Background Report

Future Needs Assessment Report

York Region Transportation Master Plan

Prepared for Regional Municipality of York
by IBI Group

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1 Introduction

York Region's 2016 Transportation Master Plan (TMP) is an update to the 2009 Transportation Master Plan and the 2008 Pedestrian and Cycling Master Plan. It is the Region's plan to achieve the transportation related goals of Vision 2051, the objectives of the York Region Official Plan (2010) and the 2015 to 2019 Strategic Plan. The TMP is shaped by Provincial policy, aligned with existing Regional and local policies and informed by stakeholder input. It will guide planning and investment in the Region's transportation network, policy implementation and service development.

1.1 TMP Update Process

The process to development of the 2016 TMP consists of four main stages:

Stage 1: Understanding what is happening in York Region:

This stage examined baseline information including information on travel patterns and behaviour, demographic and land use trends and critical issues. It also included a review of progress since the previous 2009 TMP. This review served to inform the plans key policy topics and strategic priorities. The TMP Background Report B *Foundations Report* presents the key results of this phase.

Stage 2: Determining transportation priorities and opportunities

The second stage focused on the identification of needs and opportunities based on existing and projected travel patterns and trends. These trends then inform the development of network scenarios and critical infrastructure improvements to address future needs and opportunities. This *Future Needs Assessment Report* summarizes the analysis undertaken for this phase.

Stage 3: Creating transportation solutions for tomorrow

The third stage builds on the previous stages to identify required strategies and actions to achieve the preferred network scenario. These strategies and actions are presented in the main TMP report.

Stage 4: Implementing the plan

The final stage of the TMP serves to detail the proposed projects, strategies and actions including the development of project costs and phasing. This stage also included the development of project summary sheets (under a separate cover) which includes an evaluation of specific projects, including a more detailed examination of need, impacts and alternatives on a corridor basis.

1.2 Purpose of Report

The purpose of this report is to document the needs assessment (Stage 2) and development of and analysis of network scenarios (Stage 3) for the York Region Transportation Master Plan Update.

The needs assessment examines future conditions and travel trends to the year 2041 and compares different network scenarios and their ability to address future needs.

The primary focus of this report is on road and transit network needs. The development of pedestrian and cycling networks is presented in a separate background report.

1.3 Key Trends

The TMP Background Report B *Foundations Report* (under separate cover) provides an analysis of key trends that have been occurring in York Region. Among the key findings are a number of trends that inform the future needs assessment:

1.3.1 Population and Employment

York Region was the fastest growing region in the GTHA between 2001 and 2011 in absolute terms. From 2001 to 2011, it grew by more than 300,000 people, making it the seventh largest census subdivision in Canada. Markham and Vaughan saw the largest growth adding 96,100 people and 109,000 people, respectively, and accounting for 66% of York Region's growth. This rapid growth in the southern portion of York Region has been positive for transit, but has also led to increased congestion on York Region's main arterial roads.

1.3.2 Travel patterns

York Region is becoming an increasingly attractive place to live and work and a higher proportion of people are adjusting their behaviour to bring their origins and destinations closer together. As a result, there has been an increasing percentage of trips remaining internal to York Region. In 1991, 48% of motorized AM peak period trips were internal. By 2001, this had grown to 56% and by 2011, 60%. It is also worth noting that an increasing number of motorized trips are remaining inside their own local municipality, increasing from 37% in 2001 to 41% in 2011.

One of the challenges with these patterns is that presently only 3% of all trips internal to York are made by transit in the AM peak period. This is a stark contrast to trips made to Downtown Toronto in the AM peak period, of which 74% were made by transit in 2011.

These trends highlight the need to make transit, as well as walking and cycling, more competitive for trips that start and end in York Region.

1.3.3 Travel behaviour

The majority of trips in York Region are currently made by private automobiles. Auto mode share has remained relatively unchanged since 2001 at 83% (70% auto driver and 13% auto passenger). This has resulted in more than 100,000 new auto trips hitting York Region's roads since 2001. Among other modes:

- On a percentage basis, cycling trips increased substantially, but their overall share remains less than 1% of the AM peak period total
- Overall transit share (GO+YRT/Viva) increased from 7% to 10%, a testament to the success of Viva and improvements to GO train service

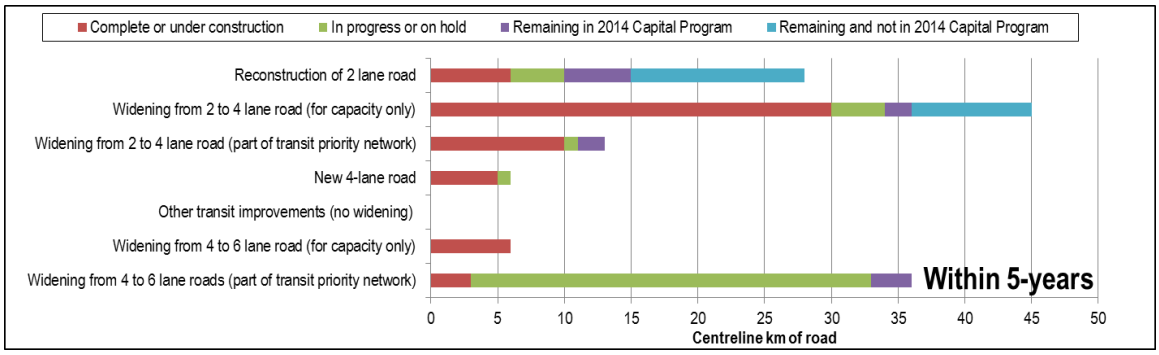
These trends highlight a major risk for York Region. In simple terms, for every 10 new trips that are added, seven of these trips will be made by car drivers if current travel behaviour continues. This reinforces the need to identify aggressive actions to provide greater mode choice for York Region residents and employees and to adopt strategies that shift travel behaviour (i.e. reduce, re-time, re-mode). However, it also highlights the reality that road improvements to address auto travel growth will still be required.

1.3.4 Transportation Supply

York Region Transit has made significant progress on expanding transit networks and service hours. Overall, transit service hours increased by 12% over the five year period from 2009 to 2014. Service levels on the GO Train saw even more rapid increased with a 33% increase in seats provided.

In contrast to transit, there has been relatively little increase in road supply. Between 2009 and 2014, overall lane kilometres increased by 4% (133 lane-km). This is significantly less than the planned level of road expansion in the 2009 TMP for the five year period. Very little progress was made on the planned transit priority network (widening from 4 to 6 lanes).

Exhibit 1.1: Progress on 5 year road plan from 2009 TMP



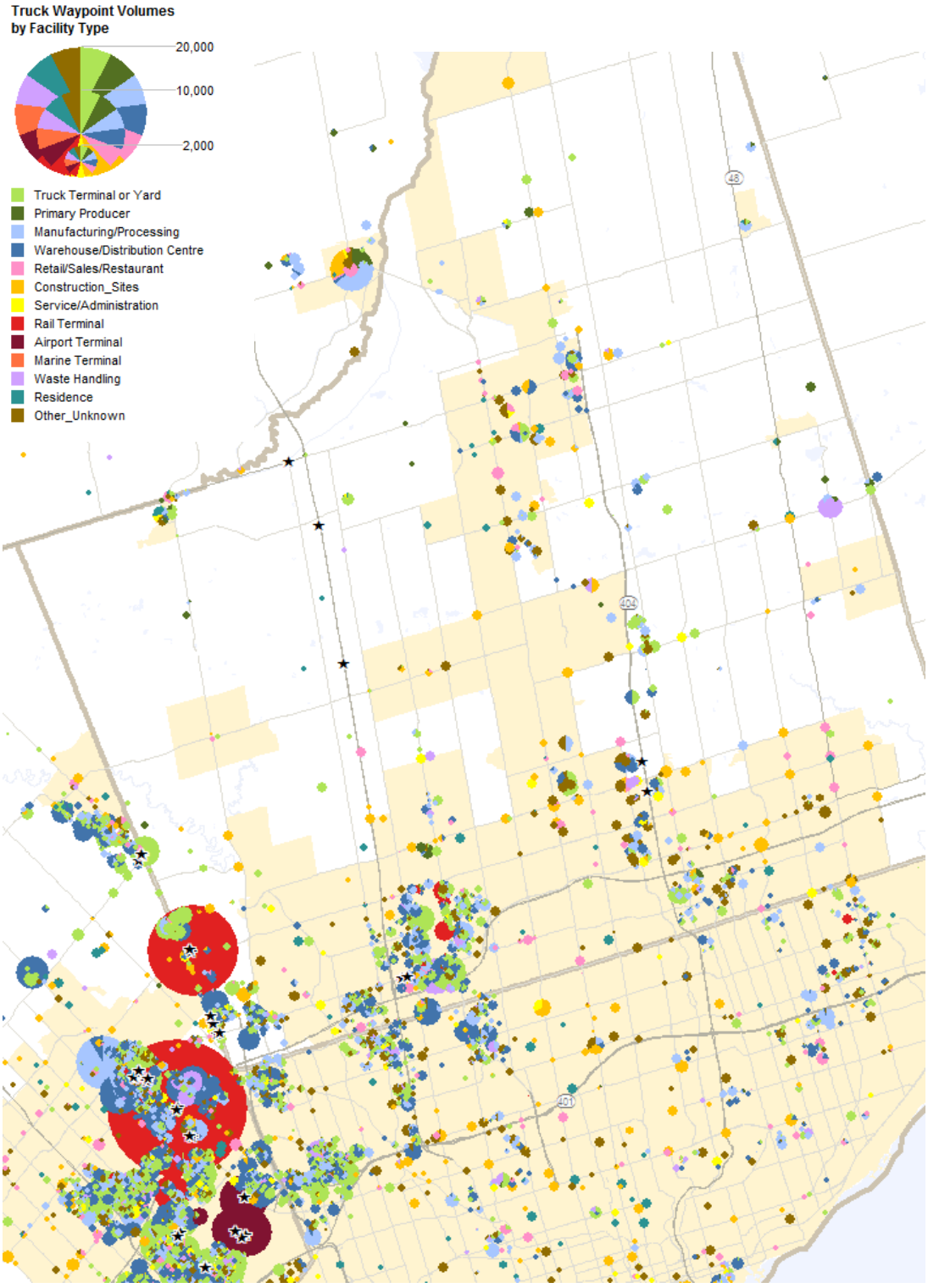
1.3.5 Goods Movement

York Region generates a significant amount of goods movement activities. Based on data from the Ministry of Transportation's 2012 Commercial Vehicle Survey (CVS) it is estimated that truck trips destined to/from York Region account for 17% of all truck trips in Ontario.

As shown on Exhibit 1.2, employment areas along Highway 400 and Highway 404 have the largest concentration of truck trips. Large concentrations are observed around the CN MacMillan Rail Yard in Vaughan (a rail to rail intermodal hub), the CP Vaughan intermodal terminal on Highway 50, as well as the CN intermodal terminal in Peel Region.

Given the significance of goods movement to York Region's economy, the needs of trucks (and rail) must be considered as part of the network development process. One of the major challenges in areas with high truck volumes is balancing the need to accommodate trucks with competing needs for pedestrians, cyclists and transit.

Exhibit 1.2: Truck Activity in York Region



Source: Map created by IBI Group using data from 2012 Ministry of Transportation Commercial Vehicle Survey

1.4 Public Input

Engagement with the public and stakeholders was a key component of the development of the TMP. York Region reached out to the public through open houses, fairs, kiosks in community centres, 'pop ups' at GO stations and shopping centres, and through social media and online tools.

Some of the key themes of input received by the project team through the consultation and engagement process were:

- Addressing traffic congestion
- Road widening – both for and against
- Improving transit service and connectivity
- Providing a more connected sidewalk and bikeway network
- Addressing needs of changing demographics and aging population
- Managing parking

Details on the TMP engagement process are provided under separate cover in the TMP Background Report A *Consultation and Engagement Summary Report*.

An on-line survey conducted during Phase 1 of the TMP gathered input from over 2,000 respondents. When asked to rank their priorities, 81% of respondents rated congestion management as their first or second priority out of 8 options. About 50% of locations identified on a map of York Region cited traffic congestion as an issue or opportunity (including 23% citing heavy traffic).

Respondents also rated transit as a high priority with 63% of respondents rating Public Transit as their first or second priority out of 8 options, with local route improvements rated as the most important initiative. Of those who rated Public Transit as a priority, 87% support continued Viva expansion and investment in rapidways.

1.5 Travel Demand Model

The key tool to assess future conditions and the development of the proposed transportation network is the York Region Travel Demand Forecasting Model. The York Region Model is a conventional four-step multi-modal transportation forecasting model that was last updated by the York Region in 2014 and validated to 2011 Transportation Tomorrow Survey (TTS) data and cordon counts. The York Region Model is described at length in *York Region Travel Demand Forecasting Model Update Report* dated June 30, 2014 and a subsequent memorandum on the 2011 York Region Model Validation dated August 8, 2014. These documents were used for background information on the application of the Model for the York Region TMP.

The Model predicts AM weekday peak period travel demands for motorized modes – transit, automobile driver and automobile passenger. The Model includes the Greater Toronto and Hamilton Area (GTHA) as well as external areas including the Counties of Peterborough, Simcoe, Dufferin, and Wellington and the Regional Municipalities of Waterloo, Niagara Falls and Brant/Brantford.

The model zone system is based on the 2006 GTA traffic zone system, and further refined with an additional 41 disaggregated zones in York Region for a total of 519 zones for York Region. The modified zone system is referenced as the 2011 zone system.

2 Understanding the Challenge

York Region is home to over one million people, the third largest municipality in Ontario, and one of the fastest growing urban regions in Canada. York Region is projected to grow to 1.8 million people and 900,000 jobs by 2041. This growth continues past trends of rapid expansion and urbanization, particularly in the southern municipalities. The result of rapid growth is increased pressure on transportation infrastructure throughout York Region. Congestion continues to be an issue with impacts on travel times, economic productivity, and quality of life. The Transportation Master Plan update will assess whether the current policies and plan will meet the future needs of York Region to the year 2041.

2.1 Development Growth

Population

Today, 1.1 million people live in York Region. In the 25 years between 1986 and 2011, York Region's population tripled from 350,600 to 1,065,500 at an average rate of almost 5% per year. In the upcoming 30 years (2011 to 2041), rapid growth in York Region will continue with a projected increase of 646,000 people, or growth of almost 2% per year, as shown in Exhibit 2.1.

Exhibit 2.1: York Region Population Growth—1986 to 2041

Population	1986	2011	2041	Average Annual Growth			
				1986 2011		2011 2041	
York Region	350,600	1,065,500	1,790,000	4.5%	28,600	1.7%	24,200

Source: 1986 data from Census, 2011 and 2041 data from York Region.

A substantial proportion of the growth has occurred in the southern municipalities of York Region in Markham, Vaughan and Richmond Hill, a trend that will continue. Historically, the City of Vaughan has been the fastest growing at an average of over 6% per year. Looking forward, the Town of East Gwillimbury will become the fastest growing municipality with an average growth of 6% per year.

Employment

Employment, measured as the number of jobs in York Region, has also been growing rapidly, although not quite at the same pace as population. In the 20 years between 1991 and 2011, employment has more than doubled. Even so, the average annual rate of growth of 4% is slower than that of population at 5% annually.

Over the next 30 years (2011 to 2041), the pace of employment growth will exceed that of population, with over 390,000 jobs created, as shown in Exhibit 2.2. The major employment centres are currently located in the southern municipalities of Markham and Vaughan. However, employment in East Gwillimbury has been growing rapidly and will continue to lead growth over the next 30 years.

Exhibit 2.2: York Region Employment Growth—1991 to 2041

Employment	1991	2011	2041	Average Annual Growth			
				1991 2011		2011 2041	
York Region	224,300	510,000	900,000	4.2%	14,300	1.9%	13,000

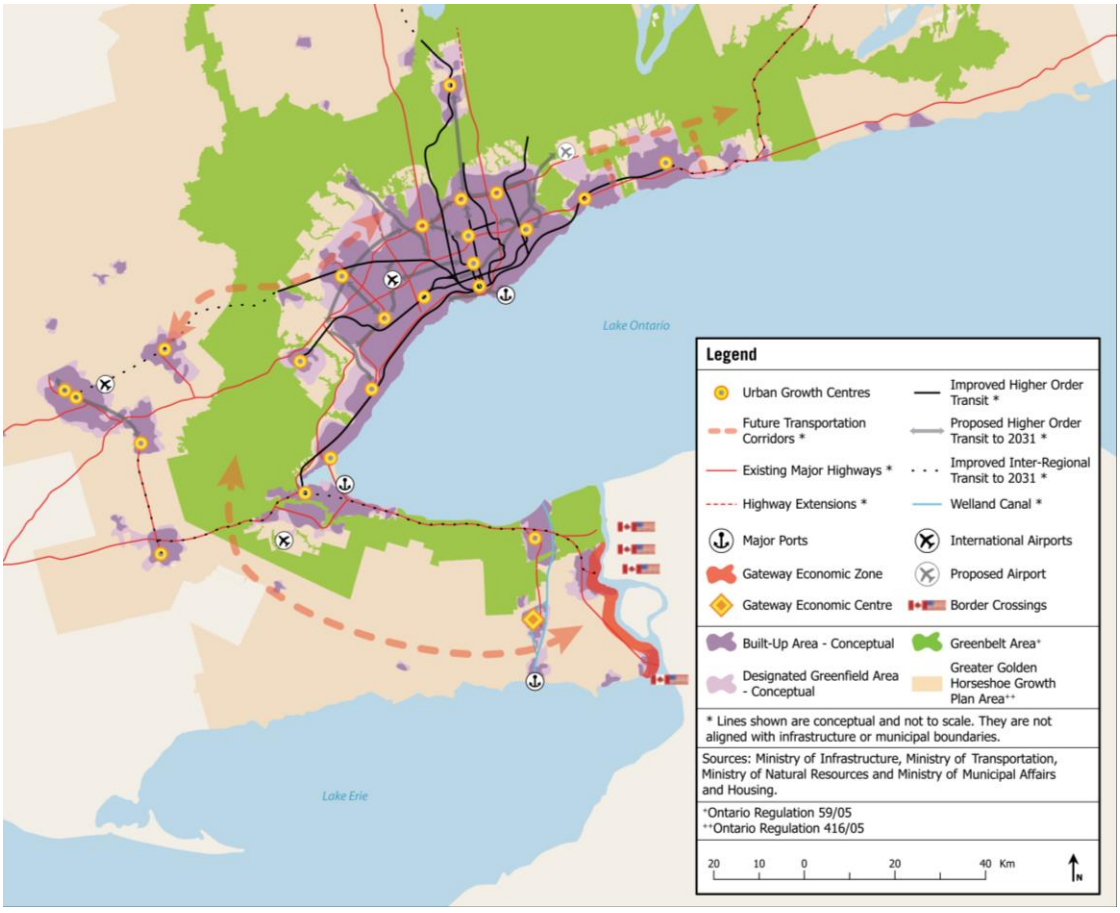
Source: 1991 data from TTS (1986 TTS did not collect place of work data), 2011 and 2041 data from York Region.

Allocation of Growth

Through the Growth Plan for the Greater Golden Horseshoe, the Province has implemented policy direction to direct growth and the supporting transportation infrastructure. Four urban growth centres are identified within York Region – Markham Centre, Newmarket Centre, Richmond Hill / Langstaff Gateway and Vaughan Metropolitan Centre. These urban centres are to be the focus of major transit infrastructure with a significant share of the population and employment growth. The Places to Grow Concept is illustrated in Exhibit 2.3.

In May 2016, the Province released the Proposed Growth Plan for the Greater Golden Horseshoe for public input and feedback. Changes in the Proposed Growth Plan includes a higher minimum intensification target in the built up area (60%, up from 40%). If approved, updates to the distribution of population and employment forecasts in York Region would be required. For the purpose of the York Region TMP, three alternative growth scenarios were assessed to identify the implications of higher intensification targets. These scenarios are discussed in Section 2.3.

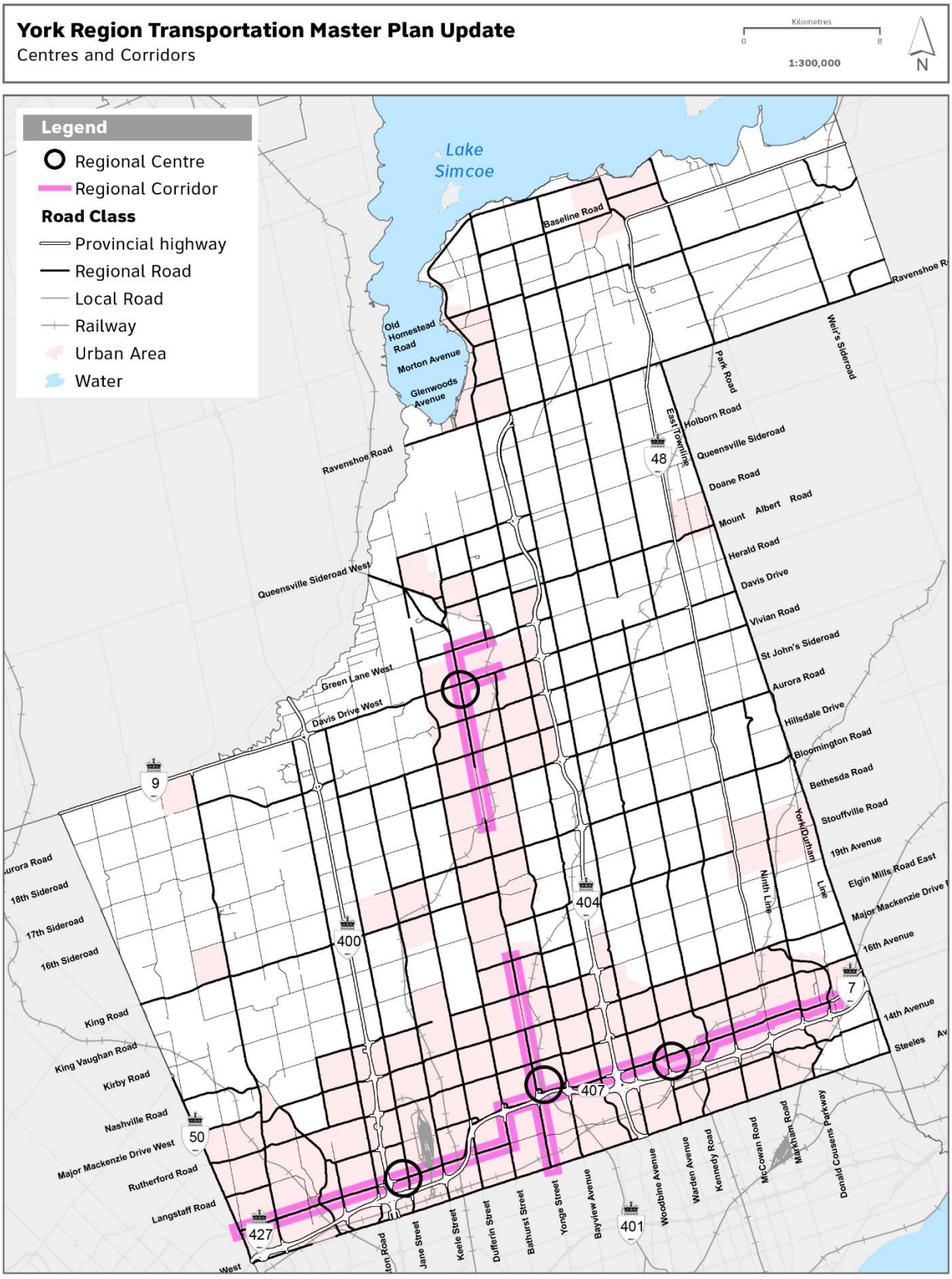
Exhibit 2.3: Places to Grow Concept



Source: Schedule 2 of the Growth Plan for the Greater Golden Horseshoe

The York Region Official Plan (2010) builds upon the policy framework from the provincial growth plan in identifying the Regional Structure (see Exhibit 2.4). The Regional Structure is made up of four Regional Centres, which coincide with the Province's Urban Growth Centres, and the Regional Corridors of Yonge Street and Highway 7, along with two shorter segments of Green Lane and Davis Drive.

Exhibit 2.4: Regional Structure

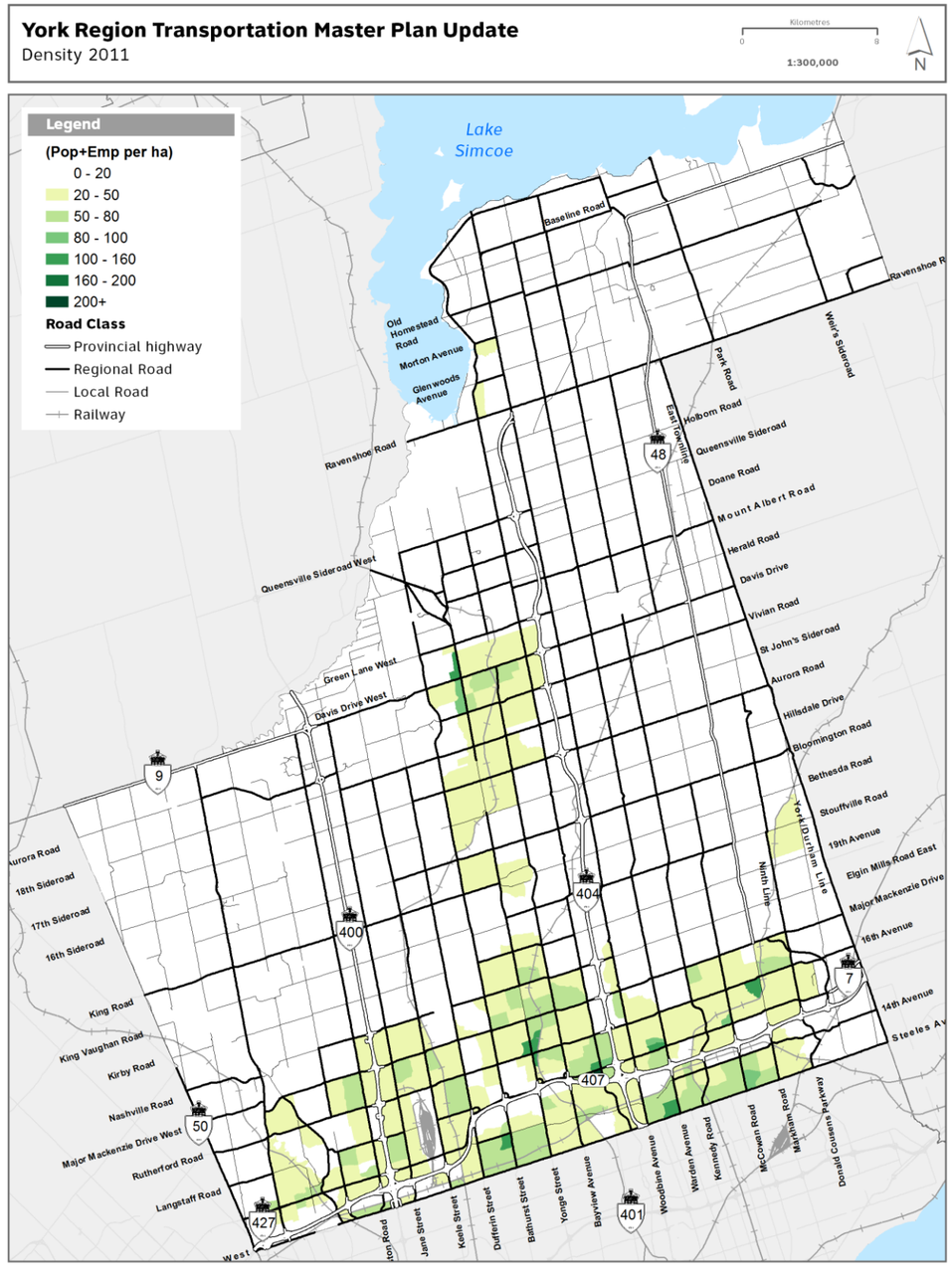


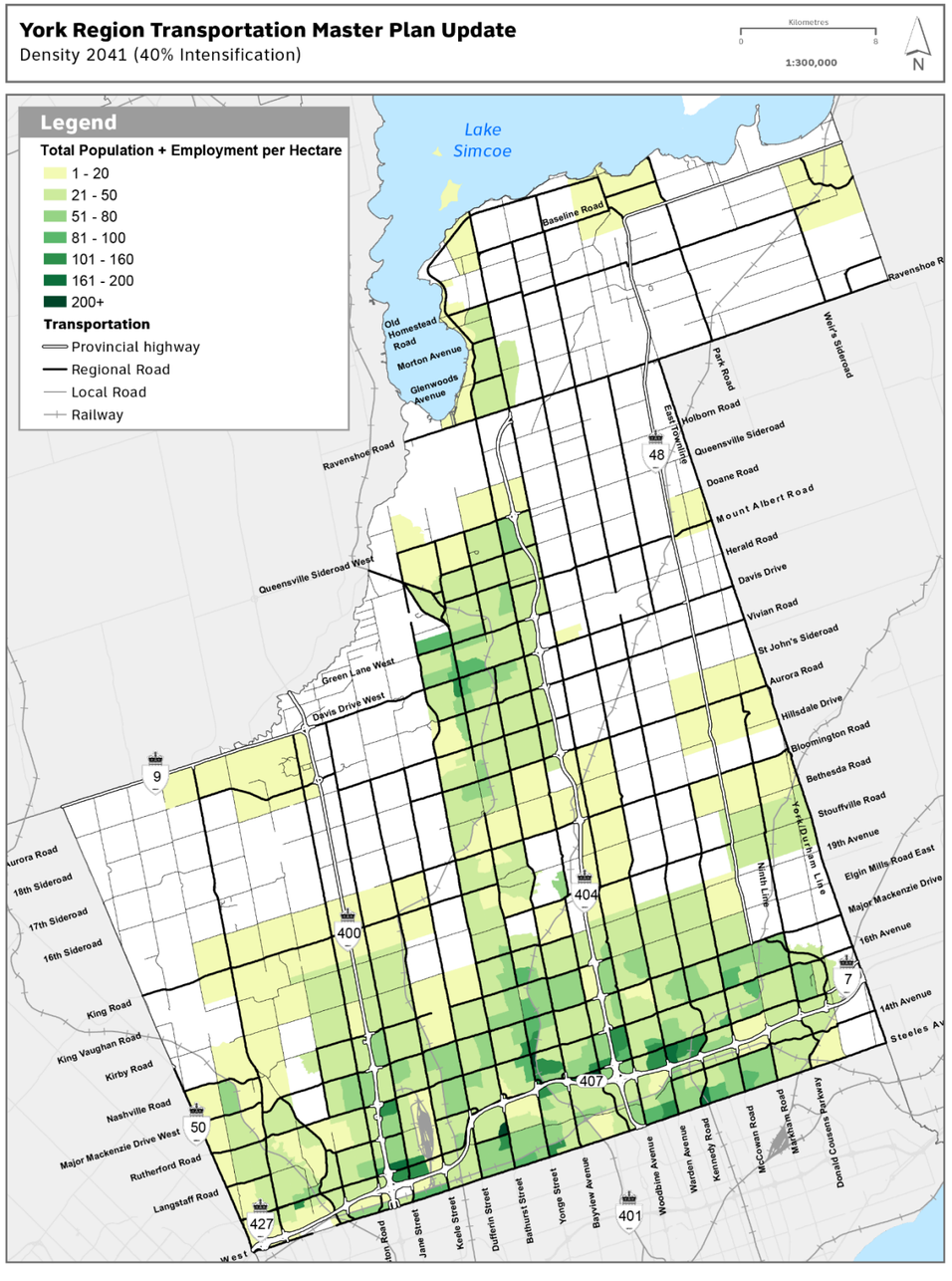
York Region's growth management targets focus the projected growth to built-up areas within York Region, with the highest levels of intensification in the Regional Centres. The growth management targets as outlined in the York Region Official Plan (2010) include:

- Minimum 40% of residential intensification within the built-up area by 2015 and beyond
- Minimum 50 residents and jobs per hectare within the designated greenfield areas
- 2.5 floor space index in the Regional Centres
- 3.5 floor space index in and around major subway stations

Land use density is a major factor in supporting transit development. Higher density land uses are needed to generate and attract the levels of transit demand required for a successful and effective system. The existing and future land use densities are shown in Exhibit 2.5. While intensification is observed throughout the urban area, the areas along the Yonge Street and Highway 7 corridors have some of the highest land use densities. These densities are needed to support the rapidways under construction on these corridors.

Exhibit 2.5: 2011 and 2041 Land Use Density





2.2 Travel Demand Growth

The rapidly evolving nature of York Region affects the transportation choices of the people who live and work in York Region. Origin and destination patterns, mode choice preferences, and the magnitude of trips are changing as York Region becomes more urbanized.

Future travel demand was estimated for the 2041 horizon year using the York Region Model. The future travel demand documented in this report is based on the land use projections provided by the Region and a 2041 base network (see Section 3.3 for more information) which includes improvements from the Region's 10-year capital program, funded rapid transit services and funded highway improvements.

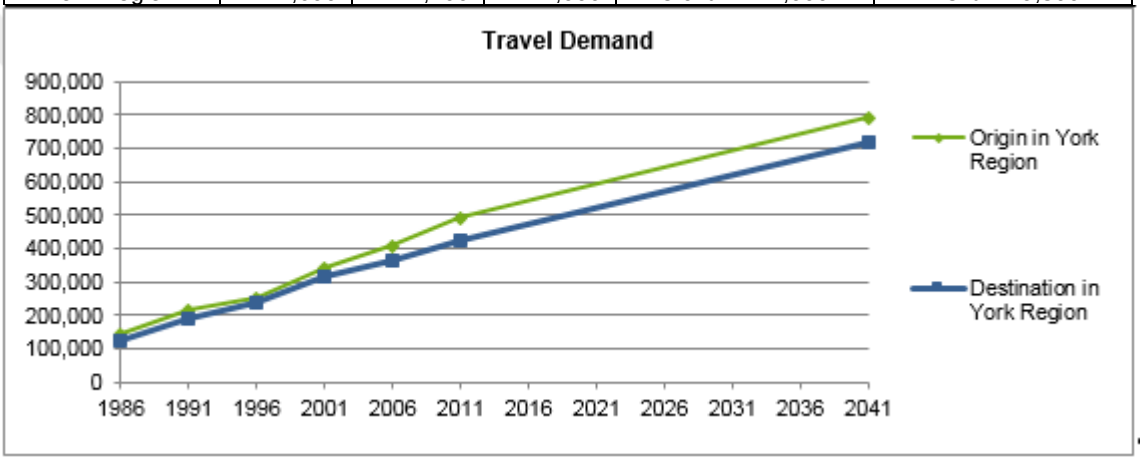
For comparison purposes, historic travel demand for transit and automobile (driver and passenger) have been extracted from the Transportation Tomorrow Survey (TTS) database. The TTS is a comprehensive travel survey that has been undertaken every 5 years since 1986. The 2011 survey is the most recent completed survey and provides a baseline of existing travel demand.

Travel Demand Growth

The result of growth in population and employment in York Region is the associated growth in travel demand. Exhibit 2.6 presents the historic and projected motorized travel demand originating in York Region as well as destined to York Region. In the last 25 years, travel demand has been increasing at an average of 5% per year, slightly faster than population growth. Over the next 30 years, demand is expected to grow about 2% per year, keeping pace with population growth. Overall, travel demand in York Region is projected to grow by 61% compared to population growth of 68% over the same period.

Exhibit 2.6: Growth in Trips Starting in York Region (AM Peak Period)

	Trips			Average Annual Growth			
	1986	2011	2041	1986 2011		2011 2041	
Trip Origin in York Region	144,900	492,300	791,000	5.0%	13,900	1.6%	10,000
Trip Destination in York Region	127,600	427,200	721,000	5.0%	12,000	1.8%	9,800



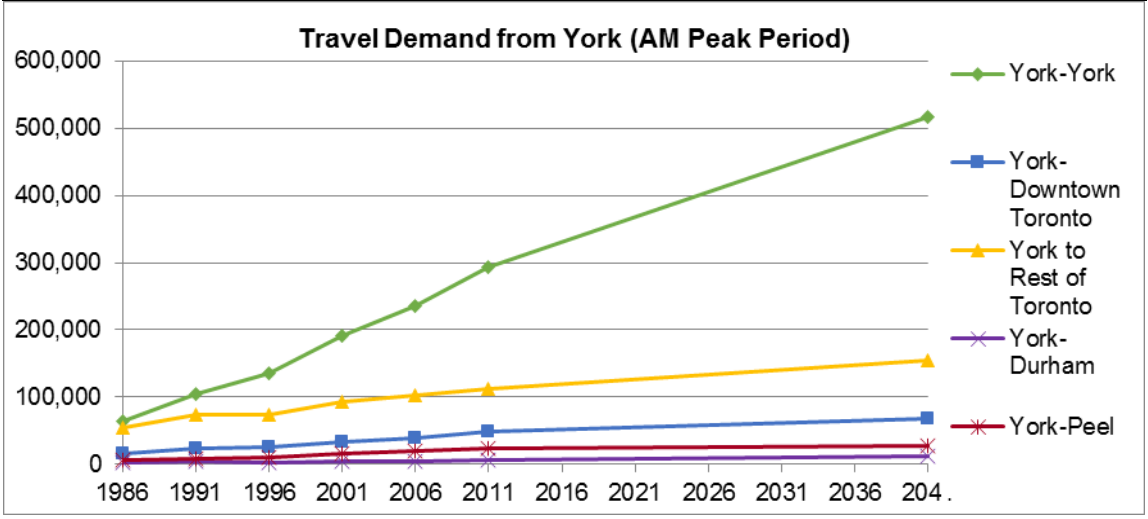
Source: 1986 to 2011 Transportation Tomorrow Survey. 2041 York Region Model.

Origin-Destination Travel Patterns

As York Region has become more urbanized, it has also become more self-contained. Exhibit 2.7 presents AM peak period trips originating in York Region by destination. The growth of York Region to York Region trips has been the fastest growing market with trips almost quadrupling in the 25 year period. Internal York Region to York Region trips will continue to be the most significant growth segment as intra-regional trips are predicted to grow 77% by 2041 while total trips originating in York Region grows 61% over the same time period. Three-quarters of all new trips originating in York Region will be internal trips.

Exhibit 2.7: Trips Originating in York Region (AM Peak Period)

	Trips			Growth			
Origin Destination	1986	2011	2041	1986 2011		2011 2041	
York-York	63,400	293,000	517,300	229,600	362%	224,300	77%
York-Downtown Toronto	16,000	49,600	68,600	33,600	210%	19,000	38%
York-Rest of Toronto	55,300	111,700	155,000	56,300	102%	43,400	39%
York-Durham	2,000	6,200	12,600	4,200	207%	6,400	104%
York-Peel	5,900	23,100	27,800	17,200	289%	4,700	21%
York Other	2,200	8,700	9,600	6,600	304%	900	11%
Total from York	**144,900**	**492,300**	**791,000**	**347,400**	**240%**	**298,800**	**61%**



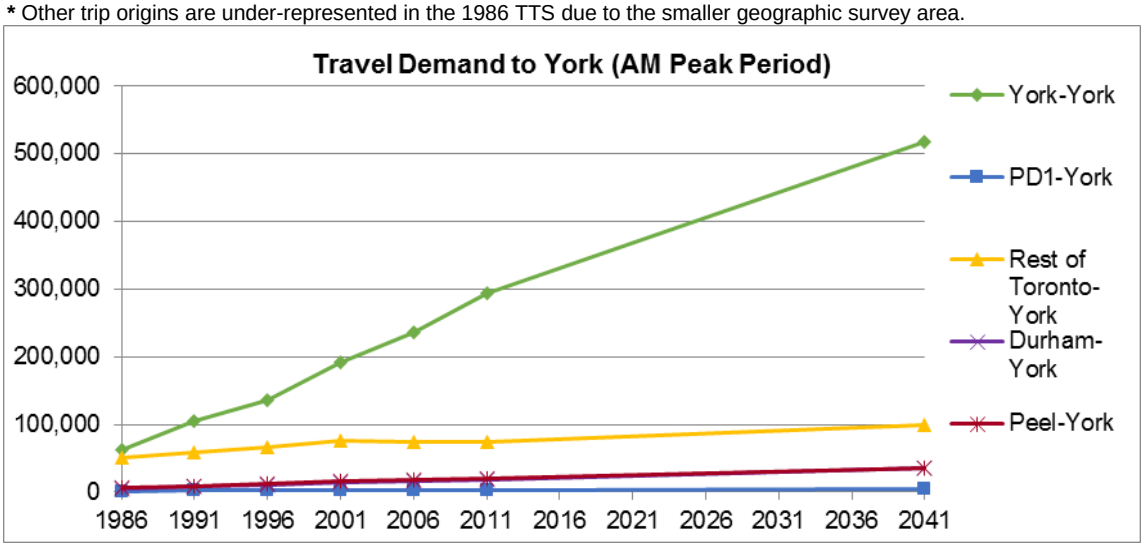
Source: 1986 to 2011 Transportation Tomorrow Survey. 2041 York Region Model.

Exhibit 2.8 presents the AM peak period trips destined to York Region by origin. Historically, York Region has been, and will continue to be, a net exporter of trips in the AM peak period. That is, there remains a component of York Region that remains a commuter suburb to Toronto. However, looking forward, the growth in new trips destined to York Region exceeds that of new trips originating in York Region.

Exhibit 2.8: Trips Destined to York Region (AM Peak Period)

Origin Destination	Trips			Growth			
	1986	2011	2041	1986 2011		2011 2041	
York-York	63,400	293,000	517,300	229,600	362%	224,300	77%
PD1-York	1,700	3,200	4,700	1,500	85%	1,500	47%
Rest of Toronto-York	50,400	74,500	99,100	24,100	48%	24,600	33%
Durham-York	4,100	17,500	35,000	13,300	321%	17,500	100%
Peel-York	6,800	20,600	35,900	13,800	204%	15,400	75%
Other-York	1,100	18,500	29,000	17,400	1544%	10,400	6%
Total to York	**127,600**	**427,200**	**721,000**	**299,600**	**235%**	**293,700**	**69%**

***** Other trip origins are under-represented in the 1986 TTS due to the smaller geographic survey area.



Source: 1986 to 2011 Transportation Tomorrow Survey. 2041 York Region Model.

In the last 25 years, more trips stay within York Region (growing from 44% to 60%). This significant change can be attributed those formerly commuting to York Region relocating to also live in York Region.

The most significant travel demand partner for York Region remains the City of Toronto. Although there has been a decrease in interaction with Toronto as a percentage of total trips, the travel demands between York Region and its southern neighbour far exceed the total interactions between York Region and all its other municipal neighbours combined.

The origin-destination trends for the AM peak hour indicate that York Region is developing into a more established urban area where more residents can choose to live, work and play.

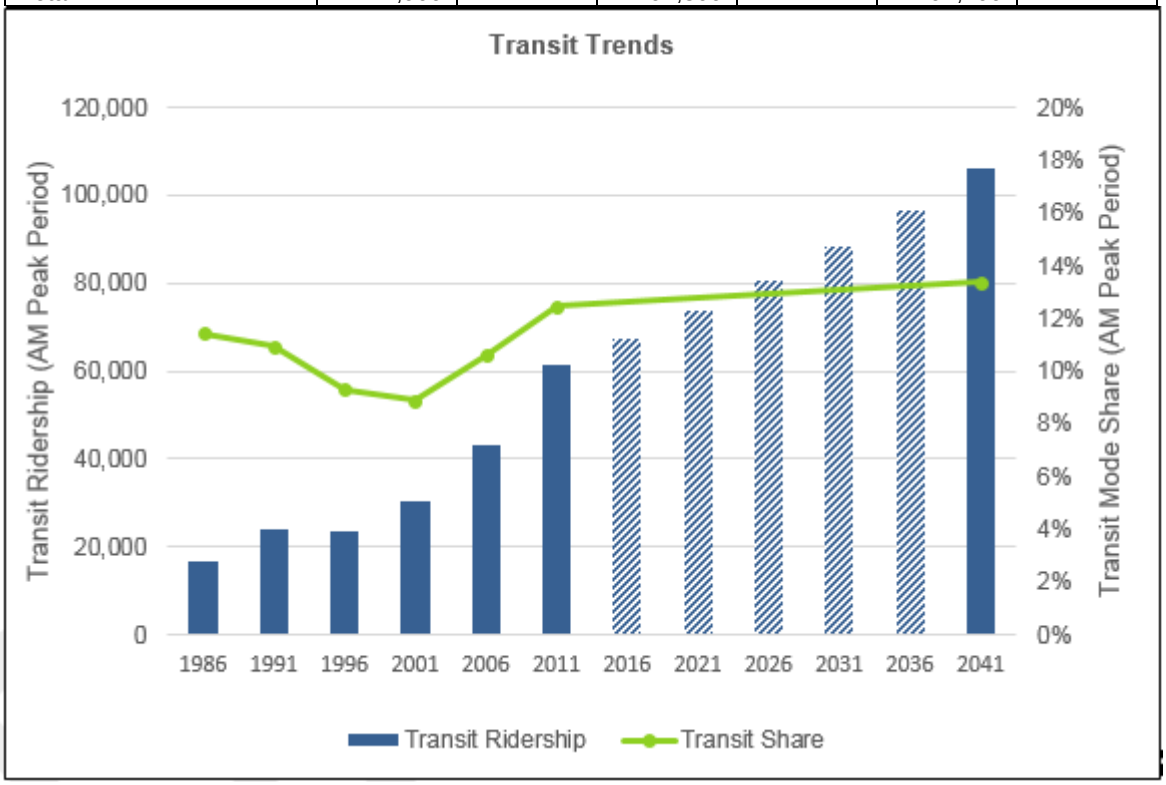
Travel Modes

As the distribution patters of trips to and from York Region has changed, so too has the travel modes of those trips. In the 15 years after 1986 (1986 to 2001) there was a downward trend in transit mode share with very little growth in transit ridership while auto trips increased rapidly. Since 2001, with the amalgamation of the five municipal transit systems to form York Region Transit (YRT) in 2001, the launch of Viva services in 2005, YRT service improvements and expansion to GO Train services, there has been an increase in transit share from a low of 8.9% in 2001 to 12.5% in 2011.

Looking forward, the predicted change in transit share over the next 30 years is similar to past growth, see Exhibit 2.9, as projected in the Model's base case estimation and existing trends and travel characteristics upon which the model was calibrated.

Exhibit 2.9: Mode Share Trends for Trips Originating in York Region (AM Peak Period)

Mode	1986		2011		2041 Base Case	
	Trips	Mode Share %	Trips	Mode Share %	Trips	Mode Share %
Transit (Local, GO)	16,600	11.4%	61,300	12.5%	106,000	13.4%
Auto (Driver+Passenger)	128,300	88.6%	430,900	87.5%	685,100	86.6%
Total	144,900		492,300		791,100	



Source: 1986 and 2011Transportation Tomorrow Survey. 2041 York Region Model.
Notes: Excludes modes that are not modelled in the York Region Model.

Mode share is strongly related to travel distribution patterns and the availability of transit connecting a specific origin-destination pair. Exhibit 2.10 summarizes transit trips originating in York Region by destination and Exhibit 2.11 summarizes the trips destined to York Region by origin.

In the 25-year period between 1986 and 2011, transit trips have tripled for internal York Region trips and for York Region to downtown Toronto trips. The growth in transit trips is partially due to the population growth in York Region but also a strong attraction for jobs in downtown Toronto, a high level of congestion on the roadway network towards downtown Toronto, and the availability of GO Rail, GO Bus and YRT connections to downtown Toronto. Transit improvements within York Region, such as the Viva Rapidways, serve both local trips and facilitate trips connecting to other transit services to Toronto.

Exhibit 2.10: Transit Trips Originating in York Region (AM Peak Period)

	Transit Trips			Growth			
Origin Destination	1986	2011	2041	1986 2011		2011 2041	
York-York	2,600	10,100	23,300	7,500	292%	13,300	132%
York-PD1	8,600	36,500	55,900	27,800	323%	19,500	53%
York-Rest of Toronto	5,300	14,000	24,100	8,700	167%	10,100	72%
York-Durham	0	300	300	300	-	0	0%
York-Peel	0	300	2,100	300	611%	1,700	545%
York-Other	100	200	200	100	175%	0	0%
Total from York	16,600	61,300	106,000	44,800	270%	44,600	73%

Source: 1986 to 2011Transportation Tomorrow Survey. 2041 York Region Model

Exhibit 2.11: Transit Trips Destined to York Region (AM Peak Period)

	Transit Trips			Growth			
Origin Destination	1986	2011	2041	1986 2011		2011 2041	
York-York	2,600	10,100	23,300	7,500	292%	13,300	132%
PD1-York	400	700	1,200	200	53%	600	84%
Rest of Toronto-York	5,600	6,700	12,400	1,100	19%	5,800	86%
Durham-York	0	0	1,800	0	0%	1,700	6427%
Peel-York	100	500	1,500	400	258%	1,000	185%
Other-York	0	100	300	100	229%	200	131%
Total to York	8,900	18,100	40,600	9,300	105%	22,500	124%

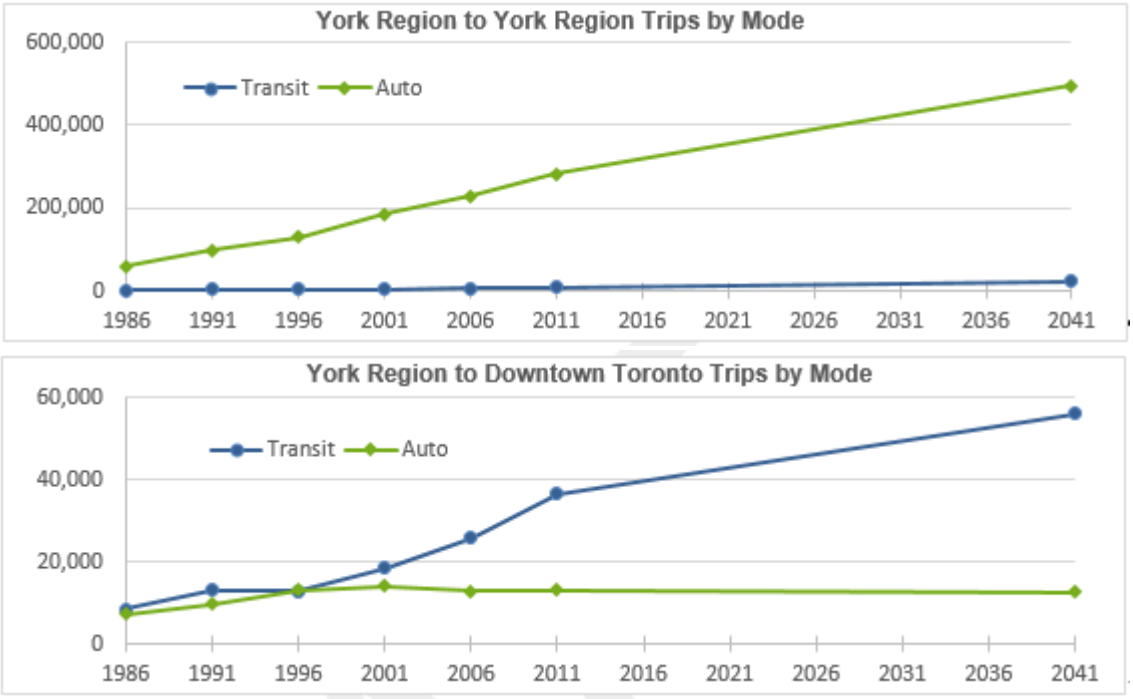
Source: 1986 and 2011 Transportation Tomorrow Survey. 2041 York Region Model.

Internal York Region trips is the most significant component of travel in York Region, representing over 517,000 total trips in the AM peak period. However, internal York Region trips are predominantly made by the automobile, either as a driver or passenger, as shown in Exhibit 2.12. If current travel trends continue, the travel demand forecast model predicts that the 2041 transit share for internal York Region trips will remain low, at about 5%.

In comparison, there has been a significant shift in travel by transit from York Region to downtown Toronto. The total volume of automobile trips to downtown Toronto has remained fairly constant since 1986 with all new trips to downtown Toronto being made by transit. Transit share for trips to downtown Toronto is anticipated to increase from 54% in 1986 to 82% in 2041.

The increased transit share to downtown Toronto is a significant achievement and supports increased capacity that will be provided by the Toronto York Spadina Subway Extension and the planned Yonge North Subway Extension and Regional Express Rail. However, it is only one component of overall travel demand; York Region to downtown Toronto trips represent about 10% of total demand generated in York Region.

Exhibit 2.12: Mode Trends for York to York Trips (AM Peak Period)



Source: 1986 to 2011Transportation Tomorrow Survey. 2041 York Region Model

Transit mode choice is highly dependent on commuter flow patterns. Transit share from York Region to downtown Toronto is about three times higher than the reverse from downtown Toronto to York Region. Transit share for all York Region trips by origin-destination are presented in Exhibit 2.13.

Exhibit 2.13: Transit Share for Trips Originating in York Region (AM Peak Period)

Origin Destination	Transit Share		
	1986	2011	2041
Trips Originating in York Region			
York-York	4.1%	3.4%	4.5%
York-Downtown Toronto	54.0%	73.5%	81.6%
York-Rest of Toronto	9.5%	12.5%	15.6%
York-Durham	0.0%	4.8%	2.5%
York-Peel	0.8%	1.4%	7.4%
York-Other	3.2%	2.1%	1.7%
Total from York	**11.4%**	**12.5%**	**13.4%**
Trips Destined within York Region			
York-York	4.1%	3.4%	4.5%
Downtown Toronto-York	25.4%	21.1%	26.4%
Rest of Toronto-York	11.2%	9.0%	12.6%
Durham-York	0.7%	0.2%	5.0%
Peel-York	2.2%	2.6%	4.2%
Other-York	4.0%	0.8%	1.2%
Total to York	**6.9%**	**4.2%**	**5.6%**

Source: 1986 to 2011 Transportation Tomorrow Survey. 2041 York Region Model.

2.3 Alternative Growth Scenarios

Analysis completed in preparation of the TMP tested the impacts of three alternative growth scenarios on travel patterns and network performance. The total growth for York Region is the same under all scenarios, with a total population of 1.8 million and employment of 900,000, and thus the resulting overall travel demands are similar. Comparing the three alternatives of 40% intensification, 50% intensification and 'No Urban Boundary Expansion' (equivalent of approximately 65% intensification), the following was projected:

- 2% to 2.5% more transit trips in the higher intensification scenarios due to higher densities in the built up and future urban areas
- 1% to 2% reduction in auto vehicle-kilometres travelled due to more compact development and higher transit share in the higher intensification scenarios
- 6% to 7% fewer road sections that are severely congested

A higher intensification scenario will:

- Reinforce the justification for planned rapid transit corridors, including the Yonge North Subway Extension
- Improve the cost recovery of transit services proposed for designated growth areas
- Support planned improvements for active transportation and "first and last mile" connections

A higher intensification scenario will not substantially change the recommended transportation networks. Areas of difference include:

- Reduced or postponement of the need for certain roadway expansion projects in growth areas including North Markham, North Vaughan and East Gwillimbury
- Potential for accelerated implementation of rapid transit corridors on the remaining sections of Yonge Street and Highway 7, as well as new corridors on Major Mackenzie, Leslie Street, Woodbine Avenue and Steeles Avenue
- Frequent Transit Network can be more compact

The analysis of future needs in this report is based on the growth scenario with 40% of residential growth in the built boundary (i.e. 40% intensification scenario).

3 Future Conditions

As discussed in Chapter 2, population and employment growth will increase travel demand in York Region by about 60% by 2041. Without additional transportation capacity to accommodate this growth, significant capacity constraints on the transportation system are expected.

The assessment of future conditions in this chapter is based on the growth scenario with 40% of residential growth in the built boundary (i.e. 40% intensification scenario).

3.1 Do Nothing Network Scenario

A 2041 Do Nothing Network scenario was assessed to identify constraints on the network in the case where additional transportation capacity is not provided. The 2041 Do Nothing Network includes the extension of Highway 404 north of Green Lane to Woodbine Avenue that was not in the 2011 Network, but no other network improvements beyond the 2011 existing conditions.

A review of traffic volumes at a screenline level identified major traffic constraints. Screenlines are used to provide a quantitative measure of network performance to identify key capacity constrained locations and takes into account all the roadways that cross the screenline, grouping the demands and capacities of parallel roads to assess the network at a broader scale. A screenline is usually defined as a line along a roadway, boundary or natural barrier. For this assessment, screenlines defined in the previous York Region TMP were used (see Exhibit 3.1).

The screenline analysis results for the existing conditions and 2041 Do Nothing conditions are shown in Exhibit 3.2. Significant capacity constraints are evident in the central parts of York Region, especially east-west travel crossing the Highway 400 and Highway 404 screenlines and north-south travel crossing the South York screenline.

It is noted that the screenlines traverse the whole of York Region and the inclusion of roads in more rural areas of York Region generally skew the screenline results such that localized congestion areas are masked. A network plot of all road links and their respective volume-to-capacity ratio is shown in Exhibit 3.3, which illustrates the extent of traffic constraints in the York Region network.

Exhibit 3.1: Screenline Locations

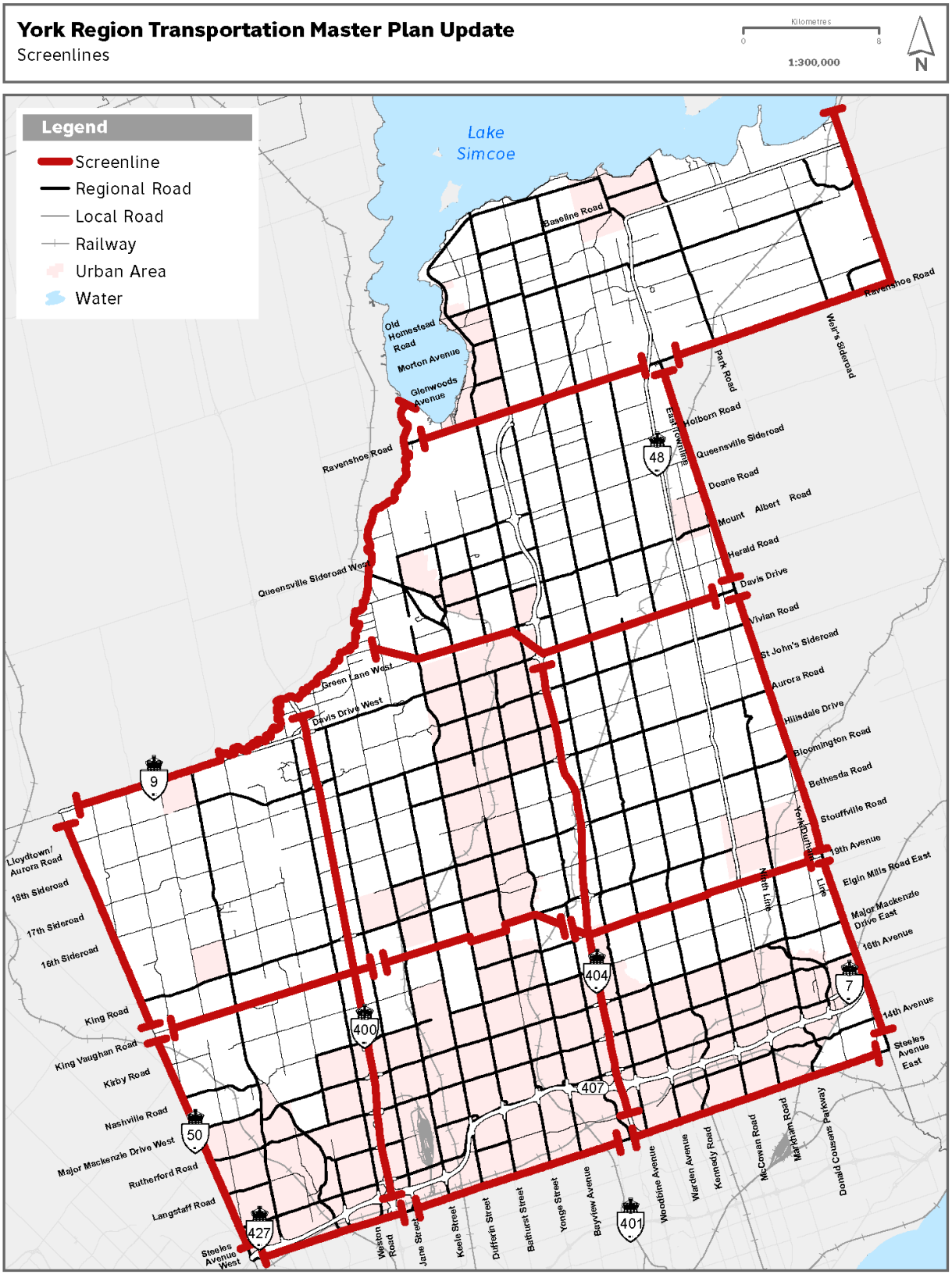
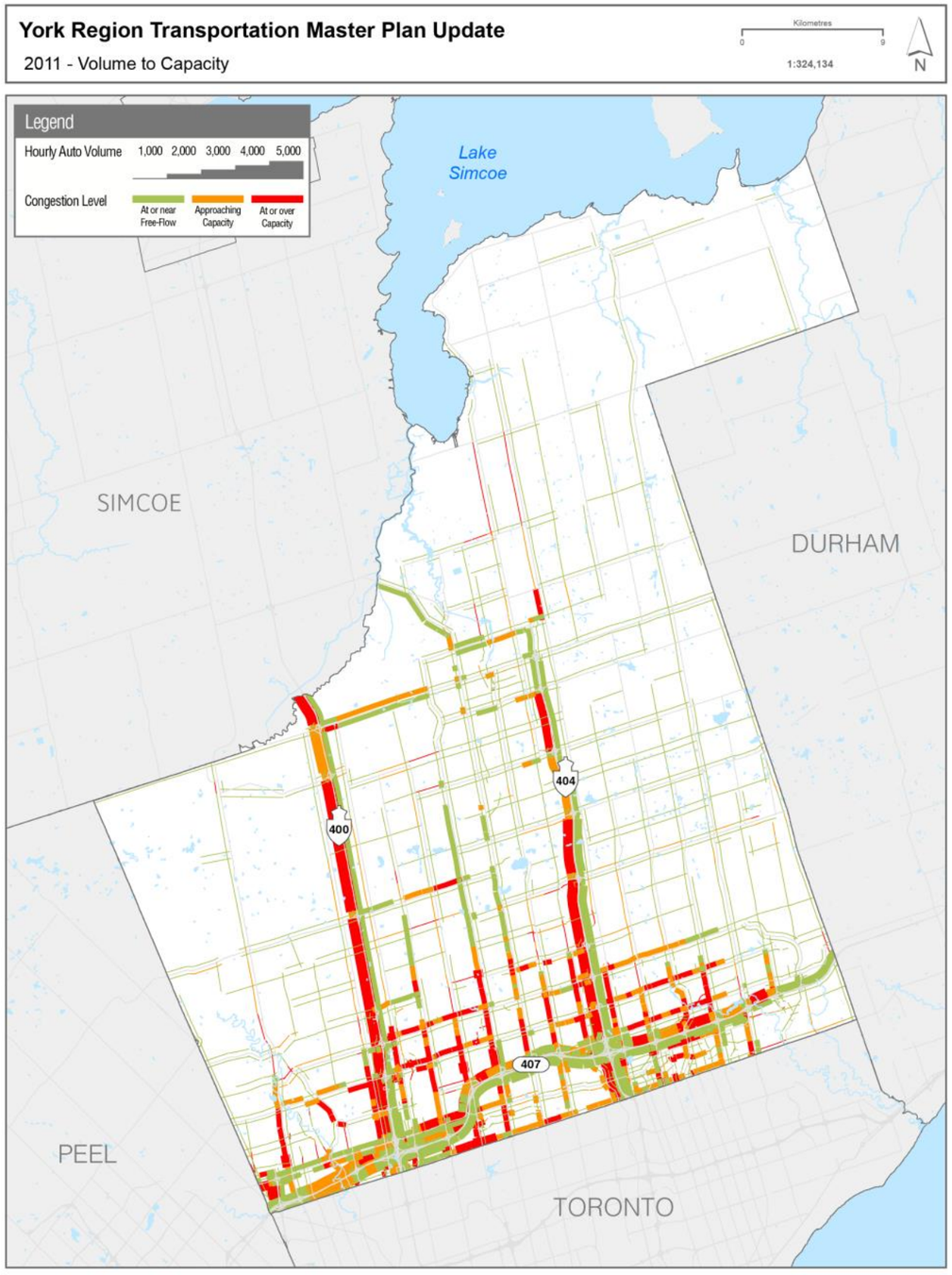


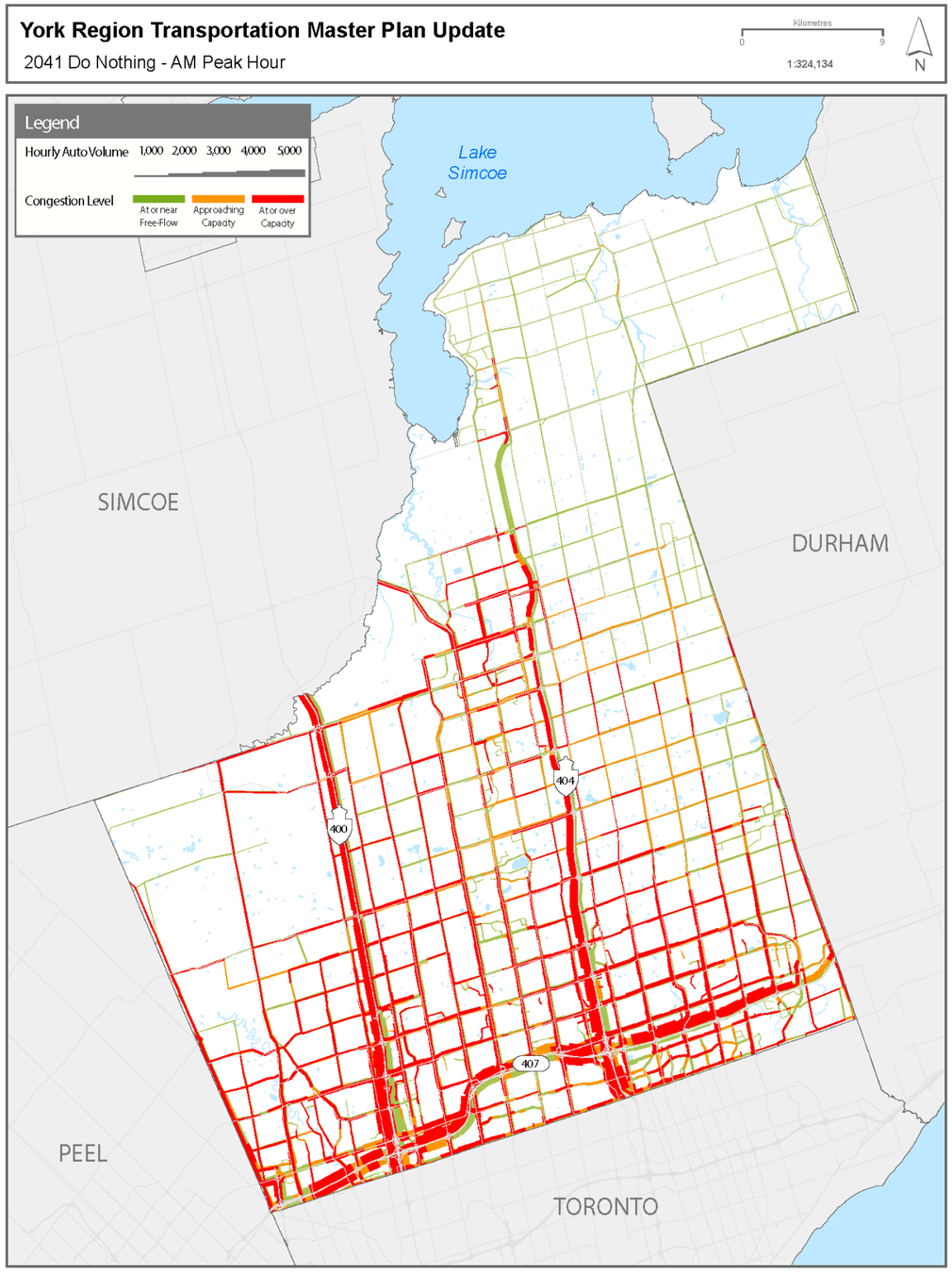
Exhibit 3.2: Screenline Analysis Summary (2011 vs Do Nothing Scenario)

Screenline		Direction	2011			2041 Do Nothing		
			Auto Volume	Auto Capacity	v/c ratio	Auto Volume	Auto Capacity	v/c ratio
York-Toronto Boundary	Hwy 50 – Hwy 400	SB (out)	22,600	36,100	0.63	27,800	36,100	0.77
		NB (in)	10,200	34,300	0.30	14,500	34,300	0.42
	Jane St – Don Mills Rd	SB (out)	14,000	15,600	0.90	16,600	15,600	**1.06**
		NB (in)	6,400	15,600	0.41	7,900	15,600	0.51
	Hwy 404 – York-Durham Line	SB (out)	21,000	31,600	0.67	25,900	31,600	0.82
		NB (in)	13,900	31,600	0.44	17,900	31,600	0.57
York-Peel Boundary	Steeles Ave – South King boundary	WB (out)	7,700	18,100	0.43	9,300	18,100	0.52
		EB (in)	11,700	18,100	0.65	17,000	18,100	**0.94**
	South King boundary – Hwy 9	WB (out)	500	2,900	0.17	700	2,900	0.25
		EB (in)	700	2,900	0.23	1,300	2,900	0.44
York-Simcoe boundar	Hwy 27 – Yonge St	NB (out)	3,800	15,000	0.25	4,500	15,000	0.30
		SB (in)	8,600	12,400	0.69	13,000	12,400	**1.05**
Durham boundary	Steeles Ave – 19th Ave	EB (out)	1,300	11,500	0.11	2,400	11,500	0.20
		WB (in)	4,900	10,100	0.49	7,500	10,100	0.75
	Hoover Park Drive – Davis Drive	EB (out)	1,300	8,950	0.15	2,500	8,950	0.27
		WB (in)	1,800	8,950	0.20	3,300	8,950	0.37
	Herald Road – Ravenshoe Road	EB (out)	400	3,300	0.12	800	3,300	0.24
		WB (in)	600	3,300	0.18	1,300	3,300	0.40
	Miles Road – Lake Simcoe	EB/SB (out)	700	7,300	0.09	1,100	7,300	0.16
		WB/NB (in)	300	7,300	0.04	700	7,300	0.09
Hwy 400 screenline	Steeles Ave – South King boundary	WB	12,700	19,900	0.64	16,900	19,900	0.85
		EB	12,900	19,900	0.65	20,100	19,900	**1.01**
	South King boundary – Hwy 9	WB	2,500	3,800	0.65	3,500	3,800	**0.92**
		EB	1,900	3,800	0.51	4,100	3,800	**1.09**
Hwy 404 screenline	Steeles Ave – 19th Ave	WB	13,600	17,500	0.78	18,300	17,500	**1.05**
		EB	12,100	17,500	0.69	16,600	17,500	**0.95**
	Stouffville Road – Green Lane	WB	5,900	11,800	0.50	10,200	12,800	0.80
		EB	7,700	11,800	0.65	11,800	12,800	**0.92**
South York screenline	Conc 11 – Hwy 400	SB	7,500	9,100	0.82	10,500	9,100	**1.15**
		NB	1,900	9,100	0.20	3,100	9,100	0.34
	Jane St – Leslie St	SB	7,100	9,900	0.72	11,900	9,900	**1.20**
		NB	2,600	9,900	0.26	3,900	9,900	0.40
	Hwy 404 – York-Durham Line	SB	10,100	11,700	0.87	14,900	12,600	**1.18**
		NB	3,900	11,700	0.33	5,700	12,600	0.45
East Gwillim -bury	Bathurst – York-Durham Line	SB	7,400	17,100	0.43	15,600	17,800	0.87
		NB	2,500	17,100	0.14	4,800	17,800	0.27
Raven-shoe	Leslie St – Hwy 48	SB	3,200	6,800	0.47	4,100	6,800	0.61
		NB	800	6,800	0.12	2,000	6,800	0.30

Red: Screenline at or over capacity; screenline v/c >0.90.

Exhibit 3.3: Network Performance - 2011 vs 2041 Do Nothing





3.2 2041 Base Network Scenario

A future Base Network scenario comprised of funded and committed transit and road improvements. This included projects in the Region's (2015) 10-Year Capital Program, VivaNext, Metrolinx's First Wave projects and Regional Express Rail. The transit and road network improvements in the Base Scenario are described below.

Transit

The transit network in York Region has been undergoing significant changes since the implementation of Viva service in 2005 and the opening of the Highway 7 East rapidway in 2014.

For the 2041 Base Network, the following transit improvements by YRT and Viva are included:

- Davis Drive rapidway
- Highway 7 West rapidway
- Yonge Street rapidway
- YRT Five-Year Service Plan improvements

Other funded rapid transit improvements in the Greater Toronto Area are also included in the Base Network. The improvements that are within York Region, as identified in the Metrolinx 5-year Strategy, include:

- The Toronto-York Spadina Subway Extension from Downsview Station to Vaughan Metropolitan Centre, with YRT/Viva services reoriented to feed into the subway.
- GO Rail extension north of Richmond Hill GO Station to Gormley and Bloomington stations.
- Regional Express Rail (RER) service with 15-min service on the Barrie corridor up to Aurora GO Station and on the Stouffville corridor up to Unionville GO Station.

Roads

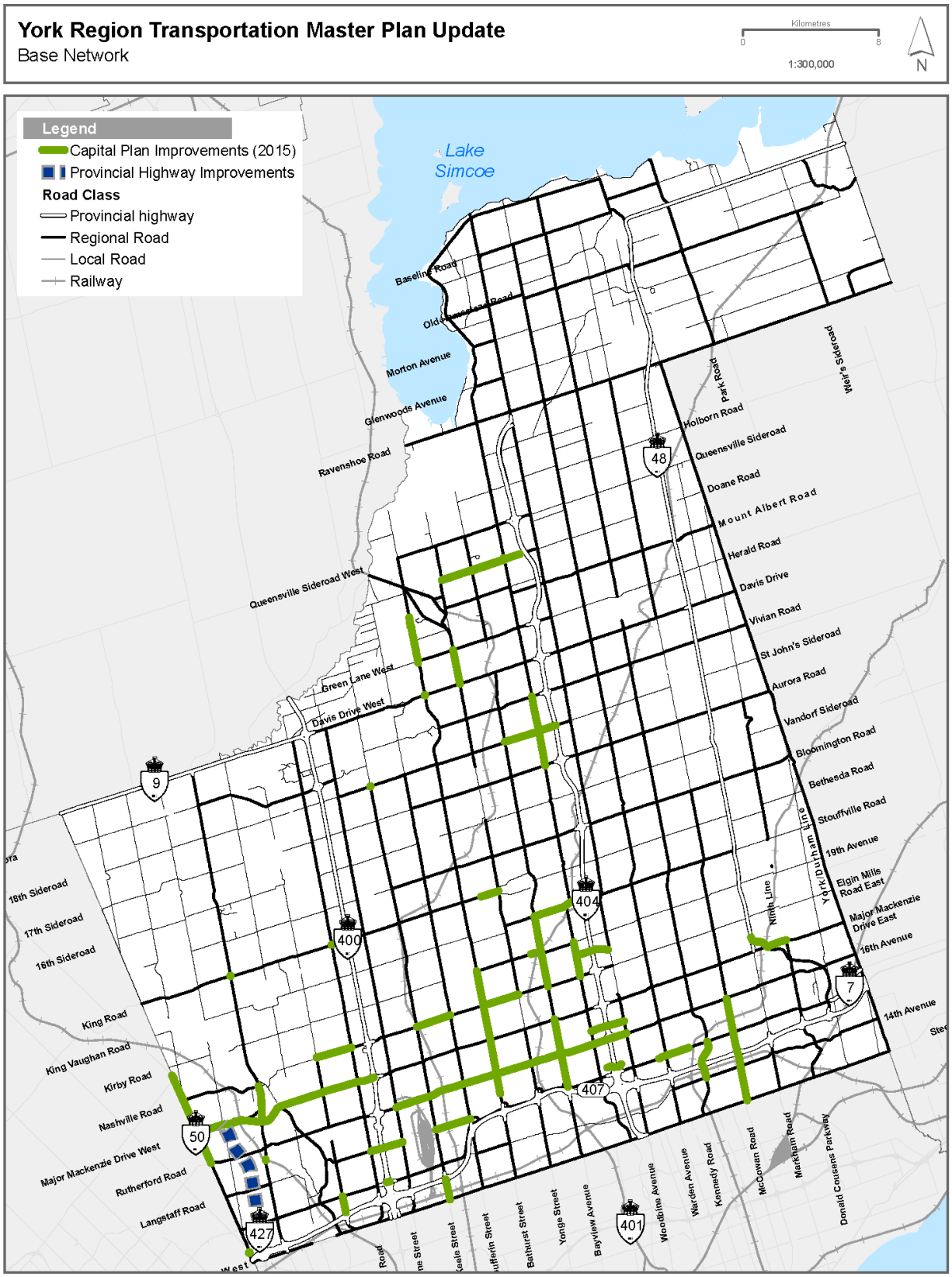
The basis of the future Base Network is the Region's (2015) 10-Year Capital Program as shown in Exhibit 3.4.

The planned road improvements by York Region include a number of roads widened from 2 to 4 lanes, roads widened from 4 to 6 lanes (with the intention that the new lanes are designated for transit/HOV), and new midblock crossings of the 400-series highways.

For roadways that are not under the jurisdiction of York Region, the following are assumed in the 2041 Base Network:

- Highway 407 East Extension, with West Durham Link and East Durham Link
- Highway 427 Extension northerly to Major Mackenzie Drive

Exhibit 3.4: York Region 10-Year Capital Program Improvements



3.3 2041 'Build-out' Network Scenario

The 2009 TMP, and subsequent 2012 Development Charge program, identified a network that would support the build-out of York Region to 2031. High-level analysis of this 'Build-out' Network was completed to provide an indication of future conditions if the Region continues with previously identified network improvements. This scenario was also assessed with the 40% intensification growth forecasts.

'Build-out' Transit Network

For the assessment of the 'Build-out' scenario, rapid transit improvements that have been previously identified by Metrolinx but which do not yet have full funding commitment were assumed to be in place - these projects were identified as the "Next Wave" of transit improvements in the *2015-2020 Metrolinx Five-Year Strategy*. The most relevant improvement for York Region is the Yonge Subway extension from Finch Station to Highway 7 in Richmond Hill.

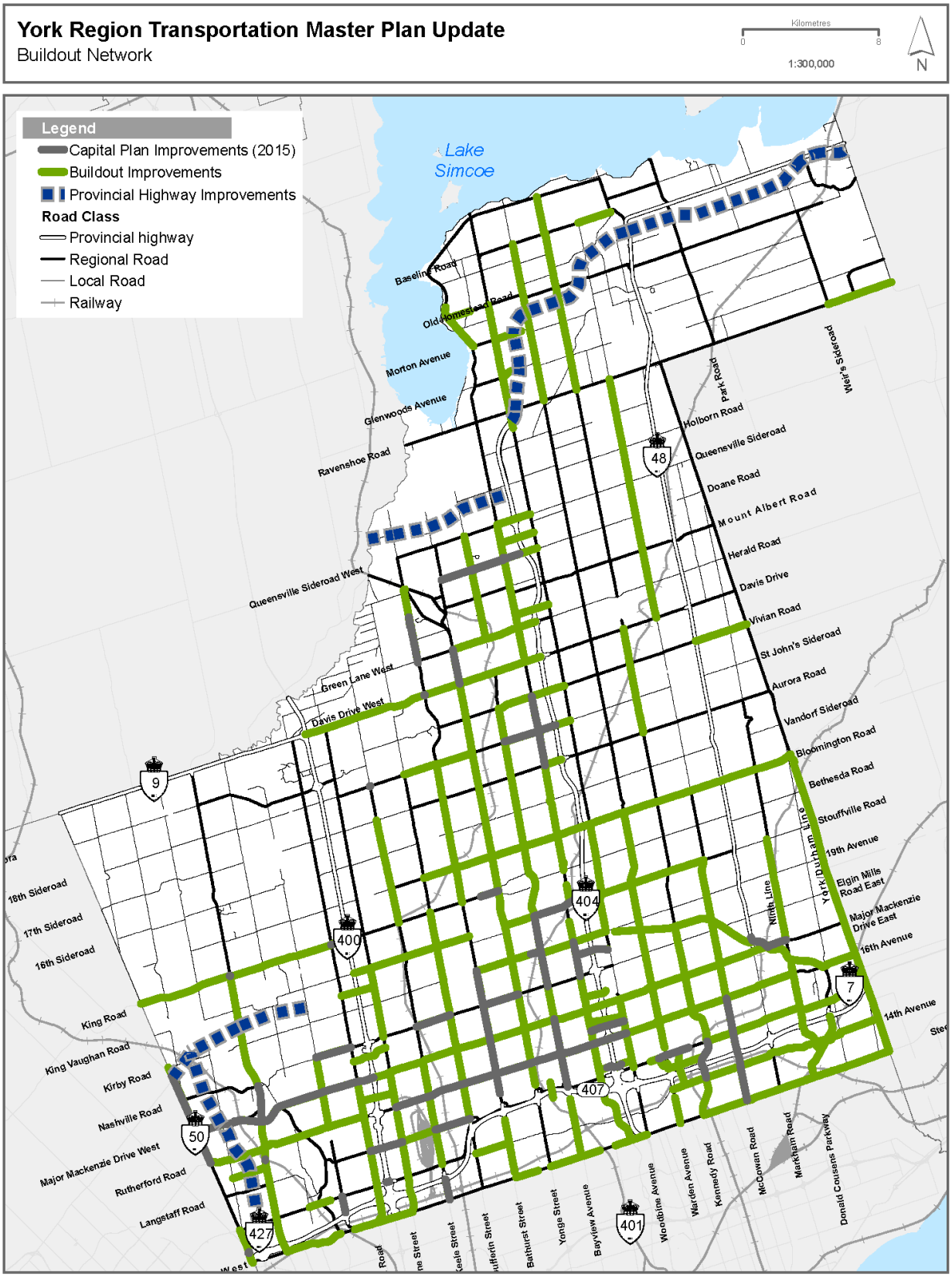
'Build-out' Road Network

The additional improvements identified in the Region's 2012 Development Charge program but not included in the Base Network, as illustrated in Exhibit 3.5, were added to the 'Build-out' road network. Other road network improvements include:

- Highway 404 Extension north of Ravenshoe Road
- Highway 427 Extension to GTA West
- GTA West
- Highway 400 / Highway 404 Link

The 'Build-out' road improvements represent an additional 676 lane-km of roads in York Region compared to the Base Network.

Exhibit 3.5: 2012 Development Charge Road Projects



3.4 Performance of Alternative Networks

Although a number of network improvements are in place, the tremendous growth in the travel demand over the next 25 years will result in significant capacity constraints and congested conditions in the future Base conditions and, to a lesser extent, Build-out conditions.

From a screenline perspective, the network experiences much higher v/c ratios in the 2041 Base than under 2011 conditions, but is an improvement over 2041 Do Nothing conditions for most screenlines. This indicates that the capacity improvements in the transportation network is not able to keep up with the growing demand. The 2041 Build-out conditions further improve network performance. The screenline analysis is summarized in Exhibit 3.7.

As the development area expands northerly, there will be significant increases in demand across the South York screenline that far exceeds current planned capacity improvements. The majority of planned capacity improvements occur south of Major Mackenzie Drive. For these reasons, the South York screenline is predicted to be over capacity while the Toronto boundary screenline appears to have excess capacity.

Overall, under the Base scenario, the network-wide volume-to-capacity ratio for York Region road links increases from 0.70 under existing conditions to 0.90. This congestion reduces the mean travel speed within York Region from 51 km/h to 43 km/hr.

Under the Build-out scenario, there is a small shift (about 1%) in travel demand from York-to-York trips to York-to-Toronto trips and York-to-Peel trips as a result of the higher available road capacity and transit service to those markets. Network-wide volume-to-capacity is improved in the Build-out scenario (0.86 under 'build-out' conditions versus 0.90 under base conditions) and the resulting travel speeds are slightly higher at 45 km/h compared to 43 km/hr.

Exhibit 3.8 illustrates the congested network links for the 2041 Base and Build-out Networks.

To provide an additional, indicative measure of future conditions, a comparison of travel time for short, medium and long distance trips were extracted from the Model. Exhibit 3.6 presents the auto and transit travel times for the 2011, 2041 Do Nothing and 2041 Base conditions. The already programmed and funding infrastructure will ameliorate, to a degree, future congestion through capacity and transit improvements.

Exhibit 3.6: Travel Time Comparisons

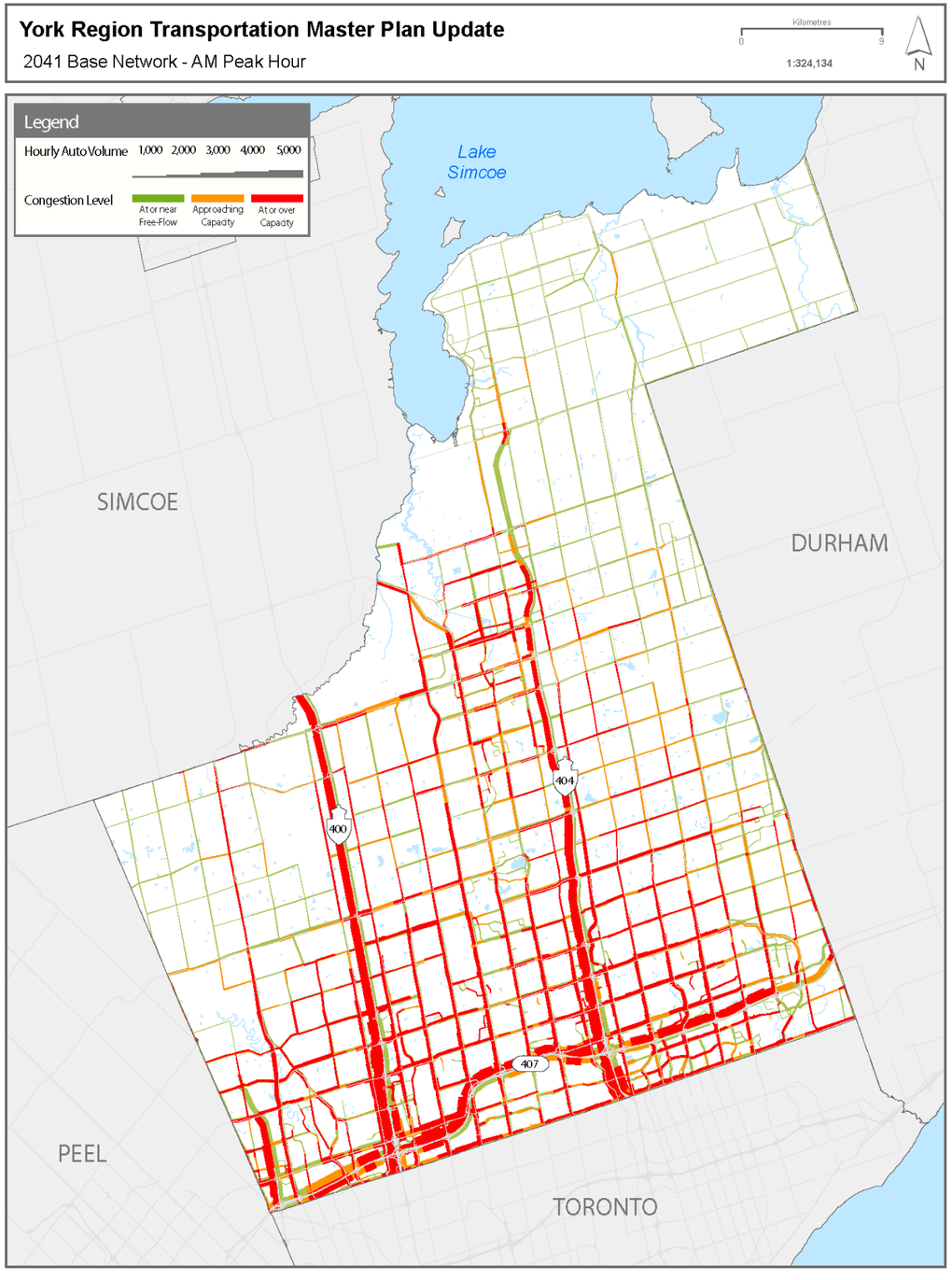
Indicator	Existing 2011	2041 Do Nothing	2041 Base	2041 Build out
Short Trips (0 5 km)				
Transit travel time	23 min	27 min	22 min	20 min
Auto travel time	5 min	7 min	7 min	6 min
Medium Trips (5 15 km)				
Transit travel time	49 min	49 min	42 min	40 min
Auto travel time	15 min	24 min	20 min	17 min
Long Trips (> 15 km)				
Transit travel time	75 min	86 min	70 min	65 min
Auto travel time	35 min	61 min	50 min	43 min
All Trips				
Transit travel time	65 min	74 min	60 min	55 min
Auto travel time	20 min	34 min	27 min	24 min

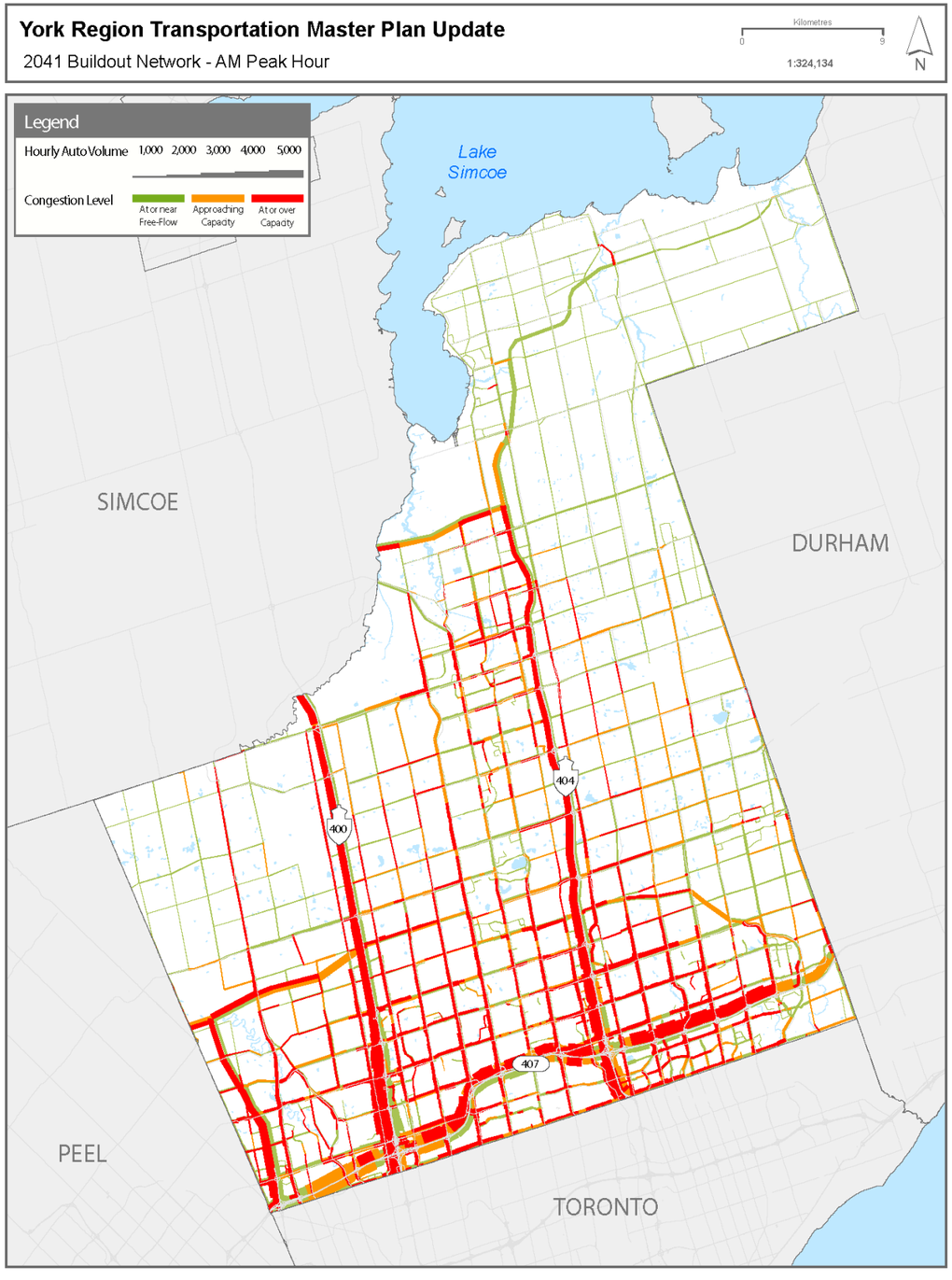
Exhibit 3.7: Screenline Analysis Summary (All Scenarios)

Screenline		Direction	2011			2041 Do Nothing			2041 Base			2041 Build out		
			Auto Volume	Auto Capacity	v/c ratio	Auto Volume	Auto Capacity	v/c ratio	Auto Volume	Auto Capacity	v/c ratio	Auto Volume	Auto Capacity	v/c ratio
York-Toronto Boundary	Hwy 50 – Hwy 400	SB (out)	22,600	36,100	0.63	27,800	36,100	0.77	28,200	34,500	0.82	29,200	36,300	0.80
		NB (in)	10,200	34,300	0.30	14,500	34,300	0.42	15,000	34,500	0.43	14,400	34,500	0.42
	Jane St – Don Mills Rd	SB (out)	14,000	15,600	0.90	16,600	15,600	**1.06**	16,400	16,400	**1.00**	17,200	18,000	**0.95**
		NB (in)	6,400	15,600	0.41	7,900	15,600	0.51	7,700	16,400	0.47	8,100	18,000	0.45
	Hwy 404 – York-Durham Line	SB (out)	21,000	31,600	0.67	25,900	31,600	0.82	26,500	33,300	0.80	27,100	36,100	0.75
		NB (in)	13,900	31,600	0.44	17,900	31,600	0.57	17,500	33,300	0.52	17,100	36,100	0.47
York-Peel Boundary	Steeles Ave – South King boundary	WB (out)	7,700	18,100	0.43	9,300	18,100	0.52	10,100	18,600	0.54	13,500	24,900	0.54
		EB (in)	11,700	18,100	0.65	17,000	18,100	**0.94**	17,200	18,600	**0.92**	20,100	24,900	0.81
	South King boundary – Hwy 9	WB (out)	500	2,900	0.17	700	2,900	0.25	1,200	3,600	0.32	400	3,600	0.11
		EB (in)	700	2,900	0.23	1,300	2,900	0.44	1,500	3,600	0.42	1,200	3,600	0.33
York-Simcoe boundary	Hwy 27 – Yonge St	NB (out)	3,800	15,000	0.25	4,500	15,000	0.30	5,800	22,400	0.26	7,000	23,600	0.30
		SB (in)	8,600	12,400	0.69	13,000	12,400	**1.05**	15,200	21,000	0.73	17,000	22,200	0.76
Durham boundary	Steeles Ave – 19th Ave	EB (out)	1,300	11,500	0.11	2,400	11,500	0.20	2,600	13,200	0.20	3,000	18,600	0.16
		WB (in)	4,900	10,100	0.49	7,500	10,100	0.75	8,700	11,800	0.74	11,400	17,200	0.66
	Hoover Park Drive – Davis Drive	EB (out)	1,300	8,950	0.15	2,500	8,950	0.27	2,200	8,300	0.27	2,200	8,300	0.26
		WB (in)	1,800	8,950	0.20	3,300	8,950	0.37	3,000	8,300	0.36	2,700	8,300	0.32
	Herald Road – Ravenshoe Road	EB (out)	400	3,300	0.12	800	3,300	0.24	1,000	3,300	0.29	900	3,300	0.28
		WB (in)	600	3,300	0.18	1,300	3,300	0.40	1,200	3,300	0.37	900	3,300	0.26
	Miles Road – Lake Simcoe	EB/SB (out)	700	7,300	0.09	1,100	7,300	0.16	1,100	7,300	0.15	700	7,300	0.10
		WB/NB (in)	300	7,300	0.04	700	7,300	0.09	500	7,300	0.07	600	7,300	0.08
Hwy 400 screenline	Steeles Ave – South King boundary	WB	12,700	19,900	0.64	16,900	19,900	0.85	16,700	21,900	0.76	18,500	27,000	0.69
		EB	12,900	19,900	0.65	20,100	19,900	**1.01**	21,000	21,900	**0.96**	22,300	27,000	0.83
	South King boundary – Hwy 9	WB	2,500	3,800	0.65	3,500	3,800	**0.92**	3,300	3,800	0.86	2,600	3,800	0.68
		EB	1,900	3,800	0.51	4,100	3,800	**1.09**	3,600	3,800	**0.95**	2,200	3,800	0.58
Hwy 404 screenline	Steeles Ave – 19th Ave	WB	13,600	17,500	0.78	18,300	17,500	**1.05**	19,800	22,700	0.87	22,300	26,300	0.85
		EB	12,100	17,500	0.69	16,600	17,500	**0.95**	17,300	22,700	0.76	18,300	26,300	0.70
	Stouffville Road – Green Lane	WB	5,900	11,800	0.50	10,200	12,800	0.80	9,300	14,000	0.67	9,500	14,000	0.68
		EB	7,700	11,800	0.65	11,800	12,800	**0.92**	12,500	14,000	0.90	12,100	14,000	0.86
South York screenline	Conc 11 – Hwy 400	SB	7,500	9,100	0.82	10,500	9,100	**1.15**	10,700	10,100	**1.06**	12,700	11,300	**1.12**
		NB	1,900	9,100	0.20	3,100	9,100	0.34	3,100	10,100	0.30	3,600	11,300	0.32
	Jane St – Leslie St	SB	7,100	9,900	0.72	11,900	9,900	**1.20**	12,100	11,200	**1.08**	11,700	11,200	**1.05**
		NB	2,600	9,900	0.26	3,900	9,900	0.40	4,000	11,200	0.35	3,600	11,200	0.32
	Hwy 404 – York-Durham Line	SB	10,100	11,700	0.87	14,900	12,600	**1.18**	16,100	14,800	**1.09**	16,400	16,500	**0.99**
		NB	3,900	11,700	0.33	5,700	12,600	0.45	6,000	14,800	0.40	6,200	16,500	0.38
East Gwillimbury Screeenline	Bathurst – York-Durham Line	SB	7,400	17,100	0.43	15,600	17,800	0.87	16,200	18,500	0.88	17,000	18,300	**0.93**
		NB	2,500	17,100	0.14	4,800	17,800	0.27	5,500	18,500	0.29	5,800	18,300	0.32
Ravenshoe Screenline	Leslie St – Hwy 48	SB	3,200	6,800	0.47	4,100	6,800	0.61	4,200	6,800	0.61	4,900	10,400	0.47
		NB	800	6,800	0.12	2,000	6,800	0.30	2,100	6,800	0.31	2,400	10,400	0.24

Red: Screenline at or over capacity; screenline v/c >0.90.

Exhibit 3.8: Network Performance - 2041 Base vs 2041 Build-out





4 Findings / Needs

The above sections documents the assessment of existing trends and anticipated future conditions in York Region based on current plans. A summary of the findings is provided below:

Growth / Land Use

- Transportation demand is increasing faster than road network capacity. Future peak period travel demand will grow by 60% while the lane-km increase in the road network is only 15%. As a result, the transportation network will be congested, have major capacity constraints, and the level of service will worsen for all users.
- Commute patterns have been changing as development growth has brought new people and jobs to York Region. Historic trends have shown that peak directional travel to Toronto has become less prominent. Trends indicate that internal trips within York Region are becoming more and more prevalent during the commute period. The projected rapid employment growth will contribute to a change in travel patterns and allow for more residents of York Region to work in York Region as well. In addition, inbound commute trips from adjacent municipalities will increase.
- New development and intensification in the Regional Centres and Corridors are just starting to be established and have thus far relied predominantly on residential development to meet density and growth targets. Attracting employment will be critical in providing quality job options in York Region to realize the travel pattern changes predicted in this analysis.

Connectivity

- Growth in the adjacent regions will also play a factor in travel demand in York Region given the interactions between York Region and Durham, Peel and Simcoe. A continuous and efficient transportation system over the municipal boundaries is needed to serve the growing demand.
- Discontinuities in the overall grid pattern also exist due to natural or man-made barriers – i.e. Teston Road west of Dufferin Street, Langstaff Road west of Islington Avenue, Major Mackenzie Drive at Highway 27 and Langstaff Road west of Keele Street – which limit route options and contributing to congestion on parallel arterial corridors.
- Connectivity between modes and the ease of access to transit are major factors to transit demand. The availability of sidewalks and path connections to transit stops, as well as park-and-ride lots at major transit stations are needed to provide mode choice options and accommodate multi-modal trips for the “first and last mile”.

Road Capacity

- The assessment of the future base and future ‘build-out’ networks indicate that continuing to widen Regional roads alone will not address the needs of York Region as demand will continue to exceed capacity. Applying alternative solutions through Transportation System Management and Travel Demand Management measures that make better use of the existing infrastructure to improve flow and reduce delay could provide relief in a more cost-effective manner. Measures could include traffic signal coordination, signal priority for transit vehicles, queue jump lanes, or operational improvements at specific locations to address local capacity constraints.

- The current policy in York Region is to designate lanes for transit/HOV use on all 6-lane road widenings. While this results in a sizeable network of transit/HOV lanes, a strategic plan for supporting infrastructure and inter-regional connections is needed to effectively maximize the person-carrying capacity of the transit/HOV lane.
- At a number of locations, the jurisdiction of a Regional road changes as it traverses through the centre of the community, i.e. Markham Main Street, sections of Yonge Street in downtown Richmond Hill and Aurora, etc. In these sections, the function of the road has changed from primarily moving people to facilitating the adjacent land uses.

Transit Capacity/Service

- Planned rapid transit service improvements and expansions are primarily focused on trips to/from Toronto. This segment of the travel demand market is and will continue to be very well served by transit, and transit share will exceed 80% for trips to downtown Toronto.
- Additional transit service focused on serving the growing demand of internal York Region trips is needed. The rapid transit corridors on Yonge Street and Highway 7 are within a 400 m walk of only 10% of the population.
- Transit share for internal trips in the future base conditions is only 5%. A suburban/urban area with a strong grid-based transit system has the potential for a transit mode share of 25%. This is exhibited in the suburban areas of Toronto (excluding transit trips to/from downtown) today.
- The vast geographic size of York Region, and the lower density development in most of it is a challenge to developing a transit system that is attractive to the user and cost-effective for the Region. Long distances which separate growth centres, employment areas and outlying urban areas make the private automobile the preferred mode of travel for many.
- The grid-pattern of the arterial road network in York Region is based on 2 km by 2 km concession blocks. There is a lack of minor, or mid-block, arterials in much of York Region which limit the provision of efficient transit and active transportation networks and results in an over-reliance on the Regional road network for both short and long-distance travel.
- The transit systems in York Region are provided by a number of different operators – York Region Transit/ Viva, GO Transit, and TTC. While recent improvements have been made towards fare integration, there is a need for a more coordinated and integrated system that operates seamlessly from the riders' perspective.

5 Recommended Road and Transit Projects

5.1 Transit Network

The proposed 2041 Transit Network is illustrated in Exhibit 5.1. The proposed network is an integrated, comprehensive transit system that builds on investment in the Toronto-York Spadina Subway Extension, Regional Express Rail, vivaNext rapidways and York Region Transit/Viva frequent transit network service expansions to help manage traffic congestion in York Region.

The development of the transit network was based on the following guidelines for transit improvements:

- Designate transit/HOV lanes where peak passenger demand, including transit, exceeds 1,000 passengers per hour in the peak direction.
- Construct median rapidways where peak transit demand exceeds 2,000 passengers per hour.
- Construct Light Rail Transit where peak transit demand exceeds 2,000- 5,000 passengers per hour.

Components of the proposed transit network are discussed in the following sections.

5.1.1 Yonge North Subway Extension

The Yonge North Subway Extension is the critical missing link in the dedicated Regional rapid transit system, a vital gap in creating a seamless transit network in the GTHA and remains a top priority for York Region and in the TMP.

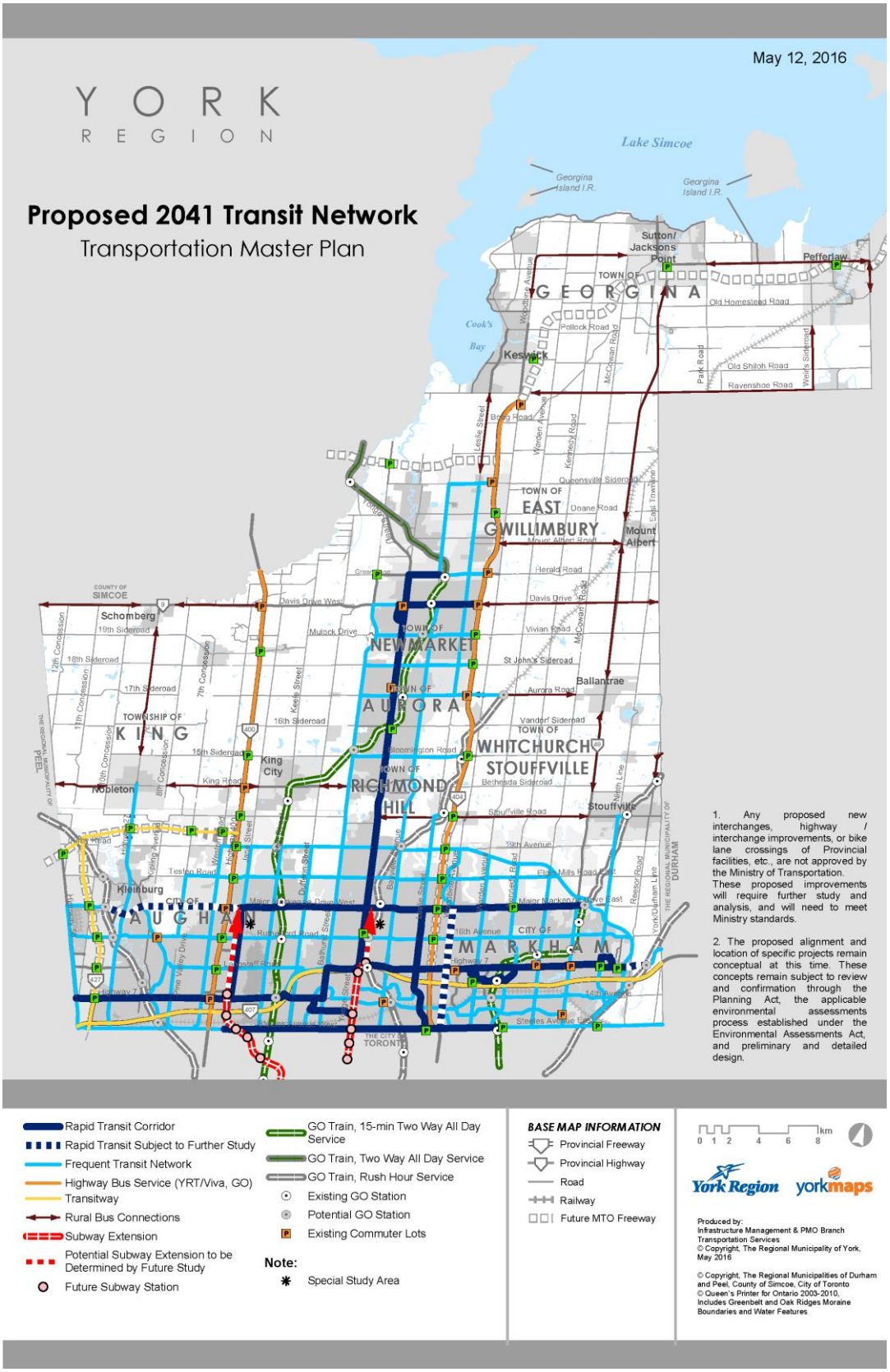
The 2015 *Yonge Relief Network Study* report to the Metrolinx Board of Directors recommended that Metrolinx work with the Region, City of Toronto and the TTC to advance the project development of the Yonge North Subway Extension to 15% preliminary design and engineering. In June 2016, the Government of Ontario announced a funding commitment for the approved preliminary engineering program and the Region continues to pursue both Provincial and Federal funding for additional engineering, design and capital construction. York Region and York Region Rapid Transit Corporation staff continue to meet and work with Metrolinx and City of Toronto staff to assess the impacts of the various municipal transportation planning initiatives throughout the GTHA to ensure that Yonge North Subway Extension retains its critical status as York Region's number one transportation project.

5.1.2 Rapid Transit Corridors

Rapid transit corridors identified in the proposed 2041 Transit Network build on the original vivaNext Plan (Yonge Street, Highway 7 and Davis Drive) to include the Viva Network Expansion Plan (Jane Street, Major Mackenzie Drive and Leslie Street/Don Mills Road) and future rapid transit corridors to accommodate growth to 2041 (Major Mackenzie Drive East, Green Lane, Yonge Street north of Davis Drive and Woodbine Avenue).

Yonge Street Rapid Transit Corridor. The vivaNext rapidway from Highway 7 to 19th Avenue is currently under construction, with the exception of the historic core of Richmond Hill from Major Mackenzie Drive to Levendale Avenue where service will remain in mixed traffic operations. In addition, construction is underway on the Yonge Street Rapidway from Davis Drive to Savage Road at the south end of Newmarket.

Exhibit 5.1: Proposed 2041 Transit Network



Construction of a dedicated rapidway from 19th Avenue/Gamble Road to south of Mulock Drive (excluding downtown Aurora) is not included in the Metrolinx Next Wave projects but will be required to support continued growth in York Region. The TMP Update recommends full dedicated rapid transit on this segment of Yonge Street by 2041.

Yonge Street north of Davis Drive is planned for widening to six lanes as part of the approved Ten-Year Roads Capital Plan. This widening is to accommodate High Occupancy Vehicle lanes and is being designed to allow for conversion to a dedicated rapidway in the future.

The constrained segments of the Yonge Street rapid transit corridor through downtown Aurora and downtown Richmond Hill pose a challenge for improving transit trip times and maximizing service reliability.

Given the importance of the Yonge Street rapid transit corridor within York Region's overall transit network, the TMP update recommends a special areas study to consider the best approach to improve transit service and enable quick operation through these areas, while at the same time, protecting the heritage of downtown Aurora and downtown Richmond Hill. This will involve partnerships with the Towns of Aurora and Richmond Hill.

Highway 7 Rapid Transit Corridor. In western Vaughan, a key constraint along the Highway 7 rapid transit corridor occurs near Islington Avenue. This TMP Update proposes eliminating this pinch point with construction of a median rapidway plus six traffic lanes through this area (Helen Street west to Kipling Avenue).

From Helen Street east to Highway 400, this rapidway segment is a Metrolinx First Wave funded project and scheduled to be completed by 2019. East of Highway 400 to Bowes Road, the rapidway is under construction and is being coordinated with the opening of the Toronto-York Spadina Subway Extension in late 2017. Once these segments are completed, there will be a continuous rapidway from Helen Street in the City of Vaughan to Unionville Station in the City of Markham, with the exception of a mixed traffic segment from Bathurst Street to Bayview Avenue.

This TMP Update reconfirms the recommendations of the approved environmental assessment to extend the Highway 7 rapidway from Unionville Station to Cornell Terminal in the east. The environmental assessment identifies a median rapidway plus four general purpose lanes.

Jane Street. Jane Street is part of the Viva Network Expansion Plan with curbside stations being constructed between Highway 7 and Major Mackenzie starting in 2018. Jane Street was identified for widening to six lanes in the 2009 Plan. Rapid transit along Jane Street will provide a service connection with the Toronto-York Spadina Subway Extension.

The TMP Update proposes that this corridor evolve to rapidway by 2041 with Viva service expansion in mixed traffic for the initial stage followed by road widening to six lanes for HOV/transit as an intermediate stage. The 2041 network includes rapidway plus four general purpose lanes between Highway 7 and Major Mackenzie Drive.

Leslie Street/Don Mills Road. Leslie Street is also part of the Viva Network Expansion Plan with curbside stations being constructed in 2018 between Steeles Avenue and Major Mackenzie Drive. The TMP Update recommends rapid transit by 2041. The ultimate timing and technology for this rapid transit corridor will be influenced by the Don Mills rapid transit plan in the City of Toronto. An environmental assessment was initiated in 2009 but put on hold pending further network planning through this TMP Update as well as by the City of Toronto and Metrolinx.

Major Mackenzie Drive. The central section of Major Mackenzie Drive, from Jane Street to Leslie Street, is part of the Viva Network Expansion Plan with curbside stations being constructed starting in 2018. The central section connects the Jane Street rapid transit corridor and the Leslie Street rapid transit corridor. The central section should be extended to Woodbine Avenue to also connect with the potential rapid transit corridor on Woodbine Avenue. Two areas

of constraint along this corridor are the sections east and west of Keele Street (Maple) and east of Yonge Street (Richmond Hill).

The TMP Update assumes rapidway plus four general purpose lanes. Re-designating traffic lanes for rapidway through constrained sections should be considered within the 2041 horizon.

Woodbine Avenue. Woodbine Avenue is a potential rapid transit corridor connecting the future Buttonville development as well as the Highway 404/7 employment node. North of Highway 7, Woodbine Avenue has been identified for widening to six lanes for High Occupancy Vehicle/Transit lanes with potential for full rapidway treatment. The corridor is constrained through the historic area of Buttonville so alternative alignments for transit may need to be considered.

South of Highway 7, Woodbine Avenue is a six lane corridor. The TMP Update recommends converting the outside lanes to High Occupancy Vehicle/Transit while protecting for the potential for full rapidway. The need for full rapidway will be influenced by the timing of rapid transit on Leslie Street and redevelopment along the Woodbine Avenue corridor.

Steeles Avenue. Steeles Avenue was identified as a rapid transit corridor in the Metrolinx Big Move as well as the 2009 TMP. The Steeles Avenue Rapid Transit project was also reviewed as part of the recent City of Toronto “Feeling Congested” process, including implementation of rapid transit from Black Creek Pioneer Village Station (Spadina Subway Extension) to Milliken Station (Stouffville GO Rail corridor). The plans provide for the inclusion of bus rapid transit on Steeles Avenue from Jane Street east to the Durham boundary.

Green Lane. A phased approach for Green Lane from Yonge Street to the East Gwillimbury GO Station is proposed. Green Lane west of the GO station will be widened to six lanes providing for curbside rapid transit and High Occupancy Vehicle lanes. The timing of the Highway 400-404 link and completion of a planned four lane east-west collector road north of Green Lane, from Bathurst Street to the Harry Walker Parkway Extension, will inform the final timing of widening of Green Lane to six lanes.

5.1.3 Conversion to LRT

After the 2041 horizon of this TMP, the Region expects to convert some or all Viva rapidways into higher-capacity light rail facilities. Key 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 dampen 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 possible operating cost savings
- 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

5.1.4 GO Rail Network

The 2041 GO rail network includes significant service improvements on the three existing GO Transit rail corridors (Barrie, Richmond Hill and Stouffville) plus new service on the Mactier Subdivision to Bolton and the Havelock Subdivision rail corridor to Locust Hill in the City of Markham.

The Province has committed to implementing the first phase of Regional Express Rail within ten years. This will include 15 minute two-way all day service to Unionville on the Stouffville rail

corridor and to Aurora on the Barrie rail corridor. The 2041 recommended network includes extensions of Regional Express Rail service to Major Mackenzie Drive on the Stouffville rail corridor and Green Lane on the Barrie rail corridor to service new growth areas in Markham and East Gwillimbury.

New GO Stations: Metrolinx is currently in the process of conducting a 'New Stations Analysis'. Within York Region, the Metrolinx study identifies seven potential new GO Stations. On the Barrie GO rail corridor, these include Concord, Kirby Road, 15th Sideroad and Mulock Drive. On the Richmond Hill GO rail corridor two new stations are identified at John Street/Greenlane and 16th Avenue, in addition to the new stations at Gormley and Bloomington Road which are underway. On the Stouffville GO rail corridor, a potential new station is identified at 14th Avenue. York Region is working with Metrolinx to further assess the feasibility of these new stations.

In addition to potential new stations identified by Metrolinx, the TMP has further identified additional stations to accommodate growth to 2041. These include a potential station at Major Mackenzie Drive on the Stouffville GO rail corridor and two potential stations on the Richmond Hill GO rail corridor at 19th Avenue and Aurora Road. Further work is required, in cooperation with Metrolinx, to assess these potential locations.

5.2 Road Network

The proposed road network for 2041 is illustrated in Exhibit 5.2. The focus of the proposed road network is to make strategic road improvements that add capacity, address traffic bottlenecks, complete missing links and optimize system performance.

The development of the road network was based on the following guidelines for capacity improvements:

- Widening to four lanes (outside of the urban area) where peak volume-to-capacity ratios exceed 0.9 and/or daily truck volumes exceed 2,500 trucks per day.
- Widening to four lanes (within the urban area) where peak volume-to-capacity ratios exceed 0.90.
- Widening to six lanes with transit/HOV lanes where peak volume-to-capacity ratios exceed 1.2.

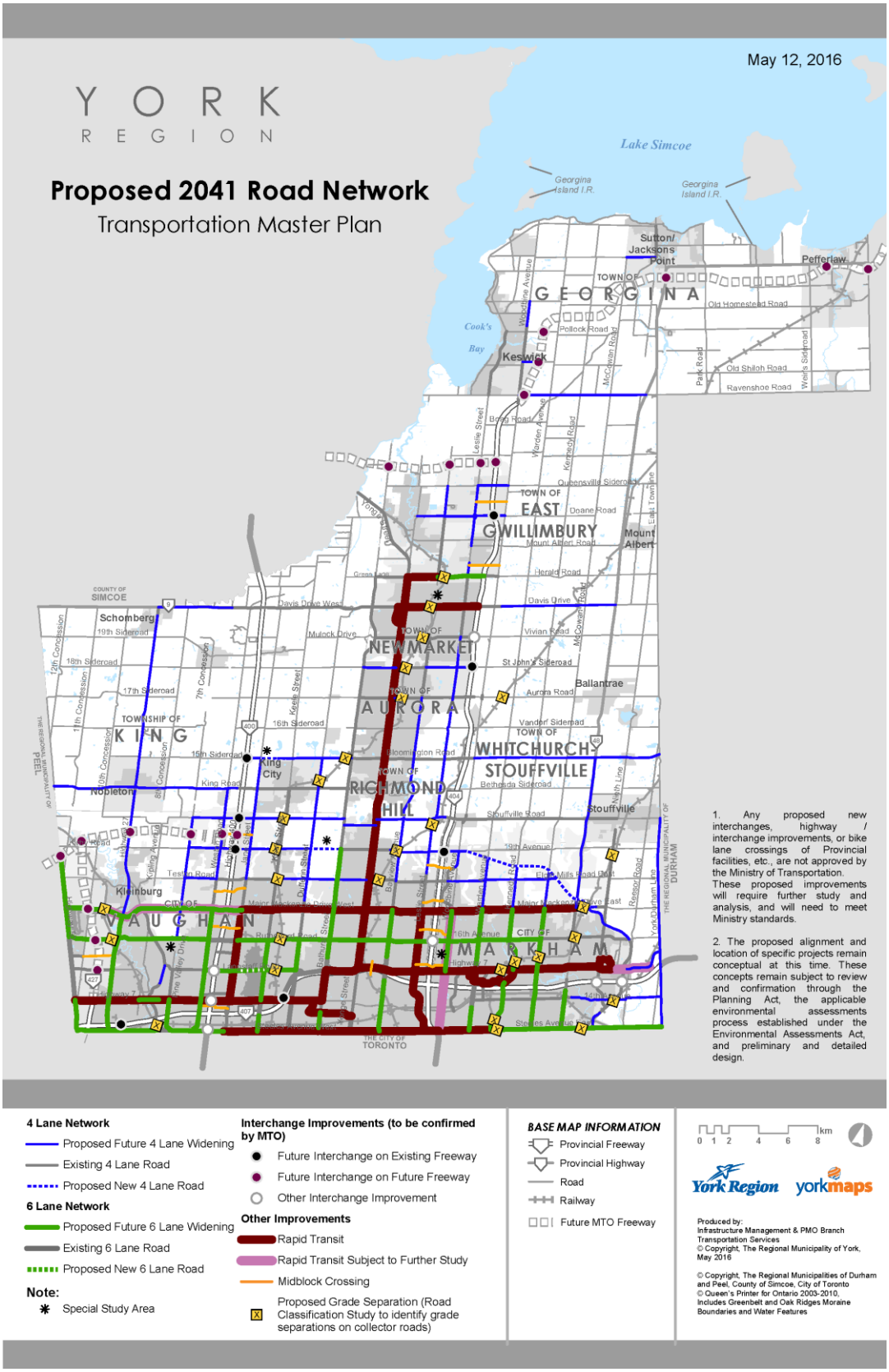
Components of the proposed road network are discussed in the following sections.

5.2.1 Four-lane Roads

As York Region's urban areas expand to accommodate population and employment growth to 2041, there will be a need to improve the existing network of roads serving new communities. The expansion of the four-lane network in a phased manner to coincide with development will achieve a number of objectives including:

- Ensuring a continuous grid of multimodal streets within the growing urban area
- Facilitating active transportation improvements, as part of road construction, consistent with the Region's context sensitive solutions approach
- Expanding capacity in line with population and employment growth
- Improving connectivity and efficiency of roads that serve longer distance trips between communities and between adjacent municipalities
- Achieving a four-lane arterial road standard in southern York Region

Exhibit 5.2: Proposed 2041 Road Network



5.2.2 Major Arterial Network

Maximizing person-carrying capacity on the arterial road network is essential to accommodate growth and manage congestion. In addition to providing rapid transit, approaches for maximizing person-carrying capacity include introducing transit priority measures and adding or converting existing general purpose lanes to High Occupancy Vehicle (HOV) lanes.

The proposed six-lane road network supports the proposed rapid transit network by expanding capacity in parallel corridors to provide for HOV and/or transit priority lanes.

The six-lane network is based on the Region's existing policy of expanding capacity beyond four lanes only for the addition of HOV or transit-only lanes. Additional lanes would generally begin as HOV lanes and then be converted to transit-only lanes where volumes/ridership warrant conversion.

For existing six-lane corridors, lanes could be converted to HOV or transit-only lanes if/when thresholds for combined transit and HOV volume are met. This conversion supports mode shift from single occupant vehicles to transit and HOV usage in the corridor.

5.2.3 Special Study Areas

The road network and phasing maps identify four special study areas:

Woodbine Avenue. Woodbine Avenue between Highway 7 and 16th Avenue is an area that will be subject to significant change given the redevelopment of Buttonville Airport. The TMP identified a need to widen Woodbine Avenue to six lanes to address vehicular demands however the existing Buttonville heritage area is recognized as a key constraint to widening. At the same time, Woodbine Avenue is also a candidate for rapid transit to support the transit-oriented development of Buttonville and to provide an effective north-south transit option connecting residential areas in north Markham to employment areas to the south.

As plans for Buttonville are advanced, further assessment of alternatives for this corridor will be analyzed respecting the many trade-offs in terms of capacity expansion, rapid transit provision and heritage protection.

Pine Valley Drive. The missing link of Pine Valley Drive between Langstaff and Rutherford Road creates challenges for network connectivity in the western part of Vaughan. This missing link has been the subject of study since before the 2009 TMP.

In February 2006 the Ministry of the Environment and Climate Change approved the EA Terms of Reference for the Pine Valley Drive Corridor, including a condition stipulating that any alternative through the Boyd Conservation Area could not be considered in the EA. Based on the approved EA Terms of Reference for the Pine Valley Drive Transportation Corridor, the Western Vaughan Individual Environmental Assessment (IEA) was initiated in 2007 to explore alternatives to address the transportation deficiencies in western Vaughan to the 2031 horizon year. The study area for the Western Vaughan IEA was bounded by Steeles Avenue to the south, Teston Road to the north, Highway 50 to the west and Highway 400 to the east. The Western Vaughan IEA was completed in 2011 and approved by the Ministry of the Environment and Climate Change in July 2012.

Subsequent to the Minister's Decision on the EA Terms of Reference which excluded the consideration of any alternative through the Boyd Conservation Area, the City of Vaughan declared the original road allowance of Pine Valley Drive between Rutherford Road and Club House Road as surplus lands and authorized the conveyance of those lands to the Toronto and Region Conservation Authority for the purpose of the protection and enhancement of the surrounding natural environment. The subject lands were conveyed by the City of Vaughan to the Toronto and Region Conservation Authority in 2009.

Analysis undertaken as part of this TMP, which includes 10 years of additional growth to the 2041 horizon year, indicates that there will be transportation deficiencies in north-south capacity in the Pine Valley Drive corridor area. In recognition of this need and respecting that no options for connecting Pine Valley on the traditional grid are viable, a future study is recommended to examine solutions to 2041.

Davis Drive Area. The general area to the north and south of Southlake Regional Health Centre and east of Main Street to Leslie Street is constrained in terms of network capacity. This area will be subject to further analysis undertaken jointly by the Town of Newmarket and the Region to address broader north/south and east/west capacity and collector network improvements both within and outside the Urban Centres. The study will include a detailed analysis to identify a preferred option for a direct connection between Prospect Street and Bayview Parkway as well as necessary modifications to signalized intersections. The study may be conducted as part of a Mobility Hub Station Area Plan.

The increasing frequency of crossings of GO Trains across Davis Drive and the associated delays to both cars and transit vehicles have been identified as key issues and follow-on studies are needed to explore alternative solutions.

Kirby Road. Kirby Road is currently a two-lane rural local municipal road providing east-west access through North Vaughan. It forms the northern boundary of the Block 41 and Block 27 expansion areas and, as a result, is part of the future urban area. While Kirby Road is largely continuous, there is a missing link between Bathurst Street and Dufferin Street.

Various plans, including the City of Vaughan Transportation Master Plan, have identified the Kirby Road missing link as a deficiency. This deficiency is related to both capacity and connectivity. The impact of the Kirby missing link on connectivity will increase over time as development in northern Vaughan proceeds. Kirby Road is also part of an emerging east-west link comprised of Donald Cousens Parkway, 19th Avenue, Gamble Road and the potential GTA West corridor. There is also a potential future GO Station at Keele Street.

Despite the growing importance of Kirby Road, it is also recognized that the missing link traverses largely undeveloped lands including an Environmentally Significant Area and an Area of Natural and Scientific Interest. As such, it is proposed that this area be identified for a special study to further evaluate potential solutions to address transportation needs in the context of environmental protection.

15th Sideroad. 15th Sideroad is currently a two-lane rural local municipal road providing east-west access through King Township. 15th Sideroad is an extension of Bloomington Road west of Bathurst and while it is largely continuous, there is a missing link between Keele Street and Jane Street. This missing link is a deficiency in the Regional road network. This deficiency is related to both capacity and connectivity. The impact of the 15th Sideroad missing link on connectivity will increase over time as development throughout York Region continues, requiring additional access to Highway 400. There is also a potential future GO Station west of Bathurst Street.

Despite the growing importance of 15th Sideroad, it is recognized that the missing link traverses largely undeveloped lands including an Environmentally Significant Area and an Area of Natural and Scientific Interest. As such, it is proposed that this area be identified for a special study to further evaluate potential solutions to address transportation needs in the context of environmental protection.

5.2.4 Mid-block Crossings

The wide, two-kilometre spacing of York Region's arterial road network is an outdated concession road system developed more than a century ago. Many of York Region's communities are contained in blocks bounded by former concession roads, which now carry the bulk of traffic. In some areas, access from Regional roads into neighborhoods tends to be

through congested intersections with a limited number of mid-block collector roads. Development of a finer-grid Regional road network will allow the Region to improve the attractiveness and efficiency of transit routes within communities, improve walkability within and between adjacent neighborhoods and reduce congestion at community access points along arterial roads. A finer grid network would mean that collector and Regional roads are one kilometre apart or less. All travel modes would have additional route options and reduced travel time.

Working with MTO and local municipalities, the Region will play a role in the protection and delivery of a series of mid-block crossings over both Highway 400 and Highway 404. Midblock crossings will be programmed as part of the Region's rolling 10-Year Capital Construction Program according to need and prioritization among all required roads-related capital improvements.

In consideration of the impacts that mid-block crossings may potentially have on established communities, the Region will continue to work alongside local municipalities to ensure that a collaborative and context-sensitive approach is applied to the design of any future mid-block crossings. This approach will ensure that the safe movement of pedestrians, cyclists and transit vehicles will be accommodated and that the structure will be compatible with adjacent existing residential communities.

In the long-term, the Region will continue to protect for a future mid-block crossing over Highway 400 in Block 32, between Rutherford Road and Major Mackenzie Drive in Vaughan. A mid-block collector road crossing of Highway 400 in this location will provide additional east-west connectivity to help relieve congestion. It will also provide mobility options for residents of established communities and planned new communities. It will also support other future land use changes, such as the new hospital.

Understanding that a number of capacity upgrades are required to help ease congestion in the short-term, such as the expansion of Rutherford Road and Major Mackenzie Drive and the extension of Bass Pro Mills Drive, the TMP proposes to deliver the Block 32 crossing within the 2031 to 2041 time horizon.