment areas within the designated urban areas of Durham Region, and rural hamlets, should be designed taking into account complete streets objectives.

6 Transportation Association of Canada, Complete Streets Policy and Practice in Canada, January 2015

This is also in keeping with the new Provincial Growth Plan (section 3.2.2.3) which requires the adoption of a complete streets approach in the design, refurbishment or reconstruction of the existing and planned street network.

Many complete streets policy elements are already included in the Region's policy documents and guidelines, including the ROP and the Arterial Corridor Guidelines while further policies for Regional roads are provided under Section 6.4.6. In addition, several area municipalities have, or are in the process of, adopting formal complete streets policies. Efforts are now required to work with the development community to ensure the successful implementation of complete streets in new development areas and redeveloping areas, and to learn from each application.

ACTIONS

The following actions are recommended to support the goal of neighbourhoods and employment areas offering multi-modal options:

1. Develop TDM development guidelines and a checklist for reviewing new development.
2. Apply a more rigorous review of site design in the development review process, with a focus on pedestrian, cycling and transit access.

GOAL

KEY NODES AND CORRIDORS WILL FEATURE TRANSIT-ORIENTED DEVELOPMENT

The TOD Strategy was included as part of the LTTS to support the Region's intensification targets for 2031 and provide a supportive built environment for future rapid transit networks. TOD is described as the clustering of high density, compact development in close proximity to transit infrastructure. TOD places have a mix of uses including office, residential, community uses, retail and other amenities that support transit ridership. They also place a high priority on good quality pedestrian-oriented streetscapes, parks and buildings.

Based on research and analysis, the TOD Strategy had three major elements: identifying TOD places for Durham Region; developing TOD guidelines; and implementation strategies, tools and partnerships. These elements are discussed below.

3.4.3 LOCATIONS

Durham's TOD Strategy identified TOD Places – areas that have the greatest potential to connect people and jobs with higher order transit investments. These TOD Places are grouped into six main types based on the level of transit service, land use mix and potential character associated with each TOD Place: downtowns, urban neighbourhoods, employment cores, market places, waterfront villages, and institutional and civic campuses. In addition, lands adjacent to proposed higher order transit lines on Regional Corridors in the LTTS were also considered to be "TOD areas of change."

TOD guidelines, using the TOD Strategy as a starting point, can be applied to Regional Centres and Corridors, Waterfront Places, Transportation Hubs and Commuter Stations designated in the ROP. A set of TOD guidelines would help plan for redevelopment and intensification in these areas, and provide the tools and strategies to help implement ROP policies for these areas.

3.4.4 TRANSIT HUBS

The ROP currently designates four "Transportation Hubs" that are major travel destinations and facilitate transfers between different modes of travel or between transit services. These include the two Urban Growth Centres (Downtown Pickering and Downtown Oshawa) in Durham, as well as a hub focused on the Windfields Regional Centre in Oshawa and the Bowmanville West Regional Centre. The ROP also designates Commuter Stations generally corresponding to existing and future GO Transit stations, some of which coincide with UGCs or Regional Centres. Effectively, these two structural elements of the ROP can be defined as "Transit Hubs".

The Province recently introduced Bill 139, Building Better Communities and Conserving Watersheds Act, 2017 that includes a number of proposed changes to the Planning Act. These changes, in regards to identifying protected major transit station areas, will be considered as part of the Regional Official Plan Review.

As the Region continues to introduce new Higher Order Transit services in the form of Rapid Transit and High Frequency Transit corridors (as described in Chapter 4), along with expansion of GO Rail service, there will be an increased need to ensure that Transit Hubs fulfill the role of both seamlessly integrating different transit modes as well as facilitating TOD as envisioned in the ROP. Increasingly, Transit Hubs will also be expected to incorporate options and facilities for cycling and new mobility options such as car-share vehicles, bike share and ride-sharing options. Policies for Transit Hubs should be expanded to include provisions for new mobility options and supporting amenities.

3.4.5 GUIDELINES

The TOD Strategy included guidelines for the creation of vibrant, pedestrian-oriented, mixed use and higher density communities that capitalize on transit infrastructure and encourage increased ridership. One element included general guidelines that apply broadly to all TOD Places, addressing streets, public spaces, land uses, buildings, parking and transit stations. A key aspect for the guidelines was to improve walkability within these areas, not just in terms of improving access to transit but also in terms of the overall pedestrian experience. Another element included specific targets and performance measures (e.g., for block dimensions, built densities, building heights and parking supplies) for each type of TOD place.

The formalization of these guidelines along with their aggressive application is critical to achieving the type of development that is envisioned for transit corridors. This requires a commitment on both the part of Regional planning staff as well as the development community. Education seminars for local developers are one tool for ensuring the widespread application of TOD guidelines.

Planning policy in the Region should also provide more non-financial incentives for developers to achieve intensification targets in Centres and Corridors. Policies that relax minimum parking requirements, for example, are sometimes used by other municipalities to reduce the cost to developers of rolling out dense projects in intensification areas. It is noted that parking standards are under municipal jurisdiction; however, the Region could provide a coordinating and influencing role.

These recommendations help the Region to move toward the strategic goals in its ROP through specific operational initiatives. Over time, this should lead to an improvement in the quality of development proposals submitted.

In 2011, Metrolinx prepared Mobility Hub Guidelines to provide a framework for the successful planning and development of Mobility Hubs. In Durham, Downtown Pickering, the existing Oshawa GO Station, the proposed Downtown Oshawa (centred around the proposed Central Oshawa GO Station), and the proposed Seaton GO Station are each designated as a Mobility Hub. These guidelines provide additional guidance and are particularly suited for enhancing land uses and transportation choices as they are focussed on a particular GO Stations and its surrounding area.

3.4.6 IMPLEMENTATION

The TOD strategy identified a number of approaches to maximize its success. These included: the alignment of Regional and area municipal policies; the development of secondary plans for TOD Places; stronger planning for TOD sites; the creation of TOD-specific development standards, processes and checklists; the use of multi-modal impact assessments for major development applications; a strategic approach to targeting public resources on a small number of TOD Places; the use of demonstration projects; and stakeholder training and education. Notably, the TOD strategy included an example of a detailed checklist for the integration of transit-supportive features into new projects.

ACTIONS

The following actions are recommended to support the goal of key nodes and corridors featuring transit-oriented development:

3. Develop Transit Oriented Development (TOD) Guidelines, in consultation with the area municipalities and other stakeholders.
4. Work with the area municipalities to develop a Regional TOD Strategy for lands in Centres and along Regional Corridors, as well as selected rapid transit stations, where there is significant opportunity for new development or intensification.
5. Implement a TOD checklist for development review to support intensification, particularly in existing centres and corridors, and shape growth in new or emerging centres and corridors.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CHAPTER 4

PUBLIC TRANSIT

4 Public Transit

4.1 Strategic Direction 2: Elevate the role of integrated public transit including rapid transit

Durham Region will continue to emphasize transit's role in building a healthier and more inclusive community, and in developing stronger urban centres and corridors. Further development of rapid transit services within Durham Region will make transit more competitive compared to the car, and will be complemented by improved access to transit by foot and bicycle. Seamless integration of service across Durham Region's boundaries will be pursued through stronger partnerships with GO Transit, York Region Transit, and the Toronto Transit Commission. The goal will be to significantly increase transit's share of travel for commuting during peak periods, and for many other trip purposes during off-peak periods. Transit services will become more reliable, and advanced technologies will support new fare, security and customer information strategies.

4.2 Background

Transit services in Durham are provided by two operators: Durham Region Transit (DRT) and GO Transit. DRT was founded in 2006 when the local transit systems of Ajax/Pickering, Whitby, Oshawa and Clarington were transferred to the Region. DRT operates the local bus services and GO Transit operates the inter-regional rail and bus network.

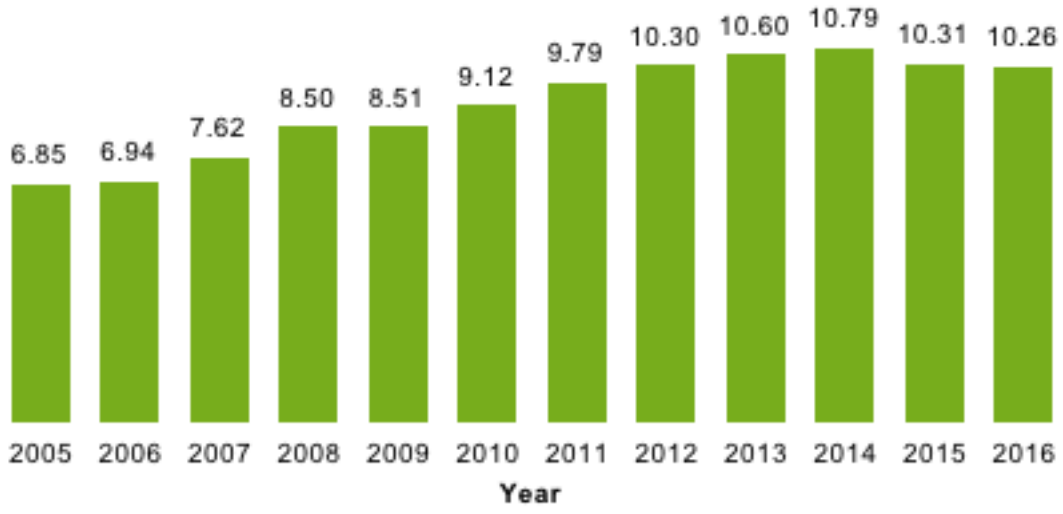
Transit ridership has been increasing in Durham Region on both DRT and GO Transit. Exhibit 4.1 shows the local transit ridership growth from pre-amalgamation (2005) to 2016. Over this time period, DRT ridership has grown by over 3.4 million trips at an average rate of about 310,000 trips per year. This growth in ridership has outpaced population growth in Durham Region, as the ridership per capita has increased from 13.8 trips in 2006 to a high of 19.6 trips in 2014. PULSE ridership continues to grow, with approximately 2 million riders in 2016.

The recent declines in ridership in 2015 and 2016 are a result of a teachers' strike that resulted in lower student ridership in the months of April and May 2015, and significant route changes and a fare increase that resulted in lower ridership in other passenger categories. In 2016, adult ridership increased but was offset by declines in co-fare (GO transfer), student and U-Pass ridership for an overall slight decline from the previous year.

The increase in municipal transit ridership is largely due to the improvements to service and service amalgamation which were recommendations of the 2003 TMP.

Improving public transit in order to provide more travel choices was a primary objective of that plan. It was also instrumental in identifying a transit priority network including the designation of Highway 2 and Simcoe Street as major corridors.

Exhibit 4.1: DRT Historical Ridership (Millions)[7]



Sources: CUTA Factbooks, 2017 DRT Servicing and Finance Study

Similar to DRT, GO Transit rail service also continues to experience ridership growth. Between 2008 and 2013, boardings at the Ajax, Whitby and Oshawa Stations grew by 32%, 25% and 21%, respectively, while Pickering Station was more stable.

Overall, transit (including GO Rail) accounted for 8% of all trips in the a.m. peak period (6:30 – 9:30) in 2011. This figure is higher in the southern municipalities, with transit accounting for as much as 11% and 12% of trips in Pickering and Ajax, respectively.

Looking forward, the role of transit in meeting the transportation needs of Durham residents will become increasingly important. As highlighted in Chapter 2, the fastest growing travel market is trips starting and ending in Durham Region, many of which are short trips that could potentially be made using public transit. Without a shift of some of these trips to transit, Durham Region faces the risk of congestion impacting economic development and growth.

The role of transit in meeting broader community objectives is also a key focus of the TMP. Based on public and stakeholder input and an analysis of emerging trends several key areas of focus have been identified for transit, as follows:

7 2015 ridership was influenced by a teachers strike and implementation of significant route changes and a fare increase. (Source: 2016 Durham Region Transit Servicing and Financing Study, Report #2016-DRT-3)

- **Supporting community health and well-being** – Public transit provides access to opportunity for those who cannot (or choose not to) drive a car, including many youth, seniors, low-income families, new Canadians, and persons with disabilities. It also encourages walking or cycling activity as a means of accessing the transit trip, especially with all buses having external bike racks. By ensuring that all residents can reach work, school, health care, social, recreational and shopping activities, transit can build public health while minimizing impacts on the environment.
- **Investing in the regional economy** – As urban areas mature, public transit becomes a critical investment in city-building and economic vitality. Convenient transit service is key to attracting highly valued millennials as workers for knowledge-based businesses, and to retaining seniors who want to retire and age in place in their own neighbourhoods. By doing so, transit can support employment, local businesses and home values while improving access to social services and employment opportunities.
- **Balancing costs and revenues** – In recent years, DRT has faced operating cost pressures even as it has carried more riders. As the organization looks to expand its service area and ridership over time, it will need new strategies—financial, managerial, operational and technological—to increase its resources and maximize their impacts. New strategies are also important to better enable new neighbourhoods to have transit service early in the phasing process.
- **Serving internal and external trips** – Over time, DRT intends to focus more on carrying internal trips (those that start and end in Durham Region), while also continuing to serve longer-distance trips between Durham Region and other parts of the GTHA. Resources will be required to develop new rapid transit corridors within Durham Region while also expanding service to GO Transit stations.
- **Addressing differences between urban and rural areas** – DRT is responsible for servicing both urban and rural areas of Durham Region, which present different market needs and operating environments. It faces the challenge of balancing the resources allocated to urban and rural services, while continuing to meet the needs of riders across Durham Region.
- **Shaping supportive land use in transit corridors** – Low-density, single-use development will limit transit's potential in a community. Conversely, TOD makes scheduled transit service more efficient, and is a necessity for effective rapid transit. Creating a development pattern that emphasizes compact, mixed land uses in targeted areas will require the Region and area municipalities to collaborate effectively.

- **Improving active transportation connections to transit stops and stations** – The success of TOD requires passengers to have safe, comfortable and direct walking routes between transit and their home or place of employment. The Region and area municipalities will need to collaborate on developing appropriate standards and guidelines for sidewalk and trail connections, lighting, road crossings, appropriate intersection spacing and site design practices.

4.3 Progress and Opportunities

Current transit plans have evolved through a number of foundational documents:

- **2005 Transportation Master Plan:** Highlighted the importance of an efficient and effective public transportation system which in turn supports economic growth, environmental objectives and community sustainability. Even though the 2005 TMP was approved prior to amalgamation of municipal transit, it adopted a Region-wide approach to transit network development. The TMP identified a Transit Priority Network, including Major Transit corridors. It provided the foundation for current rapid transit plans and the Highway 2 DRT PULSE corridor.
- **Durham Regional Official Plan (ROP):** The Regional Official Plan provides strong support for improved transit services with a goal for improving transportation linkages both within Durham Region and between Durham Region and adjacent areas. The ROP supports planning, design and operation of an integrated and coordinated transit priority network along the major arterials linked with the existing and proposed commuter rail network to serve both inter-regional and inter-municipal travel demand. It establishes policies to support the development of transportation hubs that act as development nodes as well as major transfer points between modes. Most importantly, the ROP supports the intensification of development along major transit corridors and the implementation of policies for TOD.
- **2010 Long Term Transit Strategy (LTTS):** The Vision of the LTTS study was to “Create an adaptive, safe, reliable, accessible, and desirable transit system that shapes and connects Durham Region and beyond in an economically and environmentally sustainable manner.” The development of a long-range or ultimate rapid transit network was a major component of that study. Major transit corridors were identified and a rapid transit strategy was outlined for long term implementation, including light rail transit (LRT), bus rapid transit (BRT), express and enhanced frequency services across Durham Region. The current TMP uses the LTTS to inform the development of the 2031 transit network as well as the longer term network.

- **DRT Five Year Service Strategy (2016):** The DRT Five Year Service Strategy outlined an objective "to develop and operate a transit system that will be available, consistent, direct, frequent and seamless." The intent was to increase transit market share through targeted improvements for inter-municipal trips, improved connections to GO Transit and inter-regional trips to east Toronto and York Region. The implementation strategy included a number of strategic initiatives to: restructure routes to be more direct, implement early service to newly developing areas, increase service hours to cover a longer time period during the day, improve service frequency and develop a high frequency network of routes in the main travel corridors.

In addition to these Durham Region plans, there are a number of Provincial planning initiatives that are shaping transit in Durham Region. The Metrolinx Regional Transportation Plan for the Greater Toronto and Hamilton Area (The Big Move), completed in 2008, reviewed and identified a long term rapid transit and commuter rail network for Durham Region. It confirmed the Highway 2 and Brock Road corridors as a high priority for rapid transit through their designation in the 15 year plan. It also identified an extension of the GO Rail Lakeshore East line to Bowmanville (the Province announced in 2016 a commitment to implement the expansion by 2024) and a new GO Rail line to Seaton. These GO Rail service expansions are a top priority for the Region. Metrolinx is currently undertaking a review of the Regional Transportation Plan and released a Draft Updated Regional Transportation Plan in September 2017.

A major initiative that has evolved since the completion of The Big Move is Regional Express Rail (RER). Announced in the 2015 provincial budget, RER will provide 15-minute two-way all day service on the Lakeshore East GO line from Union Station to Oshawa by the year 2024-25. Current plans are to electrify the Lakeshore East corridor as far as the existing Oshawa GO station in that timeframe.

Although Durham Region already benefits from frequent GO Rail service, the introduction of RER has the potential to transform transit options by providing a more effective service for two-way trips within Durham Region, as well as adding capacity for traditional Toronto-focused GO Rail markets. Modelling carried out for the TMP shows that RER will complement rather than compete with other Regional rapid transit corridors. Perhaps more importantly, it will support the implementation of a High Frequency Network, as identified in DRT's Five Year Service Strategy, by providing a more integrated system of local routes to feed into RER service.

A final opportunity that has the potential to transform transit and overall mobility in the future is the rapidly growing "sharing economy" enabled by wireless communications and mobile applications. This includes new mobility services such as demand-responsive transit shuttles that could be used to serve lower density and rural areas of Durham Region, as well as

conventional car-sharing, peer-to-peer car-sharing, dynamic carpooling and paid rideshare (e.g., Uber). If leveraged appropriately, new mobility services and technologies have the potential to support and complement the Region's network of rapid transit and frequent transit by helping to address the "last mile" needs of transit riders (i.e. providing connections between transit stations/corridors and trip origins/destinations).

4.4 Goals and Actions

GOAL

TRANSIT WILL BE CONVENIENT AND RELIABLE ACROSS DURHAM REGION

Convenience and reliability of transit service are important factors that travellers consider when deciding whether they should take transit for a given trip. For those residents who are unable to drive or do not have access to a vehicle, the availability of frequent and direct transit service within walking distance is critical for them to access jobs, health care facilities, educational institutions, shopping destinations and leisure activities across Durham Region.

4.4.1 SERVICE FRAMEWORK

It is important for DRT to keep customers, elected officials, developers and other stakeholders informed about its continuous efforts to improve transit service. Regular updates to the Five Year Service Strategy document that identifies planned changes for the short and medium terms, including details of new or amended transit routes, is an effective means to accomplish this. Other key topics to be addressed in each strategy include any changes that are planned to major system-wide parameters including the transit service area, service structure or service standards. More information on each of these topics is provided below.

SERVICE AREA

DRT is committed to providing transit service options for residents throughout Durham Region, according to the following general approach:

- **Urban areas** – DRT will provide service to as many residences and workplaces in Durham Region's urbanized areas as possible. Transit service will be provided within a reasonable walking distance of almost all residences and workplaces in Durham Region's urbanized areas. The current standard is to provide area coverage, which is measured as a 400 metre distance from transit stops with service

during the peak periods, where 400 metres represents a five minute walk at an average walking speed. In addition to area coverage, the following characteristics of the built up area influence transit service design:

- Demographic mix and socio-economic characteristics within the community.
- Residential and employment density in the community.
- Road network characteristics, whether suburban curvilinear streets or permeable street grid, affect how direct transit routes can operate.
- Pedestrian accessibility to transit stops, availability of connected and well maintained sidewalks.
- Impact on existing riders, as well as new riders, to changes in service.
- Financial feasibility and cost implications.

- **Rural areas** – In rural parts of Durham Region, the goal of providing attractive and efficient scheduled transit service is challenged by long trip distances and lower population densities. The following services should be offered according to the operating conditions:
  - Scheduled DRT services operating throughout the day.
  - Connector services, which are scheduled services that will provide a limited number of trips between rural areas and nearby population centres on weekdays.
  - Demand-responsive services, which is a new type of service that DRT is currently advancing. These services will use fully accessible vehicles and will not travel along a fixed route. Instead flexible routes will adapt to demand. These services can be requested by customers in advance and operate in a designated geographical area. Services will be open to all persons travelling to and from designated areas and enable DRT to link to an urban centre and connect with other transit services at a lower operating cost than fixed route service.

- **Developing areas** – As families move into new communities, they initiate travel habits that eventually become embedded in their lifestyle. An absence of transit service only encourages car ownership and use, even for families that might otherwise prefer to use transit. For this reason, it is essential to introduce transit service into developing areas as early as possible after occupancy begins. Transit service provision tends to be costlier than usual when occupancy levels are low. While this cost can be regarded as an investment toward maximizing future ridership revenues, some Ontario municipalities have adopted policies requiring developers to share the cost of early service as a condition of subdivision development agreements. For example, the City of Ottawa has utilized an early service agreement for developers in some

new communities to pay the cost of early service until transit ridership supports minimum financial performance standards.

- In addition to DRT services, Metrolinx will continue to provide GO Bus service to rural areas and between urban nodes, and potentially expand services particularly along Highways 407, 412 and 418 and associated commuter lots.

SERVICE STRUCTURE

DRT's transit services are being planned around four main elements:

- **Rapid Transit** – DRT's current PULSE rapid, high frequency service on Highway 2 has been very successful, and sets the stage for further BRT investments on Highway 2 and Simcoe Street. Rapid Transit routes would run in these arterial road corridors, with either exclusive lanes and/or effective transit priority measures as discussed below.
- **High Frequency Network (HFN)** – Building on DRT's Five Year Service Strategy, a HFN is intended to complement and feed parallel Rapid Transit corridors, major activity nodes and the GO Rail/RER network. HFN routes would be direct and carry high passenger volumes in designated High Occupancy Vehicle (HOV) lanes and shared lanes.
- **Other Transit Spines** – Other transit spines include services operating on Regional roads or Provincial highways that connect population centres in all parts of Durham Region including northern communities. These spines will include a combination of GO Bus routes and DRT services.
- **Regular Routes** – Regular, local bus routes would be generally less frequent and direct than Rapid Transit and HFN routes, and spaced closer together to maximize pedestrian access in developed areas. Some routes may have limited days of service or hours of operation (e.g., weekdays or peak periods only). They will include a new class of connector services (as discussed under service area above) which are designed to serve lower density and rural areas.

These network elements also connect with the wider GTHA transit system, including inter-regional GO Bus and GO Rail lines, and other intercity bus and rail networks. This hierarchy of integrated services would provide a wide range of transit travel options for Durham Region residents when travelling within Durham or to neighbouring municipalities.

SERVICE GUIDELINES

DRT uses qualitative and quantitative guidelines, called Guiding Principles, to help make planning and operational decisions. The following Guiding Principles were defined in the 2016 DRT Five-Year Service Strategy:

- **Available** – Most residents and employees in urban areas of Durham Region should be able to walk less than 800 metres to reach the nearest transit stop (ideally less than 600 m), and service at that stop should run from early morning to late evening.
- **Consistent** – Most services should operate over the same hours and follow the same routes throughout the week, and should remain on schedule.
- **Seamless** – Convenient connections between DRT and GO Transit, Toronto Transit Commission (TTC) and York Region Transit (YRT)/Viva should minimize waiting times.
- **Direct** – Routes should operate on a grid pattern to maximize travel speeds and cost-effectiveness.
- **Frequent** – Minimum frequencies should be attractive, and greater frequencies in major corridors should effectively enable spontaneous travel by transit.

These principles are supported by more specific Service Design Guidelines for service span, service frequency, minimum boardings per hour, and service coverage. DRT applies the Guiding Principles and Service Design Guidelines as a framework for service planning decision-making, giving staff the flexibility to adjust transit service in specific areas to better serve customers.

4.4.2 FLEET AND FACILITIES

In 2014, DRT operated a fleet of 195 standard municipal transit buses. To meet the TMP objectives for improved transit service levels, higher order transit services and an increase in the transit modal share, DRT service levels and annual revenue-service hours will need to progressively increase over the term of the TMP to 2031. Expansion of the fleet of transit vehicles is critical to enable DRT to increase service.

DRT's service levels were at 0.93 revenue-hours per capita in 2014, or 510,000 annual revenue-hours, well below DRT's comparators (e.g., YRT/Viva at 1.23 revenue-hours per capita, Grand River Transit at 1.54 revenue-hours per capita). Maintaining the current service levels would result in an increase in annual revenue-hours to between 848,260 to 902,100 by 2031 based on population growth alone. As transit ridership levels and mode share increase with the service improvements recommended in this TMP, the revenue-hours per capita ratio will increase, and annual revenue-hours will increase beyond the levels expected based on population growth alone. For example, if Durham's revenue-hours of service per capita ratio were compared to York Region (1.23/capita) for illustrative purposes, the DRT service level may be between 1.12 million and 1.2 million revenue-hours annually.

Based on the current fleet per population ratio of 1:3,250 (based on a population of about 630,000), the transit fleet can be expected to increase to approximately 300 vehicles by 2031 for the forecast population of 960,000 residents. Initiatives to increase the transit mode share through pro-active increases in transit service levels could further increase the size of the transit vehicle fleet in order to support the necessary ridership capacity, particularly during peak-hours on key routes. These improvements, in turn, would be reflected in a change in the transit vehicle per population ratio towards 1:3,000 residents or lower (toward 1:2,800) representing a future fleet size of approximately 325 vehicles. Even at these levels, DRT's transit vehicle to population ratio would be lower than the average for Mississauga, Brampton, York and Hamilton which is 1:1,900.

With each review of the Five-Year Transit Strategy, DRT should include an assessment of near-term service levels, transit fleet replacement and expansion needs, including capital and operational cost requirements. DRT intends to prepare a fleet expansion plan as necessary to ensure that the transit vehicle fleet keeps pace with the growth of Durham Region and service levels. All capital needs should be based on a life cycle basis using an asset management approach. The level of investment will be subject to the Region's annual business planning and budget process in relation to other competing priorities.

The growth in the transit vehicle fleet may also impact transit operations and maintenance (O&M) facility capacity requirements. As part of the strategic planning process, DRT should review the existing O&M facilities to ensure the necessary capacity is provided in a timely manner consistent with the pace of future fleet growth.

4.4.3 TERMINALS AND STATIONS

DRT currently operates at 11 terminals and stations across and just outside Durham Region, ranging from intermodal stations to carpool lots. These locations are:

- **University of Toronto, Scarborough Campus** – Terminal for the PULSE line, with connections to TTC services;
- **Rouge Hill GO Station** – Terminal for routes connecting Pickering and southeast Toronto, with connections to TTC and GO Rail services;
- **Pickering GO Station/Pickering Parkway Terminal** – Connections between routes operating in Pickering, the GO Rail Lakeshore East line and GO Bus services;
- **Brock Road/407 ETR Park and Ride** – Connection point for services operating in Pickering, and GO Bus service to York Region.
- **Ajax GO Station** – Connections between routes operating in Ajax and the GO Rail Lakeshore East line and GO Bus services;

- **Whitby GO Station** - Connections between routes operating in Whitby and the GO Rail Lakeshore East line and GO Bus services;
- **Oshawa GO Station** – Connections between several DRT routes, GO Rail Lakeshore East line and GO Bus services;
- **Oshawa Centre Terminal** – Connects DRT routes operating in Oshawa (GO Bus services operate on adjacent streets);
- **Harmony Terminal** – Transfer point for existing and future routes serving north Oshawa;
- **North Oshawa Campus Terminal** – Serves the University of Ontario Institute of Technology and Durham College main campuses;
- **Bowmanville Park and Ride** – Connection point for services operating on Highway 2 between Clarington and Oshawa as well as GO bus services on Highway 2, Highway 401 and Highway 35/115, on the future Bowmanville GO Station lands; and
- **Newcastle Park and Ride** – Connection point for services operating between Clarington and Oshawa, as well as GO Bus services linking Durham Region to Peterborough.

Access agreements between DRT and the owners of the facilities allow DRT to access these terminal, stations, institutions, and private property. As the Region's transit network develops to serve an increasing number of riders, and to accommodate Rapid Transit and an expanded HFN, some of these facilities may need to be upgraded or replaced. New terminals and stations may also be required. As such, DRT's Five Year Service Strategy identifies the following four new terminals and stations:

- **Pickering West** – proposed terminal in the Kingston Road/Altona Road area to coordinate services in northwest and southwest Pickering with the Highway 2 corridor;
- **Taunton Road and Brock Street** – proposed terminal for services in north Whitby;
- **Baldwin Street Park and Ride** – Connection point for routes serving north Whitby and north Oshawa, also provides connections to GO Transit's Highway 407 East bus service; and
- **Winchester Road and Simcoe Street** – proposed terminal for coordinating future transit services in north Oshawa, particularly the Simcoe Street corridor, and GO Transit's Highway 407 East bus service.

Additionally, the GO Transit Lakeshore East extension from Oshawa to Bowmanville will result in four new rail stations (and long-term protection for a fifth station at Bloor Street/Grandview Street) with local transit facilities.

Some of these locations will serve as key multi-modal station facilities with enhanced traveller amenities that act as strong anchors for the entire transit system. It is recommended that the Region collaborate with Metrolinx to ensure that these GO stations include bike parking and bike sharing stations, real-time traveller information, and park-and-ride facilities where appropriate.

Others will be terminals that will also be hubs for high-density commercial and mixed-use development, acting not only as transfer points but as major destinations themselves. The number and locations of new terminals and stations, as well as the need for upgrades at existing facilities, will be determined through the DRT strategic planning process and strongly tied to urban design and land use plans. The level of investment will be subject to the Region's annual business planning and budget process in relation to other competing priorities.

4.4.4 TRANSIT PRIORITY MEASURES

Transit priority measures reduce delay and improve the reliability of transit services that operate in mixed traffic, or in dedicated rights-of-way that intersect at-grade with regular roads. By minimizing wait times for buses at red lights or in traffic queues, transit priority measures improve schedule adherence and operating speeds, and can significantly reduce operating costs.

Two examples of transit priority that exist on the Highway 2 corridor are

- Detectors that sense an approaching bus and either extend a green signal until the bus can pass through or truncate the side street green signal to return early to main street and service the transit vehicle; and
- Sections of reserved bus lanes that allow buses to bypass regular congested areas.

Transit priority measures offer the greatest return on investment where high volumes of transit buses operate and/or where congestion and delay are greatest. From a service quality perspective, they are important where congestion can lead to very slow travel speeds or highly variable travel times. In Durham Region, Rapid Transit and HFN (see Sections 4.4.6 and 4.4.7) corridors are where transit priority measures can have the greatest benefit. Other important locations would be construction corridors where temporary delays can be have a significant impact on scheduling and operations.

DRT's adoption of advanced technologies on all buses means that a continuous stream of data is available to assess the need for, and benefits of, transit priority measures for different routes at different locations and at different times. A program to collect and analyze the operating data that is provided by these advanced technologies could serve to inform the implementation of transit priority measures (both technical approaches and business case metrics) at key locations, as resources permit.

4.4.5 INTEGRATION WITH OTHER TRANSIT SERVICES

TRANSFERS

Seamless connectivity between DRT and adjacent service providers (GO Transit, TTC and YRT/Viva) is an important objective. For example, in Durham Region, about 2,800 trips on an average weekday include a transfer between DRT and GO Rail. Making transit transfers seamless requires three key things:

- **Direct routing** – Speedy, non-circuitous routes allow passengers to quickly get to or from their transfer point. This would be a key function of transit services in DRT's proposed rapid transit and HFN corridors (see Section 4.4.7), which would provide convenient access to the TTC hub at the University of Toronto Scarborough campus (via PULSE), and to GO stations at Rouge Hill, Pickering, Ajax, Whitby, Oshawa, Courtice and Bowmanville.
- **Minimal waiting times** – DRT works with connecting services to optimize route schedules and reduce waiting times for transferring passengers. For riders on Rapid Transit or HFN routes in peak periods, the time between buses should be short enough to eliminate scheduling concerns and enable spontaneous trip-making by transit. DRT's connections with GO Transit have been, and are expected to be, a main driver of transit demand in Durham Region. As such, DRT will continue to plan and provide for convenient connections to GO Transit during peak periods. The introduction of RER, with 15-minute service on the Lakeshore East line, would require increased DRT service levels to provide connecting services outside of peak periods. DRT would continue to provide convenient connections during peak periods on most routes and service levels on the HFN will need to match and exceed those of RER, but demand along less travelled corridors may result in less frequent schedules.
- **Convenient, affordable fares** – GTHA transit agencies, including DRT, are participating as advisors on the current Metrolinx initiative to study ways of simplifying fare payments for transit trips. The adoption of the PRESTO card as a common payment system across the entire region should make it more convenient for transit riders to travel where and when they want. However, as technology continues to change, DRT should advocate that PRESTO continue to evaluate and implement new strategic technologies that could enhance and promote transit travel.

ACCESS TO GO STATIONS

It is also important to support and facilitate access to GO stations by active transportation. An increase in the number of Durham residents and workers that walk or cycle to GO stations can shift "first and last mile" travel demands away from congested roads, feeder buses and park-and-ride lots. Improvements to support access by active transportation could include prioritizing cycling infill routes that connect to GO stations, improving sidewalks and pedestrian connections, and additional secure bike parking. Further, the future GO stations for the extension of GO Rail service to Bowmanville should incorporate design elements in the station design and access routes that support and accommodate walking and cycling.

In 2016, Metrolinx released its GO Rail Station Access Plan, which updated an earlier station parking and access plan created in 2013. The plan assesses station access needs especially to support GO RER, evaluates investment options, updates the policy framework to reflect a stronger multi-modal focus, and recommends a preferred list of capital investments and operational strategies. Regional and area municipal staff provided input to the plan, which will help guide improvements to station access particularly for transit and active transportation. It is anticipated that, in collaboration with Metrolinx and the area municipalities, this plan will be a useful tool for conducting audits of existing stations in terms of walking and cycling access, and updating plans for active transportation modifications in station areas.

ACCESS TO HIGHWAY 407 COMMUTER LOTS

The Higher Order Transit network identifies the future transitway along the Highway 407, 412 and 418 corridors. Recognizing that the transitway is likely beyond 2031, commuter lots can be implemented as bus transfer stops, park and ride and carpooling facilities at interchanges on an interim basis until they become transitway stations. Lands for the transitway and associated stations are owned by the province.

Provision for more frequent GO Bus service along the Highway 407, Highway 412 and Highway 418 corridors would increase transit mode share for trips to/from York Region. As noted in the passenger travel trends (Section 2.2.5), about 10% of work trips currently made by Durham residents during the morning peak period are destined for York Region, and these trips are currently made predominantly by car.

The Brock Road commuter lot, which was opened in February 2016, is the first one of these commuter lots to be in service on the Highway 407 corridor. It provides a transfer point between DRT and GO Bus services, as well as parking for both transit users and carpoolers. Two additional lots: at Highway 412/Dundas Street via Halls Road (carpool only at this time) and at Baldwin Street, are under construction and are expected to be open in early-2018. However, there is no commitment or timing identified to construct additional Highway 407 commuter lots.

ACTIONS

The following actions are recommended to support the goal of making transit convenient and reliable across Durham Region:

6. Regularly publish a Five Year Service Strategy for Durham Region Transit that will identify planned changes to transit routes and other service characteristics.
7. In the Region's urbanized areas, continue to provide service to as many residences and workplaces as possible by aiming to provide area coverage within a 400 metre (5 minute) walk of peak transit stops.
8. When expanding service into rural parts of Durham Region, consider introducing new demand-responsive services, or expanding the service area of existing nearby demand-responsive routes.
9. Assess the feasibility of early service agreements for new developments, including both the longer-term ridership benefits and costs to developers and DRT.
10. Undertake regular reviews of DRT Guiding Principles and Service Design Guidelines to better inform planning and operational decisions as the Region's urban areas develop.
11. On proposed High Frequency Network (HFN) routes, where short headways will enable customers to rely on transit for spontaneous travel, the service guideline for minimum headways should be given higher priority than service guidelines for passenger boardings, when conflicts arise.
12. As part of the process of developing the DRT Five Year Service Strategy, continue to assess the transit fleet needs for the upcoming five-year period and prepare a fleet expansion plan as needed.
13. Identify transit station and terminal needs, including needs for upgrades to existing facilities and physical footprint and operational parameters for future facilities, as early as possible in the planning process to enable protection of land and permit long term financial planning.
14. Identify new operations and maintenance facility needs to support service expansion as early as possible in the planning process, to enable protection of land and financial resources required for timely delivery and permit long term financial planning.

15. Identify and implement transit priority measures such as transit signal priority and queue jump lanes that reduce transit delay and travel time variability at key locations that are identified through the DRT Five Year Service Strategy. Priority will be given to Rapid Transit corridors (in the short term prior the implementation of dedicated lanes) and HFN corridors, as well as to mitigating the effects of construction projects on transit service costs and reliability.
16. Strongly encourage Metrolinx to implement the recommendations of the GO Station Access Study to improve walking and cycling access conditions to GO stations, in collaboration with area municipalities.

GOAL

HIGHER ORDER TRANSIT WILL CONNECT MAJOR DESTINATIONS

Higher Order Transit corridors are the main arteries of the Region's transit network, providing fast, frequent, and direct service to Regional Centres, Transit Hubs and major destinations across Durham Region. The high level of service along these corridors will help to make transit a very attractive alternative to the car for trips around Durham Region, as well as trips to neighbouring municipalities.

These corridors include Rapid Transit corridors where BRT will provide fast, high-capacity service along reserved rights-of-way, as well as a grid of HFN routes where transit priority measures will be used to keep buses running on time. The GO Rail network connects major centres in the Region and provides fast, direct service to and from Toronto.

Maps 1a (Durham Region) and 1b (Southern Enlargement) illustrate the 2031 Higher Order Transit Network.

4.4.6 RAPID TRANSIT CORRIDORS

The planned future Rapid Transit network builds on previous studies and is based on an assessment of several candidate corridors that considered projected transit ridership and traffic volumes in the corridor; road or active transportation projects planned for each corridor; and proposed population and employment densities within 800 metres (a 10-minute walk) of the corridor. Major opportunities and constraints in each corridor including physical feasibility, land use, traffic conditions, environmental impacts, accessibility and development patterns were examined to develop the planned network.

Highway 2 and Simcoe Street are proposed to anchor the Higher Order Transit Network by 2031 (refer to Maps 1a and 1b). These Rapid Transit corridors will be complemented by the HFN, comprised of High Frequency Bus corridors in HOV lanes on Taunton Road, Whites Road, Brock Road and Bayly Street, and High Frequency Bus in shared lanes on several other corridors.

Several types of rapid transit were considered, including light rail transit (LRT) in a roadway median, bus rapid transit (BRT) in a roadway median, curbside reserved bus lanes, and curbside high-occupancy vehicle (HOV) lanes. Examples of these technologies and configurations are shown in Exhibit 4.2. For 2031, the proposed technology for the primary rapid transit corridors is BRT operating in reserved bus lanes.

Exhibit 4.2: Examples of Exclusive Rapid Transit

	Bus Rapid Transit	Light Rail Transit
Rapid Transit in Median Lanes		
Rapid Transit in Curbside Lanes		

HIGHWAY 2: RAPID TRANSIT IN RESERVED BUS LANES

Highway 2 is an exceptional regional east-west corridor for rapid transit with high projected transit ridership. It is a continuous corridor connecting five area municipalities, Regional Centres and major employment and population nodes. It provides direct access to the TTC service hub at the University of Toronto Scarborough campus.

Highway 2 serves the DRT PULSE route, which benefits from existing sections of reserved bus lanes through key intersections in Pickering and Ajax between Whites Road and Salem Road. The Highway 2 Transit Priority Measures Class Environmental Assessment (EA) has been completed for large sections of the Highway 2 corridor, and it recommended extending the reserved bus lanes to be continuous from Whites Road to Salem Road, with the exception of the constrained Pickering Village area. Future extension of the reserved bus lanes is also planned from the Toronto boundary to Whites Road and from Salem Road to Simcoe Street in Downtown Oshawa, beyond the Highway 2 Transit Priority Measures EA study area.

Constraints to the implementation of Rapid Transit on Highway 2 include the following:

- Narrow rights-of-way (approximately 20 m) in Pickering Village, Downtown Whitby and;
- In Downtown Oshawa where it operates as a one-way pair (King Street/ Bond Street).

Highway 2 is proposed as a Rapid Transit corridor with exclusive lanes from the Toronto-Pickering boundary to Simcoe Street (continuous, except for the constrained sections in Pickering Village, Downtown Whitby and Downtown Oshawa), with protection for future extensions to Highway 418. Ridership forecasts suggest that the corridor could support frequencies of five minutes based on typical BRT vehicle capacities.

Further study will be required to determine the ultimate configuration and phasing of BRT on Highway 2. For planning purposes, the recommended approach for this corridor is to implement BRT in dedicated median lanes as the ultimate condition, with the exception of constrained areas. However, this will require a phased approach to determine when and how to transition existing sections with dedicated curbside lanes.

SIMCOE STREET

Simcoe Street is an ideal Rapid Transit corridor, based on its access to major generators of transit trips including UOIT, Durham College, Downtown Oshawa, Lakeridge Health Oshawa, the future Central Oshawa GO Station (designated as a Mobility Hub by Metrolinx), and the planned Windfields Regional Centre in north Oshawa. There are mixed land uses along the 9.5 kilometre corridor and significant potential for new development. However, one of the challenges to implementing BRT on Simcoe Street is that the corridor has several narrow sections where the potential for widening is limited. This includes a narrow (typically 20 m) right-of-way between Olive Avenue and Conlin Road, one-way pair operations (Simcoe Street/Centre Street) between Olive Avenue and Elgin Street, and on-street parking between Elm Street and Colborne Street.

Several alternatives have been examined for Simcoe Street, including transit in mixed traffic, widening for median or curb-side lanes and an alternative that would re-allocate existing traffic lanes for rapid transit through the constrained sections. The latter option would provide for dedicated curbside bus lanes, but would reduce capacity for vehicles to two lanes plus left turn lanes. This option is preferred, because it provides significantly greater corridor person-carrying capacity than the current configuration. Ridership on rapid transit would more than exceed the volume that is accommodated in a typical traffic lane.

Reconfiguring Simcoe Street to accommodate dedicated bus lanes would represent a major change, but significant benefits to the overall street environment and pedestrian realm could be realized. Further work would be required through an EA study to examine design concepts.

FUTURE CONVERSION FROM BRT TO LRT

The need to convert the proposed BRT corridors into higher-capacity light rail facilities beyond 2031 should be assessed in the future. Some issues that could influence the timing of this include:

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

4.4.7 HIGH FREQUENCY NETWORK

The next level of higher-order transit consists of a HFN of buses in High Occupancy Vehicle (HOV) lanes and shared lanes. Generally, these corridors would operate with transit frequencies of 10 minutes or less in the peak hours. HOV lanes would ensure priority for transit vehicles on those corridors, while shared-lane operations would benefit from transit priority measures (e.g., queue-jump lanes and transit signal priority) at select locations.

For 2031, five corridors are proposed for High Frequency Transit service in HOV lanes:

- Taunton Road (from York Durham Line to Simcoe Street);
- Whites Road (from Bayly Street to Highway 407);
- Brock Road (from Bayly Street to Highway 407);
- Westney Road (from Bayly Street to Kingston Road); and
- Bayly Street (from Whites Road to Harwood Avenue).

Transit in HOV lanes is the optimal solution for these corridors based on the goal of maximizing person carrying capacity. Typically, ridership should be at least 600 riders per hour (and ideally 1,000) in order to justify conversion of a regular traffic lane to a dedicated transit lane, which is not the case for these corridors. HOV lanes provide priority for transit, while maintaining additional capacity for automobiles.

Additional HFN routes operating in shared lanes are proposed for sections of Highway 7, Winchester Road, Rossland Road, Bayly/Victoria/Bloor Street, Westney Road, Harwood Avenue, Brock/Baldwin Street, Thornton Road, and Harmony Road, as well as Highway 2 from Simcoe Street to the Bowmanville GO Station.

Implementation of higher frequency transit on these corridors will help build ridership by providing reliable and frequent transit between major transit station areas. This approach is consistent with the directions of the Provincial Growth Plan and the Metrolinx Regional Transportation Plan.

4.4.8 GO TRANSIT RAIL NETWORK

GO Transit's rail network will continue to play a major role in serving inter-regional mobility needs in the future, particularly as congestion on Highway 401 into Toronto increases. There are also opportunities for GO Transit to provide improved transit options for trips within Durham Region, through service and infrastructure upgrades on the Lakeshore East Corridor and potential new GO Rail lines.

LAKESHORE EAST CORRIDOR

Currently, GO Transit's Lakeshore East rail line terminates at the Oshawa GO Station on Bloor Street at Thornton Road. Metrolinx's The Big Move (2008) identified the potential easterly extension of the Lakeshore East line to Bowmanville in the 15-year plan. In 2011, the Oshawa to Bowmanville EA and Preliminary Design Study was completed, which recommended the extension of GO Rail service to Bowmanville on the Canadian Pacific Railway (CPR) Belleville Subdivision via a new rail crossing of Highway 401. The study included new stations along the CPR line at Thornton Road, Central Oshawa (between Simcoe Street and Ritson Road), Courtice Road and Bowmanville (west of Regional Road 57). The study also identified a potential future station west of Grandview Street in Oshawa.

Modelling work carried out for the TMP confirms that the extension of GO Rail to Central Oshawa and further east to Bowmanville has significant transportation and mobility benefits. In June 2016, the Province announced that the extension to Bowmanville is planned to be in service by 2024.

In 2015, the Province announced the introduction of Regional Express Rail (RER). RER will provide 15-minute two-way all day service on the Lakeshore East GO line from Union Station to Oshawa within ten years. Current plans are to electrify the Lakeshore East corridor as far as the existing Oshawa GO station by 2024-2025. Given the announcement of the expansion of rail service to Bowmanville, extending electrified service to the proposed Central Oshawa Station, and perhaps even further east, is a Regional priority. However, at present, CPR does not permit electrified service on its corridor.

FUTURE GO RAIL TO SEATON ON THE BELLEVILLE SUBDIVISION

Metrolinx identifies a new GO Rail extension to Seaton in The Big Move's 15 year plan. This service would be a new service from Downtown Toronto, extending east into Durham on the CPR Belleville Subdivision. One of the challenges with this service is that it runs through CP's Agincourt rail yard, one of the busier rail yards in the GTHA.

The extension of GO Rail to Seaton would provide a direct inter-regional transit connection for a future population of up to 70,000 and approximately 35,000 jobs in the Seaton community, as well as for north Ajax and Brooklin.

GO RAIL EXTENSION TO UXBRIDGE

GO Rail service is currently provided to Lincolnville GO Station, located just north of Stouffville. The rail line continues northeasterly through Goodwood and onwards to Uxbridge but does not currently provide GO Rail service. Extension of the Stouffville GO service to Uxbridge has been identified as a potential option, but would require major upgrades to the track infrastructure. As such, the potential extension of GO Rail service to Uxbridge has not been considered as a potential option within the timeframe of this TMP (i.e. 2031), but should be protected for in the long term.

Current GO Bus service (other transit spine) on Highway 47 provides a connection to Lincolnville Station.

FUTURE GO RAIL ON THE HAVELOCK SUBDIVISION

Plans for the introduction of service on the CPR Havelock Subdivision to Locust Hill in Markham is included in the Big Move 25-year plan but the future extension to the Pickering Airport is not. Major constraints to implementation include the fact that the corridor requires major capital investments for upgrades, as current track speeds cannot handle passenger rail requirements. Further, the rail corridor largely runs through the rural area (much of which is in the Greenbelt) and has limited ridership potential, particularly for trips to/from Durham. However, the corridor should still be protected for future implementation of service.

4.4.9 FUTURE HIGHWAY 407 TRANSITWAY

The Highway 407/412/418 Transitway is identified in the Higher-Order Transit Network (refer to Maps 1a and 1b) across Durham Region to Highway 35/115, along Highway 412 to Dundas Street, and along Highway 418 to Bloor Street. As noted in Section 4.4.5, the Highway 407/Brock Road commuter lot was opened in February 2016, and two lots are currently under construction and should open in 2017 (Highway 412/Dundas Street/Halls Road and Highway 407/Baldwin Street).

Durham Region would benefit from all of the transitway station sites at interchanges becoming commuter lots on an interim basis prior to 2031. However, there are several sites that should be prioritized for implementation within the next few years. These commuter lots not only have the greatest potential to integrate with existing DRT and GO Bus service, but support anticipated enhancements to future GO Bus service with the Region's proposed Higher Order Transit network. They would also support carpooling, particularly for inter-regional trips and are located in areas where other carpool facilities do not exist. The commuter lot locations identified are as follows:

- 407 ETR/Whites Road – serves the Seaton community by providing a connection between the planned Whites Road and Highway 7 HFN bus routes with existing GO Bus service. Construction on the Whites Road interchange is planned to be completed in 2019.
- Highway 407/Simcoe Street – serves north Oshawa, particularly the Windfields area and UOIT/Durham College students by providing a connection between the planned Simcoe Street Rapid Transit corridor and Winchester Road HFN corridor with existing GO Bus service.
- Highway 412/Taunton Road – serves West Whitby by providing a connection between the planned Taunton Road HFN corridor and future GO Bus service.
- Highway 418/Regional Highway 2 – serves Courtice/Bowmanville by providing a connection between the Highway 2 HFN corridor and future GO Bus service.

4.4.10 INTEGRATION WITH DEVELOPMENT AND PUBLIC SPACE

The ability to provide cost-effective, high-ridership services in Rapid Transit and HFN corridors is reliant upon transit supportive development adjacent to those corridors. In this sense, "transit supportive development" refers to the overall density and mix of development; the built form on individual sites including the minimization of surface parking; and the construction of direct, safe and comfortable walking and cycling routes to and from transit stations and stops. Section 3.4 contains actions towards implementing a Regional Transit Oriented Development (TOD) Strategy and TOD Guidelines.

WALKING AND CYCLING ACCESS

To support its TOD strategy (see preamble to Section 3.4.3), Durham Region should improve walking and cycling access to the stops and stations on Rapid Transit and HFN corridors. There are many elements that influence the quality of an access route—from directness and accessibility to visibility, lighting, wayfinding, weather protection and rest opportunities. The overall attractiveness of a route is generally determined by its weakest component.

As a means of measuring access to transit, the Region has developed a Walking Network Database within its urban areas. This tool identifies existing pedestrian infrastructure (e.g., sidewalks, multi-use paths, walkways, crosswalks and road walks), and can determine optimal access routes and associated distances to bus stops. It is an important tool to measure transit service area coverage, and can identify areas where new facilities are needed in order to reduce walk times to bus stops and create larger catchment areas. The tool could be expanded to include qualitative measures, including whether there is winter maintenance on specific facilities, as part of the overall assessment.

Safe walking and cycling routes to transit are important to support the overall mobility of Durham's residents and help create age-friendly, healthy communities. Lower income neighbourhoods, youth and seniors currently tend to use transit more frequently and as a result this infrastructure is particularly important for these populations. For instance, The Building on Health in Priority Neighbourhoods (2015) report, prepared by the Region of Durham Health Department, identified seven priority neighbourhoods. In this report indicators suggest that children are more likely to walk in priority neighbourhoods because their families have less access to vehicles and caregivers who drive them to school. Building on this aspect of priority neighbourhoods by ensuring there are safe and convenient walking and cycling routes can improve the health and well-being of residents. The seven priority neighbourhoods are:

- Downtown Ajax,
- Downtown Whitby,
- Lakeview in Oshawa,
- Gibb West in Oshawa,
- Downtown Oshawa,
- Central Park in Oshawa, and
- Beatrice North in Oshawa.

Improving walking and cycling access to and from transit will require partnership with area municipalities as the Region does not have jurisdiction over boulevard elements (e.g., sidewalks, lighting, multi-use paths). Elements that are required to support transit include appropriate access points and circulation routes, lighting, benches and bicycle parking. Much of this work can be addressed through the Region's TOD strategy, but will require support from area municipal partners.

Preserving access to transit for cyclists and pedestrians also involves protecting their ability to travel along and across busy transit corridors. In corridors with reserved bus lanes or HOV lanes, minimizing the number of controlled road crossings can help reduce delay to transit vehicles—but it can also increase travel distances for people trying to access stops and stations. Similarly, allocating right-of-way to transit lanes can minimize congestion impacts on transit vehicles—but it can also limit the right-of-way available for walking and cycling facilities, or for buffer spaces. Decisions about crossings and rights-of-way need to balance competing interests.

Finally, area municipalities (or other agencies) could establish public bike share programs, with input from the Region as required, to provide access to and from transit hubs and offer the potential to further promote active transportation and support transit (see Section 5.4.11).

ACTIONS

The following actions are recommended to support the goal of connecting Higher Order Transit to major destinations:

17. Designate the transit corridors in the ROP, as shown on the Higher Order Transit Network map (Maps 1a and 1b); protect the required rights-of-way; conduct required environmental assessments and functional design studies; and implement the proposed Rapid Transit and High Frequency Network.

18. Work with Metrolinx to ensure the successful implementation of Regional Express Rail (RER), which includes 15-minute electrified service to Oshawa by 2024-25, and to relocate the primary Lakeshore East GO Rail service from the current Oshawa GO station to the Central Oshawa Station and connect with the Downtown Oshawa Urban Growth Centre.
19. Work with Metrolinx to update and provide station infrastructure that will support effective local transit service with the introduction of GO RER service on the Lakeshore East corridor, as well as the extension of GO Rail service to Bowmanville.
20. Continue to work with the Province to advocate for the extension of GO Rail service to Seaton to better serve future residents of the North Pickering Area.
21. Protect existing railway corridors to allow for future implementation of regional passenger rail service, including the CP Rail Havelock Subdivision through the future Pickering Airport area to Peterborough and the Metrolinx Uxbridge Subdivision from the Lincolnville GO Station to Uxbridge.
22. Work with area municipalities to enable and encourage more intensive, compact land uses within an 800 metre (10 minute) walk of rapid transit, HFN corridors, stations and terminals.
23. As part of the next stage of rapid transit planning, develop guidelines for walking and cycling access to rapid transit stations and major stops on HFN corridors, considering the character and quality of access routes and amenities both on and off Regional lands and availability of funding. Guidelines should also describe how walking and cycling access needs should be considered in the Priority Neighbourhoods identified by the Durham Region Health Department.
24. As Rapid Transit corridors are planned and implemented, apply the walking and cycling access guidelines to all rapid transit stops.
25. Work with area municipalities to systematically review walking and cycling access to existing major stops on HFN corridors, identify upgrades and plan their implementation.

GOAL

TRANSIT WILL OFFER A SUPERIOR USER EXPERIENCE

4.4.11 ACCESSIBILITY

Persons with disabilities have full access to both DRT's accessible scheduled transit services and its specialized transit services across Durham Region. DRT encourages persons with disabilities to use its accessible scheduled transit services, instead of specialized transit services, when they are able to do so. This reduces the demand on specialized services, allowing DRT to minimize its operating costs while offering better service to customers who cannot use conventional service.

ACCESSIBLE SCHEDULED TRANSIT SERVICES

Every DRT bus is accessible to customers with mobility disabilities, and priority seating is provided for persons using wheelchairs, mobility devices, walkers, canes and persons using service animals. Conventional buses can kneel to ease customer entry from the curb, have extendable ramps, and offer securement areas for wheelchair and scooter users at the front of the vehicle.

While all DRT bus stop locations are planned to be accessible as per Accessibility for Ontarians with Disabilities Act (AODA) requirements, access routes to stop locations may not be accessible, especially in rural areas. Rough surfaces, steps, steep grades, and a lack of sidewalks or controlled pedestrian crossings can make it difficult for a customer with disabilities to travel to or from a bus stop. Durham Region is not responsible for building or maintaining sidewalks. As such, mitigating the inaccessibility of transit stops requires collaboration with area municipalities.

SPECIALIZED TRANSIT SERVICES

DRT will continue to offer specialized transit services using well-equipped vehicles to provide service for those who are unable to use the conventional accessible transit services already provided.

In rural areas, DRT intends to leverage specialized transit services as part of a suite of alternative forms of transit that better serve areas with low density (see Section 4.4.1 for a discussion of rural service options). This approach could increase the return on specialized transit operating costs by allowing able-bodied passengers in these areas to use specialized transit vehicles to reach Transit Hubs and other destinations. This service option would have to ensure it does not compromise service for customers requiring specialized transit services.

4.4.12 SAFETY AND SECURITY

The safety of its customers is one of DRT's priorities. DRT operates its Request Stop program, which allows passengers who are travelling alone at night to request a stop close to their destination even if the stop is not a DRT bus stop. Coordinating with the area municipalities to complete missing sidewalk gaps and improving lighting at transit stops would further improve safety.

4.4.13 CUSTOMER AMENITIES

DRT has design guidelines for transit stop pads and bus bays. However, DRT has not adopted formal guidelines or standards for designing transit stops (e.g., size and location of the concrete pad; when to install shelters, seating and lighting). This results in an inconsistent customer experience, and also contributes to the issue related to access to/from bus stops (see Section 4.4.11). Accordingly, DRT is actively developing transit stop design guidelines, in consultation with area municipalities, to make transit more attractive.

4.4.14 CUSTOMER INFORMATION

TRIP PLANNING

Tools such as Google Maps, TransitApp, Triplinx, etc., are available web-based and mobile applications that use DRT's current service data to inform customers of transit routes and scheduling. DRT is also developing real-time information products, named DRTtools, which allows customers to benefit from the smart technologies installed on DRT buses. The first tool released was DRTonline, a web-based service that provides customers with GPS-based, real-time schedule information for the next three buses to arrive at their stop. Real-time information will soon be made available to third party web-based and mobile applications.

COMMUNICATIONS

DRT takes advantage of social media and offers service alerts to Facebook and Twitter subscribers, as well as through email. As social media technology continues to develop, new communication platforms will emerge to better connect with travellers. DRT should continue to review its communication technologies and use platforms that offer the best opportunities to engage with its customers.

The Region also recognizes that as the transit network develops, some users may find it more challenging to find the best route for their trip. Along with the trip planning tools discussed previously, DRT's signage and wayfinding should be consistent across the transit network, allowing users to quickly find their way.

4.4.15 FARES

Transit fares are an essential component of DRT's revenues. Fare levels must take into account operating cost recovery, providing value for money to customers, and minimizing the burden on those customers who are least able to pay.

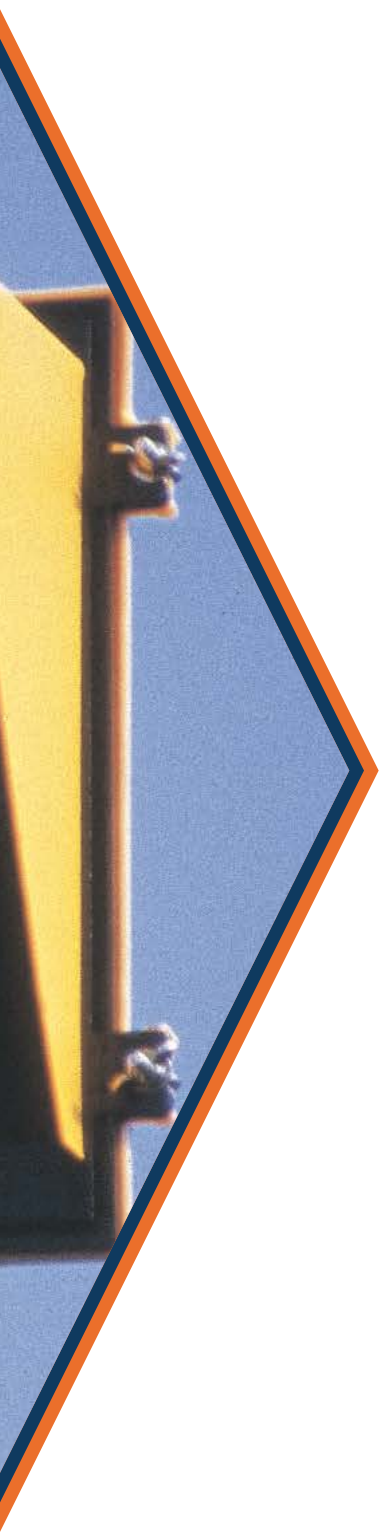
As many transit users connect between DRT services and GO Transit, TTC, and YRT/Viva, the integration of fares is an important issue. Currently, DRT has co-fare arrangements with GO Transit and YRT/Viva, but customers transferring to TTC routes must pay a second fare. The proposed Higher Order Transit Network will be an attractive system for both internal trips within Durham and inter-regional trips across municipal boundaries. An integrated fare system that reduces barriers to inter-regional connections will be a major factor in attracting new riders to the system.

The PRESTO fare card is the common fare payment medium across the GTHA. Metrolinx is leading the development of a fare integration strategy and coordinating a review of concession fares in an effort to harmonize fare policies across the GTHA. However, major governance issues need to be addressed before such policies can be implemented.

ACTIONS

The following actions are recommended to support the goal of transit offering a superior user experience:

26. Work with Regional stakeholders, Metrolinx and area municipalities to develop Transit Stop Design Guidelines related to the planning and design of transit infrastructure.
27. Review and research how the demand-response service model for rural areas can be expanded to supplement and provide transit services in other low demand areas, subject to availability of funding. Develop a flexible delivery model that can leverage traditional and new mobility service providers.
28. Leverage new and cost effective mobility services and technologies that have the potential to support and complement DRT's route network by addressing the "last mile" needs of transit riders. These technologies would apply to all DRT routes, not just the RT and HFN ones.
29. Develop and implement a consistent transit signage and wayfinding strategy that improves travel information and customer experience.
30. Continue to work with Metrolinx, York Region Transit and the Toronto Transit Commission to develop a GTHA-wide fare integration policy.



CHAPTER 5

WALKING AND CYCLING

5 Walking and Cycling

5.1 Strategic Direction 3: Make walking and cycling more practical and attractive

Significant growth in active transportation levels is both desirable and achievable. By working with area municipalities to improve the connectivity, continuity, comfort, convenience and safety of walking and cycling routes, Durham Region will shift more short trips from cars to either foot or bike. Residents who drive will find it easier to move within, through and between neighbourhoods without getting behind the wheel, and the many residents of all ages and abilities who do not drive will enjoy greater opportunity through improved access to their daily destinations as well as to public transit services. Cycling routes that improve area municipal connectivity, are key commuter routes, or enhance Regional cycling tourism will be prioritized.

5.2 Background

The Region is responsible for construction and maintenance of on-road cycling facilities and paved shoulders on Regional roads in rural areas for routes designated in the Regional Cycling Plan (RCP). The Region is also responsible for providing the platform for multi-use paths within Regional road rights-of-way for urban routes designated within the RCP. Area municipalities are responsible for building and maintaining sidewalks and multi-use paths along Regional roads as well as all pedestrian and cycling facilities on area municipal roads.

5.2.1 WALKING

In terms of the pedestrian network, urban areas are generally well covered with sidewalks on both sides of most arterial and collector roads, and on at least one side of most local roads. However, some gaps exist in the network within urban areas, particularly in or adjacent to areas of new development. While sidewalks, multi-use paths and walkways within specific subdivisions are typically provided early on for new developments, sometimes gaps exist where connections to existing on-road or off-road multi-use paths have lagged behind. In rural areas, pedestrians must use shoulders to walk along rural roadways in many areas where roadside pathways and sidewalks do not exist.

5.2.2 CYCLING

The Regional Cycling Plan provides direction for the development of a Region-wide Primary Cycling Network (PCN). Exhibit 5.1 provides a summary of the PCN and facilities constructed since the network was approved in 2012.

Exhibit 5.1 - Summary of Primary Cycling Network Development (Regional roads only)

Facility TYPE	Progress to year end 2012 (km)	Progress to OCTOBER 2016 (km)	Proposed Network BUILD OUT 2032 (km)
Boulevard Multi-use Path[1]	18.3	24.5	130.9
Paved Shoulder	0.4	9.9	41.3
Bike Lane[2]	-	1.6	32.6
Buffered Bike Lane	-	3.2	19.3
Total	18.7	39.1	224.1

1. Includes facilities constructed by the area municipalities or developers prior to the 2012 Regional Cycling Plan.
2. Includes Regional facilities that have not specifically been marked or signed as bike lanes.

The existing network is mostly made up of multi-use paths and paved shoulders. Future plans include a greater mix of multi-use paths, cycle tracks, paved shoulders, on-road cycling lanes, and buffered cycling lanes.

5.2.3 TRAILS

The existing paved pedestrian and cycling networks are augmented by an extensive network of trails in Durham Region, stretching for nearly 300 kilometres. Many of these trails are un-paved, and used primarily for recreational purposes such as recreational hiking and cycling. Some of these trails also act as high quality active transportation links between and within the area municipalities. For example, the Waterfront Trail provides a high-quality route linking all of the lakefront municipalities.

5.3 Progress and Opportunities

Over the past decade, significant improvements have been made to walking and cycling conditions in Durham Region, which is a pre-requisite for increasing the share of trips made using active transportation modes. Major achievements include:

- Approval of the 2012 Regional Cycling Plan;
- Approval of the 2012 Region Trails Network (2015 update) and Regional Trails Guide (2012);
- Establishment of the Durham Trails Coordinating Committee;
- Development of the Cycle Durham website and on-going communication strategy;
- Completion of a Durham Cycle Tours map (2012 and 2017)
- On-going expansion of the Regional Primary Cycling Network, largely through road capital projects (see Exhibit 5.1);

- Establishment of the Walking Network Database for measuring and monitoring pedestrian access to transit, which can be used for other facilities such as schools;
- Concentrated efforts by the Region and area municipalities to advance walking and cycling initiatives, both in terms of infrastructure as well as behavioural change and marketing programs, including the Smart Commute Durham and Cycle Durham programs; and,
- Rouge National Urban Park was established in 2015. Parks Canada is planning several new trails, education and orientation centres throughout the park. This presents an opportunity for the Regional Trail Network to enhance connections to the park, particularly within the expanded area in north Pickering / Uxbridge.

Implementation of cycling network modifications to date has been largely contingent on the annual Regional Road Program Capital Budget. Accordingly, this TMP identifies potential priority projects that could serve to accelerate the implementation of key cycling connections.

5.4 Goals and Actions

GOAL

A COMPREHENSIVE REGION-WIDE CYCLING NETWORK WILL CONNECT PEOPLE TO DESTINATIONS WITH SAFE AND COMFORTABLE FACILITIES SUPPORTING BOTH UTILITARIAN AND RECREATIONAL CYCLING

5.4.1 PRIMARY CYCLING NETWORK (PCN)

The Primary Cycling Network (PCN) was identified in the Regional Cycling Plan and includes routes that link major centres, intermodal facilities and destinations. The PCN primarily supports longer trips between communities, area municipalities and other regions. PCN routes are typically located along arterial road corridors, and are on a combination of Regional and area municipal roads.

The PCN represents a comprehensive long-term network goal. While no major changes to the PCN are recommended, there were some smaller network revisions identified through the TMP process (refer to Exhibit 5.2). The Regional Cycling Network, including the revised PCN, Regional Trail Network and Greenbelt Cycling Route, is illustrated in Maps 2a (Durham Region) and 2b (Southern Enlargement).

Exhibit 5.2 – Proposed modifications to the Primary Cycling Network

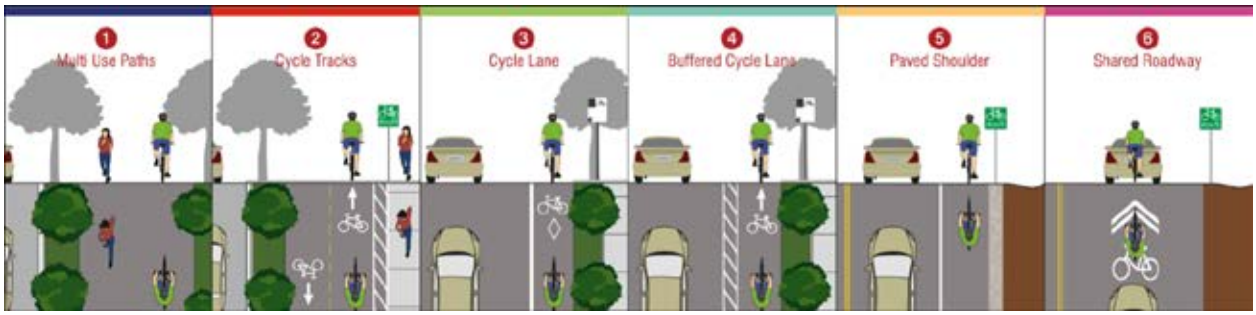
MODIFICATION / Route*	RATIONALE / Considerations
Greenbelt Route, Brooklin and South Whitby Connection - This proposed connection would extend from Columbus Road to the north (which connects to the the Greenbelt Cycling Route via the PCN on Ashburn Road) to Taunton Road in the south. The route will use the existing PCN along Cochrane Street south to eventually join with Downtown Whitby and the Waterfront Trail via Henry Street.	This connection provide access to several existing and planned network components and communities, and would: • Provide a more direct connection to the Greenbelt Cycling Route for residents living in west Whitby; • Connect the growing community of Brooklin to the existing commercial centres south of Highway 407, including the Regional Centre at Taunton Road/Baldwin Street/Brock Street; • Provide access to the Heber Down Conservation Area and Cullen Central Park, improving access to recreational facilities within Whitby; and • Connect to a crossing of Highway 407 which currently includes partially paved shoulders. The nearest alternative crossing in proximity to Brooklin is almost 1 km east at Baldwin Street, which is an interchange without cycling facilities. The next closest Highway 407 crossing with cycling facilities is at Anderson Street, about 2 km away.
Thickson Road Waterfront Trail Connection - This proposed connection extends along Thickson Road from Victoria Street (part of the PCN) to the Waterfront Trail. The Town of Whitby is planning to construct a multi-use path along this corridor in conjunction with the Region's capital road widening project (currently scheduled for 2020).	This corridor would: • Provide a gateway to the Waterfront Trail; • Serve the employment lands to support commuting; and • Provide a key connection from the Oshawa GO Station (approximately 1,200 m east of Thickson Road) down to the waterfront (via Bloor Street/Victoria Street).
North Oshawa to Scugog Connection - This proposed connection is intended to provide a link between North Oshawa & Port Perry. This connection has significant potential as a recreational corridor.	Although a specific route has yet to be recommended, the proposed network addition would: • Connect the Port Perry and Windfields Regional Centres; • Address demand for improved access to recreational trails and provide an attractive rural recreational route that connects to the Greenbelt Cycling Route and the Oak Ridges Moraine Trail; and • Enhance connections to planned rapid transit facilities on Simcoe Street, facilitating multi-modal trips.

*Routes comprise a combination of Reginoal and area municipal roads.

Preliminary facility types for the PCN were identified in the 2012 Regional Cycling Plan based on best practices in progressive cycling nations such as Denmark, Netherlands, England, New Zealand, Australia and Germany. The approach considered several options (e.g., cycling lanes, buffered cycling lanes, cycle tracks, multi-use paths, paved shoulders, shared/signed routes), as illustrated in Exhibit 5.3.

For each element of the PCN, potential design treatments were selected based on projected future motor vehicle operating speeds and traffic volumes. A more detailed examination was then completed to establish preferred treatments on a corridor-by-corridor basis, considering characteristics such as commercial vehicle volumes, driveway frequency, on-street parking provision and right-of-way constraints.

Exhibit 5.3 – Facility types assigned in the Regional Cycling Plan



Source: Region of Durham, 2012 Regional Cycling Plan

Treatment types will be confirmed and designed through future Environmental Assessments and other design studies in accordance with recognized standards and guidelines. Implementation of the PCN will rely on accepted design practices and guidelines as outlined in the Ontario Traffic Manual (OTM) Book 18 – Cycling Facilities (2013), produced by the Ministry of Transportation, with reference to other design manuals as needed.

The PCN, once built, should provide a high level of service and comfort for cyclists. As such, Regional and area municipal facilities constructed along these corridors should provide high quality design and an attractive user experience. For example, edgelines are not considered to be an appropriate long-term facility along a corridor designated as part of the PCN, as they are not a cycling facility (i.e. are typically shared with parked vehicles). Similarly, multi-use paths should be constructed with appropriate consideration of intersection crossings and conflict zones. For sections of PCN where the timing of implementation, and/or feasibility of construction may be a factor, interim connections have been identified as alternate parallel routes. The ultimate goal of the PCN is to form the backbone of the network, and result in high quality facility design.

5.4.2 RURAL CYCLING FACILITIES

While the urban facilities reflect the higher potential for increased cycling volumes in more densely populated areas, a connected network of rural cycling facilities is also integral to supporting Regional objectives. Most rural Regional roads currently have gravel shoulders and high traffic speeds making safety for cyclists a concern. A rural network of paved shoulders can support recreational and tourism opportunities, as well as providing access to local destinations in rural communities where other cycling facilities are not feasible. More discussion on paved shoulders is included in Section 6.4.9.

5.4.3 REGIONAL TRAIL NETWORK (RTN)

The Durham Trails Coordinating Committee (DTCC) is a citizen advisory committee of Council, which developed the Regional Trail Network (RTN) and continues to identify, update and promote the use of the network. The RTN comprises paved off-road, multi-use and unpaved trails such as gravel, dirt and boardwalks that serve a Regionally-significant recreational function. The current RTN is also shown in Maps 2a and 2b.

This network consists primarily of three “higher order” inter-regional trail systems, including the Waterfront Trail, the TransCanada Trail and the Oak Ridges Moraine Trail. In addition, the RTN includes several community trails of Regional significance which connect to these trails and provide links to and between local community trails. A few corridor sections identified in the RTN coincide with the PCN. The function of the RTN could be more effective and beneficial if its function was broadened from primarily recreational to include utilitarian trips.

One of the Region’s roles in sustaining safety along these major trails is to maintain safe crossings where the Regional trails network meets Regional roads. In general, trail crossings should be directed to existing or planned signalized intersections. However, there may be particular locations in the Regional context (i.e. two-lane, low-volume or low-speed corridors, for example through a rural hamlet) where crossrides, Pedestrian Crossovers (PXOs) or other signal alternatives may be considered.

ACTIONS

The following actions are recommended to support the goal of a Region-wide cycling network connecting people to destinations with safe and comfortable facilities supporting both utilitarian and recreational cycling:

31. Continue to implement and maintain the designated Primary Cycling Network (PCN) as the long term cycling network for the Region, in accordance with the funding formula approved by Regional Council.
32. Review and update the PCN, as approved by Regional Council in the Regional Cycling Plan and integrated into the TMP, on a regular basis, in consultation with the area municipalities, cycling groups and other stakeholders.
33. Continue to work with area municipalities to implement the Regional Trail Network (RTN). This includes on-going input from the Durham Trails Coordinating Committee (DTCC) to inform priorities and identify partnership opportunities. Explore opportunities to identify and improve trails to promote active transportation, as appropriate for the context.

GOAL

CYCLING ROUTES THAT PROVIDE ACCESS TO MAJOR DESTINATIONS, IMPROVE NETWORK CONNECTIVITY, AND ENHANCE REGIONAL CYCLING TOURISM WILL BE PRIORITIZED TO PROVIDE A COHESIVE NETWORK OVER A SHORTER-TERM HORIZON

5.4.4 SHORT-TERM CYCLING ROUTES

Since the RCP's initial adoption in 2008, cycling facilities have been implemented as roads are reconstructed per the annual Regional Road Program Capital Budget. This has resulted in a steady increase in cycling facilities; however, based on this program alone, the full build out of the 224 kilometre PCN is expected to be completed in 2032. At the same time, development of the segments of the PCN on area municipal roads is also tied to road capital modifications, or local priorities.

A more rigorous, complementary approach to network build-out would help achieve the TMP strategic direction for walking and cycling. Towards this end, it is important to accelerate the implementation of the cycling network by developing a shorter term network of priority routes, identified as Short-Term Cycling Routes.

The intent of identifying Short-Term Cycling Routes is to support the PCN's implementation over the short-term (e.g., next 10 years). While the PCN provides the overall vision for the Region, the Short-Term Cycling Routes aim

to provide a high-quality, connected network to support near term modal shifts and economic and tourism goals.

The Short-Term Cycling Route strategy focuses on:

Key Infill Connections – These infill links are advanced as components of the PCN outside of the road projects identified in the Regional Road Program Capital Budget and Nine Year Forecast. These links can be implemented as stand-alone projects to be evaluated and determined on a case by case basis during the Regional Business Planning and Budget process.

These links are identified to enhance connectivity to key destinations, specifically:

- **Regional Centres** – Nodes of commercial, employment, and residential activity supporting multi-modal connections, with major transit investments. Ensuring strong active transportation networks are available in these Regional Centres is important to achieving Regional goals.
- **Transit Priority Network** – Access to the Higher Order Transit Network and Transit Hubs via active transportation enhances the potential value of investment in both transit and active transportation.
- **Area Municipal Cycling Networks** – Where area municipal cycling or active transportation plans exist, connections to existing and proposed cycling facilities increases the potential for local routes to "feed" into the broader PCN. This includes paved major municipal off-road paths which can also provide key interim connections.
- **External Cycling Networks** – Connecting to networks outside of Durham Region, particularly to the City of Toronto in the west, is critical to ensuring a connected network that supports commuting and recreational travel. For instance, Rouge National Urban Park contains cycling and trail connections that should be considered in future plans for the Region's cycling infrastructure investment. Further, supporting recreational routes – components of the PCN that are geared towards recreational cycling – can be achieved by resolving existing gaps.

To complete the network of Short-Term Cycling Routes, key infill connections will work in conjunction with:

- **Planned Capital Investment** – In keeping with current practice, the Regional Road Program Capital Budget and Nine Year Forecast should continue to provide an opportunity to add cycling facilities as roads are reconstructed.
- **Regional Trails** – Regional trails support a wide variety of users, including cyclists on key corridors such as the Waterfront Trail. The Regional Trails Network can assist in providing interim, off-road connections until the PCN is built (i.e., beyond the 10-year planning timeframe).

The key infill connections have been ranked and prioritized based on a number of factors that consider the cycling potential and impact of each corridor. These factors are summarized in Exhibit 5.4.

Exhibit 5.4 – Summary of Factors used in Infill Connection Analysis.

CRITERION	RATIONALE	EVALUATION OVERVIEW
Connectivity	The primary purpose of the infill corridors is to help to connect existing and planned cycling infrastructure in order to improve the usability of standalone links and to provide a connected network that encourages cycling for transportation purposes.	The number of links that connect on either end of an infill corridor or midway through the link were calculated and used to determine its rating for the criteria. Scores vary for connections to different types of facilities (i.e. existing versus planned) since existing facilities are already in place (i.e. less uncertainty around project phasing) and already have established users.
Density	Population and employment density can support additional active transportation trips. Areas of higher population and employment density often have built form and land use patterns that support active transportation. In other cases, they may represent strategic locations for investment in multi-modal connections due to their trip generation potential (i.e. major employment areas)	A 500 m buffer was applied to infill corridors. Total density was calculated based on the area within a buffer and the population/employment density of the transportation zone within the buffered area. Thresholds based on the average density were used to determine the rating for the criteria. The analysis assumed that density was evenly distributed throughout the zone.
Potential Demand (Short Trips)	Trips of 5 km or less are generally considered to be appropriate for cycling by most people. As a result, areas where there are many short trips currently being made by single occupant vehicles likely have high cycling potential for expanded cycling networks.	A 500 m buffer of the infill corridor was created. A weighted number of existing daily auto short trips was calculated based on the area within a buffer and the number of trips in that area. Thresholds based on the number of short trips were used to determine the rating for the criteria. The analysis assumes that the number of short trips is evenly distributed throughout the zone.
Major Trip Generators	Major trip generators such as transit hubs, schools, and recreation/community centres should be accessible by active transportation so that residents have options when accessing essential services.	Major trip generators were identified: · Regional Centres · Major transit stations · Postsecondary Institutions (e.g., Durham College/ UOIT North Oshawa Campus, Durham College – Whitby Campus) · Existing carpool Lots · High schools · Recreation/community centres A 500m buffer was assigned around each corridor and the number of trip generators within the buffer was used to determine its rating for the criteria.
Barriers	Major barriers such as rail lines, water bodies or highways can impede active transportation. Key infill connections that cross a major barrier can be considered to provide a critical linkage. Often, the types of projects that cross barriers are particularly costly to implement, but it is important to recognize the value added to the network from a connectivity perspective when considering the additional capital cost.	Major barriers are identified: · Freeways (401, 407, 35/115, 412, 418) · Rail corridors The number of barriers that each infill corridor crosses was used to determine its rating for the criteria.

Short-Term Cycling Routes, including the key infill connections and Regional Road Program Capital Budget projects, are illustrated in Maps 3a (Durham Region) and 3b (Southern Enlargement).

5.4.5 FEASIBILITY REVIEW

A high-level feasibility review of each corridor was completed to identify key infill connections. As part of the feasibility review, an interim implementation strategy was identified for the route. The analysis considered how the project could be implemented independent of road work in order to complete the Short-Term Cycling Routes. The proposed interim facility type, implementation strategy and cost for each link are summarized under separate cover in Background Report G: Active Transportation Background Report.

5.4.6 FUNDING SHORT TERM CYCLING ROUTES

The following cost sharing and funding formula approved as part of the 2012 Regional Cycling Plan also applies to Short Term Cycling Routes on Regional roads:

- For all on-road cycling lanes on Regional rights-of-way that form part of the PCN, including buffered cycling lanes and paved shoulders, the Region is 100% responsible for all capital construction costs of providing the cycling facility (including land acquisition and utility relocation, signage and markings), and ongoing regular maintenance and repair costs.
- For multi-use paths located within Regional road rights-of-way that form part of the PCN, the Region is responsible for providing, at its expense, a platform for the construction of a multi-use path. The cost of providing a platform will include land acquisition, utility relocation, grading. The cost of granular, asphalt, signage, markings, the provision of other amenities and path maintenance and repair, is the sole responsibility of the area municipality in which the multi-use path is located.

The practice throughout Durham Region in the past has been to implement cycling facilities only as part of a road capital project. However, the key infill connections identified as part of the network of Short-Term Cycling Routes will be considered for implementation as stand-alone projects subject to the Regional Road Program Capital Budget as part of the annual Regional Business Planning and Budget process.

Many of the links identified on the Short-Term Cycling Routes are on roadways under area municipal jurisdiction. Cycling facilities on locally owned roads are the full responsibility of the local area municipalities. Coordination between the Region and area municipalities is required to advance the short-term network. One suggested approach is for area municipalities to consider the Short-Term Cycling Routes as a tool for prioritizing their investments in active transportation, if these projects have not already been funded through their respective capital budgets. A cohesive and connected Regional cycling network can support and advance commuting and tourism across municipalities.

ACTIONS

The following actions are recommended to support the goal of prioritizing cycling routes that provide access to major destinations, improve network connectivity, and enhance Regional cycling tourism to provide a cohesive network over a shorter-term horizon:

34. Include the identified infill connections within Regional rights-of-way in the Region's annual Regional Road Program Capital Budget and Nine Year Forecast process for consideration and prioritization with other transportation projects as part of the Region's annual business planning and budget process.
35. Seek collaboration with provincial and federal partners to advance the implementation of the key infill connections within the Primary Cycling Network beyond the capital program, as well as connecting routes between the Waterfront Trail and Greenbelt Cycling Route, in partnership with area municipalities and other agencies.

GOAL

BUILT ENVIRONMENTS WILL SUPPORT WALKING AND CYCLING

5.4.7 NEW DEVELOPMENTS

As Durham Region continues to grow, changes to the urban form can significantly impact the walking and cycling environment. Although the Region reviews all development applications, it has limited influence over area municipal roadways. This, in turn, limits the ability of the Region to influence active transportation and transit at the network level. With the identification of the PCN, Short-Term Cycling Routes, and the overall responsibility for transit throughout Durham Region, the Region can strive to ensure that development along these networks is pedestrian and cycling supportive. Further, establishing active transportation networks early in the development review process supports Regional TDM initiatives including active commuting and school travel.

5.4.8 REGIONAL ROADS

The opportunity to improve walking or cycling facilities along a Regional road should be considered at the time of new construction, roadway rehabilitation or reconstruction whenever feasible and subject to funding as per approved cost sharing policies. Regardless of the routes identified in the PCN, corridors that are undergoing construction should be reviewed for opportunities to enhance active transportation. The potential cost savings resulting from

incorporating sidewalks and cycling facilities at the time of initial construction can be considerable. Further, while improvements to walking and cycling facilities on Regional roads benefit the community as a whole, they are particularly important in supporting age-friendly communities and active school travel.

At roadway crossings such as signalized intersections and all-way stops, the provision of cycling and pedestrian friendly treatments should be considered, particularly where the PCN abuts the intersection in any direction.

Regional road projects should also consider the use of streetscaping elements that enhance attractiveness and comfort for active transportation users. These elements may include street trees and plantings, public art and amenities such as seating and lighting in partnership with the area municipality. Often referred to as "soft measures", these elements help encourage active transportation by providing an aesthetically pleasing environment for active transportation, and can often improve safety as well.

In order to ensure that cycling and pedestrian needs are considered in the planning, design, construction, operation and maintenance of the Regional Road network, updates to the Arterial Corridor Guidelines and Regional Official Plan should be made to incorporate the facility type guidance identified in the Regional Cycling Plan and best practices in pedestrian networks.

Maintenance can be a critical component to ensuring the on-going attractiveness and safety of facilities once they are constructed. The Region is responsible for the on-going maintenance of any on-road cycling facilities within Regional Road rights-of-way. For those routes on the PCN, it is recommended that priority maintenance be considered to promote year-round cycling activities.

ACTIONS

The following actions are recommended to support creating built environments that support walking and cycling:

36. Work with the area municipalities to protect for the Primary Cycling Network (PCN) and, where feasible, have sections of cycling facilities implemented through the development review process for any roadways identified in the Region's PCN.

37. Reference cycling and pedestrian facilities in more detail throughout Regional design and policy documents. The updated Arterial Corridor Guidelines developed within the scope of the TMP will be refined to show how the Regional Cycling Plan impacts the street typologies, particularly for cycling-supportive streets. The updated guidelines should be reflected in the Regional Official Plan, particularly Schedule E - Table E7, which should be expanded to provide a more detailed description of cycling facilities.
38. Address pedestrian and cycling access across and through intersections by considering design features such as enhanced pavement markings, bike boxes or other cycling infrastructure, physical modifications such as curb extensions, pedestrian and cycling-friendly signal timing and lighting, as appropriate and feasible in the context of the project. These features will be prioritized where significant numbers of pedestrians and cyclists can reasonably be expected.
39. Work with the area municipalities, developers and other stakeholders as appropriate to enhance the walking and cycling environment through streetscaping measures along Regional roads, such as street trees, public art and/or amenities as appropriate, feasible and subject to availability of funding.
40. Consider providing priority maintenance along Regional road corridors with on-road cycling facilities that form part of the Primary Cycling Network to promote year-round cycling.

GOAL

WALKING AND CYCLING TO TRANSIT WILL BE EASIER

Providing active transportation access to transit facilities is essential to ensuring an equitable, cost effective and sustainable transportation network.

5.4.9 WALKING AND CYCLING ROUTES TO TRANSIT

Concerted effort is dedicated to improving pedestrian access to Transit Hubs throughout Durham Region, such as GO Stations and key intermodal transfer points for transit, as these facilities generate significant pedestrian traffic. Multi-use paths serving both pedestrians and cyclists have been constructed and are planned near many Transit Hubs to support opportunities for multi-modal travel.

In addition, the Short-Term Cycling Routes identified in Section 5.4.4 of this report consider access to GO Stations and Transit Hubs as one of the evaluation criteria.

On-going improvement of pedestrian and cycling access to Transit Hubs should be considered, particularly where existing facilities are insufficient or incomplete. The Region's Walking Network Database can be used as a tool to help identify necessary improvements where there are gaps or facilities that require updating.

5.4.10 END-OF-TRIP FACILITIES

End-of-trip facilities (e.g., short-term and long-term bike parking, enhanced facilities such as showers, lockers, etc.) at Transit Hubs and other major transit facilities are critical to advancing opportunities to connect cycling and transit trips.

Durham Region Transit currently provides bike racks on buses to support the integration of transit and cycling. However, opportunities to explore enhanced end-of-trip facilities at Transit Hubs and other stations and terminals, where they do not exist, would further increase the viability of combining transit and cycling trips.

5.4.11 PUBLIC BIKE SHARE

There has been some local interest in pursuing a bike share system within Durham Region. The Region can provide advice to area municipal and other partners to advance the investigation of public bike share if there is local interest.

ACTIONS

The following actions are recommended to support making walking and cycling to transit easier:

41. Continue to promote high quality walking and cycling connections to major transit facilities, in cooperation with the area municipalities.
42. Collaborate with the area municipalities and Metrolinx to explore the feasibility of providing secure bicycle parking at major transit hubs and public bike share systems where local interest is expressed.

GOAL

PROGRAMS WILL MOTIVATE DURHAM RESIDENTS TO WALK AND CYCLE

5.4.12 SMART COMMUTE DURHAM

Smart Commute Durham was established in 2007 to help commuters reduce single occupant vehicle trips for work and personal travel (refer to Section 7.3). Smart Commute Durham offers various programs and services to achieve this goal, including:

- Individualized workplace TDM programming to promote behaviour shift towards sustainable travel such as carpooling, walking, cycling, transit and telework;
- An online carpool matching tool to help drivers find others to share the ride;
- Active Switch, a comprehensive walking and cycling program designed to allow employees from member companies to set goals, track progress, and earn rewards for walking or cycling to work; and
- Online resources for employer champions to implement regular campaigns and programming.

5.4.13 CYCLE DURHAM

To complement the RCP, a three-year Cycling Communications Plan (branded as Cycle Durham) was developed by the Region to provide support for current cyclists, encourage more people to cycle and educate road users on how they can safely share the road.

The Cycle Durham initiative was launched in 2015 and provides resources to cyclists of all age and skill levels in Durham through various forums, including: a website; social media; annual campaigns; and on-site events. Resources include ongoing updates about planned events and news related to cycling, cycling safety education, information on DRT's Bike & Ride program, links to area municipalities, various existing trails and recreational maps and health benefits of cycling. The intent of the Cycle Durham initiative is to incrementally build upon the Region's resources and make cycling more popular for work, school, recreational and other trips.

5.4.14 MUNICIPAL PROGRAMS

In addition to Regional programs, several municipalities within Durham Region offer programs to support walking and cycling. A sampling of these programs include:

- Bike Month Competitions in Ajax – Participants in bike month can record and track time with the opportunity to win prizes such as a bicycle tune up, gift certificates and water bottles.

- Clarington Walks – Clarington provides maps and routes to encourage year-round walking at Municipal recreation facilities.
- Healthy Kids Community Challenge Ajax – Part of a broader initiative to encourage youth to be active, this program encourages active transportation through programming like 'Step up and walk around Ajax!' This program provides children with pedometers and a 'passport' which sets out goals for various step counts over a month-long period. Children have the chance to win a bicycle for their participation.

The main benefit of the Region supporting active transportation programming is providing a central hub to conveniently disseminate information across Durham Region and encouraging behaviour change towards sustainable transportation. Cycle Durham and Smart Commute both have an important role to play in collecting and distributing information as well as supporting municipal partners.

5.4.15 REGION-WIDE NETWORK MAPPING

Cycling network information in GIS format has been collected from each municipality and combined into a single dataset. While the data is currently being reviewed by each municipality, it provides a starting point for the Region to track and update the Region-wide network over time. With this data, the Region can produce Region-wide cycling maps through the Cycle Durham initiative that support both recreational and commuter cycling. Partnerships with Durham Tourism and the DTCC could be pursued to produce and distribute published maps on an on-going basis.

ACTIONS

The following policies and actions are recommended to support programs to motivate Durham residents to walk and cycle:

43. Continue to promote walking and cycling through the Smart Commute Durham program.
44. Continue to act in a Regional coordination role to promote and publish cycling materials Region-wide through the Cycle Durham website and on-going communication strategy.
45. Prepare a Region-wide cycling map with municipal and non-profit partners. The accuracy of existing data will be verified with each municipality and updated on an annual basis to provide a complete Regional database of cycling networks.

CHAPTER 6

ROADS

6 Roads

6.1 Strategic Direction 4: Optimize road infrastructure and operation

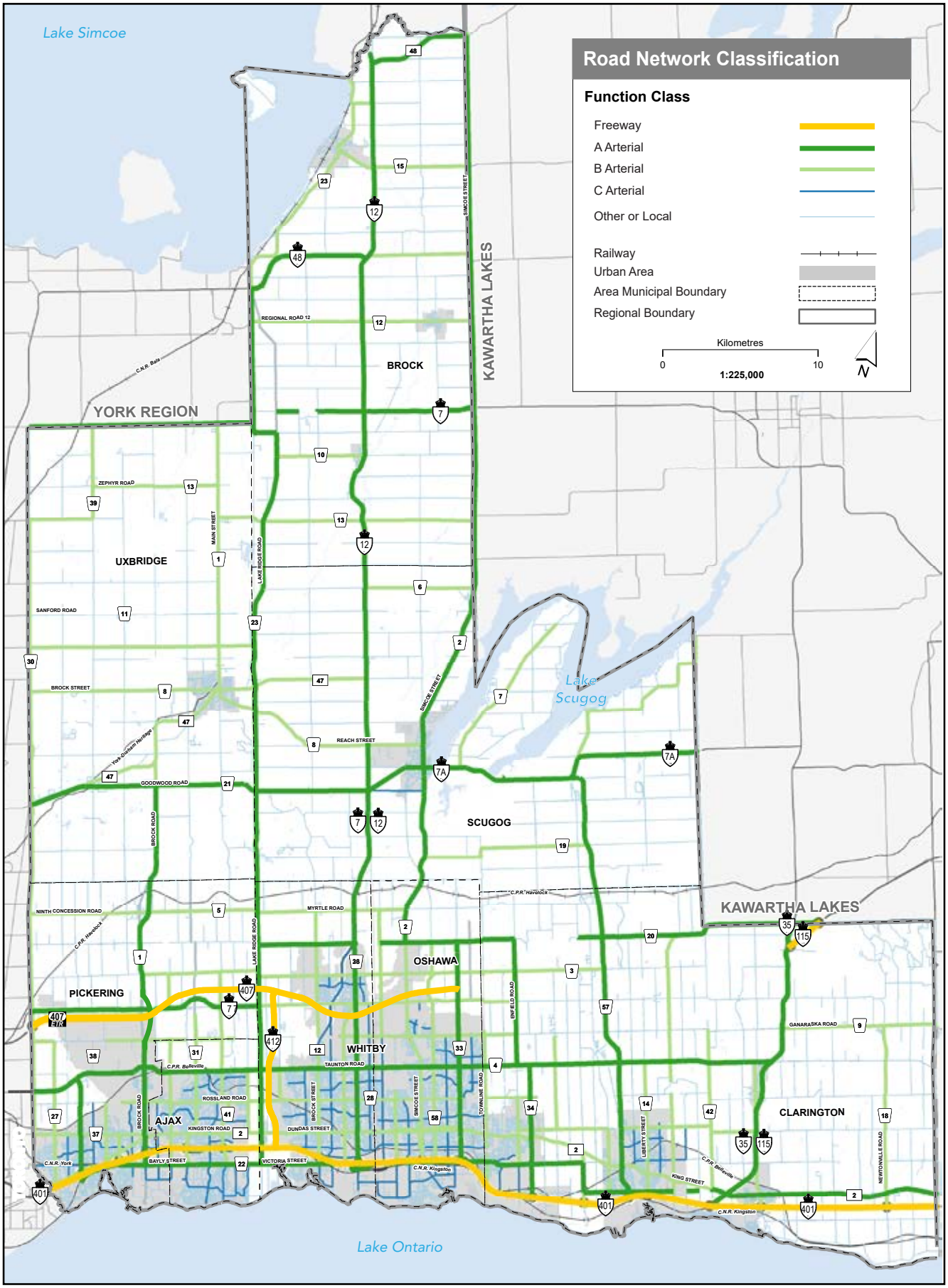
Durham Region will manage congestion levels through a proactive combination of capacity, design, and operational strategies that can reduce the impact of bottlenecks and discontinuities, improve safety for all road users, and be adaptive to climate change challenges. The use of "complete street" approaches can extract the maximum public benefit from road facilities. When integrated into street planning, design, construction, operation and maintenance processes, complete street concepts can improve the safety and comfort of all road users—especially pedestrians and cyclists, but also transit riders, car and truck drivers, and emergency service providers. A connected, efficient network of complete streets can create an optimal balance of mobility choices, while maintaining the integrity of emergency routes. The important role of Regional roads in serving public transit and enabling the movement of goods across the GTHA will be preserved through right-of-way allocation, operational prioritization, and advanced technologies.

6.2 Background

Durham Region has a well-developed road network that has supported growth and development in the Region over the last several decades. This network consists of highways, arterial roads, collector roads, and local roads that together provide for efficient movement across Durham Region as well as access to residences and businesses. The Durham Region Official Plan (ROP) is unique in that it designates a hierarchy of major roads, without regard for jurisdiction. The ROP recognizes four types of roads, namely Freeways, Type A, Type B and Type C arterials. Generally, but not exclusively, Type A and Type B arterials are the responsibility of the Region whereas Type C arterials may fall under the responsibility of either the Region or area municipalities. Lower-order roads, such as collector roads and local roads, are designated by the area municipality. Exhibit 6.1 illustrates the current road classification hierarchy.

The primary focus of the Transportation Master Plan is the arterial road network.

Exhibit 6.1: Existing Road Classification

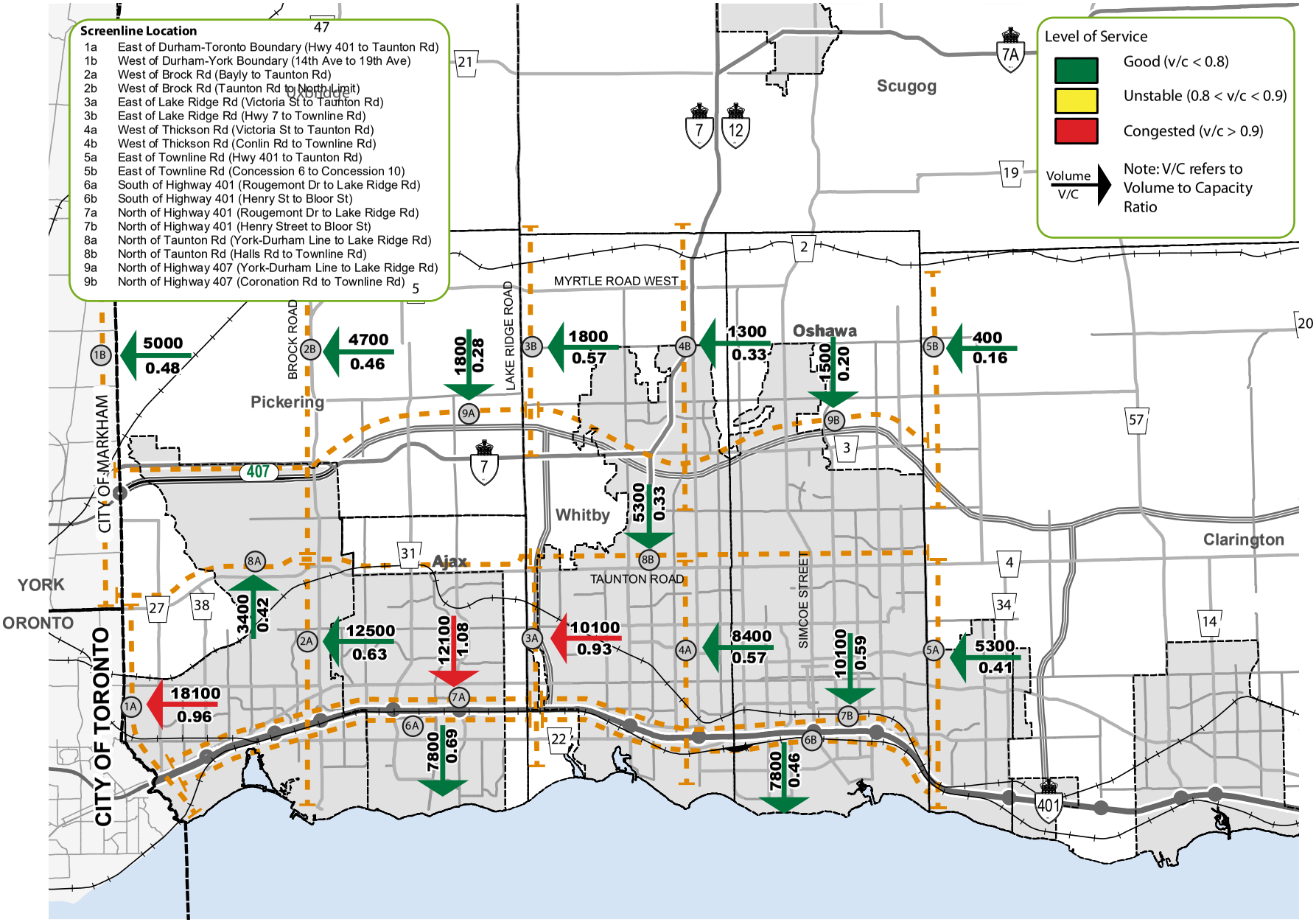


Overall, the arterial network in Durham performs reasonably well. This is in part a result of the policies that the Region has put in place to ensure a connected network and to manage access to Type A and B arterials. The major challenges are related to Highway 401, which experiences high levels of congestion in the westbound direction in the morning peak and eastbound direction in the afternoon peak. North-south roads that connect to Highway 401 and those that connect to GO Rail stations also experience high levels of congestion in both the morning and afternoon peaks.

Exhibit 6.2 and Exhibit 6.3 illustrate the existing (2011) overall level of service for roads crossing screenlines for the AM and PM peak hours, respectively. A screenline is usually defined as an imaginary line on one side of a roadway, or along a boundary or natural barrier. The screenline "level of service" takes into account all the roads that cross the screenline, grouping the demands and capacities of parallel roads, to assess the network at a broader scale. Modelling results show that even with the Highway 407 east extension completed, congestion will remain and, in some cases, increase under the "business as usual" 2031 Base Scenario.

It is also noteworthy that perceptions of congestion are increasing. Based on a public opinion survey conducted as part of the TMP, 79% of respondents feel that traffic congestion is a serious concern with 16% indicating it was their most important issue (compared to 13% for the same question in a similar survey conducted in 2000).

Exhibit 6.2: Road Network Performance – Existing Screenline Level of Service (AM Peak Hour)



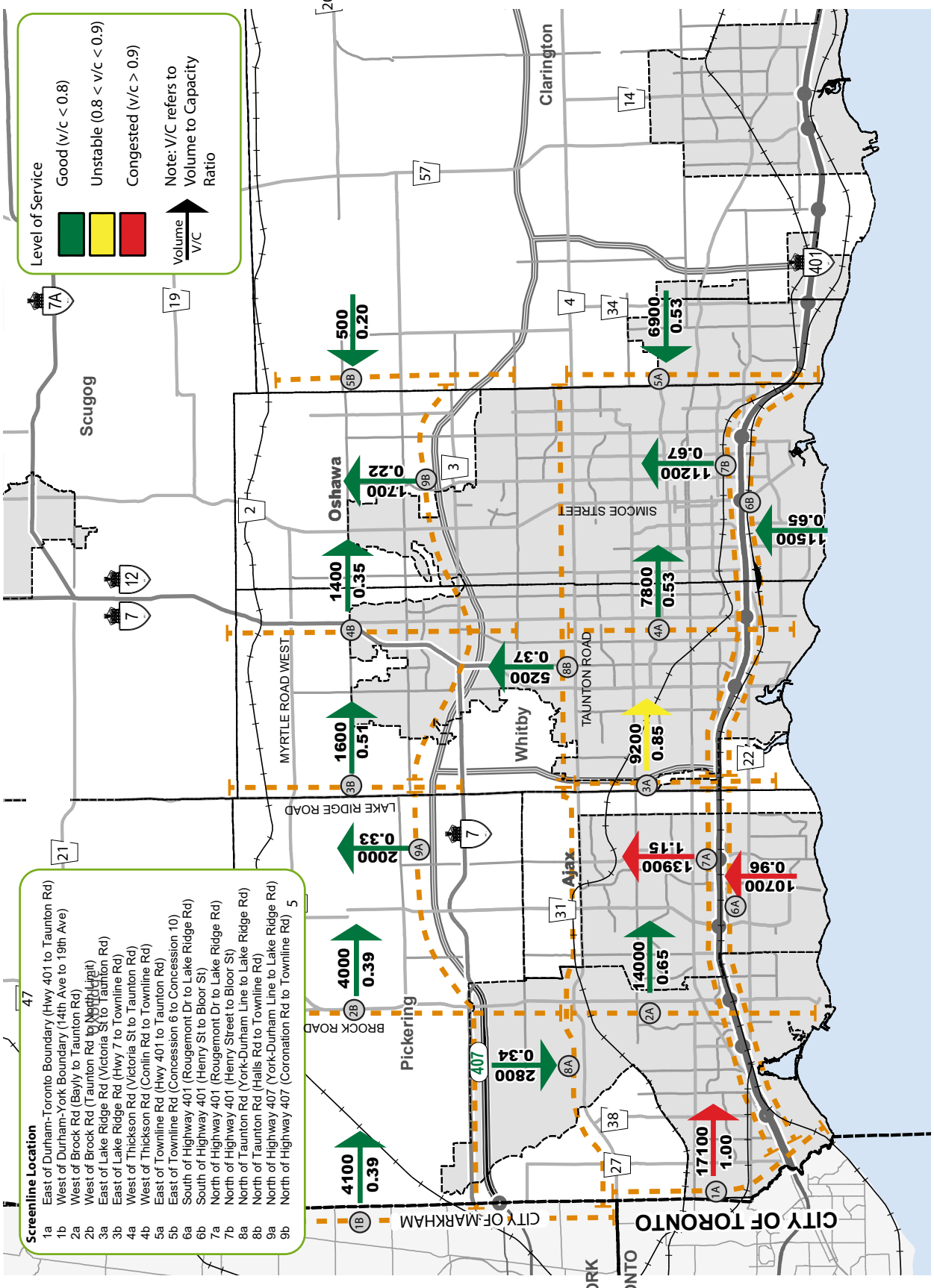


Exhibit 6.3: Road Network Performance – Existing Screenline Level of Service (PM Peak Hour)

6.3 Progress and Opportunities

Durham Region has been steadily making modifications to the road network. Between 2004 and 2015, the Region has added approximately 71 lane-km to its road network, the majority of which has come in the form of widening arterial roads. This represents a 4% increase in lane-km during this period.

Provincial highway expansion projects undertaken between 2004 and 2016 include:

- Highway 7 between Brock Road and Baldwin Street (widen from 2 to 4 lanes);
- Highway 401 between Westney Road and Salem Road (widen from 8 to 10 lanes);
- Highway 7/12 between Queen Street and north of Columbus Road (widen from 2 to 3 lanes);
- Passing lanes at several locations on Highway 7/12; and
- A new Highway 401 interchange at Stevenson Road and reconstruction of the Holt Road interchange.

A major change that has occurred since 2005 is the easterly extension of Highway 407. The extension of Highway 407 from Brock Road to Harmony Road and the new Highway 412 connecting Highway 407 to Highway 401 east of Lake Ridge Road was opened in June 2016 as part of the Highway 407 East Phase 1. Approximately 31 km in length, this new highway includes 10 new interchanges and a partial interchange at Lake Ridge Road on Highway 401 (Phase 1). These highways are owned by the Province and maintained by the 407 East Development Group. Work is proceeding by Blackbird Infrastructure Group on Phase 2 of Highway 407 East (from Harmony Road to Highway 35/115) and Highway 418 (a north-south highway from Highway 407 to Highway 401 in Clarington) which are to be constructed by 2020.

The 2017 Regional Road Program Capital Budget and Nine Year Forecast identifies a continued program of road network modifications to address existing network constraints as well as traffic from new growth areas. Road modifications identified in the nine year forecast would result in an additional 11% in lane-km added to the Regional network, which is lower than the rate of population growth. This is achievable and desirable, provided there are shifts to non-auto modes and better utilization of existing and planned roadways, consistent with the Directions of this TMP.

6.4 Goals and Actions

GOAL

REGIONAL ROADS WILL BE CONTINUOUS AND CONNECTED

6.4.1 ROAD CLASSIFICATION HIERARCHY

Road systems are typically classified according to a hierarchy which recognizes that different types of roads serve different purposes. A roadway hierarchy will typically reflect variations in design standards, flow characteristics, traffic volumes, traffic control, access control, vehicle type and abutting land uses.

As noted in Section 6.2, the Durham Region Official Plan (ROP) recognizes four types of roads: Freeways, Type A Arterials, Type B Arterials, and Type C Arterials. Lower-order roads, such as collector roads and local roads, are designated by the area municipalities.

Provincial Freeways are almost entirely flow-oriented and serve mostly longer distance trips. They provide access to and from major arterial roads. All freeways in Durham Region are generally owned and maintained by the Province, with the exception of Highway 407 west of Brock Road, which is operated and maintained by 407 ETR.

- Highway 401 is the primary east-west corridor through Durham Region, connecting southern Durham Region with Toronto and other GTHA municipalities to the west and Northumberland County and Eastern Ontario to the east.
- The extension of Highway 407 from Brock Road to Harmony Road and the new Highway 412 connecting Highway 407 to Highway 401 east of Lake Ridge Road add approximately 31 kilometres of highway to Durham's transportation network, including 10 new interchanges and a partial interchange at Highway 401/Lake Ridge Road.
- Highway 115 is constructed to a freeway standard north of the Highway 35/115 split in eastern Durham Region and provides links between the Region, Kawartha Lakes, and Peterborough.

Provincial Highways include Highway 7, Highway 7A, Highway 12, Highway 35/115 and Highway 48. These highways, which are owned and maintained by the province, are mostly classified in the ROP as Type A arterials because they provide a similar function to certain Regional roads.

- Highway 7 is an east-west corridor, connecting Durham Region with York Region to the west and the City of Kawartha Lakes to the east; the portion east of Highway 12 forms part of the Trans-Canada Highway (southern route) though Ontario.
- Highways 12 and 48 are north-south corridors and act as the primary transportation links between the northern and southern municipalities in Durham Region, and Highway 12 north of Highway 7 in the Township of Brock also forms part of the Trans-Canada Highway.
- Highways 7A and 35/115 originate in eastern Durham Region and provide links between Durham Region, Kawartha Lakes, and Peterborough.

Arterials serve both traffic flow and land access functions. They generally serve mid-distance traffic movements and distribute traffic to/from lower classification roads and to/from higher classification roads. The ROP designates three arterial subtypes, referred to as Type A, B, and C. Type A arterials are mostly flow-oriented with operating speeds of 70-80 km/h and right-of-way widths of 36-45 metres providing connections between the Durham Region municipalities and areas not served by provincial highways. Type B arterials are intended to move a lower volume of vehicles with operating speeds of 60-80 km/h and right-of-way widths of 30-36 metres. Type B arterials provide secondary connections through the southern municipalities and provide access to the urban areas and hamlets in northern Durham Region. Type C arterials are the most access-oriented with operating speeds of 50-60 km/h and right-of-way widths of 26-30 metres. Type C arterials are located only in the southern municipalities (with the exception of one Type C arterial in Scugog) and primarily within the designated urban areas.

Collector roads serve to collect traffic from local roads and distribute it to both major land developments and arterials. With few exceptions, these roads are owned and maintained by the area municipalities. **Local roads** are the most access-oriented class. These roads provide direct access to individual properties or developments and roads of a higher classification. As with collector roads, local roads are owned and maintained by the area municipalities.

The TMP provides an opportunity to update the current road classifications on a road segment basis. Potential changes were identified based on:

- Requests received from area municipalities to change designations, as identified through area municipal Official Plan review processes or TMPs;
- An analysis of road network capacity needs to support development beyond 2031 (see Background Report F: Road Network Development Report); and
- A review of draft and recently completed secondary plans.

Each road was examined to assess its role in serving network traffic needs, providing future transit service connections, and facilitating access to development areas. The review also took into account updated mapping of environmentally sensitive areas, the Greenbelt Plan and the Oak Ridges Moraine Conservation Plan Land Use Designation Map.

The results of this review and potential changes to the Schedule C – Road Network maps in the ROP are provided in Appendix A. Further technical information, including modelling results, is provided in Background Report F under separate cover.

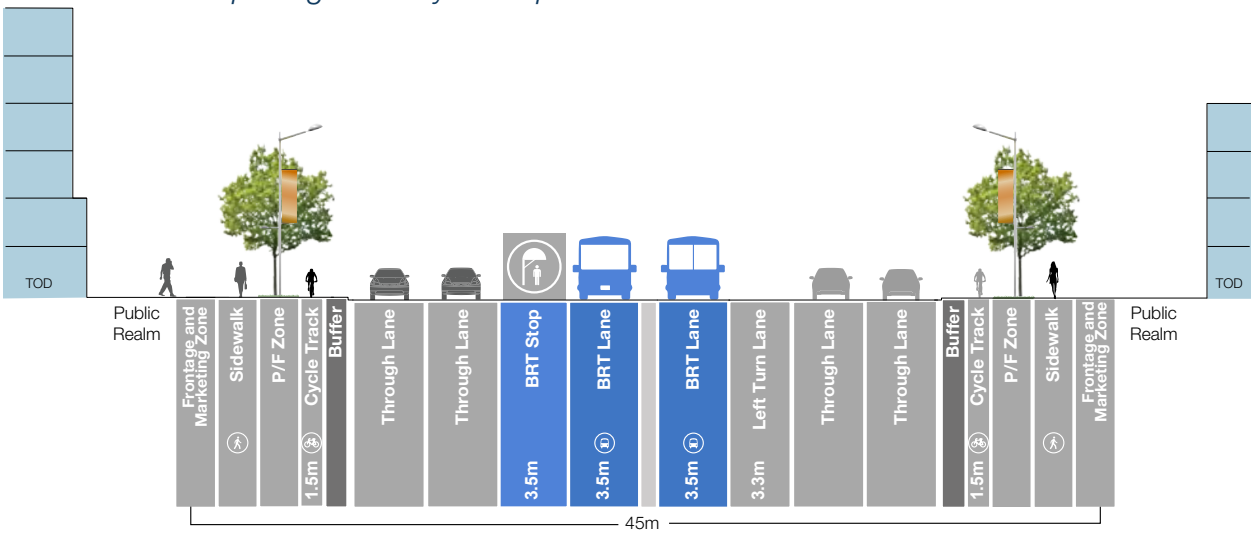
6.4.2 PROTECTING FOR RAPID TRANSIT

One of the key recommendations of the TMP is to implement a Higher-Order Transit network. The network, as described in Chapter 4, recommends classifications for transit including Rapid Transit; a High Frequency Network (HFN) of transit in HOV lanes and shared lanes; and Other Transit Spines.

While ROP policy states that Type A and B arterials may be used as transit spines, there are no specific criteria to ensure that sufficient right-of-way width is protected to accommodate rapid transit (policy 11.3.3 and Schedule E, Table E7). The current policy suggests that Type A arterials are 36-45 m in width, with the underlying assumption being that rapid transit corridors would be 45 m in width. For Type B arterials, the ROP indicates that “wider rights-of-way may be required to accommodate intersection improvements and other facilities such as transit, utilities, noise attenuation installation, bikeways and landscaping.” Since the two proposed dedicated Rapid Transit corridors on Highway 2 and Simcoe Street are on Type B arterials, it is important to strengthen policies to ensure sufficient right-of-way is protected through the ROP.

In order to ensure that sufficient right-of-way is protected for Rapid Transit and HFN routes in HOV lanes, it is recommended that a new designation for transit corridors be established in the ROP. This designation would be an overlay in addition to the arterial designation. The desirable right-of-way width for these corridors would be 45 m (except in older established neighbourhoods where right-of-way is generally limited and may include formally designated heritage districts). As shown below, this right-of-way accommodates median rapid transit, four travel lanes, and sidewalks and cycle tracks in the boulevard (or buffered on-road cycling lanes).

Exhibit 6.4: Example Right-of-way for Rapid Transit Corridors



6.4.3 REGIONAL ROAD DEFINITION

Under current policy, there is no formal definition of what constitutes a "Regional Road." In part, this is because the current arterial road classification is not constrained by jurisdiction.

Typically, Regional roads have the following features:

- Connection with Provincial and/or inter-regional network;
- Carries high volume of inter-municipal and/or Regional traffic;
- Attracts significantly higher volumes of traffic than adjacent roads;
- Higher level of access control;
- Supports Regional goods movement;
- Supports major transit route and/or planned rapid transit route;
- Supports Region-wide economic and growth objectives; and
- Does not affect corridor planning or planning of downtowns or mature urban areas.

6.4.4 RIGHT-OF-WAY PROTECTION

The ROP identifies minimum right-of-way widths for each type of arterial based on the number of lanes planned for the ultimate cross-section. However, the ultimate cross-section is based on network needs to 2031, making it difficult to acquire land for road needs beyond 2031 (the current TMP horizon).

It is recommended that a new schedule be included in the ROP which identifies ultimate right-of-way widths based on long term needs and intended road function. This would also serve to assist in acquiring land at the time of development applications on Rapid Transit corridors. Although actual right-of-way widths may be adjusted based on more detailed environmental assessments, heritage constraints or consideration for environmental conditions, a new schedule would provide a useful starting point. Consideration also needs to be given to ensuring sufficient right-of-way at intersections for right turn lanes, offset lefts, bus shelters, cycling facilities and other features, as well as accommodating sustainable stormwater management treatment and low-impact development measures.

6.4.5 CONNECTIVITY

The current road classification practice that designates Type C arterials is an effective mechanism for ensuring the connectivity of the road network. Additionally, the ROP includes policies that ensure that new communities are designed based on closely spaced grid networks that support transit and active transportation.

There are, however, occasional requests by area municipalities to remove selected Type C arterials from the ROP and their Official Plans. Examples include sections of Water Street in Whitby and Clements Road in Ajax. The basis for these requests vary, but may include environmental constraints, high costs to construct, design challenges or community impacts. One of the potential contributing factors is that criteria for Type C arterials are still reflective of an auto-oriented street environment (e.g., up to 20,000 AADT, design speed of 50-60 km/h).

It is in the Region's interest to protect for road connections to enable the efficient movement of goods and transit in anticipation of future land uses. However, in recognition of concerns regarding a limited number of future Type C road connections, it is recommended that future studies be undertaken to identify potential corridor design approaches that could retain future connectivity needs, while respecting local concerns about economic, social or environmental constraints. As an example, Water Street in Whitby could be maintained as a Type C arterial in the ROP with a special designation in the Whitby Official Plan that it be designed as a parkway-type road, with potential features to focus use on active transportation and transit. Similarly, Clements Road in Ajax could be given a special designation that results in more cost-effective and environmentally-sensitive designs.

Such policies should not undermine the overall integrity of the Regional road network.

Several of the proposed network improvements beyond 2031 require additional and more detailed assessment to confirm feasibility and better define capital costs due to unusal engineering issues and/or environmental impacts. Feasibility studies should be completed for these road links:

- Extending Ravenshoe Road easterly to Highway 7 at Highway 12, currently designated as a Type A Arterial;
- Clements Road connection across Duffins Creek, currently designated as a Type C Arterial;
- The connection of the Consumers Drive extension from Thornton Road to Laval Street / Fox Street, proposed for designation as a Type C Arterial;
- Extending Shirley Road westerly between Simcoe Street and Highway 7/12, proposed for designation as a Type B Arterial; and
- Courtice Road connection to Enfield Road at Taunton Road, currently designated as a Type A Arterial.

ACTIONS

The following actions are recommended to support the goal of a continuous and connected Regional road network:

46. Update Schedule E – Table E7 of the Regional Official Plan to include new criteria for Type "T" arterials that correspond to the Rapid Transit network and High Frequency Bus in HOV lane corridors. The Type "T" designation would be applied in addition to the base arterial road classification. The desirable right-of-way width for these corridors would be 45 metres, except in constrained built-up/heritage areas. Specific characteristics will be defined through the Arterial Corridor Guidelines.
47. Update Schedule C - Map C1 and Map C2 of the Regional Official Plan to include recommended network changes identified in the TMP.
48. Advise the area municipalities of the network changes recommended through the TMP regarding the designation of specific arterial roads.
49. Introduce a new Future Regional Road Right-of-Way Protection schedule to the Regional Official Plan, specifying ultimate right-of-way widths that can be acquired under the Planning Act through development applications. This map will generally be based on needs beyond 2031 and may be refined through future study.
50. In coordination with the area municipalities, undertake feasibility studies for the following road links: Ravenshoe Road extension to Highway 7 at Highway 12, Clements Road Connection across Duffins Creek, Consumers Drive extension connection to Laval Drive, Shirley Road extension and Courtice/Enfield Road connection.

GOAL

REGIONAL ROADS WILL SERVE ALL MODES AND USERS

6.4.6 COMPLETE STREETS

The concept of complete streets is a framework for balancing the multiple roles of roads, and ensuring the best possible outcome to their management as a public resource. A complete street accommodates all of its expected functions and serves all of the people who use it throughout the course of a day. Complete streets often require customized designs, because different streets have different functions, users and contexts. The overriding principle of complete streets is to offer safety, comfort and convenience to all users (i.e. pedestrians, cyclists, transit riders and motorists) regardless of their age or ability. However, the consideration given to different users will vary by location. For example, rapid transit corridors may prioritize space for transit vehicles and design treatments to ensure safe and convenient access to transit stops, whereas other corridors may place an emphasis on providing space for cyclists.

While Durham Region has no explicit policies or guidelines addressing complete streets, a number of current policy statements are consistent with complete streets principles. These can be found in the ROP, the 2003 TMP and the 2007 Arterial Corridor Guidelines.

The ROP also prioritizes transit and pedestrian modes in several areas. For example, Policy 8.2.1 ensures that planning and development in Urban Areas shall provide linkages for pedestrians and cyclists, and develop a transit-supportive grid pattern of roads. Policy 8A.1.2 states that Centres shall be developed using urban design that favours pedestrian traffic and public transit and Policy 11.3.22 states that the Region will implement a Regional Cycling Plan that establishes an on-road cycling network, among other objectives.

The Arterial Corridor Guidelines are consistent with the intent of the ROP in recognizing that arterials in Durham Region must be shared by all modes.

Building on the existing policy framework, there are a number of ways the Region can support the acceleration of implementation of complete streets. This requires setting an overall vision (as articulated by the strategic Directions of this TMP), influencing the decision process for the planning and design of roads, evolving operating and maintenance practices and setting performance measures to monitor outcomes. The successful creation of complete streets is as much a result of effective processes and an outcome of a community's desire, as it is a product of design standards and engineering tools.

6.4.7 MULTI-MODAL LEVELS OF SERVICE

Traditionally, road network decisions are focused on performance measures based on automobile level of service. An emerging best practice is to measure level of service for all modes including pedestrians, cyclists, transit riders, and goods movement vehicles, in addition to automobiles. As a decision-making tool, multi-modal levels of service (MMLOS) helps to allocate street rights-of-way based on trade-offs among different users, monitor network performance, identify problem areas, and understand the impacts that changes could have on one mode versus another. MMLOS provides a structured framework to inform the evaluation of alternatives, and project prioritization when considering investments that impact different modes, such as replacing traffic lanes with transit-only lanes.

MMLOS performance measures can also be used to evaluate and approve transportation impact studies (TIS) for new development and as such be encouraged or required as part of the TIS process. Currently, the Region's TIS Guidelines reference the need to examine all modes, but do not include an explicit requirement to measure level of service for all modes.

There are several approaches for quantifying MMLOS. One approach is outlined in the Highway Capacity Manual[8] which is a default approach. However, several municipalities, including the City of Ottawa, have adopted more simplified approaches which better reflect on the ground experience and perceptions of pedestrians and cyclists. The general intent of this approach is shown on Exhibit 6.4. For each mode, there are a number of easily quantifiable indicators to represent LOS. For example, pedestrian LOS considers operating speed of adjacent roadway, sidewalk width, boulevard width, adjacent traffic volumes and on-street parking for segments. Indicators for intersections include exposure to traffic (e.g., distance to cross) and crossing delay. The Ottawa approach could be easily adapted for Durham.

In further developing the approach, it will be important to outline specific thresholds or expectations for LOS by mode by corridor or context. For example, high frequency transit corridors may call for a higher LOS for transit than lower density or rural corridors. Similarly, corridors identified on the Primary Cycling Network may warrant higher LOS for cycling.

Further work will be required to refine the framework, confirm specific indicators and methods to measure MMLOS, and educate and train staff on the concept. Exhibit 6.5 provides a list of potential performance measures that the Region could consider.

8 TRB Publications. (2010). HCM2010: Highway Capacity Manual, 5th Edition. Transportation Research Board [TRB]

Exhibit 6.5: MMLOS Concept

MODE	ELEMENT	LEVEL OF SERVICE	
		GOOD ←	→ POOR
Pedestrians (PLOS)	Segments	*High level of comfort*	*Low level of comfort*
	Intersections	*Short delay, high level of comfort, low risk*	*Long delay, low level of comfort, high risk*
Bicycles (BLOS)	Segments	*High level of comfort*	*Low level of comfort*
	Intersections	*Low level of risk / stress*	*High level of risk / stress*
Trucks (TkLOS)	Segments	*Unimpeded movement*	*Impeded movement*
	Intersections	*Unimpeded movement / short delay*	*Impeded movement / long delay*
Transit (TLOS)	Segments	*High level of reliability*	*Low level of reliability*
	Intersections	*Short delay*	*Long delay*
Vehicles (LOS)	Intersections	*Low lane utilization*	*High lane utilization*

6.4.8 ARTERIAL ROAD DESIGN

Durham Region's Arterial Corridor Guidelines (2007) serve to inform the planning, design and construction of features within and abutting the public road right-of-way. The guidelines provide a toolbox of potential strategies and common reference points to be applied in the planning and design of arterial road corridors by the Region of Durham, the area municipalities, the public and other interested parties.

Although the Arterial Corridor Guidelines are still very much relevant, design practices have evolved and there are now several best practices that are not reflected in the guidelines. Notably, the guidelines were prepared prior to the adoption of the Provincial Integrated Accessibility Standards (Ontario Regulation 191/11). Additionally, there have been significant advancements in the design and types of bicycle facilities, including separated bike lanes and cycle tracks, which are not detailed in the Region's current guidelines. A key development is the publication of updated Ontario Traffic Manual documents for cycling (OTM Book 18) and pedestrians (OTM Book 15).

An update to the Arterial Corridor Guidelines will be released as a separate document. This update includes new guidance on a number of issues including lane widths, provision of cycling facilities and intersection spacing to facilitate pedestrian crossings on Higher-Order Transit corridors.

6.4.9 PAVED SHOULDERS

Paved shoulders refer to the additional strip of hard surface next to the travelled lanes on rural road cross-sections, with generally a minimum width of 1.0-1.5 metres with gravel shoulder beyond this. Paved shoulders provide significant benefits, including the following:[9]

- Provides space for emergency manoeuvres and serves as a refuge area for vehicles in the case of a collision;
- Can reduce various types of collisions including run-off-the road, sideswipe and head-on collisions;
- Improves safety for pedestrians and cyclists;
- Supports pedestrian access in rural areas, particularly through rural hamlets with residential and other land uses;
- Provides additional operating space for heavy vehicles, particularly those used for agricultural operations, or those with oversized loads;
- Contributes to reduced operating costs through improved ease of maintenance (reduced re-grading, re-gravelling and wash-out repairs);
- Improves lateral roadway support and roadway drainage, which extends pavement life; and
- Reduces gravel being swept onto paved roadways at gravel driveways. Gravel on the roadway is a safety concern as it can cause skidding and loss of control.

There are additional capital costs associated with the provision of paved shoulders. Cost estimates to provide paved shoulders as part of a road reconstruction project is in the range of 3-4% (about $67,500 to $78,750+ per each metre of width added to a one kilometre section of roadway, depending on the project type). Retrofitting paved shoulders to existing roads can be significantly more expensive than when they are implemented as part of a capital or rehabilitation project, depending on the available base, existing gravel shoulder width, extent of grading, and/or property requirements.

However, studies have shown that the additional capital cost of paving shoulders can be outweighed by the benefits of reduced collisions.[10] Many studies have examined the safety impacts of shoulder modifications, including the following:

9 Incorporating On-Road Bicycle Networks into Resurfacing Projects. FHWA. (2016) Available online: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/resurfacing_workbook.pdf

10 Ogden, K. W. (1997). The effects of paved shoulders on accidents on rural highways. Accident Analysis & Prevention, 29(3), 353-362.

- A study of the impacts of highway shoulders in Illinois found that paving shoulders on rural multilane roads reduced the percentage of shoulder-related crashes by the following amounts: fatal collisions by 19-22%; injury collisions by 0-3%; property damage only collisions by 18-20%.[11]
- A study of the impacts of providing composite shoulders on rural two-lane highways in Kansas found that upgrading narrow unpaved shoulders to composite shoulders can reduce shoulder related crashes by up to 61% and fatal and injury crashes by 31%.[12]
- A cross-sectional study of shoulder modifications in Minnesota found that upgrading a gravel shoulder to a paved shoulder with rumble strips along 7 segments of roadway resulted in a drop in the average crash rate from 1.6 crashes per million vehicle miles in the before period to 1.0 in the after, a reduction of 37%.[13]

In recognition of the importance of these links, a paved shoulder policy is proposed that recommends implementing paved shoulders as part of all future new construction, rehabilitation and resurfacing projects on rural Regional roads where it is technically and economically feasible to do so, as determined through an engineering assessment. The paved shoulder width would typically be in the range of 1.2-1.5 m (excluding rumble strip, if present). Additional information on paved shoulders, including benefits and examples of criteria for application and widths, is provided in Background Report F: Road Network Development Report.

The Region's current practice is to pave a 0.5 m width of the granular shoulder (excluding rumble strip, if present) on most rural Regional roads, and to fully pave the shoulder in front of guard rail installations and on steep grades to assist with pavement stability and shoulder maintenance. With the recommended application of wider paved shoulders on most rural Regional road projects, there will be a need to develop new standards for shoulder design and construction.

11 Bamzai, R., Lee, Y., & Li, Z. (2011). Safety impacts of highway shoulder attributes in Illinois. FHWA-ICT-11-078.

12 Li, Z., Kepaptsoglou, K., Lee, Y., Patel, H., Liu, Y., & Kim, H. G. (2013). Safety effects of shoulder paving for rural and urban interstate, multilane, and two-lane highways. Journal of Transportation Engineering, 139(10), 1010-1019.

13 Pitale, J. T., Shankwitz, C., Preston, H., & Barry, M. (2009). Benefit: Cost Analysis of In-Vehicle Technologies and Infrastructure Modifications as a Means to Prevent Crashes Along Curves and Shoulders.

ACTIONS

The following actions are recommended to support the goal of Regional roads serving all modes and users:

51. Apply a complete streets approach for road planning, design, operation and maintenance, where a complete streets approach includes consideration of the needs of all travel modes as appropriate and feasible within the context of each project.
52. Develop a formal framework and use Multi-modal Level of Service (MMLOS) approaches to assess road designs and allocate right-of-way, and promote the use of this concept for transportation impact studies submitted as part of development applications.
53. Update and adopt the Arterial Corridor Guidelines, to reflect complete streets principles and recent best practices for design, particularly for transit and cycling facilities.
54. Encourage and support efforts by area municipalities to develop and adopt complete streets policies.
55. Provide paved shoulders as part of all future rural Regional road construction, rehabilitation and resurfacing projects, except where an engineering assessment determines that it is not technically and economically feasible to do so. Develop and adopt Regional standards for the design and construction of paved shoulders on rural Regional roads.

GOAL

REGIONAL ROADS WILL GROW WITH THE REGION

Durham Region's road network plays an important role in providing for daily movement of residents, workers and visitors around Durham. A well-functioning road network is critical to economic growth and competitiveness. As outlined in Chapter 2, Durham Region's population and employment is projected to grow substantially over the next two decades and it is appropriate that the road network is expanded in an environmentally, socially and fiscally sustainable manner to accommodate this growth.

6.4.10 NETWORK EXPANSION TO SERVE GROWTH TO 2031

The development of the proposed 2031 Regional road network takes into account projected traffic demand, as well as other considerations such as providing access to new development. Projected volume to capacity ratios for each road link were examined for the base scenario, and typically a threshold of 0.9 was used to flag potential road expansion requirements. Various plans, including area municipal TMPs and Official Plans also informed the proposed road network.

The resulting road network and mobility improvement projects are identified on Maps 4a and 4b. The description, rationale, anticipated timing and estimated cost for these proposed projects are outlined in Appendix C. These projects comprise road widening projects, construction of new alignments and construction of new structures such as bridges or grade separations.

It should be noted that road expansion projects identified in the proposed road network are subject to further review to confirm issues related to constructability, environmental constraints or other physical constraints. These issues will be considered further through Environmental Assessments as discussed in Chapter 1.

6.4.11 ROAD NEEDS BEYOND 2031

In addition to identifying modifications to address the Region's transportation needs to the 2031 horizon year, a forward looking view of potential infrastructure needs beyond 2031 was undertaken. The Regional Official Plan includes 2031 population and employment forecasts consistent with the Provincial Growth Plan. However, the 2014 Provincial Policy Statement allows for long-term planning for infrastructure beyond a 20-year horizon (Policy 1.1.2). With the next municipal comprehensive review of the ROP set to launch in 2018, that will extend its horizon year to 2041, the identification of long-term networks beyond 2031 through the TMP Update is not only prudent but necessary.

The Durham Region Transportation Planning Model was used to forecast projected auto and transit demands and resultant network performance based on 2056 forecasts developed through the Growing Durham study. An analysis of network connectivity for future growth areas was also completed. The resulting recommended road network modifications beyond 2031 are illustrated in Maps 5a (Durham Region), 5b (Southern Enlargement) and Appendix C. It should be noted that these modifications are based on Regional transportation needs regardless of current road jurisdiction. Transit-related modifications beyond 2031 are already illustrated on Maps 1a and 1b where rights-of-way on specific corridors should be protected for future Rapid Transit or HOV lanes.

6.4.12 PROVINCIAL FREEWAYS AND OTHER ROAD CONNECTIONS

Provincial freeways are a major part of Durham's transportation system for both the movement of people and goods within Durham Region as well as connecting Durham Region to the rest of the GTHA, province and national highway system. The recently completed and under construction extensions of Highways 407, 412 and 418 add significantly to the overall capacity of the Provincial freeway network. However forecasts show that Highway 401 will still be congested under any future scenario in the absence of additional widening. Accordingly, MTO has identified the need to widen Highway 401 from Brock Road easterly as follows:

- From 10 to 12 lanes from Brock Road to Highway 412, which will include the easterly extension of the Express-Collector system;
- From 6 to 10 lanes from Highway 412 to Liberty Street; and
- From 6 to 8 lanes from Liberty Street to Highway 35/115.

Additionally, improving connectivity to the Provincial highway system by constructing selected new interchanges will help reduce pressure on the Regional road network while facilitating better access for major employment uses. Several interchanges are also sub-standard in terms of their design and are recommended for major improvements. Proposed new interchanges and interchange modifications are shown on Map 4. Given the importance of these corridor and interchange modifications, they are considered a top priority for the Region.

Roads parallel to freeways provide redundancy to the freeway network and should be protected for Emergency Detour Routes (EDR). Currently, an EDR for Highway 401 through Durham Region is in place with signage to guide motorists in the event of an unplanned highway closure. A similar detour routing system should be implemented for Highways 407, 412 and 418.

Modifications to the road systems of other jurisdictions beyond Durham's boundaries are equally critical. Both the City of Toronto and York Region are projected to grow rapidly over the next two decades, yet there are limited options to expand capacity in the south across the Durham/Toronto and Durham/York boundaries. The planned widening of Steeles Avenue, supported by York Region's TMP and the development of the Seaton community, is therefore a critical transportation investment.

Consistent with the recommended approach for Regional road corridor evolution, consideration should be given to designating High Occupancy Vehicle (HOV) lanes on congested sections of Provincial freeways. The potential for these lanes to improve travel times for transit and HOVs was demonstrated during the 2015 Pan Am/Parapan Am Games when temporary HOV lanes were in effect.

6.4.13 ASSET MANAGEMENT

Existing infrastructure requires ongoing maintenance and rehabilitation to ensure safe operations and maximize expected useful life. Cities across North America are facing financial challenges to balance competing needs between expanding the transportation system to meet growth and managing existing assets.

The Region has a comprehensive, coordinated program of on-going preventative maintenance and timely rehabilitation for Regional road infrastructure. Based on the annual State of Infrastructure – Roads reports, over the next decade, Durham will face increasing financial pressure not only to address transportation infrastructure needs to meet future demand, but to maintain existing assets as they age and reach their useful life span.

As guided by the Region's Asset Management Report, strategic asset management of transportation infrastructure can help make informed decisions about how to best allocate limited resources. It reduces the potential for unscheduled repairs and service interruptions, as well as more expensive investments in rehabilitation and replacement.

With the planned expansion of cycling facilities on Regional roads that comprise the PCN, additional effort is required to ensure that this infrastructure is accounted for when setting operating budgets and asset management plans. Responsibilities for the Region and area municipalities should be clearly articulated for their maintenance and rehabilitation.

ACTIONS

The following actions are recommended to support Regional roads that grow with the Region:

56. Subject to annual review through the Asset Management and Transportation Servicing and Financing Studies, and approval of the related budgets, continue to develop and maintain the Regional road network in a manner that ensures a safe, connective and sustainable network.
57. Petition the Ministry of Transportation to improve the capacity of Highway 401 through widening, upgrading existing interchanges identified on Maps 4a and 4b, and implementing HOV lanes.
58. Petition the Ministry of Transportation to implement the future freeway interchanges in Durham Region, as identified on Maps 4a and 4b.
59. Work with the Ministry of Transportation to establish Emergency Detour Routes for Highways 35/115, 407, 412 and 418 that identify suitable alternative routes in the event of an unplanned freeway closure.
60. Work with the Region of York and City of Toronto to accelerate the widening of Steeles Avenue for vehicular, transit and HOV capacity.
61. Continue to support a transportation asset management program that enables the existing and future transportation infrastructure to be maintained in a state of good repair and optimize rehabilitation investments, while not compromising on safety and level of service.

GOAL

ROAD OPERATIONS WILL SUPPORT
A BETTER QUALITY OF LIFE

6.4.14 ROAD SAFETY

Road safety is a fundamental objective of all road authorities. Motor vehicle collisions result in financial loss, pain and suffering, and sometimes loss of life. They are also a major cause of traffic congestion and economic impacts for the broader community.

The approach of targeting known road safety concerns with reactive counter-measures has proven successful. However, more effort is still needed to address driver behaviour, particularly given the widespread unsafe practice of texting while driving. Developing new initiatives and continuing existing programs, like Road Watch, Save a Life and RIDE, co-operatively with the Durham Regional Police Service and other stakeholders help to make drivers more aware of their actions.

The observance and application of appropriate warrants and criteria for the installation of traffic control devices can also help to promote a safer operating environment for all road users. Inappropriate or poorly placed measures like traffic control signals, speed zones and turn restrictions contribute to driver frustration and violation of the devices, in addition to gridlock. New and emerging techniques have a role to play in improving road safety.

In early 2017, the Region initiated work to develop a **Strategic Road Safety Action Plan.** Consistent with a safety-conscious planning philosophy, the plan will feature actions to:

- Co-ordinate and integrate broad-based safety programs;
- Develop processes to ensure that major safety problems are identified and addressed;
- Consider safety early and explicitly for all transportation programs and projects, through processes like Road Safety Audits;
- Identify safety needs of special and vulnerable user groups, such as pedestrians and cyclists;
- Ensure routine maintenance and operation of the safety measures and other infrastructure elements; and
- Market the program to the community and stakeholders to encourage their involvement from the start.

6.4.15 INTERSECTION MODIFICATIONS

Building on the recommendations of the 2005 TMP, the Region continues to identify and program intersection modifications that can address safety concerns, congestion hot spots, or reduce neighbourhood traffic infiltration. It is recommended that this important and effective program of road safety and operational modifications be continued. The list of proposed intersection modification locations, based on the Region's 2017 Regional Road Capital Budget and Nine Year Forecast, is summarized in Appendix B and will be updated and extended on a regular basis. Implementation of these projects will be subject to annual review and approval through the Transportation Servicing and Financing Study and the Regional Road Program Capital Budget and Nine Year Forecast.

6.4.16 RAIL GRADE SEPARATIONS

Within Durham Region there are some 156 road-rail grade crossings, of which 20 are on Regional roads. Efforts to eliminate level rail crossings and at-grade road intersections at locations with high traffic volumes and collision histories should be pursued where warranted. A preliminary assessment of at-grade crossings warranting grade separation has flagged the following locations as requiring grade separation by 2031:

- Bloor Street East, west of Grandview Street South;
- Altona Road, north of Finch Avenue;
- Hopkins Street, south of Nichol Avenue;
- Whites Road, between Finch Avenue and Concession Road 3; and
- Thornton Road, south of Gibb Street.

6.4.17 TRANSPORTATION SYSTEM MANAGEMENT

Transportation system management solutions can offer substantial, benefits and gains in operational efficiency, such as:

- Smoother traffic flow and reduced congestion;
- Reduced fuel consumption and vehicle emissions;
- Reduced user costs for fuel and vehicle maintenance;
- Potential for fewer accidents and lower related costs; and
- Delay to the need for costly road expansion.

These apply to all modes including transit vehicles.

Transportation system management goes hand in hand with Intelligent Transportation Systems (ITS) solutions. ITS includes a broad range of diverse and emerging technologies that can make the transportation system safer and more efficient, reliable and environmentally friendly, minimizing the scope of physical changes to existing infrastructure.

The Region's ITS Strategic Plan has identified the needs and developed plans for the application of advanced technologies to the Regional multi-modal transportation system. This plan includes recommendations in a number of areas including monitoring and managing traffic flow, detecting and clearing incidents, providing travellers with real-time road, traffic and transit information, and optimizing the operational effectiveness of existing transportation infrastructure. This plan was last updated in 2012 and will be reviewed again in 2018.

Looking to the future, the next generation of transportation systems management will need to address and leverage emerging technologies such as connected vehicles and autonomous vehicles. These types of vehicles, combined with smart phone technology, offer the potential to completely transform mobility.

6.4.18 ACCESS MANAGEMENT

Access management is generally defined as the systematic control of the location, spacing, design and operation of driveways, raised centre median openings, interchanges and street connections to a roadway. Effective access management is essential to maximizing the safety and efficiency of arterial road operations. At present, there are a number of high level existing policies on access management in the ROP, including 8A.1.5 (b) which speaks to the consolidation of driveways and policy 8B.2.3 (b) (i) which promotes the concentration of commercial uses into Centres and Corridors, with particular emphasis on common internal traffic circulation and restricted access to arterial roads by means of service or collector roads, wherever possible. The ROP also includes policies on minimum intersection spacing and on-street parking provision. The Arterial Corridor Guidelines also include direction on the frequency of intersections and mid-block access.

While existing policies provide high level guidance, there is a need to develop a more comprehensive and formalized access management policy. Such a policy would include a decision-making process that seeks to maintain and optimize mobility, safety and Level of Service on the arterial road network. The policy would also have regard to land use and urban design objectives when applying access management principles, and include a framework for making trade-offs.

6.4.19 NEIGHBOURHOOD TRAFFIC MANAGEMENT

Motor vehicle use in neighbourhoods can have undesirable effects including excessive traffic volumes and speeds, aggressive driver behaviour and the creation of hostile conditions for walking and cycling. The Regional arterial network and road classification hierarchy is designed to preserve neighbourhood quality of life by mitigating these problems in a way that addresses the needs of residents and businesses, while also respecting the obligations, rights and desires of road users. However, there still remain areas where traffic management is an issue, particularly in smaller hamlets and villages where a Regional road serves both through traffic needs and a main street function.

To this end, the Region has prepared a Traffic Management Guide for Hamlets. The purpose of the guide is to provide information and guidance on the process and techniques available to address traffic issues on Regional roads within hamlets and other built-up rural areas in Durham Region. The procedures may also be appropriate for Regional roads within: the six small urban areas designated in the ROP (i.e. Beaverton, Cannington, Orono, Port Perry, Sunderland and Uxbridge); smaller, rural settlements not explicitly identified in the ROP (e.g., Saintfield, Blackwater, Vallentyne); and urban fringe areas.

6.4.20 AIR QUALITY

Improvements in vehicle technologies have greatly reduced emissions of critical air contaminants. Ontario's 2014 Air Quality Report shows that air quality has improved significantly over the past 10 years, especially for nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and carbon monoxide (CO) – pollutants emitted by vehicles, as well as fine particulate matter (PM2.5). Emissions of nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and carbon monoxide (CO) are all down by more than 40% since 2004. As there is no acceptable level of exposure, there is still a significant concern because of the health impacts from local traffic related air pollution.

Historically in Durham air quality assessments have been undertaken for some road and transportation projects as part of Phase 3 of the Municipal Class EA process. These air quality studies look at the effects of the individual project on air quality, in comparison to background conditions.

Given that this TMP has recommended a preferred solution that focuses on improving mode shares for transit, walking and cycling, and whereas transportation emissions are projected to have a downward trend despite the projected increase in the number of vehicles, it is recommended that air quality assessments not be undertaken for individual transportation projects. The Region will work with the Ministry of the Environment and Climate Change to confirm this recommended approach.

6.4.21 NATURAL HERITAGE SYSTEM

The focus of the TMP has been to optimize the use of the existing system, limiting the need for new infrastructure, especially in greenfield areas. The proposed road network aims to protect the Natural Heritage System for road reconstruction or widening projects by first avoiding impacts if possible, then minimizing, mitigating, and finally compensating for impacts to the Natural Heritage System.

6.4.22 DRAINAGE

There is growing concern over environmental issues related to road drainage and its impacts on receiving bodies of water, vegetation, soils and wildlife. Environment Canada has identified potentially harmful environmental effects related to road salt run-off. Other substances contained in road drainage and the erosion effects of unchecked water volumes also pose significant concerns.

Increasingly, the severity of storms brought on by climate change is impacting the need for improved drainage and future-proofing infrastructure. Climate change mitigation and adaptation programs are presented in Section 2.3.6.

Identifying “state-of-the-art” and “best management” practices that the Region can use to mitigate the impacts of stormwater run-off is a key priority. There is also a need to improve clarity on the role and responsibility of the Regional road storm drainage system in accommodating flows from adjacent development, and identifying opportunities for integrating systems.

6.4.23 LOW IMPACT DEVELOPMENT

Low Impact Development (LID) is a design approach to managing stormwater run-off on-site by using landscape features to replicate natural watershed functions. The goal of LID is to mimic predevelopment hydrology by using design techniques that infiltrate, filter, store and detain runoff at or near its source such as pervious pavements, bioswales, and tree planting techniques. The Durham Community Climate Adaptation Plan speaks to the Region implementing LID techniques, green infrastructure and programs to help reduce impervious surfaces, as well as working with area municipalities to implement LIDs through site plan controls.

6.4.24 NOISE

The effect of noise from the use of transportation facilities has a significant impact on liveability and health. As development intensifies along Regional road corridors, the number of people exposed to road-related noise will increase. Traditional approaches to mitigate noise impacts are to construct noise attenuation barriers; however, such barriers are not compatible with the type of urban form that is desired for urban areas and transit corridors. Reducing speeds can also reduce traffic noise.

The Durham Region Traffic Noise Attenuation Policy outlines policies for the installation and maintenance of noise attenuation barriers associated with the expansion of Regional roads.

6.4.25 ROADWAY LIGHTING

Roadway lighting, when properly designed, installed, and maintained reduces vehicle collisions, improves safety for cyclists and pedestrians, and enhances personal security.

Area municipalities in Durham Region are responsible for installation, operation and maintenance of all illumination on Regional roads in urbanized areas. The Region takes responsibility for illumination of isolated intersections on Regional roads in rural areas.

As part of this TMP, a review of current practice was undertaken. A summary of the review is included in Background Report D: Current Policy and Practice Review.

The review concluded that, while there may be some benefit to harmonizing the standards that guide the design and installation of roadway lighting, there is no strong rationale to implement changes to jurisdiction.

ACTIONS

The following actions are recommended to support the goal of road operations supporting a better quality of life:

62. Develop and implement a Strategic Road Safety Action Plan which will focus on reducing fatalities and personal injury collisions, promoting safer walking and cycling and reducing the number of intersection-related collisions.
63. Work with the Durham Regional Police Service and other stakeholders to reinforce the benefits of safe driving and to combat distracted and impaired driving.
64. Continue to implement intersection modifications on an annual basis to reduce congestion due to bottlenecks and improve safety for all users.
65. Engage the railway companies proactively to gain their support, including financial, for improving the safety of railway crossings of Regional roads, including construction of grade separations where conflict warrants have been established.
66. Address and leverage existing and emerging cost-effective technologies, such as connected vehicles, autonomous vehicles and smart phone technology, in transportation systems management.
67. Continue to implement measures from the Region's Traffic Management Guide for Hamlets to address traffic management issues in hamlets and other built-up rural areas.
68. In consultation with the Ministry of the Environment and Climate Change, adopt a regional approach for air quality assessments as opposed to conducting assessments on an individual project basis.
69. Apply best practices for designing and adapting transportation infrastructure to better respond to climate extremes and climate change and mitigate stormwater run-off.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CHAPTER 7

TRAVEL CHOICES

7 Travel Choices

7.1 Strategic Direction 5: Promote sustainable travel choices

Durham Region will pursue a number of approaches to maximizing the return on its investments in facilities and services for walking, cycling, public transit and carpooling. Those modes provide a suite of alternatives to driving and enable a variety of healthy, independent lifestyles for people—including children, youth, seniors and adults with disabilities—who cannot or choose not to operate their own car.

Transportation demand management (TDM) measures engage with travellers, and offer information, incentives and assistance to make choices that truly work best for them. TDM-supportive features in new developments, like parking for bicycles and carpools, enable more sustainable choices and can be fostered through planning approval processes. In collaboration with the Area Municipalities, the Region can also implement parking management approaches that lead to a more efficient balance between car travel and more sustainable modes.

7.2 Background

Improving mobility choices is a fundamental goal of the TMP. Providing individuals with a range of travel options supports social equity, public health, compact development, community liveability, and the environment.

Transportation facilities and services are essential to attractive choices, as are education, information, promotion and incentives that motivate awareness of, and desire and preference for, travel options such as walking, cycling, public transit, flexible work arrangements, telework and carpooling. Transportation Demand Management (TDM) encompasses these elements and encourages less frequent car travel, shorter trips, and time-shifting of trips outside peak periods.

7.3 Progress and Opportunities

Since 2007, the Region of Durham in partnership with Metrolinx has developed a workplace-based TDM program called Smart Commute Durham (one of 13 similar organizations across the GTHA that are supported by Metrolinx and local partners). It has recruited more than 28 member employers, with over 38,000 employees. Smart Commute Durham offers various programs and services to employers, including an online ridematching tool, an emergency ride home program, annual campaigns and events, custom workplace TDM strategies, and program development assistance. Smart Commute Durham has also developed various program guidelines that can be implemented across workplaces where feasible, such as a bike lending program and carpool pass program.

Over the last few years, the Region has implemented a Small Urban and Rural Carpool Lot Program, which enhances carpool opportunities in underserved portions of Durham Region by identifying and promoting dedicated carpool spaces at several existing parking lots.

Two recent initiatives support the new directions that are recommended in this chapter. The first is the addition of school and community programming by Metrolinx as strategic elements to the GTHA-wide Smart Commute program to improve public health, economic conditions and quality of life. The second is a recent review by the Region of Smart Commute Durham's business plan and operating model, which responds to the recent work by Metrolinx and incorporates knowledge of TDM best practices across Canada. Those practices extend considerably beyond Durham's current programs, and offer the potential to support other dimensions of this TMP, particularly those related to active transportation and public transit.

To maximize their effectiveness, TDM initiatives should be an integrated component of larger investments in transportation facilities and services. TDM programming and initiatives have evolved from a program focused on workplace engagement to becoming more fully integrated into the Region's activities. This implies a growing awareness of, and support for, TDM initiatives among staff, elected officials, partners and key stakeholders, and greater integration of TDM principles into other Regional endeavours including land use planning and approvals. This could boost the return on major investments by the Region in public transit and active transportation infrastructure, and could yield substantial benefits for public health, congestion levels, economic development and land use planning goals.

Achieving broader TDM benefits will require resources, and the recent Smart Commute Durham business plan and operating model review found the Region's current TDM program needs to be expanded in order to deliver the future performance that Metrolinx requires. Reallocation of staff time and resources will be needed to achieve the desired outcomes.

7.4 Goals and Actions

GOAL

SMART COMMUTE DURHAM WILL INCREASE ITS REACH AND EFFECTIVENESS

Metrolinx guides the overall GTHA Smart Commute program based on its transportation plan, The Big Move. Metrolinx provides funding support to Smart Commute Durham and other Smart Commute organizations in return for workplace based TDM programming. For this reason, Durham's recent Smart Commute Durham business plan and operating model review reflects the objectives set by Metrolinx. This provides a platform for regional consistency, and the exchange of best practices, resources and related information.

The Smart Commute program is rooted in a long-term mandate to engage employers and support the encouragement of sustainable employee commuting habits. The need for such TDM programming will only increase as time passes, and as travel demand and congestion grow. Increasing the employer base and service portfolio, paired with a greater degree of integration with other activities of both Regional and local governments, will be vital to the long-term success of TDM in Durham Region.

7.4.1 EXPAND SERVICE PORTFOLIO

A recent update to the Smart Commute Durham program structure offers the opportunity to engage workplaces in TDM programming without the requirement to commit to a full membership. As such, Smart Commute Durham can expand its service portfolio and offer custom project-based TDM support and services to workplaces looking to achieve specific TDM goals.

There are opportunities to provide expanded programming such as PRESTO card promotions, individualized marketing, and lunch-and-learn programming relevant to the workplace. Possible lunch-and-learn programming could include EcoDriver workshops, a transit ride/tour along a DRT PULSE corridor, or cycle training and ride if a workplace is located near a major cycling route.

Smart Commute Durham can also support employers and developers seeking LEED certification for new or existing commercial buildings. Many services offered by Smart Commute Durham can help earn transportation credits, such as the baseline/follow-up travel surveys, preferred carpool parking programs, and site assessments that identify cycling network connections and frequent transit routes in close proximity to a workplace. This is an effective way to engage new members who are keen to support travel behaviour change in Durham.

7.4.2 LEADERSHIP AT REGIONAL FACILITIES

As one of the largest employers in Durham, the Region of Durham has an obligation to lead by example. The Region's workforce offers an opportunity to pilot test different TDM strategies including, for example, paid parking, and employee-focused social marketing campaigns.

ACTIONS

The following actions are recommended to support the goal of enabling Smart Commute Durham to increase its reach and effectiveness:

70. Evaluate the benefits and costs of providing individualized marketing and other innovative new services to Smart Commute Durham members, and if favourable then recommend demonstration projects to Regional Council through the annual business planning and budget process. Continually scan for best practices that could be adapted from other jurisdictions.
71. Continue to lead by example by implementing targeted TDM initiatives for Region of Durham employees.

GOAL

RESIDENTS WILL MAKE SUSTAINABLE TRAVEL CHOICES MORE OFTEN

There is significant opportunity to expand TDM programming to schools and the broader community. Schools are a major class of travel generator, and the promotion of healthy, safe travel options for students is necessary across North America. Households, in general, are another major hub of travel decisions, and thus are an important market for TDM programs.

As Durham Region creates better options for transit, walking, cycling and carpooling, the opportunity to encourage individual sustainable travel decisions will grow. Information, education, promotion and incentives will become an even better way to leverage infrastructure investments and maximize the use of new services and facilities. Possible partners include Smart Commute Durham, Cycle Durham, Durham Region Transit, Durham Region Health, local municipalities, school boards, community associations, developers and business groups.

7.4.3 REGION-WIDE INFORMATION AND PROMOTION

Travel choices can be influenced by information. When considering different ways to make a trip, travellers will apply their knowledge of routes, services, safety and delay considerations. The Regional government is a natural hub for concentrating and delivering that information across multiple modes and municipalities, and for shifting individual perspectives on the practicality, benefits and popularity of different travel choices.

Promotional tools such as special events, social media, campaigns and contests can build awareness and understanding, and encourage shifts in social norms that support the acceptance of active transportation, transit and carpooling as practical and beneficial choices.

7.4.4 NEIGHBOURHOOD OUTREACH

Communicating directly with individuals and families in their homes has proven to be an effective way of increasing the use of sustainable modes of travel. Neighbourhood-based individualized marketing can be a relatively low-cost way of supporting much larger investments in infrastructure or transit service (e.g., rapid transit or express bus routes, new trails or bike lanes). There is a rapidly growing body of evidence and experience from the GTHA and across North America that could guide Durham Region in piloting this technique, possibly in partnership with area municipalities, community organizations and interest groups that can offer important local knowledge and volunteer resources.

7.4.5 SCHOOL TRAVEL PLANNING

Schools generate a large proportion of trips during busy weekday peak periods, and school trips in Ontario have become increasingly motorized in recent decades. Slowing and reversing this trend requires the involvement of multiple stakeholders.

For new or redeveloped school sites, the Region's School Site Access and Operations Guideline (2010) provides information on locating schools to maximize opportunities for active transportation and promoting safe school travel.

Durham Region's Planning Division and Health Department have partnered to coordinate the planning and delivery of Active School Travel programming in conjunction with area municipalities. With support from Metrolinx, Durham's Planning Division and Health Department have reached out to the area municipalities, school boards, school transportation providers and other stakeholders to establish a Region-wide Active School Travel (AST) program. Effective school travel planning requires strong partnerships, adequate resources, and the commitment of school boards and individual schools. Support is especially vital through the early demonstration and growth stages, until a robust capacity is developed that enables expansion. While area municipalities are key actors on issues around local street design,

operation, development review, and providing and improving active transportation networks, the Region and Metrolinx can also provide support in program development, coordination and information sharing.

7.4.6 CARPOOLING FACILITIES

Carpooling in a large area like Durham Region is made easier when carpoolers who share a destination, but do not live near each other, can meet en-route and park one or more cars for the day.

There are currently 20 commuter parking lots in Durham Region (refer to Maps 1a and 1b). The Region operates two lots: at Simcoe Street (Regional Road 2)/Shirley Road (Regional Road 19) and at Simcoe Street (Regional Road 2)/Cameron Street (Regional Road 12). MTO operates seven formal carpool parking lots across Durham (at the Highway 35/115 split, Highway 401/Brock Street, Highway 401/Simcoe Street, Highway 401/Newtonville Road, Highway 35/115/Regional Highway 2, Highway 407/Brock Road, and Highway 412/Highway 7). MTO has also identified an additional 27 potential carpool lot locations, largely comprised of new locations enabled by the Highway 407 east extension, Highway 412, Highway 418 and future transitway lands. Metrolinx also provides priority parking for carpools at GO Stations and will provide similar facilities as part of the GO Rail extension to Bowmanville.

Smart Commute Durham has facilitated the implementation of carpool facilities by partnering with area municipalities and private businesses as part of the Small Urban and Rural Carpool Lot Program. The program has developed shared parking facilities with dedicated, signed Smart Commute parking spaces in municipally-owned parking areas (e.g., Goodwood Community Centre in Uxbridge, Sunderland Arena) and one privately-owned parking area (Fisher's Independent Grocer near Beaverton). There is additional opportunity and demand over time to create more of these strategically located, low-cost facilities to help carpoolers share a ride, especially rural commuters who are heading to urban areas in Durham or elsewhere in GTHA.

Another approach to promoting carpooling is the establishment of high-occupancy vehicle (HOV) lanes on arterial roads. As described in Chapter 4 (Transit), the TMP recommends a network of High Frequency Transit Routes, enabled by HOV lanes. While the purpose of these HOV lanes is primarily to give priority to transit vehicles, the inclusion of carpools as eligible users of those lanes can be a valuable tool to educate the public of the value and benefit of HOV lanes. Allowing carpools to use transit priority lanes can promote carpooling and the efficient use of road infrastructure, but it is important to cautiously evaluate any potential impacts on road safety and transit vehicle delay. This is an issue to be considered on a case-by-case basis when Durham Region is planning to implement HOV/transit priority lanes in future.

The role of the Region in planning, funding, and/or operating carpool facilities has been assessed. Consideration was given to whether the Region should be in the business of providing purpose built carpool lots outside of those provided by others. Given the existing involvement of the area municipalities, MTO and Metrolinx, the Region should maintain a planning role (e.g., Smart Commute Durham Small Urban and Rural Carpool Lot Program). The Region may also construct a carpool facility on Region-owned lands where there is demand, and provided that a highest and best use study is conducted to confirm that this use of the lands is appropriate.

Another area of interest to the Region, as noted in Section 4.4.9, is the use of Highway 407 Transitway stations as interim commuter lot facilities until such time as the transitway is built. By the end of 2017, three locations should be operational: Highway 407/Brock Road (opened in February 2016), Highway 412 at Dundas Street/Halls Road and Highway 407/Baldwin Street). At present, there are no MTO or Metrolinx commitments to open additional locations, yet there are several locations that would be beneficial as carpool lots and park and ride facilities for GO Bus/DRT, and to support carpooling in the short-term.

7.4.7 LOW EMISSION AND ELECTRIC VEHICLES

The commercial availability of electric vehicles (EVs) and other low emission vehicles such as hydrogen-powered vehicles is increasing rapidly. EVs in particular significantly reduce air emissions and greenhouse gas emissions. In July 2016, the Province of Ontario announced a $20 million grant program to encourage the public and private sector to build electric charging stations with the goal of creating a system of fast-charging stations. Various public and private sector stakeholders in Durham were successful in receiving funding for a total of seven locations consisting of facilities in Beaverton, Goodwood, Newcastle, Oshawa, Pickering, Port Perry and Whitby.

A key rationale for governments investing in charging stations is to encourage uptake of EVs by reducing anxiety associated with limitations on range.

The Region plans to develop an Electric Vehicle Strategy to support industry, help identify and expand the number of EV charging station locations in a coordinated and beneficial way, partner with area municipalities and leverage potential provincial (or other agency) funding opportunities. One of the key benefits of being a stakeholder in the EV marketplace is that the Region could accelerate progress towards its own climate mitigation objectives.

Additionally, UOIT has a Smart Transportation Electrification and Energy Research (STEER) Group, an Automotive Centre of Excellence and a Canada Research Chair in Electric Energy Storage Systems for Transportation Electrification. Key areas of research include improvements to rechargeable battery technology, ultracapacitors as an alternative to batteries, and fast, wireless (inductive) charging systems. Durham Region should consider supporting the on-going research where possible through data sharing or prototype testing.

7.4.8 CONNECTED AND AUTONOMOUS VEHICLES

The prospect of Connected and Autonomous Vehicles (CAVs) represents a transformation in the way the world moves. Connected Vehicles (CVs) are vehicles that are connected to infrastructure, mobile devices, and other CVs and are capable of sharing information with each other to optimize their function and performance. Autonomous Vehicles (AVs) are capable of interpreting the world around them and navigating roads without human intervention. Driverless cars are fully autonomous vehicles.

Connected and Autonomous Vehicles (CAVs), including automated trucking/freight movement and transit, have the potential to address a number of issues in Durham Region, but also present risks if the implementation of technology is not appropriately managed. From a congestion reduction potential, connected vehicles could mean that more vehicles can operate in a smaller space by being closer together. Significant safety benefits are also possible. For transit, autonomous vehicles could provide solutions that extend service to lower density and rural communities, and also serve as feeder vehicles to rapid transit routes in urban areas. However, the same challenges with too many cars on the road that exist today could persist with these technologies. It is unlikely that they will replace the need for Rapid Transit, the High Frequency Network and other transit routes.

There are opportunities for Durham to be a leader in the development of policies and to take advantage of new technologies to help achieve the goals of this TMP. Durham is in a unique position to be at the forefront of these new technologies, given its auto manufacturing history, and the more recent expansion of post-secondary institutions offering technology programs.

7.4.9 NEW MOBILITY ALTERNATIVES

The rapidly growing "sharing economy" has been brought about by the advent of wireless communications and mobile applications and by the emergence of a technologically-savvy population that is open to conducting informal transactions. It has several manifestations in the transportation sector, such as:

- Conventional carsharing allows members to rent vehicles for short time periods based on per-minute, per-hour and/or per-kilometre rates. While originally a community-based, cooperative paradigm, it has also attracted corporate backers including large car rental companies.
- Peer-to-peer carsharing is an emerging practice that allows member drivers to rent out their personal vehicles when not in use to other members.
- Conventional ridesharing, such as that facilitated through workplaces by Smart Commute member organizations, aims to establish a regular schedule of drivers and passengers (with possibly alternating roles) travelling together to a routine destination. If money changes hands, it typically only covers out-of-pocket fuel and parking costs.

- Dynamic carpooling uses mobile communications to match drivers and passengers in real time for as little as a single shared trip that may or may not involve payment.
- Car-hailing involves paid, independent drivers using their own cars to respond to ride requests administered through a central broker (e.g., Uber). This model is similar to conventional taxi service except that it is still generally unregulated, including in Durham Region.

To the extent that these shared mobility options (and others that may arise in future) make it easier for individuals to get around the Region without owning a private vehicle, they join public transit, walking, cycling and taxis as important alternatives to auto ownership and dependence. The Region has little direct influence over the legality or operation of these activities (with the exception of conventional carsharing and ridesharing, both of which it actively supports). However, the Region has to keep apprised on the impacts paid carsharing services have on transit and travel demand, and how they are impacting traditional transportation services (e.g., conventional transit routes, taxi ridership, carpooling and commuting).

ACTIONS

The following actions are recommended to support the goal of enabling residents to make sustainable travel choices more often:

72. Create and promote an accessible online clearinghouse for practical information on travel choices in Durham Region that serves a wide range of travellers, modes and trip purposes.
73. Create and maintain a Regional cycling map, in printed and/or online format that identifies cycling facility types, road safety hotspots, steep hills, transit hubs and other information of concern to potential cyclists.
74. Work with partners to develop and implement a program that promotes travel choices through events such as Bike Month, Walk to School Month and Carpool Week. Integrate positive multi-modal messages into Regional communications on infrastructure, health, recreation and other public services.
75. Develop, test and deliver a targeted, sustained program of individualized marketing that supports public awareness and use of Regional facilities and services for active transportation, transit and carpooling. Maximize effectiveness and efficiency by applying best practices developed through experience elsewhere in the GTHA.

76. Work with partners to develop an Active School Travel Strategy to guide planning and programs across Durham Region.
77. Regularly review the need and opportunity for additional rural and small urban community commuter lots.
78. Develop an Electric Vehicle Strategy for the Region, in cooperation with industry, including consideration of potential partnership and funding opportunities from provincial or other agency programs.

GOAL

NEW DEVELOPMENT WILL SUPPORT SUSTAINABLE TRAVEL CHOICES

Because it will likely be easier to influence how new trips are made, over time, than to reshape existing travel patterns, it is vital that new developments feature facilities and programs that make sustainable travel options as attractive as possible. While the Region of Durham's role in shaping new developments is more limited than that of area municipalities, it is still an important one.

The characteristics that are typical of new developments have been shifting with growing awareness of climate change and other environmental challenges. However, developments in many parts of Durham adhere to conventional suburban or semi-rural designs that are less supportive of transit and active transportation. Continued progress is needed.

7.4.10 DEVELOPMENT REGULATION AND APPROVALS

Development regulations and approval processes are important tools to maximize the support that new developments give to individuals who choose transit, active transportation or carpooling. Area municipalities vary in their regulations and approval practices, which means that achieving consistent regional outcomes can be challenging. By collaborating with area municipalities, the Region can maximize the application of practices that are essential for supporting TDM, whether they involve zoning by-laws or negotiations with developers leading to development agreements. Supportive development features reflect North American best practices, and are not uncommon in the GTHA. They could include physical features such as secure bicycle parking facilities, showers and change rooms, priority carpool and carshare parking, adequate lighting and the provision of safe walking routes to adjacent sidewalks and transit stops. Other developer actions that could be the subject of negotiation might include commitments to provide transit

information, discounted transit passes, carsharing services, Smart Commute Durham membership and special events, for the benefit of owners/tenants.

The creation of a Regional TDM-supportive development strategy could accelerate the adoption and implementation of favourable approaches across Durham, in a way that also establishes equity for developers in different areas and preserves flexibility to meet the unique circumstances of individual communities. It could identify the expected health benefits and other positive impacts for the general public, residents and tenants of new developments, and other stakeholders. A shared strategy would also be an opportunity for the Region to identify the ways in which it will support sustainable travel choices in new developments. These could include active transportation facilities, transit service standards, arterial road access controls, and Smart Commute Durham services and incentives.

7.4.11 REGIONAL PARKING STRATEGY

Off-street parking is perhaps the development feature that has the greatest long-term impact on sustainable travel choices—and this is particularly true in areas where promoting transit and active transportation is a key strategic goal. However, the Region has limited influence over the supply and operation of parking. Area municipalities control parking at new developments through zoning by-laws, and are responsible for on-street parking operations.

Parking is a particularly important determinant of travel behaviours in TOD areas and near Rapid Transit stations, where the availability of abundant free parking would make this plan's objectives difficult to achieve. The Region has a long-term interest in limiting parking supply in those areas, and ensuring that parking is appropriately priced. The creation of Regional guidelines for areas of strategic interest, including Regional Centres and along Rapid Transit corridors, would be an opportunity for area municipalities to establish a shared approach that is both equitable and effective. Consideration should be given to integrating parking guidelines as part of the TOD guidelines or TDM development guideline recommended through this document, and applied to these areas. Such guidelines could identify desirable parking limits for individual developments as well as entire districts, and how those limits might be phased in as densities increase and supporting transportation facilities and services are introduced (e.g., Rapid Transit). It could also suggest appropriate roles for collective parking solutions (e.g., shared private parking, public parking lots).

ACTIONS

The following actions are recommended to support the goal of requiring new development to support sustainable travel choices:

79. Create a TDM-supportive development strategy, in partnership with the area municipalities, that would require new developments to support transit, active transportation and carpooling. Actions could include reviewing and updating zoning by-laws and development agreement checklists, and requiring certain development applications to identify travel behaviour targets and the actions required to achieve them. Implementation of the strategy would benefit from tools and events to share information with municipal staff members, developers and consultants, and to discuss their questions and concerns.

80. Create guidelines that support a Regional parking strategy for strategic nodes and corridors, in partnership with the area municipalities. Actions could include amendments to zoning by-laws (e.g., to reduce parking minimums, set maximums and allow shared parking), identifying parking supply caps for key districts, and studying the feasibility and benefits of public parking authorities.


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CHAPTER 8

GOODS MOVEMENT

8 Goods Movement

8.1 Strategic Direction 6: Improve goods movement to support economic development

Durham Region will ensure that its transportation network makes adequate provision for the needs of all modes of goods movement, including road, air, rail, marine, and intermodal. Providing efficient, continuous, and connected goods movement is integral to the Region's economic competitiveness and growth, including the growth of traditional and emerging agricultural industries in rural communities. Durham Region's ports, freight terminals, and airports are key nodes in the broader transportation network that supports and connects businesses with markets across the GTHA, the province, and the country. The Region will work with all levels of government and other stakeholders to maintain and strengthen goods movement networks and policies.

8.2 Background

Supporting reliable and efficient movement of goods within and through Durham Region is a critical role for the transportation system. The Region's goods movement network includes Provincial highways, Regional roads, area municipal roads, railways, an airport and harbours. Goods movement has been steadily increasing in Durham Region, with a strong growth in truck traffic crossing the Toronto-Durham and York-Durham boundaries in recent years. A high-quality goods movement system can attract investment, foster economic growth and create jobs in Durham Region.

The Regional Official Plan (ROP) designates a Strategic Goods Movement Network, which was developed through the current TMP with consideration for existing haul routes, major generators of truck traffic and ROP road designations. The current TMP's recommendations also include encouragement of intermodal facilities in Durham, collecting better goods movement data, and engagement with industry stakeholders.

The ROP includes goals, general policies and policies for transportation that emphasize the role of the transportation network in supporting economic development through goods movement. The policies outlined in the ROP address issues and gaps in goods movement, but do not provide an overall strategy to meet the goods movement goals.

In 2010, Durham Region developed a Goods Movement Strategy, as part of the Long Term Transit Strategy (LTTS), which provides an approach to planning for goods movement built upon the goals and policies identified in the previous TMP and ROP, along with business needs identified through stakeholder consultation.

8.3 Progress and Opportunities

The 2010 Goods Movement Strategy was developed as a stand-alone study as part of the larger LTTS project. As part of the development of the Strategy, a goods movement survey of manufacturers and transportation firms in Durham was conducted. This survey informed both the development of a goods movement model and strategy. One of the key recommendations of the Goods Movement Strategy was to establish a Durham Regional freight forum and several recommendations were provided around data collection and technology.

There is a new opportunity to build upon the recommendations from the Goods Movement Strategy to identify a comprehensive suite of supportive actions for the role of goods movement in Durham Region. The recommended actions described below recognize that goods movement is integrated with other aspects of regional planning, including land use and economic development. It also involves multiple levels of government, agencies such as the port and airport authorities, industry associations and the private sector.

8.4 Goals and Actions

GOAL

THE BUILT ENVIRONMENT WILL SUPPORT GOODS MOVEMENT

8.4.1 STRATEGIC GOODS MOVEMENT NETWORK

In Durham, most freight is carried by truck and because trucking relies heavily upon major roads for access to industrial and commercial centres, a high-quality freeway and arterial road network is necessary. While all arterial roads are intended to carry all types of traffic with generally no restrictions to goods movement, a Strategic Goods Movement Network is a tool for the Region to promote preferred routes for truck traffic and prioritize road investments to meet freight-supportive design standards. The Strategic Goods Movement Network, shown in Schedule C, Map C4 of the ROP, identifies a network of preferred haul routes that are planned to accommodate full-load commercial vehicles on a year-round basis and connect major generators of traffic.

The Strategic Goods Movement Network was reviewed to identify potential changes to support improved goods movement across Durham Region. The following routes are proposed to be added to the revised Strategic Goods Movement Network (refer to Map 6):

- Bayly Street/Victoria Street/Bloor Street between Brock Road and Courtice Road. This corridor links the major industrial areas of the lakeshore municipalities with each other, with north-south routes, and connects to Highway 401 Interchanges. This corridor is also an emergency detour route for Highway 401.
- Courtice Road between Bloor Street and Highway 401. This corridor links the proposed route on Bloor Street with Highway 401, providing a continuous designated goods movement route, and links employment lands south of Bloor Street to Highway 401.
- Southerly extension of goods routes on Brock Road, Lake Ridge Road, and Thickson Road from Highway 401 to the proposed Bayly Street/ Victoria Street goods route.
- Farewell Street between Bloor Street and the Port of Oshawa. This corridor links the Harmony Road route, Bloor Street route and Highway 401 to the Port of Oshawa and surrounding major industrial area.
- Harmony Road from south of Winchester Road to Highway 407. This section extends the goods movement designation northerly to connect to Highway 407. The former designation ended at the previously planned alignment of Highway 407 on the south side of Winchester Road.
- Highway 7 from York Durham Line to Highway 7/12 then continuing on Winchester Road to Thickson Road. This corridor links future employment area lands in Seaton and Brooklin/north Whitby, and encourages through truck movements away from Downtown Brooklin. It is also recognized in the Metrolinx Regional Transportation Plan draft report as part of its goods movement network.

Implementation of the network should focus on actions to ensure the routes are continuous, without truck bans or restrictions; serve typical truck weights and dimensions; and are clearly marked. Road modifications will be required in certain locations to reduce impediments to truck travel, such as seasonal and permanent load restrictions, insufficient turning radii, and narrow lanes. Implementation of these works will be subject to annual review and approval through the Transportation Servicing and Financing Study and Roads Capital Budget as part of the Region's Business Planning and Budget process. Further consultation with the area municipalities and affected stakeholders, including the trucking industry, will assist to establish implementation priorities.

8.4.2 LAND USE PLANS

While it is important that employment and commercial areas are well served by the goods movement network, it is also important that goods movement activities do not create conflicts with sensitive adjacent land uses. To minimize conflicts between residential and employment areas, consideration for goods movement is needed early in the planning process (i.e. at the community planning stage). MTO's Freight-Supportive Guidelines include strategies for land use planning and design to maximize flexibility and productivity for businesses while preserving quality of life in nearby neighbourhoods.

8.4.3 TRANSPORTATION PLANS, DESIGNS AND OPERATIONS

The efficient movement of goods in Durham Region is dependent upon a network of roads to accommodate truck traffic, and supporting operating practices and policies that consider the specific needs of truck traffic as a component of the overall transportation system.

Opportunities to improve the efficiency and level of service of the transportation network for goods movement include updating road design standards, protecting for appropriate road rights-of-way to support safe and efficient truck movements, implementing time-of-day restrictions for deliveries, accommodating on-street loading bays in certain areas (i.e. Regional Centres that otherwise cannot accommodate off-street loading), and addressing truck parking needs (for drivers to comply with hours of service regulations). Additionally, traffic management for construction projects need to recognize goods movement and truck configurations.

Increasingly, businesses are relying on Long Combination Vehicles (LCVs)[14] for the movement of goods to and from large warehouses and distribution centres. Accordingly, these, and other over-dimensional configurations, need to be considered in both truck route planning and road design standards. At present, the Provincial LCV program restricts LCVs to designated controlled access, multi-lane, divided highways and approved connecting routes to destinations within 2 km of highway interchanges. The evaluation of corridors for LCVs is typically done as a one-off process by the proponent. Creating a map of corridors that can accommodate LCVs would make this process more efficient.

The operation of farm equipment on public roadways is permitted under the Highway Traffic Act. Farm equipment typically travels at low speeds and may require the full width of the travel lane and shoulder when travelling. The design of Regional roads should consider the accommodation of mobile farm equipment, including adequate platform width, paved shoulders, and vehicular turning path at intersections and roundabouts.

14 An LCV is a truck up to 40 metres in length consisting of a tractor pulling two full length trailers.

The operation of trucks in and through existing communities and hamlets is necessary. For new communities and developments, consideration for trucks should be considered in the community planning stage to minimize conflicts between trucks and adjacent sensitive land uses (see Section 8.4.2). However, in existing communities, especially hamlets on rural Regional roads, it may not be possible to reduce truck volumes. As discussed in Section 6.4.19, the Region has prepared a Traffic Management Guide for Hamlets to provide guidance on the techniques available to address traffic issues on Regional roads within hamlets and other built-up rural areas in Durham Region. Techniques identified to address truck volumes include warning signs and markings, and truck route signs to direct truck traffic to an alternative route if one exists. Consideration may also be given to the completion of a Hamlet By-pass Study to address more significant conflicts that cannot otherwise be resolved.

ACTIONS

The following are recommended actions to support the goal of creating a built environment that supports goods movement:

81. Add the following routes to the Strategic Goods Movement Network, designated in the Regional Official Plan: Bayly Street/ Victoria Street/Bloor Street from Brock Road to Courtice Road; Courtice Road from Bloor Street to Highway 401; the southerly extension of routes on Brock Road, Lake Ridge Road and Thickson Road from Highway 401 to the proposed Bayly/Victoria/ Bloor route; and Farewell Street between Bloor Street and the Port of Oshawa; northerly extension of the route on Harmony Road to Highway 407; and Highway 7 from York Durham Line to Highway 7/12 then continuing on Winchester Road to Thickson Road.
82. Regularly review and update the Strategic Goods Movement Network in consultation with the area municipalities and key stakeholders.
83. Implement and promote the Strategic Goods Movement Network by identifying and planning for removal of barriers (e.g., load restrictions, turning radii, height requirements, pavement condition) as part of Regional road expansion and rehabilitation projects, signing preferred truck routes, disseminating information on the network, and avoiding by-law restrictions to truck movement on preferred routes.

84. Develop criteria for evaluating land use plans from a goods movement perspective to minimize conflicts between truck traffic generated by employment areas and adjacent communities.
85. Implement measures from the Traffic Management Guideline for Hamlets to address the impacts of truck traffic in hamlets and small communities in rural areas through the Regional Road Program Capital Budget and Nine Year Forecast and rehabilitation programs.
86. Create standards for access and loading for different land use types, including considering freight centres to support industrial areas, off-street neighbourhood loading facilities for commercial developments in downtown areas, and on-street loading bays in specific areas that otherwise cannot accommodate off-street loading. Work collaboratively with the area municipalities to develop and implement these standards.
87. Develop criteria for evaluating transportation initiatives from a goods movement perspective.
88. Review and update road design standards as needed to provide an acceptable and cost effective level of service for goods movement on Regional roads.
89. Protect rights-of-way to provide for safe and efficient truck connectivity to existing and future intermodal facilities, and improve connectivity between modes.
90. Design new or reconstructed Regional arterials linking employment areas with Highway 401 and Highway 407 to accommodate Long Combination Vehicles (LCVs), where feasible.
91. Identify and promote potential locations for inter-modal transfer facilities to enable more use of rail and other modes.
92. Work with special industries and national bodies for targeted and effective use of existing special intermodal facilities, such as the Oshawa Executive Airport and the Port of Oshawa.
93. Work with the area municipalities to plan for efficient truck access to current and future intermodal hubs, including zoning and land use planning, as well as physical infrastructure such as turning lanes, turning radii, conditions of railway grade crossings and connectivity to the freeway system.

GOAL

COLLABORATION WILL INFORM AND SUPPORT SHARED SOLUTIONS

8.4.4 COLLABORATION WITH STAKEHOLDERS

The accommodation of goods movement in Durham has implications on economic development, land use, the transportation network and traffic operations. The needs of goods movement will evolve over time, reflecting changes in the types of goods and commodities carried, vehicles/technologies used for goods movement, locations of major generators and global economy. Municipal governments are not as familiar with the challenges facing the industry as industry stakeholders. Better collaboration with stakeholders, and all levels of government, will further support and improve goods movement in Durham.

The Region participates in Metrolinx's Urban Freight Forum, comprised of representatives from the province, regional municipalities, Toronto and Hamilton, and industry. The forum meets regularly to discuss goods movement related challenges and opportunities across the GTHA. The forum is also involved with the review of Metrolinx's Strategic Goods Movement Study, which is a component of the Regional Transportation Plan review.

ACTIONS

The following actions are recommended to support the collaboration to inform and support shared solutions:

94. Initiate a Durham Regional freight forum, with participation from all levels of government that have jurisdiction within the Region, industry "thought leaders," major carriers and port authorities. The purpose of the forum is to identify specific goods movement issues and to find ways to address them in partnership, acting as a coalition of "goods movement champions" and addressing opportunities and challenges. The freight forum would focus on Durham-specific issues. It would coordinate with broader GTHA initiatives, such as the Southern Ontario Gateway Council, Metrolinx and other governments/agencies to promote effective goods movement throughout the GTHA.
95. Develop a goods movement communication strategy that engages and educates the public and elected officials. Communicate the importance of integrating consideration of goods movement into all aspects of Regional business, identifying barriers in the existing network and promoting a consistent and supportive road network for goods movement.
96. Work with private industry and national bodies to expand international processing abilities, including encouraging freight-related industries, such as third party logistics providers and bonded warehouses.
97. Work with all levels of government and the private sector to ensure that plans for goods movement address the entire route ('shelf to shelf') to maximize efficiency.
98. Work with the province and adjacent regions to normalize weight and size requirements and work with local industries to identify ways to provide infrastructure to meet specific needs.

GOAL

FREIGHT INFORMATION WILL SUPPORT POLICIES, PLANS AND PRACTICES

8.4.5 DATA COLLECTION, ASSESSMENT AND STORAGE

Unlike passenger travel, available information on goods movement is limited. One source of data is the Ministry of Transportation's Commercial Vehicle Survey (CVS), an ongoing program that includes data collection of trucking activity. Currently, the program includes four directional sites in Durham Region.

Continued effort to gather and assess data on trucking activity and on-going dialogue with stakeholders will assist the Region in developing the necessary policies and strategies to effectively manage the transportation network in Durham Region and further support economic development.

8.4.6 TOOLS AND BEST PRACTICES

As part of the Region's prior work on goods movement, a review of best practices in intra-urban, inter-regional and international goods movement was undertaken. This review is the first step in identifying tools and best practices that can assist the Region in its planning for goods movement. The Region can build upon established practices elsewhere to incorporate, where appropriate, new data collection techniques, and advances in technology such as automated trucking.

ACTIONS

The following actions are recommended to support the goal of collecting freight information to support policies, plans and practices:

99. Create a common set of metrics and collect data to measure performance.
100. Conduct or participate in goods movement surveys and other data collection initiatives to improve understanding of the structure and nature of freight activity.
101. Work with other governments in the GTHA to develop a GTHA-wide initiative for multi-modal freight data collection.
102. Work with MTO and the federal government to produce and release regular goods movement data to facilitate planning and avoid duplication of resources.
103. Ensure the Region has the data, tools, and knowledge to fully participate in super-regional, Provincial, and national efforts (such as the ongoing Continental Gateway initiative) to invigorate the rail network and capitalize on Durham's geographic advantage to become a new rail hub for service to and from eastern Ontario.
104. Monitor and promote technologies that can reduce drayage times, avoid congestion, and disseminate information (e.g., E-seals, radio frequency identification, traffic and wait time information for drivers), and investigate the use of new cost-effective technologies on Regional facilities (e.g., through traffic control systems).


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CHAPTER 9

IMPLEMENTATION

9 Implementation

9.1 Strategic Direction 7: Invest strategically in the transportation system

Durham Region will work with Federal, Provincial and Area Municipal governments, as well as Metrolinx, to coordinate transportation investments and maximize their benefits. It will consider the full life cycle of infrastructure, and apply asset management techniques to measure and forecast the implications of capital spending on future operational requirements. Investments will be guided by evidence-based decision making, considering financial and economic measures related to the performance of the transportation system, the needs and behaviours of its users, and the outcomes on many aspects of life and business in Durham Region.

9.2 Background

In 2015, transportation accounted for approximately 60% of the Region's annual property tax capital expenditures with the Regional roads program being the single largest investment. Accordingly, it is imperative that investments are closely tied to needs and that there is a clear and predictable level of funding for all recommended projects in this TMP.

The 2017 road and bridge capital funding is $81.8 million including $38.9 million for road expansion, $29.6 million for rehabilitation and $5.7 million for Highway 407-related work,[15] as summarized in Exhibit 9.1. Over the next 9 years, the Regional Road Capital Program and Nine Year Forecast estimated an average annual cost of $111.0 million in road capital works, including $52.8 million for road expansion, $44.3 million for rehabilitation and $7.2 million for Highway 407-related work on the Regional road network.

On the transit side, the 2017 capital assets expenditure (major tangible assets) is $29.9 million, which includes transit vehicles, facilities and system modifications. The nine year forecast for the same is an average annual expenditure of $21.7 million.[16]

15 2017 Transportation Servicing and Financing Study (Report #2016-COW-57)
16 2017 Durham Region Transit (DRT) Servicing and Financing Study (Report #2017-DRT-01)

Exhibit 9.1: 2017 Capital Budget and Nine-Year Forecast

	2017 Capital Budget	Nine-Year Forecast (Average Annual)
Roads	**$81.8**	**$111.0**
Road Expansion	$38.9	$52.8
Road and Bridge Rehabilitation	$29.6	$44.3
Highway 407-related	$5.7	$7.2
Other	$7.6	$6.7
Transit	**$29.9**	**$21.7**

The estimated initial upfront capital investment for the recommended networks to the year 2031 will require $1.25 billion for road capital investment, $585 million for transit capital investment and $38 million in cycling investment. In addition, the Region will also incur ongoing road and structure rehabilitation projects on a life cycle basis, road operating and maintenance, and transit operating costs, which can be substantial.

To fund capital investments, the Region relies on property taxes, development charges and grants and transfers from other levels of government.

- Development charges are charged to new developments in Durham Region based on the forecasted costs of capital expenditures required to provide municipal services to those developments. The applicability and calculation methodology for development charges across Ontario are governed by the Development Charges Act, 1997, which was most recently updated in May 2017.
- The Province of Ontario distributes to municipalities a portion of its Provincial gas tax revenues to support public transit investments such as vehicle replacements, Bus Rapid Transit implementation, and some operating expenditures. In 2016, Durham Region received $8.3 million from this source and this represents one of the few stable, predictable sources of senior government funding for transit.
- The federal government administers a similar federal gas tax, which is used to fund environmentally sustainable infrastructure projects. It is anticipated that after 2021, a portion of the Region's share of Federal Gas Tax could be redirected toward investing in improving the Region's Road network.

- The Region's Special Road Reserve (currently at $12.6 million/year) is a dedicated source of annual funding used to leverage available DC's to finance the growth related expansion road projects. The Regional Road Rehabilitation Reserve (currently at $21.2 million/year), the Regional Bridge Rehabilitation Reserve (currently at $5.5 million/year), and the $6.2 million in annual general property tax for transportation, are all used as a sustainable ongoing source of funding for capital rehabilitation and replacement needs.

9.3 Progress and Opportunities

The 2005 TMP estimated both capital and operating costs over the 18 year plan horizon. It also highlighted the funding gap between projected and current annual expenditures and raised the prospect of other sources of funding beyond property taxes and development charges including fuel taxes, registration and user fees and toll charges.

Since 2005, the Region has placed an increases focus on asset management (as discussed in Section 6.4.13) and continues to increase transportation expenditures to meet needs based on annual increases in Regional funding. Funding support will also be required from senior levels of government to implement the recommended rapid transit plan. Recent changes to the Development Charges Act through Bill 73 also make it easier to use this source of funding for a broader range of modifications including transit. The Regional Transit Development Charge Background Study and By-law was updated in September 2017 in response to recent Provincial changes to the DCA.

9.4 Goals and Actions

GOAL

PHASED TRANSPORTATION INVESTMENTS WILL SUPPORT REGIONAL OBJECTIVES

9.4.1 PHASING AND COSTS

Transportation infrastructure projects are prioritized on an on-going basis through Durham Region's capital budget and nine year forecasting process as part of the Region's Business Planning and Budget process. This process, conducted by Region staff, accounts for existing and projected traffic and ridership volumes, development-driven needs, on-going asset management, and financial envelopes.

This TMP provides a longer term outlook on the recommended road capital program for planning to the 2031 horizon and beyond. Through a broad based preliminary prioritization process, recommended projects as described in Appendix C have been prioritized and phased according to the following time periods:

- Phase 1: 2017 – 2021
- Phase 2: 2022 – 2026
- Phase 3: 2027 – 2031
- Phase 4: Beyond 2031

The approach to this preliminary broad prioritization process was to balance the needs of addressing congestion in Durham Region with those of improving the environment for other modes, providing access to new development lands, and providing strategic investments. Each of the recommended projects was scored against the following criteria:

- Provides access to development – the degree to which the project makes lands accessible for new development or intensification areas;
- Manages congestion– the degree to which the project alleviates congestion on the roadway or adjacent roadways;
- Provides investment value – the degree to which the capital cost of the modification benefits users;
- Addresses network gaps – the degree to which the project improves connectivity, and in turn reduces pressures on existing neighbourhoods; and
- Supports non-motorized and transit infrastructure – the degree to which the project improves the operating environment for transit, cyclists and pedestrians.

Consideration for development timing on adjacent or upstream lands and the status of the project in the environmental assessment process were also factors in the recommended project phasing.

The estimated costs for the recommended transportation networks, to the year 2031, are $1.25 billion in Regional road infrastructure, $585 million of transit infrastructure and $38 million in Regional cycling infrastructure as summarized by phase in Exhibit 9.2 (all costs in 2015$). Costs for projects beyond 2031 have been considered in broad terms for the purpose of assessing their feasibility, but detailed costs are not presented in the TMP.

Exhibit 9.2: Estimated Capital Costs (2015$) by Phase

Estimated Capital Cost	Phase 1 2017-2021	Phase 2 2022-2026	Phase 3 2027-2031	Total
Roads – Expansion projects	$304,080,000	$478,200,000	$467,800,000	$1,250,080,000
Transit – Rapid Transit projects	$192,543,000	$137,232,000	$254,954,000	$584,729,000
Cycling				
Regional infill projects	$5,447,000	$5,447,000	-	$10,894,000
Road expansion related (cost included under roads)	$7,100,000	$9,975,000	$10,333,000	$27,408,000
Total	**$502,070,000**	**$620,878,000**	**$722,754,000**	**$1,845,703,000**

As shown in the table, capital investments in roads are projected to increase significantly between Phase 1 and Phase 2/3. This is partially due to the fact that near term road projects focus on continued incremental capacity modifications whereas longer term road projects are related to the development of new growth areas and include new corridors and corridors involving major structures.

The timing for these investments will be refined through on-going monitoring of transportation system performance, land development and the annual capital budget process.

ACTIONS

The following action is recommended to support the goal of phased transportation investments to support Regional objectives:

105. Subject to annual review and approval through Servicing and Financing Studies and the related budgets, develop the Regional road, transit and cycling networks in a phased approach as recommended to accommodate travel demand growth.

GOAL

A LIFE-CYCLE APPROACH WILL OPTIMIZE TOTAL COSTS

9.4.2 OPERATING, MAINTENANCE AND REHABILITATION COST

As described in Section 6.4.13, existing infrastructure requires ongoing maintenance and rehabilitation to ensure safe operations and maximize expected useful life. Durham Region has a comprehensive, coordinated program of on-going preventative maintenance and timely rehabilitation for Regional road infrastructure. Strategic asset management of transportation infrastructure is undertaken annually through the Region's Asset Management Report and Servicing and Financing Studies to help make informed decisions about how to best allocate limited resources.

Capital costs for new infrastructure must also account for life-cycle costs to maintain and operate proposed infrastructure in a safe manner that minimizes risks and maximizes the life of the asset in the most cost effective manner. The annual incremental operating and maintenance costs for the proposed road network are summarized in Exhibit 9.3. The costs are approximately $2.3 million per year for new road projects added in the first 5 years. This will increase to $5.5 million per year in the following 5 years (2022 to 2026), and $7.7 million per year in the last 5 years (2027 to 2031) of the plan. These costs account for operating costs (e.g., winter control, signs and markings, storm sewers, roadside maintenance, and other general maintenance) and future rehabilitation (e.g., mill and overlay).

Transit operating costs are primarily related to vehicle operations, although there will be road maintenance costs associated with bus-only lanes.

Exhibit 9.3: Annual Incremental Operating and Maintenance Costs (2015$)

Road Maintenance and Operations	2017-2021	2022-2026	2027-2031
Annual incremental cost of operating and maintenance of new/expanded infrastructure	$1,131,000	$2,702,000	$3,753,000
Annual incremental cost of road rehabilitation of new/expanded infrastructure	$1,190,000	$2,837,000	$3,942,000
Total annual incremental cost	**$2,321,000**	**$5,539,000**	**$7,695,000**

ACTIONS

The following action is recommended to support the goal of using a life-cycling approach to optimize total costs:

106. Continue to plan growth and asset management related infrastructure investments, including modifications, in a manner that recognizes implications for service level standards, operating and maintenance practices and life cycle costs.

GOAL

TRANSPORTATION FUNDING WILL BE ADEQUATE, STABLE AND PREDICTABLE

9.4.3 INTERNAL FUNDING SOURCES

With increasing infrastructure costs, funding the infrastructure, services and programs to support those who live or work in Durham Region is a continual challenge. Internal funding sources for the Region's road and transit capital program includes property taxes, roads and transit development charges and, for transit, farebox revenue. In addition to capital costs, the Region needs to fund road and structure rehabilitation projects, road operating and maintenance costs, and transit operating costs.

Other potential mechanisms for generating adequate, stable and predictable funding for capital and operating needs of the transportation system could be investigated to identify potential new sources of funding and new methods of service delivery.

9.4.4 EXTERNAL FUNDING SOURCES

External funding sources for the Region's road and transit capital program include provincial and federal grants and transfers, and the Ontario Gas Tax for transit projects as well as Federal Gas Tax for sustainable infrastructure. Although the provincial and federal governments collect billions of dollars in fuel taxes, and vehicle licensing and registration fees, these revenue sources are not available to the municipalities for funding transportation or public transit. The involvement of other levels of government in the funding of municipal transportation and public transit is crucial.

ACTIONS

The following action is recommended to support the goal of generating transportation funding that is adequate, stable and predictable

107. Work with Provincial and Federal Governments to maximize senior government grant funding opportunities to obtain sustainable, dedicated funding sources for financing transportation infrastructure and services.

GOAL

PERFORMANCE MEASUREMENT WILL SUPPORT EVALUATION AND UPDATES

9.4.5 MONITORING AND REPORTING

Implementing the TMP will require consistent monitoring to gauge how effective the policies, programs, and infrastructure modifications are at meeting the needs of Durham Region. Continuing to track key performance indicators will allow the Region to track changes in mode share, land use patterns, economic sustainability, and how well the transportation system is performing. Proposed performance indicators are identified in the following table and are structured around the TMP Strategic Directions.

Monitoring of some indicators may be done annually, timed with Census updates, or as localized projects are completed; however, a more comprehensive review of performance indicators should be done in conjunction with future TMP reviews and updates.

Corridor and area-specific monitoring may be considered in the future to measure development and transportation system performance in key corridors. This will help to proactively identify areas of concern and timely responsive measures. It is anticipated that the elements of this program may be monitored more frequently, perhaps every one to five years given the nature of the data and their collection methods.

Exhibit 9.4 offers a range of indicators that could be used to monitor the effectiveness of the Plan in achieving both system goals and progress towards a more transit-supportive urban form. Care should be exercised not to duplicate, but rather to build upon, other performance measurement exercises already underway.

Exhibit 9.4: Recommended Performance Indicators (to be refined)

Direction	Indicators
Direction 1: Strengthen the bond between land use and transportation	• Average Home-Work Trip Distance • Employment Self-containment (% of Employed Labour Force working Durham Region) • Employed Labour Force to Jobs Ratio • Transit area coverage for households and/or residents (proportion within 400 m of peak transit stops)
Direction 2: Elevate the role of integrated public transit including rapid transit	• DRT ridership (rides per capita) • DRT mode share (AM peak period and all day) • DRT supply (AM peak period and all day; DRT seat-km per capita) • Average transit commute time (minutes) • DRT service levels (transit service hours per capita) • DRT Specialized Services ridership • Accessible transit stops (% of stops) • GO Rail ridership in Durham (rides per capita) • GO Rail mode share in Durham (AM peak period and all day)
Direction 3: Make walking and cycling more practical and attractive	• Pedestrian Volumes on Arterials and Collector Roads • Bicycle Volumes on Arterial and Collector Roads • Pedestrian mode share (AM peak period and all day) • Bicycle mode share (AM peak period and all day) • Bicycle facilities in Regional Cycling Plan (km of on-road and boulevard cycling lanes/facilities)
Direction 4: Optimize road infrastructure and operation	• Vehicle-km travelled/capita • Regional lane-km per capita • Average AM peak period auto trip travel time (minutes) • Auto occupancy (AM peak period and all day) • HOV lane-km per capita • % of lane-km rated with a Pavement Condition Index of Good to Very Good • Annual collisions per capita • Collisions by type of vehicle/pedestrians • Injuries and fatalities per capita • Injuries and fatalities by type of vehicle/pedestrians

Direction	Indicators
Direction 5: Promote sustainable travel choices	• Number of workplaces / employees that are Smart Commute Durham members • % trips by carpool / paid rideshare (AM peak period and all day) • Mode shares for key districts (e.g., Urban Growth Centres; AM peak period and all day) • Mode shares for short-trips (<5km) • Automobile ownership (automobiles per capita) • Designated carpool parking spaces • Utilization of carpool parking spaces
Direction 6: Improve goods movement to support economic development	• Average truck travel times based on travel time surveys • Lane-km of Provincial highway network added • Lane-km of Provincial highway network rehabilitated • % of Strategic Goods Movement Network that is capable of year-round full-loads for trucks
Direction 7: Invest strategically in the transportation system	• Capital investments in Regional transportation ($/capita) - DRT - Regional roads - Cycling facilities on Regional roads • Operating investment Regional transportation ($/capita) - DRT - Regional roads - Cycling facilities on Regional roads - Planning and staffing (Updates to policies, TDM) • Average age of Regional transportation infrastructure (arterial roads, bridges) • Farebox as % of budget • Operating costs for conventional transit per regular passenger-trip • Number of conventional transit passenger-trips per person in service area

9.4.6 PLAN UPDATES

Regular reviews and updates of the TMP will allow for the on-going assessment of its effectiveness and relevance. Establishing a stable transportation planning cycle ensures the Plan strategies remain flexible to respond to unforeseen developments and imprecise assumptions. The performance of the Plan in achieving the Transportation Vision can also be reviewed, and necessary adjustments in strategy made. The Municipal Class EA also recommends that master plans be reviewed every five years to determine the need for a detailed formal review and/or update.

The Planning Act requires the Region to assess the need for an update to its Official Plan up to 10 years from when a new official plan comes into effect and every five years thereafter unless it is replaced by a new Official Plan. That review process provides a timely opportunity to revisit the assumptions of the TMP and consider the need for an update. The monitoring program discussed in Section 9.4.5 will also provide an indication of the need for a review.

ACTIONS

The following actions are recommended to support the goal of tracking performance measures to evaluate and update the Plan:

108. Develop and conduct a Region-wide transportation monitoring program, and report progress to Regional Council on a regular basis.

109. Support new and on-going data collection initiatives critical to monitoring transportation conditions and predicting future needs, including:
    - Census of Canada Journey to Work/Place of Work data;
    - Transportation Tomorrow Survey;
    - Cordon Count Program;
    - MTO Travel Time Survey; and
    - Region of Durham Walking Network Database.

110. Conduct future reviews of the Transportation Master Plan in conjunction with a comprehensive review of the Regional Official Plan.

111. Consider the relevant recommended actions of the Transportation Master Plan in a future transportation-related amendment of the Regional Official Plan.


Mackie
MOVING SYSTEMS
TITANIUM

CHAPTER 10

CONCLUSION

10 Conclusion

This Transportation Master Plan is the result of the input of many individuals and stakeholders. It represents the Region's vision for a sustainable future.

The TMP outlines the policies, actions and recommended infrastructure modifications that are required to address transportation needs to 2031 and beyond. It builds on several foundational documents including the Regional Official Plan, 2012 Regional Cycling Plan and DRT Five Year Service Strategy. It identifies solutions to respond to Durham Region's transportation needs as well as to take advantage of opportunities in the Region and the broader Greater Toronto and Hamilton Area.

This TMP is designed around the overall goal of creating a transportation system that provides improved travel choices for walking, cycling and transit, while accommodating continued, but moderated growth in automobile and truck traffic.

It recognizes that it is neither feasible nor sustainable to build infrastructure to meet all demands and that making better use of infrastructure is critical. The many actions identified in this TMP will require a partnership approach to ensure their successful implementation. This TMP should be viewed as a resource document to guide future work and initiatives as it is, by all accounts, a living document.

Glossary

CAV	Connected and Autonomous Vehicles
CEAA	Canadian Environmental Assessment Act
CPDP	Central Pickering Development Plan
DCA	Development Charges Act
DRT	Durham Region Transit
DRTPM	Durham Region Transportation Planning Model
DTCC	Durham Trails Coordinating Committee
EA	Environmental Assessment
EDR	Emergency Detour Route
GGH	Greater Golden Horseshoe
GTHA	Greater Toronto and Hamilton Area
HFN	High Frequency Network
HOV	High Occupancy Vehicle
LTTS	Long Term Transit Strategy
MMLOS	Multi-modal Level of Service
MTO	Ministry of Transportation
OP	Official Plan
ORM	Oak Ridges Moraine
PIC	Public Information Centre
PCN	Primary Cycling Network
RCP	Regional Cycling Plan
ROP	Regional Official Plan
RTN	Regional Trail Network
SAC	Stakeholder Advisory Committee
TDM	Transportation Demand Management
TMP	Transportation Master Plan
TOD	Transit Oriented Development
TTS	Transportation Tomorrow Survey

MAPS

MAP 1A

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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2031 Higher-Order Transit Network

Durham Region Transit (DRT)

- Rapid Transit (Exclusive Lanes)
- Protect for Future Rapid Transit*
- High Frequency Bus in HOV Lane
- Protect for Future HOV*
- High Frequency Bus in Shared Lane
- Other Transit Spine**

Peak Period Service Headway (minutes)

60 min — 20 min — 10 min — 5 min

GO Train Services

- Existing GO Station
- Future GO Station
- Existing GO Line
- Future GO Line
- Protect for Future GO L

Provincial Transit

- Future Provincial Transitway
- Existing Commuter Lot
- Future Commuter Lot

- Interchange
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Notes:
*Protect for future transit corridors anticipated beyond 2031.
**Other Transit Spine can be a combination of DRT and GO Bus service.

Lake Simcoe
Lake Scugog
Lake Ontario

SIMCOE COUNTY
KAWARTHA LAKES
YORK REGION
BROCK
UXBRIDGE
SCUGOG
OSHAWA
WHITBY
AJAX
PICKERING
CLARINGTON
TORONTO

REGIONAL ROAD 12
ZEPHYR ROAD
SANFORD ROAD
BROCK STREET
GOODWOOD ROAD
REACH STREET
NINTH CONCESSION ROAD
MYRTLE ROAD
ROSSLAND ROAD
TAUNTON ROAD
KINGSTON ROAD
DUNDAS STREET
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GANARASKA ROAD
KING STREET
MAIN STREET
LAKE RIDGE ROAD
BROCK ROAD
SIMCOE STREET
YORK DURHAM LINE
ENFIELD ROAD
TOWNLINE ROAD
LIBERTY STREET
NEWTONVILLE ROAD

C.P.R. Belleville
C.P.R. Havelock
C.N.R. Kingston
C.N.R.-York
C.N.R. Bala
York-Durham Heritage

Lincolnville GO Station
Rouge Hill GO Station
Pickering GO Station
Ajax GO Station
Whitby GO Station
Oshawa GO Station
Central Oshawa GO Station
Oshawa East GO Station (Beyond 2031)
Courtice GO Station
Bowmanville GO Station
Thornton's Corners GO Station
Seaton GO Station

MAP 1B

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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2031 Higher-Order Transit Network

Durham Region Transit (DRT)
- Rapid Transit (Exclusive Lanes)
- Protect for Future Rapid Transit*
- High Frequency Bus in HOV Lane
- Protect for Future HOV*
- High Frequency Bus in Shared Lane
- Other Transit Spine**

Peak Period Service Headway (minutes)
60 min 20 min 10 min 5 min

Notes:
*Protect for future transit corridors anticipated beyond 2031.
**Other Transit Spine can be a combination of DRT and GO Bus service.

GO Train Sevices
- Existing GO Station
- Future GO Station
- Existing GO Line
- Future GO Line
- Protect for Future GO Line*

Provincial Transit
- Future Provincial Transitway
- Existing Commuter Lot
- Future Commuter Lot
- Interchange
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

UXBRIDGE
SCUGOG
YORK REGION
UXBRIDGE-PICKERING TOWNLINE ROAD
NINTH CONCESSION ROAD
CENTRAL STREET
MYRTLE ROAD
RAGLAN ROAD
BRAWLEY ROAD
HOWDEN ROAD
BROCK ROAD
SEVENTH CONCESSION ROAD
WHITBY
OSHAWA
PICKERING
BALDWIN STREET
WINCHESTER ROAD
HIGHWAY 7
407 ETR
MARKHAM
WHITEVALE ROAD
FIFTH CONCESSION ROAD
CONLIN ROAD
SIMCOE STREET
HARMONY ROAD
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AJAX
TAUNTON ROAD
LAKE RIDGE ROAD
THICKSON ROAD
THORNTON ROAD
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WESTNEY ROAD
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COURTICE ROAD
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KING STREET
NASH ROAD
LIBERTY STREET
ALTONA ROAD
WHITES ROAD
FINCH AVENUE
DUNDAS STREET
OLIVE AVENUE
KINGSTON ROAD
BAYLY STREET
CONSUMERS DRIVE
VICTORIA STREET
BLOOR STREET
HOLT ROAD
TORONTO
Seaton GO Station
Ajax GO Station
Pickering GO Station
Thornton's Corners GO Station
Whitby GO Station
Oshawa GO Station
Central Oshawa GO Station
Oshawa East GO Station (Beyond 2031)
Courtice GO Station
Bowmanville GO Station
Rouge Hill GO Station
Lake Ontario
C.P.R. Havelock
C.P.R. Belleville
C.N.R. York
C.N.R. Kingston

MAP 2A

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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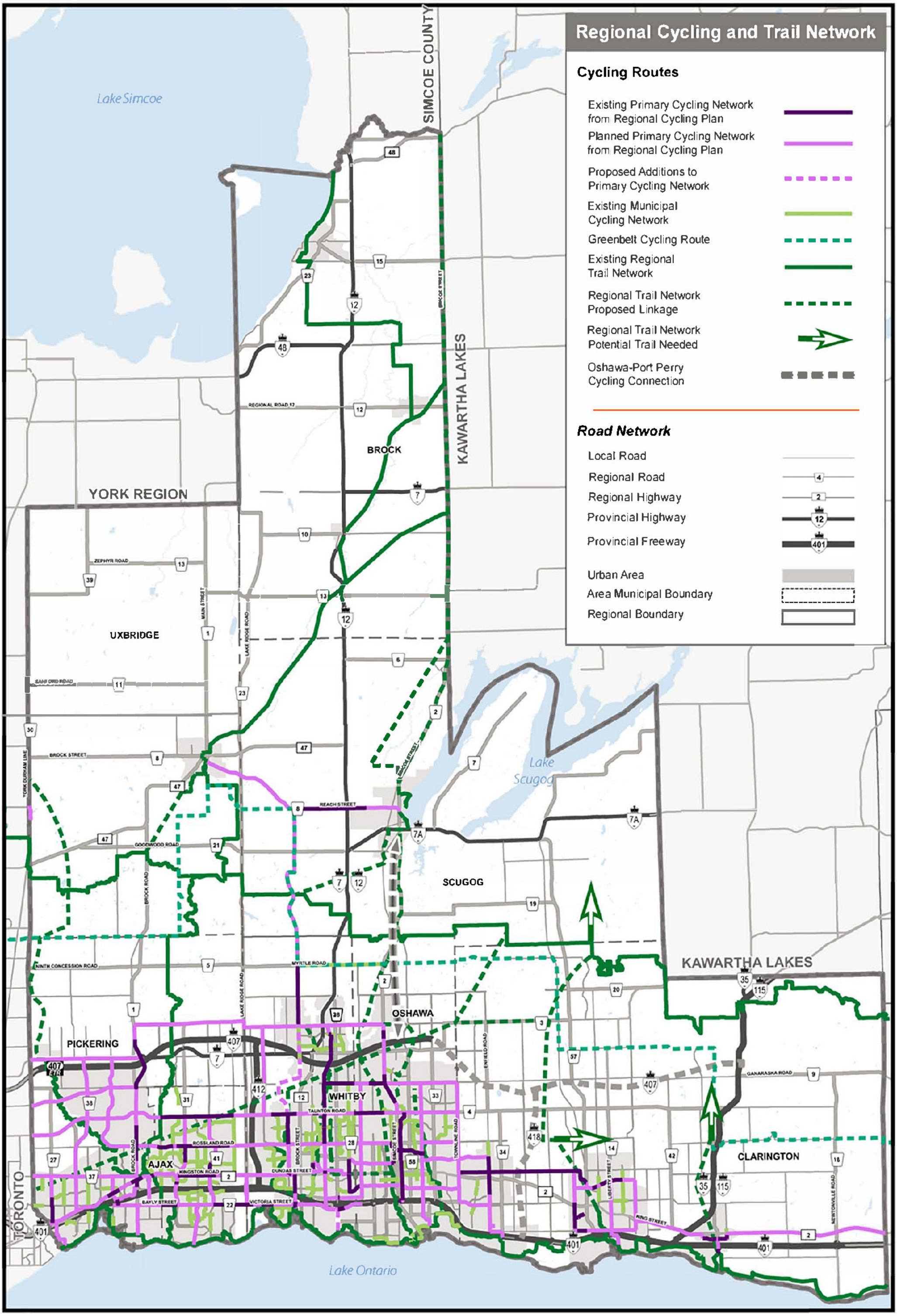

Regional Cycling and Trail Network

Cycling Routes

- Existing Primary Cycling Network from Regional Cycling Plan
- Planned Primary Cycling Network from Regional Cycling Plan
- Proposed Additions to Primary Cycling Network
- Existing Municipal Cycling Network
- Greenbelt Cycling Route
- Existing Regional Trail Network
- Regional Trail Network Proposed Linkage
- Regional Trail Network Potential Trail Needed
- Oshawa-Port Perry Cycling Connection

Road Network

- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

MAP 2B

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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Regional Cycling and Trail Network

Cycling Routes

- Existing Primary Cycling Network from Regional Cycling Plan
- Planned Primary Cycling Network from Regional Cycling Plan
- Proposed Additions to Primary Cycling Network
- Existing Municipal Cycling Network
- Greenbelt Cycling Route
- Regional Trail Network
- Regional Trail Network Proposed Linkage
- Regional Trail Network Potential Trail Needed
- Oshawa-Port Perry Cycling Connection

Road Network

- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

UXBRIDGE
SCUGOG
YORK REGION
UXBRIDGE-PICKERING TOWNLINE ROAD
NINTH CONCESSION ROAD
CENTRAL STREET
MYRTLE ROAD
RAGLAN ROAD
BRAWLEY ROAD
HOWDEN ROAD
BROCK ROAD
WHITBY
SEVENTH CONCESSION ROAD
PICKERING
OSHAWA
BALDWIN STREET
WINCHESTER ROAD
HIGHWAY 7
407 ETR
MARKHAM
WHITEVALE ROAD
FIFTH CONCESSION ROAD
CONLIN ROAD
SIMCOE STREET
HARMONY ROAD
ENFIELD ROAD
AJAX
TAUNTON ROAD
LAKE RIDGE ROAD
THICKSON ROAD
RITSON ROAD
TOWNLINE ROAD
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ANDERSON STREET
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THORNTON ROAD
WESTNEY ROAD
SALEM ROAD
ALTONA ROAD
WILSON ROAD
COURTICE ROAD
CLARINGTON
INTERIM MEASURE
ADELAIDE AVENUE
STEVENSON ROAD
KING STREET
NASH ROAD
WHITES ROAD
FINCH AVENUE
DUNDAS STREET
OLIVE AVENUE
KINGSTON ROAD
CONSUMERS DRIVE
BAYLY STREET
VICTORIA STREET
BLOOR STREET
HOLT ROAD
LIBERTY STREET
TORONTO
INTERIM MEASURE
Lake Ontario

MAP 3A

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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Short Term Cycling Routes

Short Term Cycling Routes
- Existing Primary Cycling Network
- Regional Capital Road Project (in Nine-Year Forecast)
- Infill Project (Regional Road)
- Infill Project (Municipal Road)
- Existing Regional Trail Network

Other Cycling Routes
- Greenbelt Cycling Route
- Existing Municipal Cycling Network
- Primary Cycling Network (Beyond Nine-Year Forecast)
- Oshawa-Port Perry Cycling Connection

Road Network
- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Note: This map reflects approved Capital Road Program financing for 2016. Timing for cycling projects shown in the Nine-Year Forecast, as well as Infill Projects, is tentative and subject to change.

Lake Simcoe
Lake Scugog
Lake Ontario
SIMCOE COUNTY
KAWARTHA LAKES
YORK REGION
BROCK
UXBRIDGE
SCUGOG
OSHAWA
WHITBY
AJAX
PICKERING
CLARINGTON
TORONTO
REGIONAL ROAD 12
ZEPHYR ROAD
SANFORD ROAD
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GOODWOOD ROAD
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MYRTLE ROAD
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ROSSLAND ROAD
KINGSTON ROAD
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DUNDAS STREET
VICTORIA STREET
REACH STREET
KING STREET
GANARASKA ROAD
MAIN STREET
LAKE RIDGE ROAD
BROCK ROAD
YORK DURHAM LINE
SIMCOE STREET
ENFIELD ROAD
TOWNLINE ROAD
LIBERTY STREET
NEWTONVILLE ROAD

MAP 3B

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

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N

Short Term Cycling Routes

Short Term Cycling Routes

- Existing Primary Cycling Network
- Regional Capital Road Project (in Nine-Year Forecast)
- Infill Project (Regional Road)
- Infill Project (Municipal Road)
- Existing Regional Trail Network

Other Cycling Routes

- Greenbelt Cycling Route
- Existing Municipal Cycling Network
- Primary Cycling Network (Beyond Nine-Year Forecast)
- Oshawa-Port Perry Cycling Connection

Road Network

- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Note: Regional council has only approved Capital Road Program financing for 2016. Timing for cycling projects shown in the Nine-Year Forecast, as well as Infill Projects, is tentative and subject to change.

UXBRIDGE
SCUGOG
YORK REGION
PICKERING
WHITBY
OSHAWA
MARKHAM
AJAX
CLARINGTON
TORONTO
Lake Ontario
UXBRIDGE-PICKERING TOWNLINE ROAD
NINTH CONCESSION ROAD
CENTRAL STREET
MYRTLE ROAD
RAGLAN ROAD
BRAWLEY ROAD
HOWDEN ROAD
BROCK ROAD
SEVENTH CONCESSION ROAD
BALDWIN STREET
WINCHESTER ROAD
HIGHWAY 7
WHITEVALE ROAD
FIFTH CONCESSION ROAD
CONLIN ROAD
SIMCOE STREET
HARMONY ROAD
ENFIELD ROAD
TAUNTON ROAD
LAKE RIDGE ROAD
THICKSON ROAD
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ANDERSON STREET
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WHITES ROAD
FINCH AVENUE
KINGSTON ROAD
BAYLY STREET
DUNDAS STREET
VICTORIA STREET
CONSUMERS DRIVE
STEVENSON ROAD
ADELAIDE AVENUE
KING STREET
OLIVE AVENUE
BLOOR STREET
NASH ROAD
HOLT ROAD
LIBERTY STREET
YORK DURHAM LINE
407 ETR
407
401
412
418

MAP 4A

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

Kilometres
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2031 Road Expansion Projects

Regional Road Modifications

Existing Road		New Connection
	2 Lanes	
	3 Lanes	
	4/5 Lanes	
	5 Lanes	
	6/7 Lanes	

Railway Grade Separation

Provincial Road Modifications

- Future Provincial Freeway
- Provincial Freeway Expansion
- Existing Interchange
- Future Interchange
- Existing Partial Interchange to Full Interchange
- Existing Interchange Removal
- Interchange Modification (MTO Class EA Studies)

Road Network

- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Lake Simcoe
Lake Scugog
Lake Ontario

SIMCOE COUNTY
YORK REGION
KAWARTHA LAKES
TORONTO

BROCK
UXBRIDGE
SCUGOG
OSHAWA
WHITBY
AJAX
PICKERING
CLARINGTON

REGIONAL ROAD 12
ZEPHYR ROAD
SANFORD ROAD
BROCK STREET
GOODWOOD ROAD
REACH STREET
NINTH CONCESSION ROAD
MYRTLE ROAD
TAUNTON ROAD
ROSSLAND ROAD
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BAYLY STREET
VICTORIA STREET
KING STREET
GANARASKA ROAD

SIMCOE STREET
MAIN STREET
LAKE RIDGE ROAD
BROCK ROAD
YORK DURHAM LINE
ENFIELD ROAD
TOWNLINE ROAD
LIBERTY STREET
NEWTONVILLE ROAD

C.N.R. Bala
C.P.R. Havelock
C.P.R. Belleville
C.N.R. York
C.N.R. Kingston
York-Durham Heritage

MAP 4B

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

Kilometres
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N

2031 Road Expansion Projects

Regional Road Modifications

Existing Road	New Connection
2 Lanes	
3 Lanes	
4/5 Lanes	
5 Lanes	
6/7 Lanes	

Railway Grade Separation

Provincial Road Modifications

- Future Provincial Freeway
- Provincial Freeway Expansion
- Existing Interchange
- Future Interchange
- Existing Partial Interchange to Full Interchange
- Existing Interchange Removal
- Interchange Modification (MTO Class EA Studies)

Road Network

- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

UXBRIDGE
SCUGOG
YORK REGION
UXBRIDGE-PICKERING TOWNLINE ROAD
C.P.R.-Havelock
NINTH CONCESSION ROAD
CENTRAL STREET
MYRTLE ROAD
RAGLAN ROAD
BRAWLEY ROAD
HOWDEN ROAD
BROCK ROAD
WHITBY
OSHAWA
SEVENTH CONCESSION ROAD
PICKERING
BALDWIN STREET
WINCHESTER ROAD
HIGHWAY 7
407 ETR
MARKHAM
WHITEVALE ROAD
FIFTH CONCESSION ROAD
CONLIN ROAD
SIMCOE STREET
HARMONY ROAD
ENFIELD ROAD
AJAX
LAKE RIDGE ROAD
TAUNTON ROAD
BROCK STREET
THICKSON ROAD
THORNTON ROAD
RITSON ROAD
TOWNLINE ROAD
ROSSLAND ROAD
ANDERSON STREET
STEVENSON ROAD
WILSON ROAD
COURTICE ROAD
CLARINGTON
WESTNEY ROAD
SALEM ROAD
ALTONA ROAD
C.P.R.-Belleville
ADELAIDE AVENUE
KING STREET
NASH ROAD
LIBERTY STREET
WHITES ROAD
FINCH AVENUE
DUNDAS STREET
OLIVE AVENUE
KINGSTON ROAD
C.N.R. York
BAYLY STREET
CONSUMERS DRIVE
VICTORIA STREET
BLOOR STREET
HOLT ROAD
TORONTO
C.N.R.-Kingston
Lake Ontario

MAP 5A

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

Kilometres
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Beyond 2031
Road Expansion Projects

Regional Road Modifications
- Road Expansion
- Future Connection
- Bridge / Tunnel Expansion

Non-Regional Road Modifications*
- Road Expansion
- Future Connection
- Road Reconstruction

Other Modifications
- Railway Grade Separation
- Future Interchange

Modifications by 2031
- Railway Grade Separation
- Existing Interchange
- Regional Road Modifications

Road Network
- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Note: Regional and Non-Regional Road Modifications are shown based on current road jurisdiction. Modifications are based on regional transportation needs regardless of current road jurisdiction.

*Timing subject to Area Municipal Transportation Master Plans

Lake Simcoe
SIMCOE COUNTY
KAWARTHA LAKES
YORK REGION
BROCK
UXBRIDGE
SCUGOG
OSHAWA
WHITBY
AJAX
PICKERING
CLARINGTON
KAWARTHA LAKES
Lake Scugog
Lake Ontario
TORONTO
REGIONAL ROAD 12
ZEPHYR ROAD
SANFORD ROAD
BROCK STREET
GOODWOOD ROAD
REACH STREET
NINTH CONCESSION ROAD
MYRTLE ROAD
TAUNTON ROAD
ROSSLAND ROAD
KINGSTON ROAD
VICTORIA STREET
GANARASKA ROAD
KING STREET
MAIN STREET
LAKE RIDGE ROAD
BROCK ROAD
SIMCOE STREET
BROCK STREET
ENFIELD ROAD
TOWNLINE ROAD
LIBERTY STREET
NEWTONVILLE ROAD
YORK DURHAM LINE
C.N.R. Bala
C.P.R. Havelock
C.P.R. Belleville
C.N.R. York
C.N.R. Kingston
York-Durham Heritage

MAP 5B

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

Kilometres
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N

Beyond 2031 Road Expansion Projects

Regional Road Modifications
- Road Expansion
- Future Connection
- Bridge Expansion

Non-Regional Road Modifications*
- Road Expansion
- Future Connection
- Road Reconstruction

Other Modifications
- Railway Grade Separation
- Future Interchange

Modifications by 2031
- Railway Grade Separation
- Existing Interchange
- Regional Road Improvements

Road Network
- Local Road
- Regional Road
- Regional Highway
- Provincial Highway
- Provincial Freeway
- Railway
- Urban Area
- Area Municipal Boundary
- Regional Boundary

Note: Regional and Non-Regional Road Modifications are shown based on current road jurisdiction. Modifications are based on regional transportation needs regardless of current road jurisdiction.

*Timing subject to Area Municipal Transportation Master Plans

UXBRIDGE
SCUGOG
YORK REGION
PICKERING
WHITBY
OSHAWA
AJAX
MARKHAM
TORONTO
CLARINGTON
UXBRIDGE-PICKERING TOWNLINE ROAD
NINTH CONCESSION ROAD
CENTRAL STREET
MYRTLE ROAD
RAGLAN ROAD
BRAWLEY ROAD
HOWDEN ROAD
SEVENTH CONCESSION ROAD
BROCK ROAD
BALDWIN STREET
WINCHESTER ROAD
HIGHWAY 7
FIFTH CONCESSION ROAD
WHITEVALE ROAD
CONLIN ROAD
SIMCOE STREET
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LAKE RIDGE ROAD
THICKSON ROAD
THORNTON ROAD
RITSON ROAD
TOWNLINE ROAD
COURTICE ROAD
LIBERTY STREET
ROSSLAND ROAD
BROCK STREET
ANDERSON STREET
STEVENSON ROAD
WILSON ROAD
ADELAIDE AVENUE
KING STREET
NASH ROAD
OLIVE AVENUE
BLOOR STREET
DUNDAS STREET
VICTORIA STREET
CONSUMERS DRIVE
KINGSTON ROAD
BAYLY STREET
FINCH AVENUE
WHITES ROAD
ALTONA ROAD
WESTNEY ROAD
SALEM ROAD
HOLT ROAD
YORK DURHAM LINE
C.P.R.-Havelock
C.P.R.-Belleville
C.N.R. York
C.N.R.-Kingston
Lake Ontario

MAP 6

REGIONAL MUNICIPALITY OF DURHAM
Transportation Master Plan Update

Kilometres
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Strategic Goods Movement Network

Existing Network		Proposed Network
	Airport	
	Harbour	
	Arterial Road	
	Freeway	
	Proposed Additions to Goods Movement Network	
	Railway	
	Urban Area	
	Area Municipal Boundary	
	Regional Boundary	

Lake Simcoe
SIMCOE COUNTY
SIMCOE STREET
KAWARTHA LAKES
REGIONAL ROAD 12
BROCK
YORK REGION
C.N.R. Bala
ZEPHYR ROAD
MAIN STREET
LAKE RIDGE ROAD
UXBRIDGE
SANFORD ROAD
BROCK STREET
YORK DURHAM LINE
York-Durham Heritage
GOODWOOD ROAD
BROCK ROAD
REACH STREET
Lake Scugog
SCUGOG
NINTH CONCESSION ROAD
MYRTLE ROAD
C.P.R. Havelock
PICKERING
OSHAWA
WHITBY
TAUNTON ROAD
C.P.R. Belleville
ROSSLAND ROAD
AJAX
KINGSTON ROAD
DUNDAS STREET
BAYLY STREET
VICTORIA STREET
C.N.R. York
C.N.R. Kingston
TORONTO
ENFIELD ROAD
TOWNLINE ROAD
LIBERTY STREET
GANARASKA ROAD
CLARINGTON
NEWTONVILLE ROAD
KING STREET
Lake Ontario

APPENDICES

APPENDIX A

Proposed Changes to Regional Official Plan, Schedule 'C' - Road Network

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Pickering							
Altona Road	CPR Belleville crossing to Whitevale bypass	Pickering	Durham	Refer to CPDP	Add designation to ROP as per Central Pickering Development Plan (CPDP); Pickering OPA 22 (Seaton Conformity Amendment)	Add existing Type B arterial designation	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add existing Type B arterial designation to be consistent with CPDP and Pickering OPA 22.
Church Street/ Sideline 14	Fifth Concession Road to Seventh Concession Road	Pickering	Pickering	Existing/Future Type B	Ajax TMP recommended deletion; link potentially redundant	Remove Type B arterial designation and delete future interchange at Highway 407	Not required to serve development, and TMP modelling shows that parallel routes have capacity. Upgrading and extending Church Street as a Type B arterial, and connecting it to Sideline 14, would also have significant impacts on Greenwood Conservation Area.
Dixie Road	Kingston Road to Third Concession Road	Pickering	Pickering	Existing Type B	Deferral #3 to ROP; CPDP; Pickering OPA 22 (Seaton Conformity Amendment)	Redesignate from Type B to Type C arterial	With Dixie Road now terminating at Third Concession Road as a result of the CPDP, and not extending northerly into Seaton, it is no longer necessary to designate it as a Type B arterial. A Type C arterial classification is consistent with Pickering OPA 22 (the City of Pickering's Seaton Conformity Amendment) and the current intended function of this road. Redesignation of this road will allow the Region to seek resolution of Deferral #3 to the ROP that applies to this section of road.
Fairport Road	CPR Belleville crossing to Third Concession Road	Pickering	Pickering	n/a	Add designation to ROP as per Pickering OPA 22 (Seaton Conformity Amendment)	Add existing Type C arterial designation	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add existing Type C arterial designation to be consistent with Pickering OPA 22.
Fifth Concession Road	Sideline 4 to Lake Ridge Road	Pickering/Ajax	Pickering	Future Type B	Whitby TMP (removal of section east of Lake Ridge Road)	Maintain as future Type B arterial	Provides east-west connectivity through Pickering and Ajax. Alternative to Highway 7 and Taunton Road.
Future north-south Type C arterial in hydro corridor (Downtown Pickering)	Kingston Road to Bayly Street	Pickering	Pickering	n/a	Downtown Pickering Intensification Study (Pickering OPA 26)	Add future Type C arterial designation	Supports growth in Downtown Pickering. Provides alternative crossing of Highway 401 to relieve Brock Road and Liverpool Road.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Sideline 24 (proposed Burkholder Drive)	Rossland Road Extension (proposed Peter Matthews Drive) to Highway 7	Pickering	Pickering	Refer to CPDP	Add designation to ROP as per CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Add future Type C arterial designation	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future Type C arterial designation to be consistent with CPDP and Pickering OPA 22. Alignment identified in Seaton Class EA for City of Pickering roads.
Rossland Road Extension (proposed Peter Matthews Drive)	Taunton Road to Highway 7	Pickering	Durham	Refer to CPDP	Add designation to ROP as per CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Add future Type B arterial; new alignment consistent with CPDP Class EA	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future extension of Rossland Road as Type B arterial and alignment as per CPDP Class EA.
Rossland Road Extension (proposed Peter Matthews Drive)	Brock Road/Third Concession Road to Taunton Road	Pickering	Durham (existing portion is currently Pickering)	Refer to CPDP	Add designation to ROP as per CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Add existing/future Type B arterial; new alignment consistent with CPDP Class EA	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future Type B arterial designation to be consistent with CPDP and Pickering OPA 22. Add extension of Rossland Road as Type B arterial and alignment as per CPDP Class EA.
East-West Residential Arterial (proposed Nathaniel Hastings Drive)	Highway 7 to Rossland Road Extension (proposed Peter Matthews Drive)	Pickering	Pickering	Refer to CPDP	Add designation to ROP as per CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Add future Type C arterial designation	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future Type C arterial designation to be consistent with CPDP and Pickering OPA 22. Alignment identified through Seaton Class EA for City of Pickering roads.
Third Concession Road (Realignment)	Realignment from Whites Road to Rossland Road Extension (proposed Peter Matthews Drive)	Pickering	Pickering	Refer to CPDP	CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Do not add future Type C arterial connection	Realignment of Rossland Road extension northerly through CPDP Class EA and traffic modelling through CPDP Class EA and TMP, demonstrates that this connection is not required. Significant environmental impacts which crossing West Duffins Creek, and lack of good intersection location in terms of constructability along Rossland Road extension. Designated as Collector road in Pickering OPA 22 for future corridor protection.
Third Concession Road	Whites Road to Dixie Road	Pickering	Pickering	n/a	Add designation to ROP as per Pickering OPA 22 (Seaton Conformity Amendment)	Add existing Type C arterial designation	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future Type B arterial designation to be consistent with Pickering OPA 22. Completes network of Type C arterials. Consistent with Pickering OPA 22 (Seaton Conformity Amendment).
Whitevale By-pass (proposed Alexander Knox Road)	York-Durham Line to Brock Road	Pickering	Durham (existing portion is currently Pickering)	Refer to CPDP	Add designation to ROP as per CPDP, Pickering OPA 22 (Seaton Conformity Amendment)	Add existing/future Type B arterial; new alignment consistent with CPDP Class EA	Only Freeway and Type A arterial roads are shown within the CPDP Specific Policy Area on Schedule 'C', Map 'C1'. Add future Type B arterial designation to be consistent with CPDP and Pickering OPA 22. Whitevale By-pass as extension of Fifth Concession Road. Alignment as per CPDP Class EA.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Ajax							
Achilles Road Extension	Audley Road to Lake Ridge Road	Ajax	Ajax	n/a	Ajax TMP recommended extension of Type C arterial	Add future Type C arterial designation	The easterly extension of Achilles Road would provide an additional east-west connection to Lake Ridge Road from Ajax, particularly for goods movement. It would also provide relief to Bayly Street and Salem Road for access to/from Highway 401, especially once Lake Ridge Road becomes a full interchange.
Church Street	Taunton Road to Fifth Concession Road	Ajax	Ajax	Existing Type B	Ajax TMP recommended deletion; link potentially redundant	Remove Type B arterial designation but maintain as local access road or trail	Not required to serve development, and TMP modelling shows that parallel routes have sufficient capacity. Upgrading and extending Church Street as a Type B arterial, and connecting it to Sideline 14, would also have significant impacts on Greenwood Conservation Area.
Clements Road	Extension from Church Street to Westney Road	Ajax/Pickering	Ajax	Future Type C	Ajax TMP recommended deletion of connection	Maintain as future Type C arterial. Note that this recommendation is subject to feasibility and more detailed environmental studies.	The extension of Clements Road would provide additional network east-west capacity and connectivity through south Ajax. Traffic modelling shows that the volume reduction on Bayly Street would be moderate (~200 peak hour vehicles) but benefits would be higher when incidents on parallel routes occur. The link would require a crossing of Duffins Creek and, therefore, has potential negative environmental impacts.
Shoal Point Road (Realignment)	Bayly Street to Ashbury Boulevard	Ajax	Ajax	Existing/Future Type C	Ajax TMP recommended deletion of realignment, and plan of subdivision for lands on realigned portion also recommended deletion	Maintain current alignment of Shoal Point Road south of Bayly Street and redesignate as collector road.	Deletion of Shoal Point Road realignment and designation as a Type C arterial was identified through OMB settlement for Regional and Ajax OPAs, plan of subdivision and zoning by-law amendment (Magnum Opus). Draft decision released by OMB on July 18, 2017 with final order still pending.
Shoal Point Road (Extension)	Bayly Street to Achilles Road	Ajax	Ajax	Future Type C	Ajax TMP recommended deletion of extension/realignment to the south	Maintain designation as future Type C arterial	Protect for link in the future. Provides connection to Achilles Road as alternative to the congested Salem Road/Bayly Street intersection. Potentially provides access to employment area lands which may be redeveloped long-term.
Williamson Drive	Connection from Harwood Avenue to Thackery Drive	Ajax	Ajax	Future Type C	Ajax TMP recommended deletion of connection across the CPR Belleville line	Maintain as future Type C arterial	Provides additional connectivity and access between neighbourhoods, schools and would better allow DRT buses to serve neighbourhood. Ajax TMP noted some community resistance and concerns about traffic infiltration. Requires crossing of CP rail corridor and therefore high cost. Maintaining this link as a potential future connection is consistent with the goal of maximizing network connectivity and supporting active transportation.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Whitby							
Ashburn Road	Mid-block Type B arterial to Baldwin Street	Whitby	Whitby	Existing/Future Type B	Brooklin Secondary Plan and TMP Study	Remove future Type B arterial designation	Ashburn Road terminates south of Robmar Road without a direct connection to Baldwin Street. No need for Type B arterial between mid-block Type B and Baldwin Street with other north-south connections (Baldwin Street, Garden Street) existing/proposed. Constructability of link across environmentally sensitive lands and hydro corridor would be very difficult to achieve.
Baldwin Street	Highway 7/Winchester Road to future Ashburn Road	Whitby	MTO (Winchester Road to Hydro Corridor), Durham	Existing Type C	Logical end point for Type B arterial	Redesignate as Type B arterial from Highway 7/Winchester Road to Ashburn Road (approx.)	Upgrade to Type B designation given function of roadway with connection to Highway 407 interchange, and corresponding deletion of the continuous Ashburn Road/Baldwin Street Type B arterial designation.
Bonacord Avenue	Extension from Des Newman Boulevard to Lake Ridge Road	Whitby	Whitby	n/a	Whitby OPA 91 (West Whitby Secondary Plan); West Whitby Class EA Study	Add future Type C arterial designation	Provides network connectivity by protecting for an alternative crossing of Highway 412. Connects future development area along Lake Ridge Road to the West Whitby development area east of Highway 412 and along Des Newman Boulevard.
Burns Street	Extension from Michael Boulevard to Dundas Street	Whitby	Whitby	Future Type C	Whitby OPA 91 (West Whitby Secondary Plan); West Whitby Class EA Study	Modify the future Type C arterial designation for the extension of Burns Street westerly, from Michael Boulevard then curving northerly to Dundas Street, and delete extension to Lake Ridge Road	Extension of Burns Street to Dundas Street replaces previous extension of Burns Street to Lake Ridge Road. Environmental constraints at Lynde Creek crossing and a wetland feature south of Dundas Street. Burns Street will not be able to connect directly to Des Newman Boulevard north of Dundas Street, so designate to vicinity of Highway 412 partial interchange.
Carnwith Drive	Extension from Ashburn Road to Coronation Road	Whitby	Whitby	n/a	Brooklin Secondary Plan and TMP Study	Extend Carnwith Drive to Cochrane St or Coronation Road as future Type C arterial	Extension of an existing Type C arterial into new development area of Brooklin, as identified in the Brooklin Secondary Plan and TMP Study, and connect to Coronation Road.
Cochrane Street	Brawley Road to Columbus Road	Whitby	Whitby	n/a	Brooklin Secondary Plan and TMP Study	Add existing Type C arterial designation	Upgrade Cochrane Street to Type C arterial; connects to Type B designation south of Columbus Road.
Cochrane Street	Columbus Road to Highway 7	Whitby	Whitby	n/a	Brooklin Secondary Plan and TMP Study	Add existing Type B arterial designation	Preferred arterial corridor from Brooklin Secondary Plan and TMP Study. Provides arterial connection to proposed Highway 407 interchange and continuity to new Midblock Type B Arterial to the south.
Cochrane Street/ Midblock Type B Arterial	Highway 7 to Garrard Road	Whitby	Whitby	Future Type C (Anderson Road to Garrard Road)	Brooklin Secondary Plan and TMP Study	Add/redesignate to future Type B arterial designation	Preferred arterial corridor from Brooklin Secondary Plan and TMP Study. Provides arterial mid-block connection within the south end of Brooklin from Highway 7 to Thickson Road. Potential by-pass alternative of Downtown Brooklin in the Feasibility Study for transfer of Highway 7/12.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Garrard Road	Winchester Road/Cachet Boulevard to south of Highway 407	Whitby	Whitby	Existing Type C with jog at Winchester Road	Brooklin Secondary Plan and TMP Study	Add realigned future Type C arterial	Brooklin Secondary Plan and TMP Study identifies a continuous Garrard Road connection as a Type C arterial, with a grade separation over Highway 407. Instead of a jog in alignment of Cachet Boulevard (north of Winchester Road) and Garrard (south of Winchester Road), include realignment in ROP.
Garrard Road	Midblock Type B Arterial to Conlin Road	Whitby	Whitby	Existing Type C	Brooklin Secondary Plan and TMP Study	Redesignate from existing Type C to Type B arterial	Midblock arterial corridor as a future Type B Arterial proposed to connect to Garrard Road, and then Conlin Road easterly, in the Brooklin Secondary Plan and TMP Study (identified through proposed amendment to Whitby OP). Continuous movement could be provided through roundabouts at the Midblock/Garrard and Conlin/Garrard intersections.
Conlin Road (Fifth Concession)	Extension from Lake Ridge Road to Anderson Street	Whitby	Whitby	Future Type B	Brooklin Secondary Plan and TMP Study; Whitby OP/OP Review (link noted as subject to further study)	Remove connection / extension of Columbus Road to Conlin Road between Lake Ridge Road and Anderson Street	Extension will bisect Heber Down Conservation Area and cross the Lynde Creek valley, having significant environmental impacts. The area between Country Lane Road and Ashburn Road is identified as a Provincially Significant Wetland and ANSI. Brooklin Secondary Plan and TMP Study proposes an alternative network with Midblock Type B Arterial/Cochrane Street connection to help serve east-west traffic. East-west capacity deficiencies between Whitby and Ajax/Pickering have been/can be accommodated through widening of other roads (Highway 407, Highway 7, Taunton Road) and increased transit services proposed through Higher Order Transit Network.
Conlin Road	Anderson Street to Thickson Road	Whitby	Whitby	Existing Type B	Brooklin Secondary Plan and TMP Study	Redesignate from existing Type B to Type C arterial	A Type C arterial designation for this section of Conlin Road is more appropriate, given the proposed deletion of the westerly extension to Lake Ridge Road, and Midblock Type B Arterial/Cochrane Street connection to the north. Conlin Road will maintain its Type B arterial designation east of Garrard Road and easterly through Oshawa.
Coronation Road	Columbus Road to Des Newman Boulevard (north of Taunton Road)	Whitby	Whitby	n/a	Brooklin Secondary Plan and TMP Study; West Whitby Class EA Study; Whitby TMP	Add Type B arterial designation	Whitby TMP and West Whitby Class EA Study recommended northerly extension of Des Newman Boulevard as Type B arterial. Maintains a good arterial grid in northwest Whitby serving adjacent urban expansion areas, with a grade separation over Highway 407.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Garden Street	Midblock Type B Arterial to Consumers Drive	Whitby	Whitby	Existing/Future Type C	Whitby TMP; Brooklin Secondary Plan and TMP Study	Maintain existing/future Type C arterial designation	Whitby TMP recommended upgrading designation of road from Type C to Type B arterial, identifying that it fulfilled a higher-order function. At the time, there was potential for the Highway 401 interchange to be directly off of Garden Street and BRT was proposed on Brock Street (through the LTTS), which is parallel to Garden Street and thereby diminishing auto capacity from that road. However, with Brock Street (also a Type B) recommended as part of the High Frequency Network in shared lanes/complete street initiative, Anderson Street parallel to the east (also a Type B) and the interchange ramps not proposed directly off of Garden Street through the completion of the Highway 401 (Salem Road to Brock Road) EA Study in 2013, a Type C arterial designation is still appropriate for the role/function of this road.
Twin Streams Road	Extension from Coronation Road to Lake Ridge Road	Whitby	n/a	n/a	Whitby OPA 91 (West Whitby Secondary Plan); West Whitby Class EA Study	Add future Type C arterial designation	Provides network connectivity and an alternative crossing of Highway 412. Connects future development area along Des Newman Boulevard to Lake Ridge Road.
Water Street	South Blair Street to Thickson Road	Whitby	Whitby	Future Type C	Whitby Council resolution to delete connection; Planning Committee Report #2010-P-31 for further study through the TMP Update	Maintain future Type C arterial designation	Recommend maintaining in network, as it provides the only potential alternative to Victoria Street for east-west travel demand and potentially serves redevelopment of employment lands over the long-term. Note that roadway could be designed as a special purpose road focusing on active transportation, local transit and an enhanced streetscape recognizing the natural environment.
Oshawa							
Britannia Avenue (east extension)	Ritson Road to Townline Road	Oshawa	Oshawa	Future Type C (Ritson Road to Harmony Road)	Oshawa OPA 179 (Growth Plan Conformity Exercise); Kedron Part II Plan	Update alignment and extend easterly to Townline Road	Alignment to be consistent with Kedron Part II Plan in Oshawa OP and Oshawa OPA 179. A Class EA study for Kedron major roads is currently in progress.
Consumers Drive extension	Thornton Road to Stevenson Road	Oshawa	TBD	n/a	Future Thornton's Corners GO Station, TMP Update	Extend future Type C to Stevenson Road (via Laval Drive)	Consumers Drive extension connects the future Thornton's Corners GO Station, Durham College, existing commercial areas and new development areas. Provides an alternative to Champlain Avenue that can also better accommodate pedestrian and cycling facilities. Champlain Avenue is constrained from being widened beyond 2/3 lanes, with the Stevenson Road interchange and Highway 401 future widening abutting the corridor. Potential for Thornton's Corners GO Station to provide RER service in the long-term, which will place more demand on corridor.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Future East-West Type C (Kedron)	Ritson Road to Grandview Street	Oshawa	Oshawa	Future Type C	Oshawa OPA 179 (Growth Plan Conformity Exercise); Kedron Part II Plan	Add future Type C arterial designation	Additional east-west Type C identified as part of Kedron Part II Plan. Update ROP to include Type C arterial designation. A Class EA study for Kedron major roads is currently in progress.
Highway 401/Colonel Sam Drive interchange	-	Oshawa	MTO	Designated as "Future Interchange"	Highway 401 EA Study (Brock Road to Courtice Road)	Delete future interchange designation and future Type C arterial road connection	May not be feasible to construct an interchange given CN Rail and CP Rail on both sides of Highway 401. MTO's Highway 401 (Brock Road to Courtice Road) Class EA and Preliminary Design Study shows a significant reconfiguration of the interchange at Harmony Road/Bloor Street in lieu of a new interchange at Colonel Sam Drive. In addition, there is fairly limited employment growth in vicinity of Colonel Sam Drive interchange, as well as nearby environmental constraints associated with the waterfront, to warrant its justification.
Highway 401 at Park Road interchange	-	Oshawa	MTO	Designated as "Existing Interchange to be removed"	Interchange was removed with construction of Highway 401/Stevenson Road interchange	Delete "Existing Interchange to be removed" designation	Park Road Interchange ramps were removed as part of Stevenson Road interchange reconfiguration (completed in 2009). Accordingly, ROP needs to be updated.
Highway 401 at Ritson Road interchange	-	Oshawa	MTO	Designated as "Existing Interchange to be removed"	Highway 401 EA Study (Brock Road to Courtice Road)	Replace with "Existing Interchange" designation.	MTO's Highway 401 (Brock Road to Courtice Road) Class EA and Preliminary Design Study shows a reconfiguration of the Ritson Road interchange (partial diamond) replacing the existing ramps at Drew Street and at Bloor Street. Accordingly, interchange will be upgraded and supplement planned improvements at the Simcoe Street interchange.
North-South Type C Arterial west of Simcoe Street	East-West Type C Arterial to Winchester Road	Oshawa	Oshawa	Future Type C	Oshawa OPA 179 (Growth Plan Conformity Exercise)	Delete section of future Type C arterial	Given this road's close proximity to Highway 407 north of Winchester Road, the ability to construct a grade separation over Highway 407 appears to be rather constrained, even with Highway 407 slightly below grade in this section. There is also some limited network connectivity with this road to the south, given the previous deletion of a future north-south Type C Arterial south of Winchester Road through the Tribute Windfields development in 2012 (ROPA #142) and, previously, a section of Type C Arterial through UOIT lands.
Stevenson Road (realignment)	Conlin Road to Taunton Road	Oshawa	Oshawa	Existing/Future Type B	Oshawa OPA 159 (Northwood employment area) and 179 (Conformity Exercise) propose to change from Type B to Type C arterial in Oshawa OP	Delete future Type B arterial realignment to Thornton Road; add existing Type C arterial designation to apply to existing road	Without the planned realignment of Stevenson Road to connect to Thornton Road through the Oshawa Executive Airport lands and Northwood employment area, the Type C arterial designation is more appropriate for this section of existing Stevenson Road.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Stevenson Road	North of Rossland Road to Conlin Road	Oshawa	Oshawa	Existing/Future Type B	Oshawa OPA 159 (Northwood employment area) and 179 (Conformity Exercise) proposes to delete realignment	Redesignate extension from existing/future Type B to Type C arterial	Eliminates potential impacts to Provincially Significant Wetlands. Redesignation of Thornton Road and Stevenson Road corridors to provide Type B and Type C continuous corridors.
Thornton Road	Conlin Road to Taunton Road	Oshawa	Oshawa	n/a	Oshawa OPA 159 (Northwood employment area) and 179 (Conformity Exercise) proposes to redesignate from Type C to Type B	Add existing Type B arterial designation	Without the planned realignment of Stevenson Road, the Type B arterial designation is more appropriate as sections to the north are already classified as a Type B arterial.
Thornton Road	Taunton Road to Rossland Road	Oshawa	Oshawa	Existing Type C	TMP Update	Redesignate from existing Type C to Type B arterial	Upgrade to Type B designation consistent with sections to the north. Provides Type B arterial connection between Highway 401 and 407 via Stevenson Road, Rossland Road and Thornton Road.
Clarington							
Courtice area							
Baseline Road	Prestonvale Road to Courtice Road	Clarington (Courtice)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C arterial designation	Recommended to be added to Clarington OP through OPA 107. Consistent with designation in Clarington OP east of Courtice Road, but not included in ROP.
Baseline Road	Courtice Road to Holt Road	Clarington (Courtice)	Clarington	n/a	Clarington OP, Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type C arterial.
Energy Drive/South Service Road	Highway 401 to Regional Road 57	Clarington (Courtice)	Clarington	Existing Type B arterial	Clarington OPA 107 (Clarington Official Plan Review); realignment of road	Redesignate as existing/future Type C and show alignment to match Energy Drive	ROPA #114 added the designation of South Service Road, from Courtice Road to Regional Road 57, as a Type B arterial. This road is designated as a Type C arterial in the Clarington Official Plan. The ROP Type B designation was given as this road connects the Courtice and Bowmanville urban areas (and Type Cs are primarily within urban areas), but the role and function of the road should more appropriately be classified as a Type C (similar to other roads in Region south of Highway 401). Further, the "rural" section of the road is relatively short adjacent to the Darlington Generating Station. Sections of Energy Drive have been constructed to a Type C arterial standard, and the ROP needs to be updated to show the realignment.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Future East-West Type C Arterial	Courtice Road to Hancock Road	Clarington (Courtice)	n/a	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add future Type C arterial designation	Recommended to be added to Clarington OP through Clarington OPA 107. Extension of arterial road from Courtice Road to Hancock Road will also provide a connection between the future transitway on Highway 418/Courtice Road. This future Type C arterial is an extension of the future Type B arterial extension of Townline Road west of Courtice Road.
Hancock Road	Regional Highway 2 to Bloor Street	Clarington (Courtice)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add future Type C arterial designation	The realigned Hancock Road forms the new east urban boundary of the Courtice area. It connects to the planned transitway stations along Highway 418 at Regional Highway 2 and Bloor Street.
Meadowglade Road	Extension from Courtice Road to Hancock Road	Clarington (Courtice)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add future Type C arterial designation	Extend Meadowglade Road easterly to Hancock Road to service the new urban area east of Courtice Road.
Nash Road	Townline Road to Trulls Road	Clarington (Courtice)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type C arterial.
Prestonvale Road	Hwy 2 to Bloor Street	Clarington (Courtice)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C arterial designation	The Clarington Draft OP upgrades roadway from Collector to Type C, consistent with section of Prestonvale Road south of Bloor Street.
Townline Road/Future East-West Type B Arterial	Southport Drive to Prestonvale Road	Clarington (Courtice)	Clarington	Future Type B arterial	Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Realign corridor	Clarington Draft OP provides updated alignment for future Type B arterial connection to Prestonvale Road and its continuous extension as a Type B arterial corridor to Courtice Road. Prestonvale Road would also have a Type B arterial designation from the Townline Road/Future East-West Type B Arterial to Highway 401.
Bowmanville area							
Bennett Road	Regional Highway 2 to East Beach Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type C arterial.
Bloor Street	Holt Road to Maple Grove Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C designation	Recommended to be added to Clarington OP through OPA 107.
Concession Street	Scugog Street to Liberty Street	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type C arterial.
Concession Street/ Concession Road 3	Lambs Road to North Street (in Newcastle)	Clarington (Bowmanville)	Clarington	Existing Type C arterial (Lambs Road to Providence Road)	Clarington OPA 107 (Clarington Official Plan Review)	Designate as existing Type B arterial	Recommended to be added and re-designated from a Type C to a Type B arterial in the Clarington OP through OPA 107. Creates continuous Type B arterial route linking the Bowmanville and Newcastle urban areas.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
East Beach Road	Port Darlington Road to Bennett Road (new construction between South Service Road and Bennett Road)	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing/future Type C arterial designation	Connects to South Service Road and future interchange at Lambs Road. Fulfills Type C arterial function similar to other roads located south of Highway 401 in Region. A portion of the road to be constructed though development of a plan of subdivision.
Future North-South Type C (Mearns Avenue)	Liberty Street to Concession Road 3	Clarington (Bowmanville)	Clarington	Future Type C arterial	Clarington OPA 107 (Clarington Official Plan Review)	Realign future Type C arterial as per Clarington OPA 107	Future extension of Mearns Avenue north of Concession Road 3 is realigned westerly to curve and connect to Liberty Street, eliminating the need to cross a watercourse/valley feature. Further study will be provided through secondary plan process, but connection to East-West Type C arterial (at Bowmanville north urban boundary) not required for capacity or active transportation.
Highway 401/Bennett Road interchange	-	Clarington (Bowmanville)	MTO	Designated as "Existing Interchange to be removed"	Clarington OPA 107 (Clarington Official Plan Review); maps show existing interchange, but text indicates closure of interchange once Lambs interchange is in place	Maintain "Existing interchange to be removed" designation	Bennett Road (south of Highway 2) is not designated as an arterial road in the Region's OP but provides access to Highway 401. It is the intention that Lambs Road (Type B) become the east gateway to Bowmanville with a future interchange at Highway 401 to replace the interchange at Bennett Road. The MTO Highway 401 Courtice Road to Durham East Boundary EA indicated improvements to the Liberty Road and Bennett Road interchanges but did not consider a future Lambs Road interchange. However, through this EA, MTO has identified the need for further study of a Lambs Road interchange to support future development.
Holt Road	Longworth Avenue to Hwy 2	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing Type B arterial designation	Connects Longworth Avenue (Type B) to Highway 2; subject to outcome of preferred alternative from ongoing Longworth Avenue EA Study.
Lake Road	Liberty Street to Port Darlington Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing Type C arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type C arterial.
Lambs Road extension	Highway 401 to East Beach Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing/future Type C arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing/future Type C arterial. Connects to East Beach Road (Type C arterial) and Highway 401 interchange, where Lambs Road becomes a Type B corridor north of the interchange.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Liberty Street	Taunton Road to Highway 407	Clarington (Bowmanville)	Durham	Existing Type B arterial	Clarington OPA 107 (Clarington Official Plan Review); Highway 407 East EA Study	Remove existing Type B arterial designation	Liberty Street will not have interchange with Highway 407. As such, designation of Liberty Street as a Type B arterial north of Taunton Road is not needed.
Longworth Avenue	Holt Road to Green Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add future Type B arterial designation	The Clarington TMP and OPA 107 recommends this section of road to be upgraded to a Type B Arterial. Subject to outcome of preferred alternative from ongoing Longworth Avenue EA Study.
Maple Grove Road	Highway 2 to Nash Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Do not designate as an arterial road	The Clarington Draft OP upgrades roadway from Local to Type B. However, Maple Grove Road is adjacent to Green Road which is already designated as a Type B arterial. Insufficient network spacing between Type B corridors.
Port Darlington Road	Lake Road to East Beach Road	Clarington (Bowmanville)	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing/future Type C arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing/future Type C arterial. Fulfills Type C arterial function similar to other roads located south of Highway 401 in Region. The Port Darlington Road Realignment EA study is currently underway, with a portion of the road to be constructed though development of a plan of subdivision.
Rest of Clarington							
Arthur Street	Concession Road 3 to King Avenue (Hwy 2)	Clarington	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type C designation	Arterial function is appropriate. Roadway will serve future growth area.
Concession Road 3	Hwy 35/115 to North Street	Clarington	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing Type B designation	Arterial function is appropriate. Roadway will serve future growth area. Connects North Street (Type B arterial) to Highway 35/115.
Concession Road 3	North Street to Arthur Street	Clarington	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Clarington TMP	Add existing Type C arterial designation	Arterial function is appropriate. Roadway will serve future growth area.
North Street	CP Rail to Concession Road 3	Clarington	Durham	Existing Type B arterial	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Modify alignment as per Clarington OP	Update alignment in ROP to be consistent with Clarington OP and draft approved plans of subdivision.

Road Name	Limits	Municipality	Current or Proposed Jurisdiction	Current Arterial Road Classification in ROP (Maps 'C1' and 'C2')	Basis for Review	Recommendation for ROP (Maps 'C1' and 'C2')	Background and Rationale
Solina Road	Taunton Road to Highway 407	Clarington	Clarington	Existing Type B arterial	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review); Highway 407 East EA Study	Remove existing Type B arterial designation	Solina Road will not have interchange with Hwy 407. Designation as a Type B arterial north of Taunton Road is not needed.
Solina Road	Nash Road to Regional Highway 2	Clarington	Clarington	n/a	Clarington OP; Clarington OPA 107 (Clarington Official Plan Review)	Add existing Type B arterial designation	The Clarington OP included this road section as a Type C arterial, but it was not included in ROP. Add to ROP as an existing Type B arterial. Its designation is consistent with the sections of Solina Road north of Nash Road.
Scugog							
Scugog Line 2	Highway 7/12 to Simcoe Street (at Shirley Road)	Scugog	Scugog	n/a	TMP Update	Designate to existing/future Type B arterial	Provides by-pass of Simcoe Street and Hwy 7A through Port Perry, from Highway 7/12 to Shirley Rd. Requires designation of missing section as a future Type B arterial between Old Simcoe Road and Simcoe Street. Would require construction of missing link and upgrades to corridor in order to fulfill a Type B arterial function.
Second Access - Scugog Island	Highway 7A to Island Road (RR #7)	Scugog	Scugog	n/a	TMP Update; Second Access EA Study by Township of Scugog (2007)	Do not designate as arterial road, more appropriate as Collector road in Scugog OP	The provision of a second access to Scugog Island would provide an emergency-related network redundancy function in time of need, but does not serve a Regional function.
Uxbridge							
Davis Drive	York-Durham Line to Concession 7 (RR #1)	Uxbridge	Uxbridge	Existing Type B Arterial	TMP Update	Remove existing Type B arterial designation	Road is continuous with York Region, but would require significant upgrades to a Regional road standard. Region is best to focus efforts on upgrades to Sandford Road, which is already constructed to a higher standard, than take jurisdiction over Davis Drive. However, recommend maintaining section of Davis Drive between Concession 7 and Lake Ridge Road as Type B arterial for network connectivity.
Sandford Road	York-Durham Line to Concession 7 (RR #1)	Uxbridge	Durham	n/a	TMP Update	Designate as Type B arterial	Regional road provides east-west connectivity from Concession 7 (RR #1) to York-Durham Line. Type B arterial designation is consistent with actual function of this road in the Regional road network.

APPENDIX B

Proposed Regional Road Intersection Modification Projects (2017 Capital Budget and Nine Year Forecast)

Intersection	Municipality	Estimated Cost	Proposed Year of Construction
Brock Road #1 / 7th Concession	Pickering	$2,700,000	2022
Brock Road #1 / Goodwood Road #21	Uxbridge	$3,000,000	2020
Regional Road #3 / Regional Road #57	Clarington	$2,600,000	2019
Taunton Road #4 / Anderson Street	Whitby	$1,000,000	2021
Taunton Road #4 / Enfield Road #34	Clarington	$5,000,000	2017
Taunton Road #4 / Courtice Road #34	Clarington	$3,400,000	2021
Taunton Road #4 / Regional Road #57	Clarington	$7,000,000	2021
Regional Road #12 / Lake Ridge Road #23	Brock	$3,700,000	2018
Ritson Road #16 / Beatrice Street	Oshawa	$1,100,000	2023
Bayly Street #22 / Sandy Beach Road	Pickering	$1,050,000	2023
Bayly Street #22 / Church Street #24	Pickering	$6,550,000	2020
Bayly Street #22 / Westney Road #31	Ajax	$700,000	2017
Victoria Street #2 / Brock Street #46	Whitby	$4,320,000	2023
Thickson Road #26 / Burns Street	Whitby	$700,000	2021
Thickson Road #26 / Rossland Road #28	Whitby	$3,900,000	2022
Rossland Road #28 / Cochrane Street #43	Whitby	$275,000	2021
Rossland Road #28 / Garden Street	Whitby	$2,500,000	2020
Salem Road #41 / Rossland Road #28	Ajax	$1,800,000	2022
Stevenson Road #53 / Phillip Murray Avenue #52	Oshawa	$520,000	2023
Townline Road #55 / Pebblestone Road	Oshawa/Clarington	$1,000,000	2018
Regional Road #57 / Concession 7	Clarington	$2,060,000	2023
Manning Road #58 / Brock Street	Whitby	$3,250,000	2019
King Street #Hwy 2 / Maple Grove Road	Clarington	$2,970,000	2017
King Street #Hwy 2 / Lambs Road	Clarington	$1,400,000	2023
Regional Highway #47 / Concession 6	Uxbridge	$1,450,000	2022

APPENDIX C

Proposed Regional Road Expansion Projects to 2031

ID #	Corridor	Limits	Description	Recommended Phasing	EA Status
1.2	Brock Road	Finch Avenue to Taunton Road	Widen from 5 to 7 lanes	2027-2031	Completed
1.3a	Brock Road	Taunton Road to Whitevale Road	Widen from 2 to 4 lanes	2017-2021	Completed
1.3b	Brock Road	Taunton Road to Whitevale Road	Widen from 4 to 6 lanes	2027-2031	Completed
1.5	Brock Road	Whitevale Road to Highway 7	Widen from 4 to 6 lanes	2027-2031	Completed
2.1	Simcoe Street	Conlin Road to Winchester Road	Widen from 2/4 to 5 lanes	2017-2021	Completed
2.2	Simcoe Street	King Street to Greenway Boulevard	Widen from 2 to 3 lanes	2027-2031	Completed
3.1a	Winchester Road	Baldwin Street to Anderson Street/Watford Street	Widening from 2 to 3 lanes	2017-2021	Completed
3.1b	Winchester Road	Anderson Street/Watford Street to Garrard Road	Widening from 2 to 5 lanes	2017-2021	Completed
4.1	Taunton Road	York-Durham Line to Brock Road	Widen from 4 to 6/7 lanes	2027-2031	Completed
4.2	Taunton Road	Brock Road to Brock Street	Widen from 5 to 6/7 lanes	2027-2031	Not started
4.3	Taunton Road	Brock Street to Simcoe Street	Widen from 5 to 6/7 lanes	2027-2031	Not started
5.1	Central Street	Canso Drive/William Street to Brock Road	Urbanize and improve corridor	2022-2026	Not started
14.1	Liberty Street	Baseline Road to King Street	Widen from 2 to 3 lanes	2017-2021	Not started
16.1	Ritson Road	Taunton Road to Conlin Road	Widen from 2/3 to 5 lanes	2022-2026	Not started
16.2	Ritson Road	Conlin Road to Britannia Avenue	Widen from 2 to 4 lanes	2027-2031	Not started
17.1	North Street	North of the CPR to Concession Road 3	Construct new alignment and widen from 2 to 3 lanes	2027-2031	Not started
22.1	Bayly Street	Liverpool Road to Brock Road	Widen from 5 to 6/7 lanes	2022-2026	Not started

ID #	Corridor	Limits	Description	Recommended Phasing	EA Status
22.2a	Bayly Street	Brock Road to Westney Road	Widen from 5 to 7 lanes	2027-2031	Not started
22.2b	Bayly Street	Westney Road to Harwood Avenue	Widen from 5 to 7 lanes	2022-2026	Not started
22.3	Bayly Street	Harwood Avenue to Salem Road	Widen from 4 to 6 lanes	2027-2031	Not started
22.5	Victoria Street	South Blair Street to west of Thickson Road	Construct new alignment and widen from 2 to 5 lanes	2017-2021	Completed
22.6	Victoria Street	East of Thickson Road to west of Stevenson Road	Widen from 2/3 to 4/5 lanes	2017-2021	Completed
22.8	Bloor Street	Ritson Road to Farewell Street	Widen from 3 to 5 lanes	2027-2031	Not started
22.10	Bloor Street	Harmony Road to Grandview Drive	Construct new alignment to 4 lanes, with new CPR grade separation and bridge crossing of Farewell Creek	2022-2026	Not started
22.12	Bloor Street	Prestonvale Road to Courtice Road	Widen from 2 to 3 lanes and improve profile	2022-2026	Not started
23.1	Lake Ridge Road	Bayly Street/Victoria Street to Kingston Road/Dundas Street	Widen from 2 to 4/5 lanes	2017-2021	In progress
23.2	Lake Ridge Road	Kingston Road/Dundas Street to Rossland Road	Widen from 2 to 4/5 lanes	2022-2026	Not started
25.1	Consumers Drive	East of Thickson Road to Thornton Road	Construct new 3 lane connection	2017-2021	Completed
26.1	Thickson Road	Wentworth Street to CNR Kingston	Widen from 2 to 4 lanes	2017-2021	Completed
26.2	Thickson Road	Consumers Drive to Dundas Street	Widen from 5 to 7 lanes	2022-2026	Not started
26.3	Thickson Road	Taunton Road to Highway 407	Widen from 2 to 4/5 lanes	2022-2026	Not started
26.4	Thickson Road	Winchester Road to Baldwin Street	Widen from 2 to 4/5 lanes	2022-2026	Not started
27.1	Altona Road	Strouds Lane to Finch Avenue	Widen from 2 to 3 lanes	2027-2031	Completed

ID #	Corridor	Limits	Description	Recommended Phasing	EA Status
28.4	Rossland Road	Ritson Road to Harmony Road	Widen from 3 to 5 lanes	2022-2026	Not started
28.5	Rossland Road	Harmony Road to east of Townline Road	Construct new alignment to 3 lanes including new bridge crossing of Harmony Creek tributary	2027-2031	10 Year Time Lapse: Review & Addendum Required
28.6a	Rossland Road	Brock Road to Sideline 24	Construct new alignment to 4 lanes with CPR grade separation	2017-2021	Completed
28.6b	Rossland Road	Sideline 24 to Whitevale Road Realignment	Construct new alignment to 5 lanes	2017-2021	Completed
28.7	Rossland Road	Whitevale Road Realignment to Highway 7	Construct new alignment to 5 lanes	2022-2026	Completed
29.1	Liverpool Road	Highway 401 to Kingston Road	Widen from 5 to 6 lanes	2022-2026	Not started
31.1	Westney Road	Bayly Street to Highway 401	Widen from 5 to 7 lanes	2022-2026	Not started
31.2	Westney Road	Highway 401 to Kingston Road	Widen from 5 to 7 lanes	2022-2026	Not started
31.4	Westney Road	Rossland Road to Taunton Road	Widen from 2 to 5 lanes	2017-2021	Completed
31.5	Westney Road	Hamlet of Greenwood	Construct new Greenwood Bypass to 2 lanes south of Highway 7 and 4 lanes to Highway 407	2022-2026	Completed
33.1	Harmony Road	Rossland Road to Taunton Road	Widen from 3 to 5 lanes	2017-2021	Completed
33.2	Harmony Road	Taunton Road to Conlin Road	Widen from 2/3 to 5 lanes	2017-2021	Completed
33.3	Harmony Road	Conlin Road to Britannia Avenue	Widen from 2 to 4 lanes	2027-2031	Not started
35.1	Wilson Road	Bloor Street to Olive Avenue	Widen from 2/3 to 4 lanes	2027-2031	Not started
36.1	Hopkins Street	Victoria Street to Consumers Drive	Construct new 4-lane overpass of Highway 401	2022-2026	Completed
36.2	Hopkins Street	Consumers Drive to Dundas Street	Widen from 2 to 3 lanes, with new CPR grade separation	2027-2031	Not started

ID #	Corridor	Limits	Description	Recommended Phasing	EA Status
37.1	Finch Avenue	Altona Road to Brock Road	Widen from 2 to 3 lanes	2022-2026	Not started
38.2	Whites Road	Kingston Road to Finch Avenue	Widen from 5 to 6 lanes including structure widening	2022-2026	Not started
38.3	Whites Road	Finch Avenue to Third Concession Road	Widen from 2 to 6 lanes, with new CPR grade separation	2022-2026	Completed
38.4	Whites Road	Third Concession Road to Taunton Road	Construct new alignment to Sideline 26 (future Whites Rd connection) and widen from 2 to 6 lanes across West Duffins Creek (1.1 km)	2022-2026	Completed
38.5	Whites Road	Taunton Road to Whitevale Road	Construct new connection to 6 lanes	2017-2021	Completed
38.6a	Whites Road	Whitevale Road to Highway 7	Construct new alignment to 4 lanes	2017-2021	Completed
38.6b	Whites Road	Whitevale Road to Highway 7	Widen from 4 to 6 lanes	2027-2031	Completed
52.1a	Thornton Road	Champlain Avenue to north of Consumers Drive Extension	Widen from 2 to 3 lanes	2017-2021	Completed
52.1b	Thornton Road	North of Consumers Drive Extension to King Street	Widen from 2 to 4 lanes, with new CPR grade separation	2022-2026	Not started
53.1	Stevenson Road	CPR Belleville to Bond Street	Widen from 4 to 5 lanes	2027-2031	Not started
53.2	Stevenson Road	Bond Street to Rossland Road	Widen from 3/4 to 5 lanes	2027-2031	Not started
57.1	Regional Road 57	Baseline Road to south of King Street	Widen from 2 to 4 lanes	2017-2021	In progress
57.2	Regional Road 57	South of King Street to north of Stevens Road	Widen from 2 to 4 lanes	2017-2021	In progress
57.3	Regional Road 57	North of Stevens Road to north of Nash Road	Widen from 2 to 4 lanes	2022-2026	In progress
58.1	Manning Road/Adelaide Ave	Garrard Road to Thornton Road	Construct new connection to 3 lanes, with new crossing of Corbett Creek	2017-2021	Completed

ID #	Corridor	Limits	Description	Recommended Phasing	EA Status
58.2	Adelaide Avenue	Townline Road to Trulls Road	Construct new bridge crossing of Farewell Creek and new 3-lane connection	2022-2026	Completed
59.1	Gibb Street	East of Stevenson Road to Simcoe Street	Widen from 3 to 4/5 lanes	2017-2021	Completed
59.2	Gibb Street / Olive Avenue	Simcoe Street to Ritson Road	Construct new connection and widen from 2/3 lanes to 4/5 lanes	2022-2026	Completed
99.1a	Whitevale Road	Brock Road to West limit of Phase 1	Construct new connection to 4/5 lanes. Widen existing portion from 2 to 4 lanes.	2017-2021	Completed
99.1b	Whitevale Road	West limit of Phase 1 to east of West Duffins Creek	Construct new connection to 4/5 lanes	2017-2021	Completed
99.2	Whitevale Road	York-Durham Line to east of West Duffins Creek	Construct new 2-lane connection	2027-2031	Completed
99.3	Whitevale Road	East of Sideline 16 to Brock Road	Widen from 2 to 4 lanes	2022-2026	Completed
102.7	Regional Highway 2	East of Newcastle	Widen railway overpass tunnel from 1 to 2 lanes (bridge replacement)	2027-2031	Not started
112.1	Brock Street (Regional Highway 12)	Rossland Road to Taunton Road	Widen from 3 to 5 lanes	2017-2021	Completed
112.2	Baldwin Street (Regional Highway 12)	Taunton Road to Highway 407	Widen from 2 to 4/5 lanes	2022-2026	Not started
147.1	Regional Highway 47	York-Durham Line to Goodwood Road	Road Widening from 2 to 4 lanes with intersection modifications	2022-2026	Not started

Proposed Road Expansion Projects Beyond 2031

RR	Corridor	Limits	Description	Recommended Phasing	EA Status
1	Brock Road	Highway 7 to Seventh Concession Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
1	Brock Road	Bridges over Highway 401 and CNR/GO Rail corridor	Widen bridges to 6/7 lanes	Beyond 2031	Not started
2	Simcoe Street	Winchester Road to Howden Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
3	Winchester Road	Garrard Road to Simcoe Street	Widen from 2 to 4 lanes	Beyond 2031	Not started
4	Taunton Road	Simcoe Street to Townline Road	Widen from 5 to 6/7 lanes	Beyond 2031	Not started
22	Bloor Street	Grandview Drive to Prestonvale Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
23	Lake Ridge Road	Highway 7 to Brawley Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
27	Altona Road	Finch Avenue to Taunton Road	Widen from 2 to 4 lanes, with new CPR grade separation	Beyond 2031	Not started
27	Altona Road	Taunton Road to Whitevale Road Extension	Widen from 2 to 4 lanes	Beyond 2031	Not started
29	Liverpool Road	Bridge over Highway 401 and CNR/GO Rail corridor	Widen bridge over Highway 401 to accommodate cycling facilities	Beyond 2031	Not started
33	Seventh Concession Road	Brock Road to Westney Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
31	Westney Road	Bridges under Highway 401 and CNR/GO Rail corridor	Widen bridges to 6/7 lanes	Beyond 2031	Not started
31	Westney Road	Highway 407 to Seventh Concession Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
33	Harmony Road	Britannia Avenue to Winchester Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started

RR	Corridor	Limits	Description	Recommended Phasing	EA Status
34	Courtice Road	Taunton Road to Enfield Road	Construct new connection and realignment north of Taunton Road	Beyond 2031	Not started
34	Courtice Road	Bloor Street to Highway 401	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
35	Wilson Road	Olive Avenue to Bond Street	Widen from 3 to 4 lanes	Beyond 2031	Not started
42	Darlington-Clarke Townline	Regional Highway 2 to Concession Street	Widen from 2 to 3 lanes	Beyond 2031	Not started
55	Townline Road	Olive Avenue to Bloor Street	Construct new bridge crossing of Farewell Creek, with widening of approach roads from 2 to 3 lanes	Beyond 2031	Not started
55	Townline Road	Adelaide Avenue to Pebblestone Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
55	Townline Road	Pebblestone Road to Taunton Road	Widen from 2 to 3 lanes	Beyond 2031	Not started
59	Gibb Street	Stevenson Road to Thornton Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
RHwy2	King Street	Townline Road to Highway 418	Widen from 4/5 lanes to 7 lanes	Beyond 2031	Not started
RHwy2	King Street / Regional Highway 2	Mearns Avenue to Highway 35/115	Widen from 2 to 4 lanes	Beyond 2031	Not started

Non-Regional Roads					
	Baseline Road	Holt Road to Regional Road 57	Widen from 2 to 4 lanes	Beyond 2031	Not started
	Baseline Road	Lambs Road to Regional Highway 2	Construct new 4 lane road.	Beyond 2031	Not started
	Bloor Street	Courtice Road to Holt Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Brawley Road	Lake Ridge Road to Highway 7/12	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Brawley Road	Highway 7/12 to Thornton Road	Construct new 4 lane road.	Beyond 2031	Not started

RR	Corridor	Limits	Description	Recommended Phasing	EA Status
	Brock Concession Road 8	Lake Ridge Road to Highway 12	Upgrade to Type A Arterial standard and realign to Ravenshoe Road	Beyond 2031	Not started
	Clements Road	Church Street to west of Westney Road	New 2-lane arterial over Duffins Creek	Beyond 2031	Not started
	Cochrane Street extension and new east-west midblock arterial	Highway 7 to Garrard Road	New 4-lane arterial	Beyond 2031	Not started
	Columbus Road	Lake Ridge Road to Whitby/Oshawa boundary	Widen from 2 to 4/5 lanes and realign to connect to Seventh Concession Road	Beyond 2031	Not started
	Columbus Road	Whitby/Oshawa boundary to Grandview Street	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Consumers Drive Extension	Thornton Road to Fox Street (at Laval Drive)	Construct new 2 lane or 4 lane connection to Stevenson Road (via Laval Drive) with grade separation at CP Rail spur line	Beyond 2031	Not started
	Eighth Concession Road	Brock Road to Lake Ridge Road	Widen from 2 to 4 lanes	Beyond 2031	Not started
	Harmony Road	Winchester Road to Highway 407	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Harmony Road	Highway 407 to Columbus Road	Upgrade to Type A Arterial standard when assumed by the Region	Beyond 2031	Not started
	Holt Road	Regional Highway 2 to Bloor Street	Widen from 2 to 3 lanes	Beyond 2031	Not started
	Holt Road	Bloor Street to Highway 401	Widen from 2 to 3 lanes with grade separation at CP Rail	Beyond 2031	Not started

RR	Corridor	Limits	Description	Recommended Phasing	EA Status
	Highway 7	York-Durham Line to Brock Road	Widen 2 to 4 lanes	Beyond 2031	Not started
	King Street	Harmony Road to Townline Road	Widen from 4/5 lanes to 7 lanes	Beyond 2031	Not started
	Kingston-Bayly Connector (Downtown Pickering, hydro corridor west of Brock Road)	Kingston Road to Bayly Street	Construct new connection, including grade separations at Highway 401 and CN/GO rail corridor	Beyond 2031	Not started
	Lambs Road	Durham Highway 2 to Highway 401	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	New arterial road extension of Garden Street	North of Robert Attersley Drive to east-west mid-block arterial	New 2/4-lane arterial	Beyond 2031	Not started
	Notion Road-Squires Beach Road connection across Highway 401	Pickering Parkway to Kellino Street	New crossing of Highway 401 with grade separation at CN/GO Rail corridor	Beyond 2031	Not started
	Salem Road	Highway 7 to Eighth Concession Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Scugog Line 2	Highway 7/12 to Simcoe Street	Upgrade and extend across missing section between Old Simcoe Road and Simcoe Street	Beyond 2031	Not started
	Seventh Concession Road	Westney Road to Lake Ridge Road	Widen from 2 to 4/5 lanes and connect to realigned Columbus Road	Beyond 2031	Not started

RR	Corridor	Limits	Description	Recommended Phasing	EA Status
	Stevenson Road	North of Rossland Road to Taunton Road	Construct new 4/5-lane connection and widen existing section from 2 to 4/5 lanes (if Oshawa Executive Airport closes)	Beyond 2031	Not started
	Thornton Road	Taunton Road to Howden Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Townline Road	Taunton Road to Conlin Road	Widen from 2 to 3 lanes	Beyond 2031	Not started
	Townline Road	Conlin Road to Winchester Road	Construct new 3-lane road and grade separation over Highway 407	Beyond 2031	Not started
	Westney Road	Seventh Concession Road to Eighth Concession Road	Widen from 2 to 4/5 lanes	Beyond 2031	Not started
	Highway 48	Lake Ridge Road to Highway 12	Widen as part of future Highway 404 extension	Beyond 2031	Complete