

Chapter 2 – Transportation Needs



407 TRANSITWAY – WEST OF HURONTARIO STREET TO EAST OF HIGHWAY 400

MINISTRY OF TRANSPORTATION - CENTRAL REGION

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2. TRANSPORTATION NEEDS

2.1. Introduction

2.1.1. Overview

The Transportation (Systems) Planning component of the TPAP, described in this section of the report, provides the need and justification for the transitway, a corridor-level alignment, ridership forecasts, and an evaluation of station locations.

The 407 Transitway is a proposed bus rapid transit service operating on its own runningway adjacent to 407 ETR. The section under study in this TPAP is from Hurontario Street in the west to Highway 400 in the East, where it would connect to the central 407 Transitway. The central section of the transitway extends from Highway 400 to Kennedy Road and the TPAP was completed in 2011. Connections to the West of Hurontario Street are protected for via MTO's Corridor Protection Study undertaken in the 1990's, and are being evaluated under a separate TPAP.

The planning context in the western corridor is different in comparison to the eastern and central sections of the transitway due to the industrial nature of adjacent land-uses with dispersed employment and population. The corridor does not connect directly to planned Urban Growth Centres, and therefore serves a different role in regional travel including connections to other transportation modes and services. Park and ride, and connections to GO Transit and other express or rapid transit services in the corridor, will be drivers of ridership and therefore need and justification for the transitway.

2.1.2. Scope of Systems Planning

The focus of this report is to develop ridership forecasts for the 23 kilometre western section (407 Transitway West) from Hurontario Street to Highway 400. Stemming from ridership forecasts are station demands including walk access, transfer from other municipal transit services, and park-and-ride demand. Station forecasts will be used in evaluating the need for stations, the possibility of consolidating or removing under-performing stations, and help establish station footprints in terms of park-and-ride lot size and connectivity requirements.

This Chapter describes the development of ridership forecasts for the 407 Transitway West from Hurontario Street to Highway 400, and is organized as follows:

Section 2.2: Existing Characteristics and Trends describe the corridor's existing network and travel demand, and how travel patterns have evolved in the past 20 years.

Section 2.3: Future Growth provides estimates of future land use and resulting travel demand to show

where growth is likely to occur and any emerging travel markets.

Section 2.4: 407 Transitway West Service Concept describes the transit service concept for the 407 Transitway including the service strategy, vehicle technology, and the route structure.

Section 2.5: Transitway Ridership Forecasts summarizes outcomes of the ridership forecasting exercise including modelling methodology and a sensitivity analysis for alternative operating strategies. It also includes an assessment of station locations based on connecting transit services, and station spacing.

Section 2.6: Summary provides a summary of work to date and recommended next steps.

2.2. Existing Travel Characteristics and Past Trends

The following chapter describes the existing multi-modal transportation network supporting travel near and through the study area, existing travel conditions, and how travel patterns have changed over the past 20 years. This information will be used to compare travel patterns from 2011 to 2041 without the West Transitway, and then with the West Transitway to determine the impact of the West Transitway.

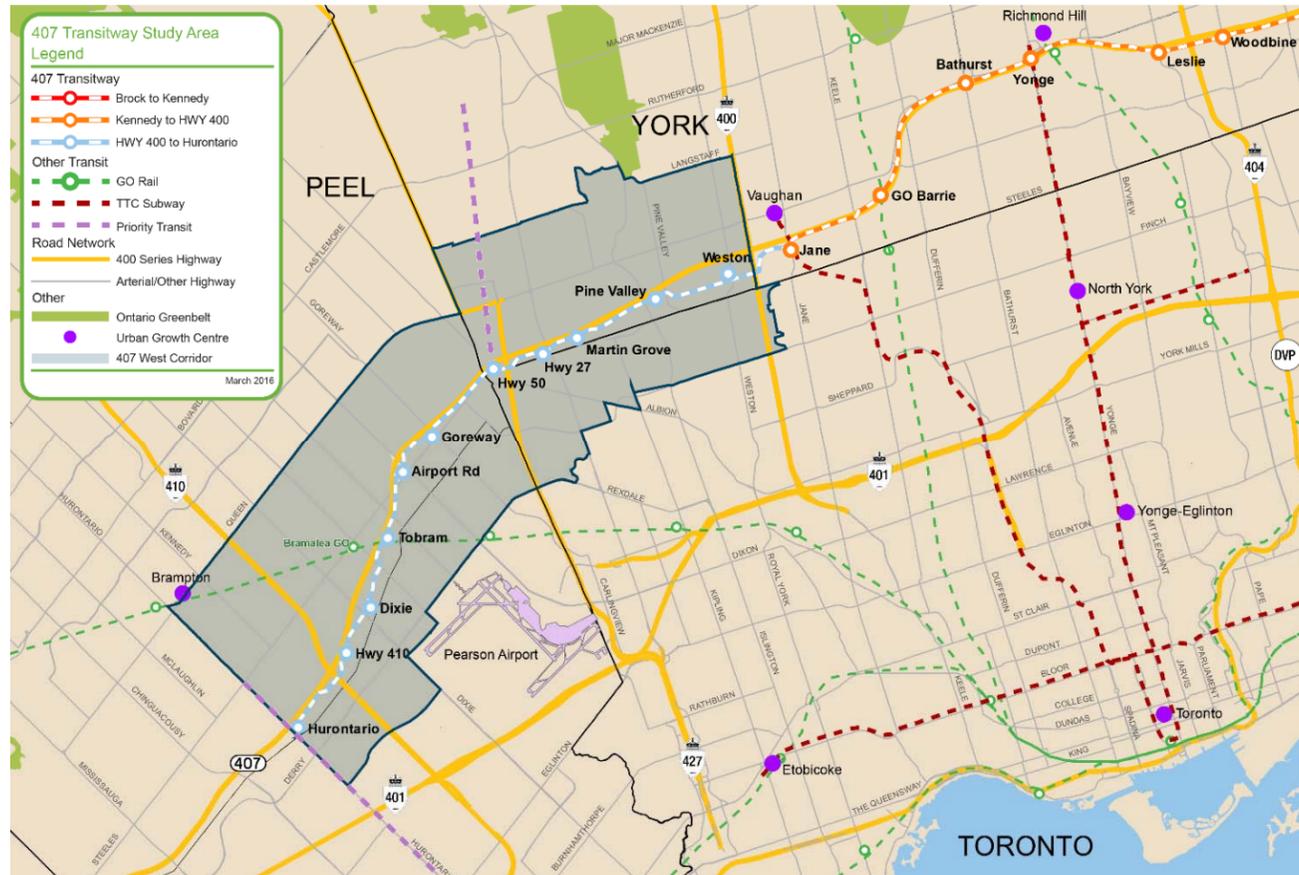
2.2.1. Corridor Overview

For the purpose of Transportation Planning assessment, the 407 West Corridor study area has been defined as the area bound by Highway 400 to the East; Queen Street to the North; Hurontario Street to the West; and Derry Road to the South as seen in **Figure 2.1**. The study area is located in York, Toronto, and Peel Regions, and is influenced by a number of high activity areas such as Brampton, Mississauga, Vaughan, North York, and Etobicoke. The study area is broadly characterized by low-density land use predominantly industrial / commercial near 407 ETR and residential and retail beyond. Some higher-density areas do occur such as Bramalea in Brampton and central Malton in Mississauga. The study area includes natural environment land forms at Claireville Conservation Area and at Etobicoke Creek.

Within the immediate vicinity of 407 ETR, for example within walking distance of the corridor protection study alignment, land use is predominantly low-density industrial with a mix of manufacturing, distribution centres, and commercial office space interspersed with small-format retail. This land-use is not normally supportive of rapid transit services, but as detailed in the following sections, the corridor is also serving high demand for east-west travel in the GTHA, and there are a number of important highway and transit connections providing access to Urban Growth Centres.

Directly to the east of the study area is the central section of the 407 Transitway which serves three Urban Growth Centres (Markham Centre, Richmond Hill Centre, and Vaughan City Centre), connects to three GO rail corridors, and two TTC subway extensions.

FIGURE 2.1: STUDY AREA



2.2.2. Transportation System

The 407 Transitway West Corridor includes an extensive existing road and highway system as well as a combination of local and long-distance commuter transit services, as described in the sections below (as seen in **Figure 2.1**). The road and highway system in the Study Area will drive the park-and-ride demand for the West Transitway stations.

2.2.2.1. Highway System

The following are the primary highways relevant to the study area:

- 407 Express Toll Route (ETR):** The 407 ETR is a privately operated and tolled 400-series Highway in the northern GTHA spanning over 100 kilometre from the Queen Elizabeth Way (QEW) in Hamilton to Brock Road in Pickering. It is a major east-west facility providing a fast alternative to Highway 401 during peak periods. The segment within the Study Area spans from eight lanes and goes up to ten lanes at interchanges with Highways 400, 403/410, and 427. In addition to major highways, interchanges exist at all major north/south regional roads. The highway accommodates

east-west travel across the northern part of the GTA and high traffic flow (and high tolls) illustrates the high demand for east-west travel in the corridor.

- Highway 400:** A north-south 400-series Highway that spans from south of Highway 401 to Parry Sound in the north. It connects the GTHA to Barrie and the Georgian Bay. The segment within the Study Area spans ten lanes. In addition to an interchange with the 407 ETR, interchanges exist at all major east/west regional roads.
- Highway 427:** The Highway 427 is a north-south 400-series Highway that spans from the QEW to Fogal Road in York Region. In the Study Area, the highway consists of six lanes with interchanges at major east/west regional roads and Highways 401, 407, and 409. A northern extension of the Highway to Rutherford Road is planned, and includes a transitway along the west side of Highway 427 north of 407 ETR. Interconnections with the planned transitway could generate transit demand at the Highway 50 station, thus contributing to a long term inter-regional priority transit network in the north GTA.
- Highway 410:** Highway 410 is a north-south 400-series Highway that runs from Highway 401 to Mayfield Road, with a direct connection to Hurontario Street / Highway 10. In the Study Area, the Highway has a span ranging from six to eight lanes and has interchanges with Highways 401 and 407, in addition to all major east/west regional roads. Highway 410 is currently being widened to ten lanes with HOV lanes.
- Highway 403:** Highway 403 is an east-west 400-series Highway that spans from Highway 401 to Brantford, merging with the QEW from Oakville to Hamilton. In the Study Area, it spans eight lanes, with two High Occupancy Vehicle (HOV) lanes from Highway 401 to Winston Churchill Boulevard.
- Highway 401:** Though not directly in the 407 West Corridor, Highway 401, the largest expressway in Ontario, has a large influence on corridor travel patterns, serving a large number of east-west trips especially between the Study Area and Toronto. Highway 401 spans eighteen lanes east of Hurontario, running parallel to 407 ETR.

Major north-south regional roads and arterials include (from west to east) Hurontario Street, Dixie Road, Bramalea Road, Torbram Road, Airport Road, Goreway Drive, Highway 50, Highway 27, Martin Grove Road, Kipling Avenue, Islington Avenue, Weston Road, and Jane Street. These arterials all generally operate as signalized four-lane or six-lane facilities. Besides the listed regional facilities, Steeles Avenue and Derry Road are major east/west arterial roads in the study area and run parallel to 407 ETR. The arterials serve significant commuter traffic and stations with park-and-ride facilities and are expected to be an import source of ridership for the 407 Transitway.

2.2.2.2. Existing Transit Services

Transit in the study area is provided by a number of operators including GO Transit, YRT/Viva, Brampton Transit/Züm, MiWay and the Toronto Transit Commission (TTC). Existing high order services are depicted in **Figure 2.1**. These transit services will drive the walk/transit demand to the West Transitway stations, dependent on connections to these stations.

GO TRANSIT

GO Transit operates rail and bus services within the 407 ETR Corridor. The Kitchener Line (formerly known as Georgetown Line) provides a connection between Kitchener to downtown Toronto. Two GO Rail Stations are located near or within the Study Area, all a part of the Kitchener GO Line:

- **Bramalea Station:** This rail and bus station is located at the southwest corner of Steeles Avenue and Bramalea Road, less than one kilometre north of 407 ETR. It provides bus connections to Yorkdale, York University, Guelph University, Wilfred Laurier, and University of Waterloo. A transitway station integrated with Bramalea GO could potentially provide the 407 Transitway a direct connection to downtown Toronto / Union Station.
- **Malton Station:** This rail and bus station is located at Airport Road and Derry Road, approximately four kilometres south of 407 ETR. It is smaller than Bramalea Station (775 parking spaces versus 1,991 at Bramalea) and provides bus connections to the local bus service.

Bramalea Station could be used to provide seamless transfers between the 407 Transitway and the Kitchener GO Line. The Malton Station would potentially be integrated with the Transitway using local services.

There are also a number of GO Bus routes providing regional services in this corridor including the 25-route connecting the University of Waterloo, Wilfred Laurier, and York University to Square One and the 30-31-33 routes providing bus service along the Kitchener Line outside of peak periods. The 25-route provides 21-minute peak headways on weekdays and hour peak headways on weekends. The Kitchener bus offers 25-minute peak headways on weekdays and weekends. The construction of the Transitway would see the integration of 407 GO Bus services with transitway operations in order to provide the most efficient services to all types of travellers.

YRT/VIVA

YRT operates local, express, and Viva routes near and along the 407 ETR Corridor. Viva services include the Viva Orange line which runs parallel to 407 ETR on Highway 7 from Martin Grove to Pine Valley during weekday rush hours and mid-day only. The line runs regularly along the corridor from Pine Valley to Weston and links the West Corridor to the Vaughan Corporate Centre and York University. Local YRT services in the study area include Route 7 along Martin Grove Road from Rutherford Road to Rexdale Boulevard; Route 10 along Weston Road from Woodbridge Avenue to York University; Route 12 along Pine Valley Drive from Vaughan Mills to the Thackeray Conservation Lanes (Steeles Avenue); Route 13 along Islington Avenue from Napa Valley Avenue to Steeles Avenue; Route 28 along Highway 27 from Rutherford Road to Steeles Avenue; and Route 77 along Highway 7 from The Gore Road to Finch GO Bus Terminal.

The success of Viva in increasing transit use in York Region is encouraging when considering adding new rapid transit in the western 407 Corridor. New Transitway services will need to be planned and coordinated with Viva and local transit services to provide effective first and last mile connections, and to ensure the 407 Transitway serves distinct trip markets that are not redundant or competing with other

agencies. While Viva routes serve local trips within York Region, services on the 407 Transitway are anticipated to serve more regional purposes including long distance and cross-boundary travellers.

BRAMPTON/ZÜM

Brampton Transit operates local, express, and Züm routes near and along the 407 ETR Corridor. Züm services in the study area includes Route 501 along Queen Street and 407 ETR from the Brampton GO Station to York University; Route 502 runs along Main Street/Hurontario Street from Sandalwood Parkway to Square One; and Route 511 runs along Steeles Avenue from Lisgar GO Station to Humber College.

Local Brampton Transit services are provided on all arterial all collector roads crossing the study area including Hurontario Street, Goreway Drive, Kennedy Road, Torbram Road, Bramalea Road, Dixie Road, Airport Road, and Highway 50.

MIWAY

Mississauga Transit, known as MiWay, operates two express routes near and along the 407 ETR Corridor as the highway is located outside of the City's borders. Route 103 is an all-day service express route that runs along Hurontario Street from the Brampton Gateway Bus Terminal to the Port Credit GO Station. Route 185 is a peak period rush hour service that runs along Dixie Road from the Bramalea Terminal in Brampton to the future Dixie 407 Transitway Station. The Mississauga Transitway is a newly constructed BRT corridor that runs along Highway 403 from Winston Churchill Boulevard to Renforth Drive.

Metrolinx is currently in the design / procurement stages for the planned Hurontario LRT which is included in future forecast assumptions.

HURONTARIO LIGHT RAIL TRANSIT (LRT)

The future Hurontario Light Rail Transit (HuLRT) service will be managed and operated by a separate entity. The HuLRT is a surface light rail service being designed in a dedicated right of way along the median of Hurontario Street being designed and built by Metrolinx, together with the City of Mississauga and the City of Brampton. The 20 km., 22 stops line from Port Credit GO Station in Mississauga to the Brampton Gateway Terminal at Steeles Avenue will drive economic growth, reduce transit travel and connection times, and improve quality of life in the community. The HuLRT will connect to GO Transit's Milton and Lakeshore West rail lines, GO buses, MiWay, Brampton Transit, Brampton Zum, the Mississauga Transitway and future 407 Transitway.

Metrolinx is currently in the design/build stage of the Hurontario LRT.

TORONTO TRANSIT COMMISSION (TTC)

Though the TTC generally operates within the City of Toronto south of Steeles Avenue, there are two buses that intersect the western 407 ETR Corridor. Route 165 runs from Canada's Wonderland to Wilson and York Mills Subway Stations. Route 35D is a limited service that runs along Jane Street from Courtland Road to Jane Subway Station. Route 60 is an east-west service that runs parallel to 407 ETR on Steeles

Avenue, from Martin Grove Road to Finch Subway Station.

The central portion of the 407 Transitway, east of Jane, would provide connections to two TTC subway lines including the currently under construction Toronto York Spadina Subway Extension (TYSSE) and the planned Richmond Hill Subway extension. Designing high quality connections to these routes would provide transitway passengers with several rapid transit options for accessing parts of York Region as well as mid- and downtown Toronto.

2.2.3. Travel Demand Trends

Due to the study area’s location in the industrial area of Peel Region, auto has dominated travel with approximately 89% of AM peak period motorized trips being made by car in 2011. Transit travel in the study area is driven by local transit travel from Toronto, with more than half of the AM peak period trips originating from Toronto were destined for the study area according to the Transportation Tomorrow Survey (TTS). **Table 2.1** shows the AM peak period travel in 1991 and 2011, illustrating past and existing travel patterns and how travel has changed over the past twenty years.

Trips to/from the south is defined as the areas of Mississauga and Toronto, south of the West Transitway. The west area is defined as some areas of Brampton, Halton Region, and Hamilton Region. Trips to/from the north area is defined as some areas of Brampton, Caledon, and parts of York Region. The east area is defined as Durham Region, and areas of York Region and the City of Toronto.

TABLE 2.1: AM PEAK PERIOD MOTORIZED TRAVEL IN THE 407 ETR WEST CORRIDOR, 1991 – 2011

A. 1991

TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	2,900	26,200	29,100	10%
To/From South	3,800	38,800	42,600	9%
To/From West	1,300	23,300	24,600	5%
To/From North	500	17,300	17,800	3%
To/From East	7,900	33,000	40,900	19%
Through Eastbound	200	3,300	3,500	6%
Through Westbound	-	600	600	0%
Total	16,600	142,500	159,100	10%

B. 2011

TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	2,700	26,000	28,600	9%
To/From South	8,500	65,600	74,000	11%
To/From West	2,300	32,900	35,300	7%

TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
To/From North	2,600	47,900	50,400	5%
To/From East	12,100	45,400	57,400	21%
Through Eastbound	1,500	4,400	5,900	25%
Through Westbound	100	13,800	13,900	1%
Total	29,800	236,000	265,500	11%

C. 1991 – 2011 Growth

TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	-200 (-7%)	-200 (-1%)	-500 (-2%)	-1% (-5%)
To/From South	4,700 (124%)	26,800 (69%)	31,400 (74%)	3% (29%)
To/From West	1,000 (77%)	9,600 (41%)	10,700 (43%)	1% (25%)
To/From North	2,100 (420%)	30,600 (177%)	32,600 (183%)	2% (82%)
To/From East	4,200 (53%)	12,400 (38%)	16,500 (40%)	2% (9%)
Through Eastbound	1,300 (650%)	1,100 (33%)	2,400 (69%)	19% (309%)
Through Westbound	100 (-)	13,200 (2200%)	13,300 (2217%)	1% (-)
Total	13,200 (80%)	93,500 (66%)	106,400 (67%)	1% (8%)

Note: Percent growth shown in parentheses.

Source: 1991 Transportation Tomorrow Survey (TTS), 2011 GGHM

Although transit demand has significantly increased (an increase of 80%) between 1991 and 2011, the mode split has increased by only 1%. Transit travel grew in specific markets with 41% of new transit trips originated from Toronto, 18% of new transit trips originated from the City of Mississauga, and 16% of new transit trips originated from the City of Brampton. Transit outpaced auto growth to the study area from Toronto and Mississauga, but was outpaced by auto growth for almost all other origin-destination pairs. For example, though the 2011 AM peak period had 1,000 more transit trips from York Region to the Study area than in 1991, it also had an additional 13,500 auto trips. Transit represented under 8% of new trips in this market.

Due to the industrial nature of the study area, travel self-containment has decreased over the twenty-year period. In 2011, 17% of AM peak period trips beginning in the study area remained within its bounds, compared to 27% in 1991. With more industrial development in the area and the expansion of Pearson Airport over the past twenty years, the number of neighbourhoods in the study area has

declined. This is also reflected in the internal transit share, which is down from 11% in 1991 to 9% in 2011. In addition, this low transit share is also reflective of the barriers to transit use that exist in the 407 ETR corridor. The highway itself acts as a significant deterrent due to the long walking distances needed to reach developments in the corridor and the unfriendly walking environment that exists for last-mile access.

The broad travel context and trends illustrate that the travel market for the west transitway would mainly consist of longer distance inter-municipal trips rather than trips within the corridor. The transitway would provide access to connecting services (GO Kitchener, Hurontario LRT, 427 Transitway, TTC subway) in addition to some growth areas located further east along the transitway.

2.2.4. Existing Travel Context

A more detailed breakdown of 2011 AM peak period travel patterns and mode choice in the study area is illustrated in **Table 2.2**. Travel is highly directional with almost twice as many inbound trips as outbound trips during the AM peak period, given the high employment in the study area.

Overall travel to the corridor is high and attracts long distance commuter's due to the industrial nature of the area. It was found that 60% of trips to the corridor originate within the Study Area or elsewhere in Brampton, Mississauga, and Vaughan, meaning that the 40% of trips to the corridor commute longer distances. This includes the 4% travelling from the western area of the GTHA. Transit trips to the corridor serve 10% of the travel demand. There are 17,300 transit trips to the corridor during a typical AM peak period with Toronto, Brampton, and Mississauga serving as the major origins for these trips.

Figure 2.2 and **Figure 2.3** are plots of auto and transit travel into and out of the study area. These illustrate the dominance of auto over transit travel in the AM peak period. The maps also illustrate that there is a balanced split of auto directionality in the AM peak period, with the largest auto flows to the

corridor from Mississauga, Brampton, Vaughan, and Toronto. However, transit travel shows the strongest directionality are flows to the corridor from Toronto.

A large number of trips pass through the corridor in both directions with 4,400 eastbound trips and 13,800 westbound trips heading to employment areas throughout the GTHA.

Flows within and into the corridor have transit shares of 9% and 10%, respectively, showing modest transit usage in a predominantly low-density industrial land use.

Transit trips from the corridor to downtown Toronto represent a 60% modal split. It is likely that a significant portion of these trips are served by GO Transit. From the central corridor, the Bramalea GO Station offers a direct connection to Union Station in downtown Toronto via the Kitchener GO train line. The rail line offers 15-minute peak headways during the weekday and is a 30-minute journey. In addition, the TTC operates in the eastern corridor of the study area and provides several bus routes that connect to downtown Toronto.

Overall the travel patterns and mode share illustrate that the travel market for the 407 Transitway would mainly consist of longer distance inter-municipal trips rather than trips between local destinations. The transitway would provide access to connecting services (GO Kitchener, Hurontario LRT, 427 Transitway, TTC subway) in addition to some growth areas located further east along the transitway. It is expected that ridership forecasts will be sensitive to travel times and number of transfers due to the nature of travel demand in this portion of the corridor. Park-and-ride will likely be an important element of service due to the number of transfers that may otherwise be required in connecting lower-density land forms in the study corridor. Because the area is low-density with high through travel demand and long-distance trips, a higher design speed with fewer stations at greater spacing, and good quality connections to existing or planned rapid transit services, will be crucial in attracting demand to the transitway.

TABLE 2.2: 2011 AM PEAK PERIOD TRAVEL FLOWS BY MODE

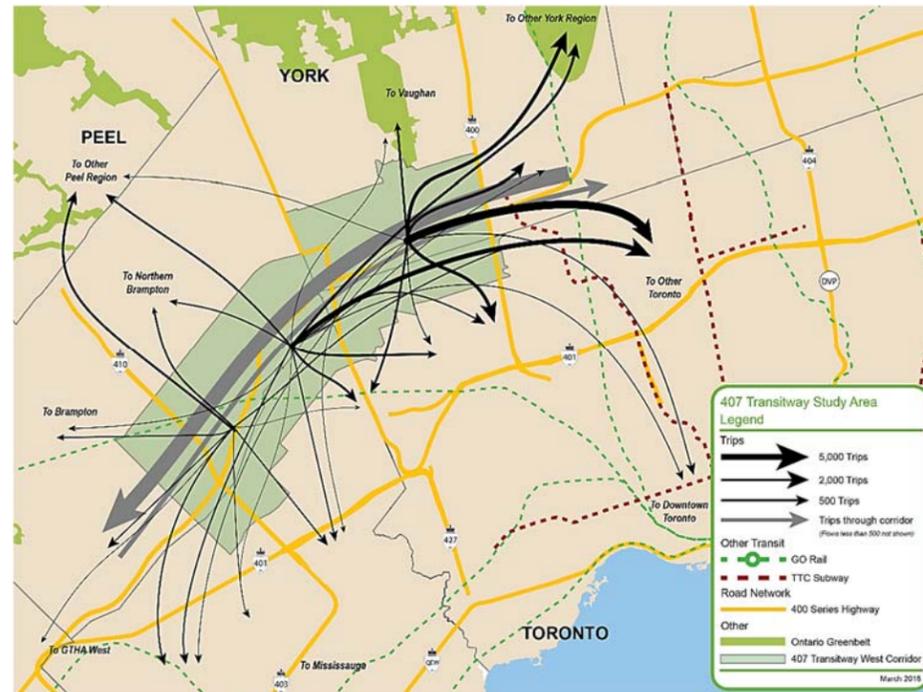
ORIGIN	DESTINATION										
	WESTERN CORRIDOR	CENTRAL CORRIDOR	EASTERN CORRIDOR	TOTAL CORRIDOR	OTHER TORONTO	OTHER PEEL	OTHER YORK	DOWNTOWN TORONTO	DURHAM	WESTERN GTHA	TOTAL
ALL TRIPS											
Western Corridor	3,700	1,700	300	5,700	2,300	11,900	600	800	100	700	22,100
Central Corridor	1,700	8,200	1,400	11,300	9,600	9,600	3,800	2,200	300	600	37,400
East Corridor	600	2,800	8,200	11,600	15,400	3,700	8,400	2,900	100	300	42,400
Total Corridor	6,000	12,700	9,900	28,600	27,300	25,200	12,800	5,900	500	1,600	101,900
Other Toronto	4,400	14,300	16,200	34,900	728,800	54,400	90,200	202,800	11,000	8,300	1,130,400
Other Peel	37,600	28,700	7,700	74,000	92,700	425,200	29,500	46,600	1,500	38,200	707,700
Other York	2,100	7,400	12,600	22,100	125,700	29,200	293,000	39,300	5,400	1,600	516,300
Downtown Toronto	400	700	600	1,700	46,500	8,400	4,600	33,800	1,400	1,500	97,900
Durham	100	500	300	900	35,000	3,300	14,300	15,800	224,400	600	294,300
Western GTHA	4,000	2,600	700	7,300	15,200	50,500	2,700	16,700	400	1,086,100	1,178,900
Total	54,600	66,900	48,000	169,500	1,071,200	596,200	447,100	360,900	244,600	1,137,900	4,027,400
TRANSIT TRIPS											
Western Corridor	300	200	-	500	400	1,000	-	500	-	-	2,400
Central Corridor	200	700	100	1,000	1,400	900	100	1,300	-	-	4,700
East Corridor	-	600	500	1,100	2,800	200	300	1,800	-	-	6,200
Total Corridor	500	1,500	600	2,600	4,600	2,100	400	3,600	-	-	13,300
Other Toronto	400	4,300	2,300	7,000	175,700	5,800	7,300	131,700	300	400	328,200
Other Peel	2,400	2,800	400	5,600	13,600	31,400	1,100	30,800	-	2,100	84,600
Other York	-	600	500	1,100	15,000	800	11,100	28,200	100	-	56,300
Toronto PD1	100	300	200	600	19,200	2,100	1,400	18,700	400	300	42,700
Durham	-	-	-	-	3,200	100	200	11,800	8,600	-	23,900
Western GTHA	100	100	-	200	1,300	1,300	100	11,200	-	51,500	65,600
Total	3,500	9,600	4,000	17,100	232,600	43,600	21,600	236,000	9,400	54,300	614,600
PERCENTAGE TRANSIT TRIPS											
Western Corridor	8%	12%	0%	9%	17%	8%	0%	63%	0%	0%	11%
Central Corridor	12%	9%	7%	9%	15%	9%	3%	59%	0%	0%	13%
East Corridor	0%	21%	6%	9%	18%	5%	4%	62%	0%	0%	15%
Total Corridor	8%	12%	6%	9%	17%	8%	3%	61%	0%	0%	13%
Other Toronto	9%	30%	14%	20%	24%	11%	8%	65%	3%	5%	29%
Other Peel	6%	10%	5%	8%	15%	7%	4%	66%	0%	5%	12%
Other York	0%	8%	4%	5%	12%	3%	4%	72%	2%	0%	11%
Toronto PD1	25%	43%	33%	35%	41%	25%	30%	55%	29%	20%	44%
Durham	0%	0%	0%	0%	9%	3%	1%	75%	4%	0%	8%
Western GTHA	3%	4%	0%	3%	9%	3%	4%	67%	0%	5%	6%
Total	6%	14%	8%	10%	22%	7%	5%	65%	4%	5%	15%

Source: 2011 GGHM

Note: Trips to/from the south is defined as the areas of Mississauga and Toronto, south of the Transitway. The west area is defined as some areas of Brampton, Halton Region, and Hamilton Region. The north area encompasses areas of Brampton, Caledon, and parts of York Region. The east area is defined as Durham Region, and areas of York Region and the City of Toronto.

FIGURE 2.2: 2011 AM PEAK PERIOD STUDY AREA AUTO TRIPS

A. Auto Trips from the Study Area



B. Auto Trips to the Study Area

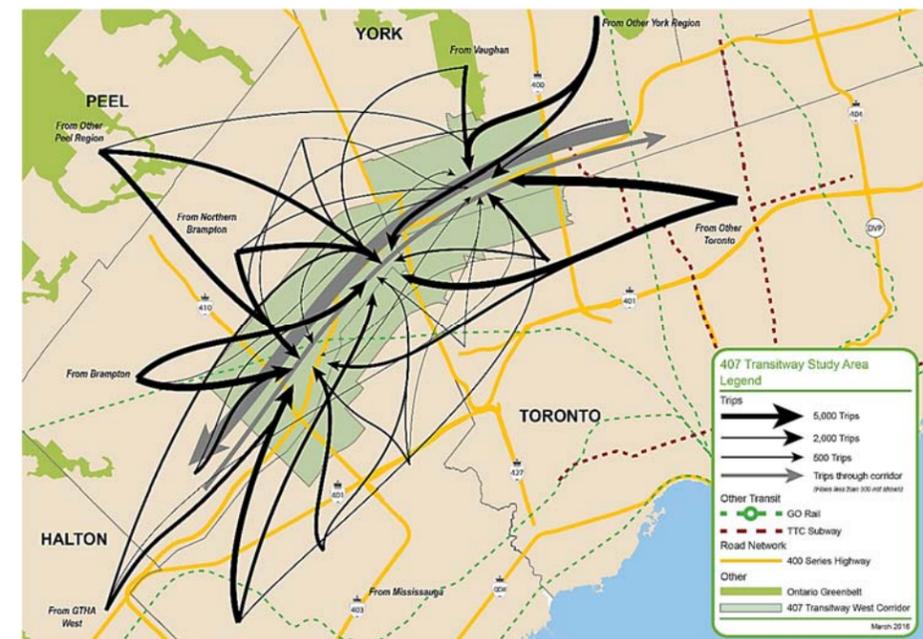
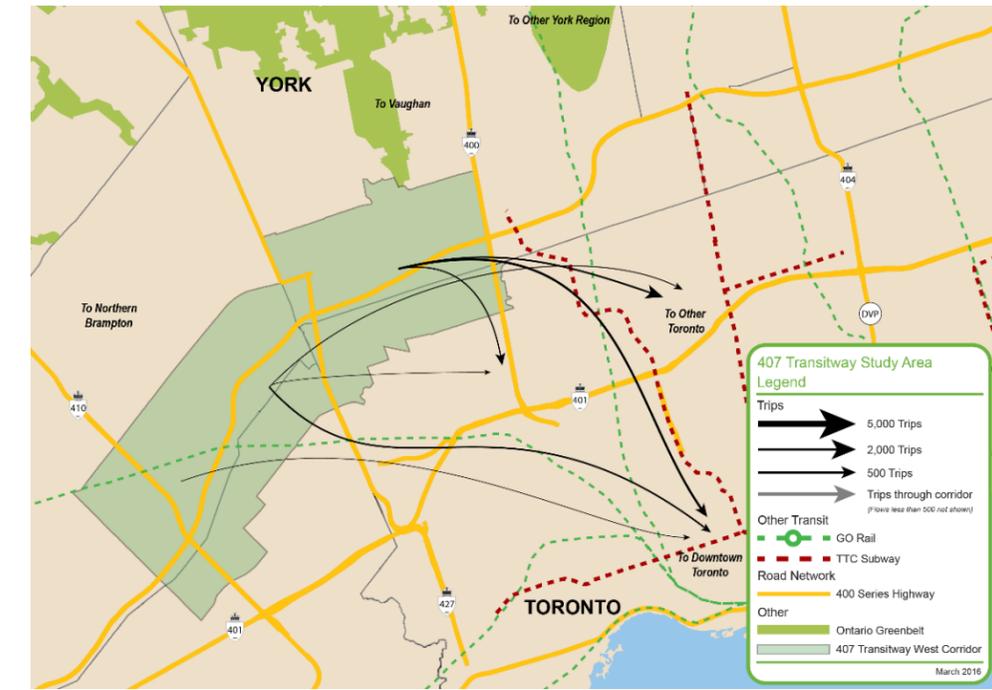
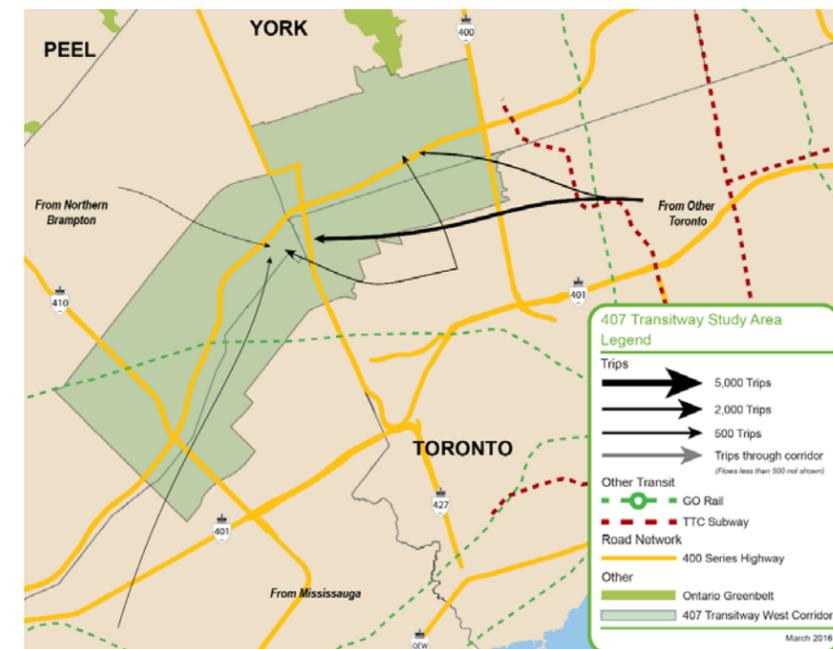


FIGURE 2.3: 2011 AM PEAK PERIOD STUDY AREA TRANSIT TRIPS

A. Transit Trips from the Study Area



B. Transit Trips to the Study Area



2.3. Future Growth and Transportation Needs

Growth and development in the York and Peel regions and elsewhere in the GTHA will drive travel demand and the success of a Transitway facility in the western 407 corridor. This chapter explores how land use trends and policy will impact transportation needs, what committed transportation projects are being built or planned to serve these needs and the approach for forecasting 2041 future travel demand.

2.3.1. Land Use, Population & Employment

The GGH is one of the fastest growing regions in North America with a 2011 population of 9 million that is expected to increase by nearly 4.5 million (49%) to approach 13.5 million residents by 2041. In 2006, recognizing the rapid speed of development, the Growth Plan was enacted to create a policy environment that promotes vibrant and self-sustainable communities, limits urban sprawl, protects farmland, and reduces auto oriented development. These objectives are to be achieved by directing growth to built-up areas through intensification, thereby creating complete communities that are easier to serve with alternative modes.

2.3.1.1. Population and Employment Growth

Table 2.3 shows 2011 and 2041 population and employment data for the study area and elsewhere in the GGH. The study area is expected to experience a 125% increase in population between 2011 and 2041, paired with a slight decrease (11%) in jobs, likely associated with the growing service economy and modest continued decline in manufacturing. However, both Peel and York Region – the broader study area – are expected to see steady growth in population and employment. Peel Region is expected to grow by 46% in population and 42% in employment, while York Region is expected to see 67% growth in both categories to 2041 and will nearly double the number of jobs in the area.

TABLE 2.3: 2011 AND 2041 POPULATION AND EMPLOYMENT BY REGION

AREA / REGION	POPULATION (IN 000S)				EMPLOYMENT (IN 000S)				JOBS/RESIDENT		
	2011	2041	GROWTH	% GROWTH	2011	2041	GROWTH	% GROWTH	2011	2041	CHANGE
407 West Corridor	242	544	302	125%	234	208	-26	-11%	0.90	0.38	-0.59
Peel	1,350	1,967	617	46%	682	966	284	42%	0.51	0.49	-0.02
York	1,072	1,794	722	67%	540	903	363	67%	0.50	0.50	0.00
Toronto	2,725	3,362	637	23%	1,515	1,715	200	13%	0.56	0.51	-0.05
Halton	520	1,013	493	95%	255	467	212	83%	0.49	0.46	-0.03
Hamilton	540	779	239	44%	234	352	118	50%	0.43	0.45	0.02
Durham	631	1,198	567	90%	240	428	188	78%	0.38	0.36	-0.02
Total GTHA	6,838	10,113	3,275	48%	3,466	4,831	1,365	39%	0.51	0.48	-0.03
Total Outer Ring	2,192	3,331	1,139	52%	998	1,443	445	45%	0.46	0.43	-0.03
Total GGH	9,030	13,444	4,414	49%	4,464	6,274	1,810	41%	0.49	0.47	-0.02

Source: Growth Plan for the Greater Golden Horseshoe, MTO

As mentioned, York Region and Peel Region are the two regions that are projected to generate many new jobs in the next 30 years and creating high quality transit connections between these areas and other areas of the GGH will be key in supporting *Growth Plan* goals and policies.

Figure 2.4 and **Figure 2.5** provide detailed population and employment forecasts for the study area and surrounding communities. Population growth is expected to occur throughout and near the study area, particularly in northern Brampton and Vaughan. Employment growth in the study area is more modest, however there will be significant growth in the Vaughan areas. As the study area has high level of employment, many residents outside of the corridor will likely commute to employment opportunities within the study area.

FIGURE 2.4: 2011, 2031, AND 2041 CORRIDOR POPULATION

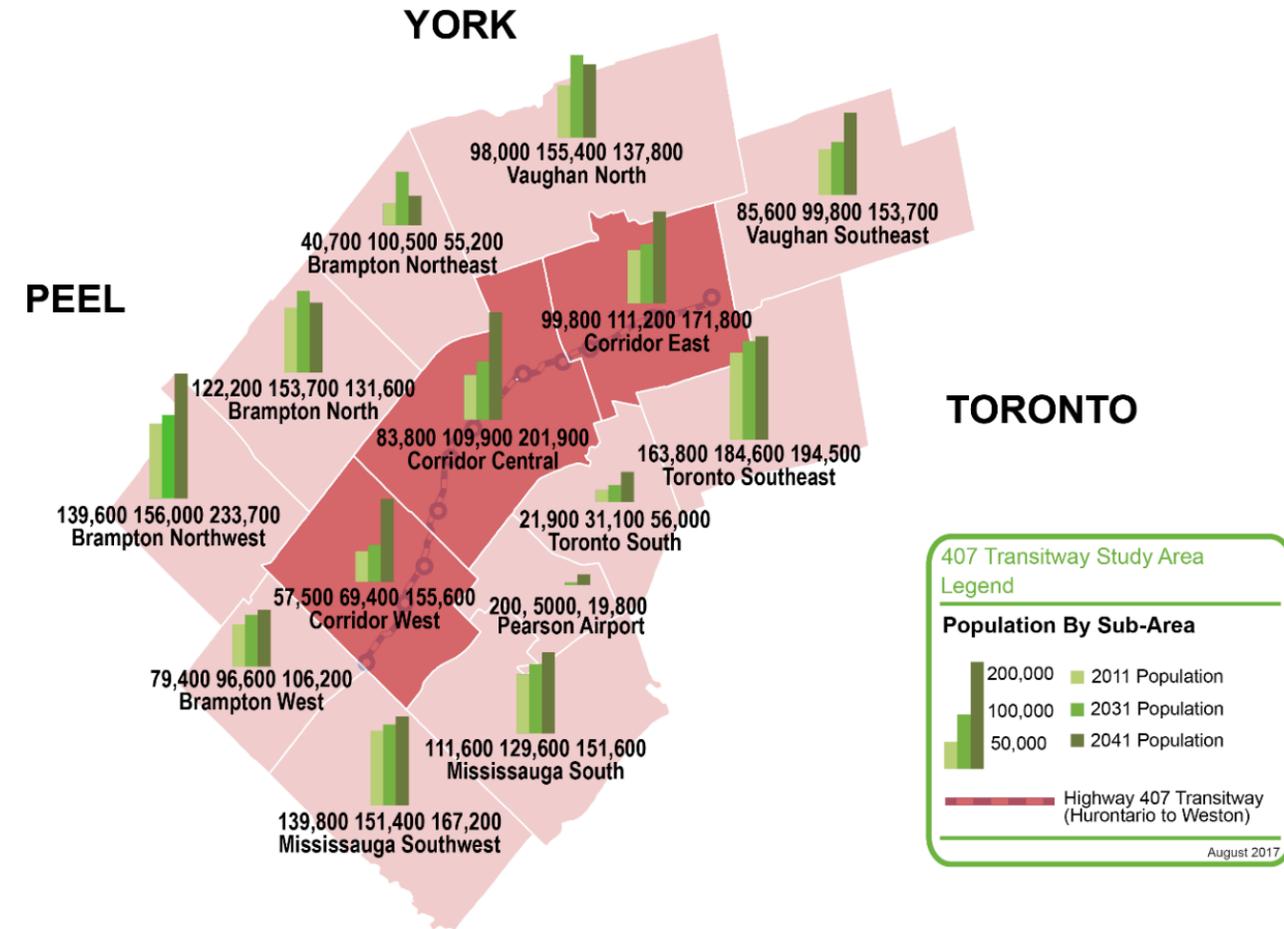
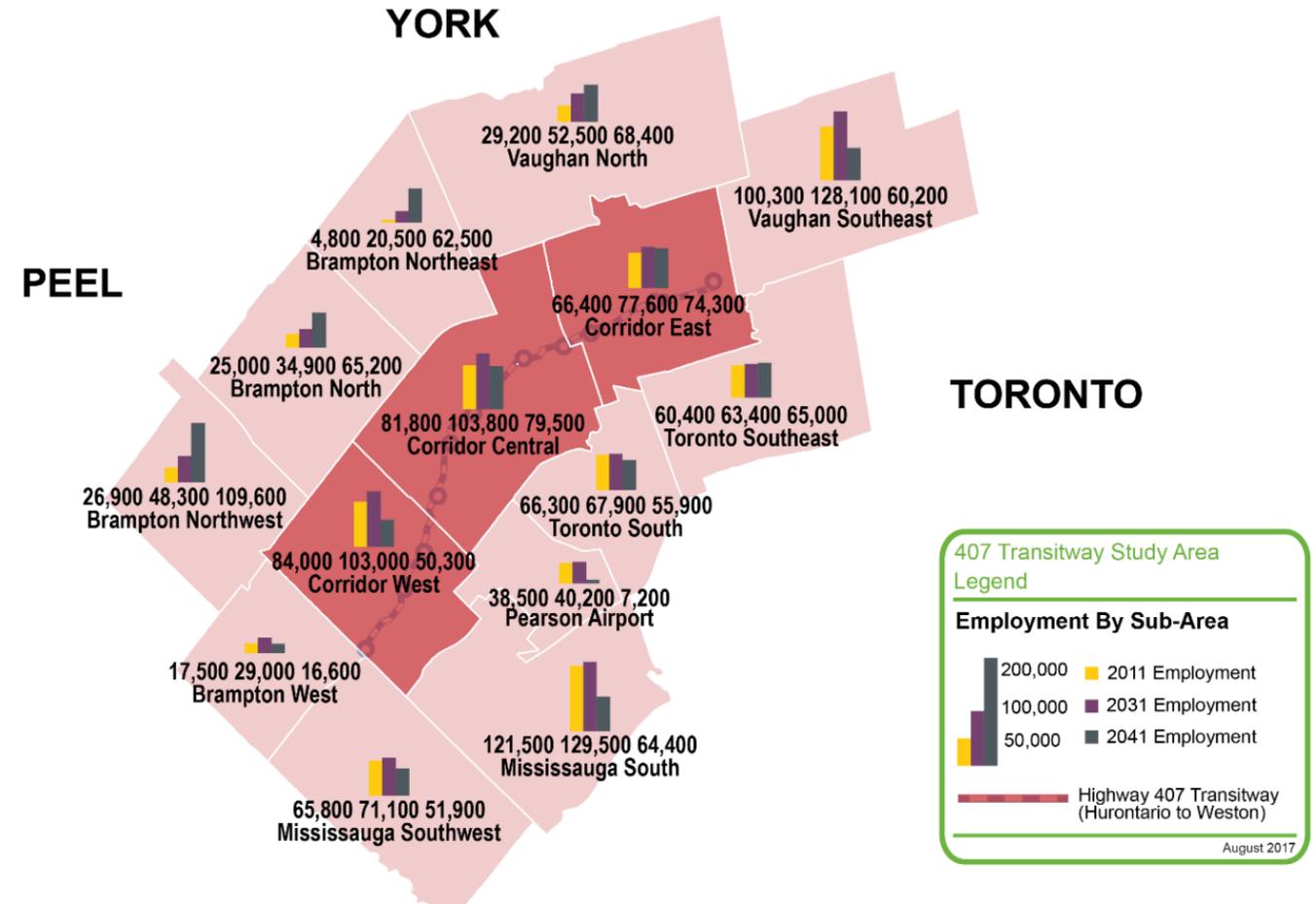


FIGURE 2.5: 2011, 2031, AND 2041 CORRIDOR EMPLOYMENT



2.3.1.2. Allocation of Growth and Density

The Growth Plan is a 25-year plan governing where growth and density will occur in the GGH through 2041. Per the Growth Plan, at least 40% of the population growth has to occur in existing urban areas (intensification zones) while the remainder can occur in designated Greenfield areas. UGCs are targeted to have densities of 200 persons plus jobs per hectare outside of Toronto. There are two UGCs located within the 407 West Corridor: Brampton and Vaughan. There are also several UGCs located adjacent to the corridor and can be connected by Transitway services, including Mississauga, Markham, Richmond Hill, and North York.

Figure 2.6 and **Figure 2.7** illustrates urban density in the 407 West Corridor and surrounding areas for 2011 and 2041, respectively. Generally, an urban density of above 120 people plus jobs per hectare (dark green on the exhibits) is required to support high-order transit such as BRT and LRT while anything over 200 can support heavy rail investments. These densities are important for providing not only transit riders but also transit friendly origins and destinations that will minimize many of the first and last mile barriers present in auto oriented areas. In the 407 West Corridor, current densities are notably less than the 120-threshold reflecting the travel and land-use context described previously. Future densities along the corridor support rapid transit, but only in select locations near designated nodes such as Hurontario Street, Torbram / north Malton, and portions of York Region along Highway 7. Further afield there are Urban Growth Centres Brampton and Vaughan. In addition, the corridor is connected to the Mississauga UGC with the future Hurontario LRT.

FIGURE 2.6: 2011 URBAN DENSITY

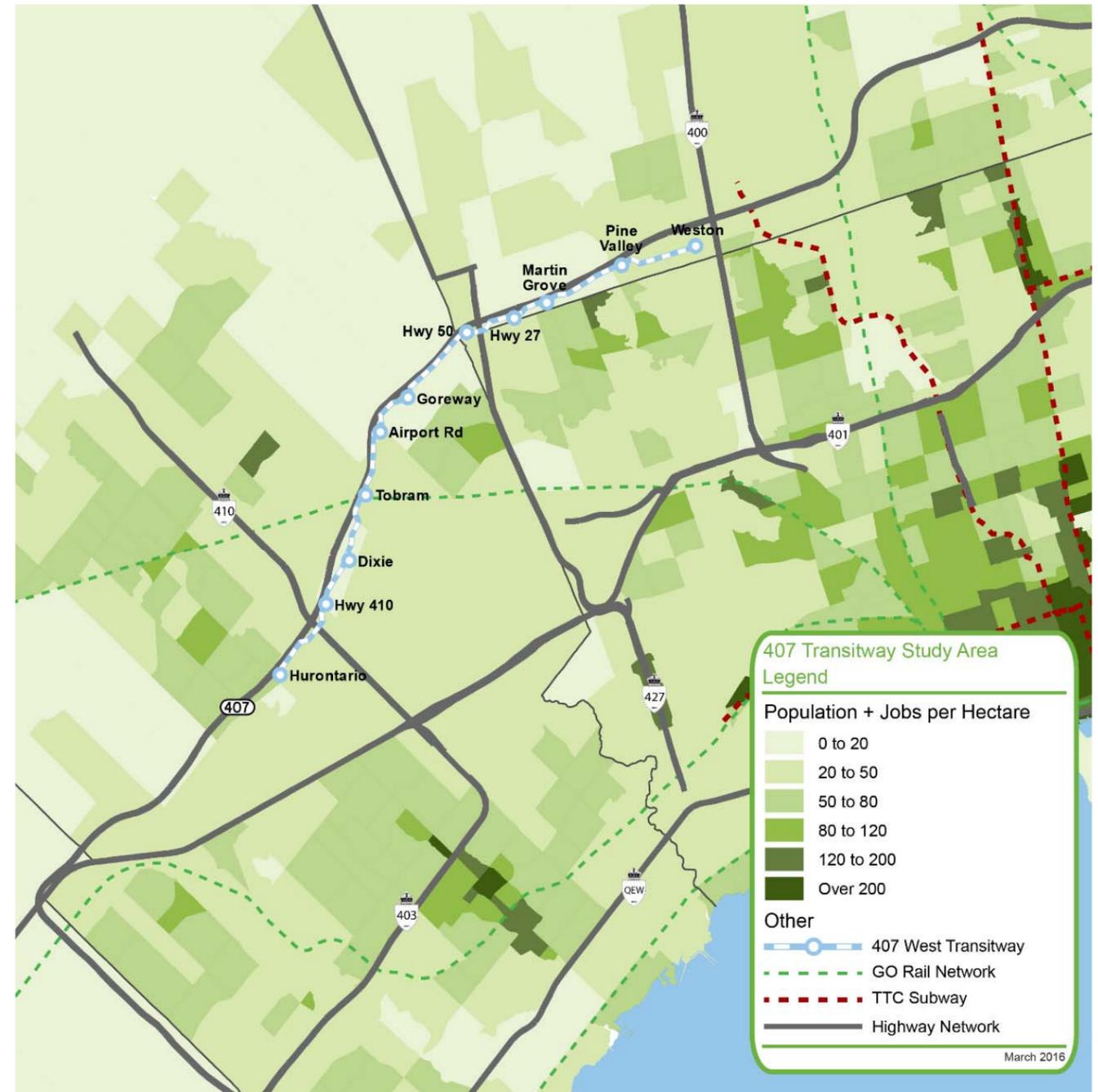


FIGURE 2.7: 2041 URBAN DENSITY



2.3.1.3. Developments Impacting Travel in 407 West Corridor

The following are planned and proposed developments within or near the study area that are likely to have large impacts on land use and travel demand. These include intensification of existing areas, and discusses mobility hubs:

- **Hurontario-Main Street:** the Hurontario-Main Street corridor is recognized as a top priority corridor for intensification and a rapid transit network. The approved LRT will link the UGCs of Mississauga

and Brampton, connecting the mobility hubs of Port Credit GO Station, Cooksville GO Station, and Square One. It also includes the suburban transit node of Hurontario Street and Steeles Avenue. Intensified land use will occur in the corridor due to the LRT. The Hurontario LRT was included during the modelling and forecasting process, resulting in high walk/transit connections at the Hurontario Station with the implementation of the West Transitway.

- **Downtown Mississauga:** in April 2010, the City of Mississauga announced their plans for Downtown21, a master plan for downtown Mississauga to create an urban area. The plan aims to catalyze employment, create an urban place, build a multi modal network, and commit to sustainability. Downtown Mississauga is expected to have a population of over 55,000 people and an employment of 34,000 by 2031. The population and employment will drive the Hurontario LRT, which will be connected to the 407 West Transitway.
- **Square One:** located in downtown Mississauga, Square One is known as the heart of Mississauga City Centre, attract 23 million visitors annually. This is expected to increase with the recent expansion of the Square One Shopping Centre, the largest shopping centre in Ontario. The Mississauga City Centre is a mobility hub that serves GO Transit at the Square One GO Bus Terminal and serves, MiWay and Brampton Transit at MiWay’s City Centre Transit Terminal. In addition, the Hurontario LRT will have 4 stops located in the Square One area which will connect Square One to the 407 Transitway West.
- **Downtown Brampton:** located at Queen Street and Main Street, downtown Brampton is expected to have a population of 69,000 and an increase in employment by 48,000 by 2041. It is a regional transportation hub for Brampton Transit, VIA Rail, and GO Transit. Linkages to the 407 Transitway would be via bus service along Hurontario Street. Plans for future LRT connecting the downtown to the currently-planned terminus at Steeles Avenue and Hurontario Street are under separate environmental assessment at the City and could potentially enhance the linkage.
- **Pearson Airport:** An anchor mobility hub, Pearson Airport is a unique destination that acts as the international gateway for the GTHA and attracts over 42 million guests annually. It is the 4th largest entry point into North America and has connections to MiWay, the TTC, and the new Union-Pearson Express. Under current plans the 407 Transitway would connect to the airport via local bus service on Airport Road. Other future connections such as express buses are likely.
- **Bramalea GO Station:** listed as a Mobility Hub by Metrolinx, the Bramalea GO Station services the Kitchener GO Line, the Waterloo/Mississauga bus, the Kitchener bus, and the Orangeville/Brampton bus. Riders from the station can access the transitway via the GO Bramalea Bus Route. Because of the location of Bramalea GO at approximately 1kilometre north of 407 ETR, the current TPAP needs to evaluate connectivity options and opportunities. Connections between the GO rail corridor and 407 Transitway could provide an important linkage for cross-regional travel.

2.3.2. Forecasting Approach & Assumptions

Modelling activities were performed using the Greater Golden Horseshoe Model (GGHM), a state-of-

practice multi-model travel demand model used to estimate future travel demand within and through the GGH. The GGHM was developed to forecast peak period demand in support of Growth Plan policies and has strengths in predicting mode shifts as a result of development, congestion and new public transit infrastructure. The GGHM is an advanced four-stage travel demand model and can be used to test responses to changes in transit supply, speed, station location, and park-and-ride availability.

The GGHM is a peak period model providing estimates of travel during morning and afternoon peak periods. The model was originally calibrated using 2006 TTS data and updated using 2011 TTS and Census data. Future year forecasts for 2041 were developed by IBI Group and Hemson Consulting for MTO as described previously. Travel demand and ridership forecasts for this study have been developed for the AM peak period.

2.3.2.1. Network Assumptions

Transit and road networks were revised from the base 2006 GGHM to represent conditions in 2011 and anticipated conditions in 2031 and 2041.

Transit network upgrades to 2011 included revising the GO Bus network and modifying local transit routes based on updated agency service plans. Particularly relevant to this study was the inclusion of the DRT Pulse BRT service and updates to the Viva network.

Transit infrastructure expansion included in the 2031 and 2041 models were based on committed and funded projects, representing the lower end of likely transit investment. It is likely that more major projects will be funded but this reflects a more conservative approach. The following relevant rapid transit projects were included within the 2031 and 2041 GGH transit networks:

- Toronto-York Spadina Subway Extension (TYSSE);
- 407 Transitway Central Section (Highway 400 to Kennedy Road);
- Viva routes and busways;
- Mississauga Transitway;
- Eglinton Crosstown LRT;
- Sheppard LRT;
- Finch West LRT;
- Yonge Subway Extension to Richmond Hill;
- Two-way all-day GO Rail service (Regional Express Rail);
- Scarborough RT Extension;
- Hurontario-Main LRT; and,
- Highway 427 Transitway.

The Hurontario-Main LRT and the 427 Transitway have direction connections to the West 407 Transitway. With a stop located just south of 407 ETR, the LRT would have a direct connection to the Hurontario Street Station of the West 407 Transitway, providing a strong potential for transit demand. Less than a

five-minute walk from the two stations would allow users from downtown Mississauga to travel east across Peel Region and Toronto using transit with minimal connections.

The 427 Transitway has its southernmost station stop located at the southwest corner of the interchange of 407 ETR and 427, and would share the station with the Highway 50 Station from the West Transitway. The connection between the two transitways would allow for a high potential for transfer transit demand.

A base 2041 model was run that did not include the 407 Transitway East (Kennedy Road to Brock Road) in order to measure overall network impact resulting from its inclusion.

A number of improvements and expansions are also assumed to have been made to the road network by 2031 and 2041. Highway expansions included in the 2041 model are shown in **Table 2.4** detailing the location and extent of assumed improvements. Other regional roads in Durham Region were extended and widened, consistent with assumptions for previous MTO studies.

TABLE 2.4: ROAD NETWORK UPGRADES (2011 - 2041)

CORRIDOR	REGION	FROM	TO	DESCRIPTION
Highway 400	York	Major Mackenzie Drive	9 th Line	Widening (6 to 8 lanes)
Highway 401	Peel	407 ETR	Highway 403	Widening (6 to 8/12 lanes)
Highway 401	Toronto	Avenue Road	Leslie Street	EB collector widening (+1 lane)
Highway 401	Halton/Peel	Martin Street	Highway 403	Add 1 HOV lane in each direction
Highway 401	Durham	Brock Road	Harmony Road	Add 1 HOV lane in each direction
Highway 403	Halton	QEW	407 ETR	Widening (4 to 6 lanes)
Highway 403	Peel	407 ETR	Eglinton Avenue West	Widening (6 to 8 lanes)
Highway 403	GTHA	Entire length	Entire length	Add 1 HOV lane in each direction
Highway 404	Toronto/York	Highway 401	407 ETR	Widening (8 to 10 lanes)
Highway 404	York	407 ETR	Major Mackenzie Drive	Widening (6 to 10 lanes)
Highway 404	York	Major Mackenzie Drive	Green Lane	Widening (4 to 6 lanes)
Highway 404	York	Green Lane	Ravenshoe Road	New 4 Lane Facility
Highway 404	Toronto/York	Highway 401	Green Lane	Add 1 HOV lane in each direction
407 ETR	Halton	QEW	Highway 403	Widening (4 to 6 lanes)
Highway 427	Toronto/York	Highway 409	407 ETR	Add 1 HOV lane in each direction
407 ETR	Peel/York	Highway 401	Highway 404	Widening (8 to 10 lanes)
407 ETR	York	Highway 404	York-Durham Line	Widening (6 to 8 lanes)
407 ETR	Durham	York-Durham Line	Brock Road	Widening (4 to 6 lanes)
407 ETR East	Durham	Brock Road	Highway 35/115	New 4 Lane Tolled facility
Highway 410	Peel	Highway 401	Queen Street	Widening (6 to 10 lanes)
Highway 427	York	Highway 7	Rutherford Road	Extension (6 lanes)
Highway 427	York	Rutherford Road	Major Mackenzie Drive	Extension (4 lanes)
West Durham Link	Durham	Highway 401	407 ETR East	New 4 Lane Tolled facility
East Durham Link	Durham	Highway 401	407 ETR East	New 4 Lane Tolled facility
QEW	Halton	Guelph Line	Trafalgar Road	Widening (6 to 8 lanes)
QEW	GTHA	Entire length	Entire length	Add 1 HOV lane in each direction

2.3.3. Future Travel Demand

Table 2.5 illustrates the travel flows within and through the study area in the 2011 and 2041 AM peak periods. It also shows the travel growth over the 40-year period visually, assuming a base scenario without the 407 Transitway West.

Overall, significant growth of 175% in transit trips is expected in the corridor due to rapid transit developments in the surrounding area, including the Highway 427 Transitway and the Hurontario-Main Light Rail Transit (HMLRT). Transit mode share rises from 10% in 2011 to 13% in 2041. Auto trips grow at a smaller pace of 120%. Growth occurs in nearly all directions of travel with the most pronounced change being for trips to the study area from Caledon. This is a result of development occurring in

northern Peel Region. While travel flows to/from Caledon are not served directly by the 407 Western Transitway, connectivity options would include north-south feeder routes and the planned 427 transitway.

TABLE 2.5: AM PEAK PERIOD MOTORIZED TRAVEL IN THE 407 ETR WEST CORRIDOR, 2011 – 2041

A. 2011

TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	2,900	26,200	29,100	10%
To/From South	3,800	38,800	42,600	9%
To/From West	1,300	23,300	24,600	5%
To/From North	500	17,300	17,800	3%
To/From East	7,900	33,000	40,900	19%
Through Eastbound	200	3,300	3,500	6%
Through Westbound	-	600	600	0%
Total	16,600	142,500	159,100	10%

B. 2041

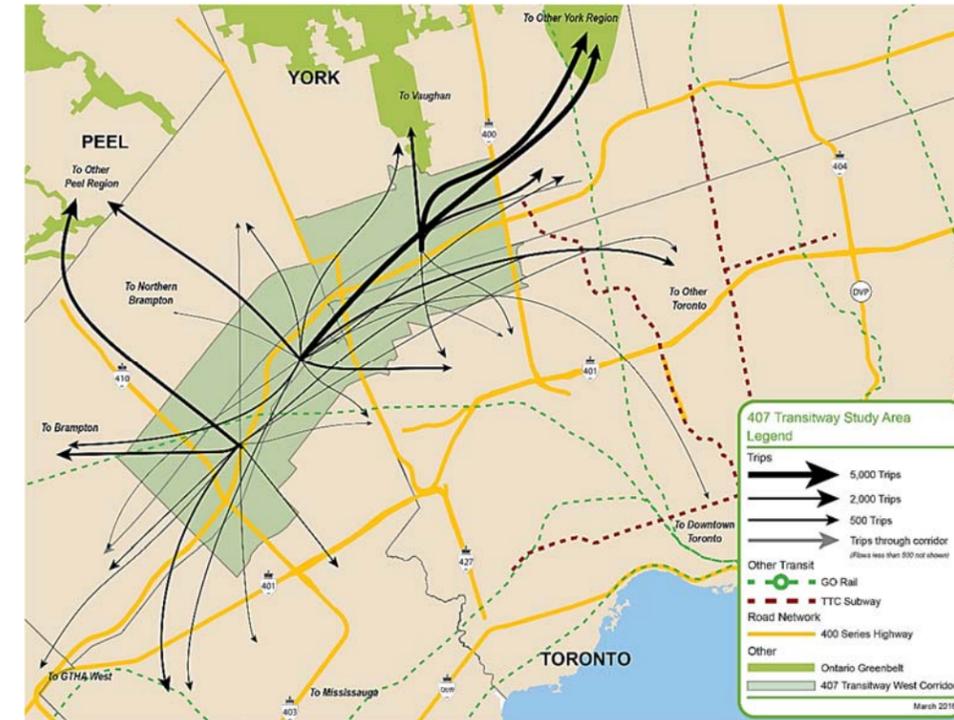
TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	4,000	33,400	37,400	11%
To/From South	11,800	81,500	93,300	13%
To/From West	4,600	51,400	56,100	8%
To/From North	5,800	76,400	82,200	7%
To/From East	17,500	53,100	70,500	25%
Through Eastbound	1,700	4,200	5,800	29%
Through Westbound	300	14,200	14,500	2%
Total	45,700	314,200	359,800	13%

C. 2011 – 2041 Growth

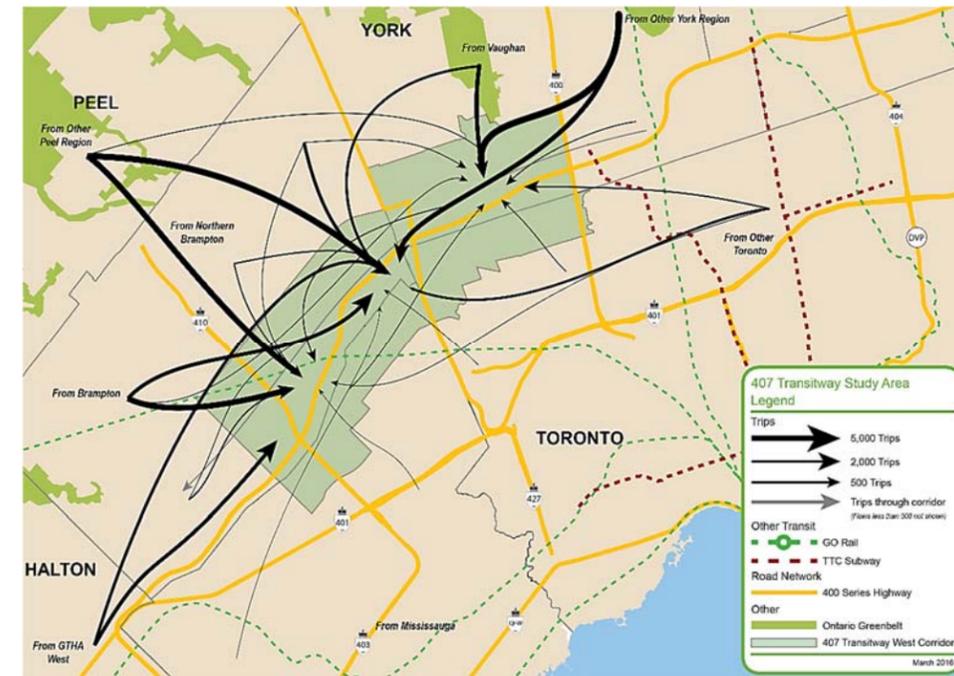
TRIP INTERCHANGE	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	1,100 (38%)	7,200 (27%)	8,300 (29%)	1% (7%)
To/From South	8,000 (211%)	42,700 (110%)	50,700 (119%)	4% (41%)
To/From West	3,300 (254%)	28,100 (121%)	31,500 (128%)	3% (64%)
To/From North	5,300 (1060%)	59,100 (342%)	64,400 (362%)	4% (135%)
To/From East	9,600 (122%)	20,100 (61%)	29,600 (72%)	6% (31%)
Through Eastbound	1,500 (750%)	900 (27%)	2,300 (66%)	23% (389%)
Through Westbound	300 (-)	13,600 (2267%)	13,900 (2317%)	2% (-)
Total	29,100 (175%)	171,700 (120%)	200,700 (126%)	3% (27%)

FIGURE 2.8: 2011 AND 2041 AM PEAK PERIOD TRAVEL FLOW GROWTH

A. Trips from the Study Area



B. Trips to the Study Area



Emerging transit markets can be seen in the eastbound direction from the corridor and from the northbound and westbound direction to the corridor, indicating a need for better services to support these directions of travel. Travel demand will be driven by activity at UGCs as there are expected to be over 75,000 trips to the Study Area from Brampton and Mississauga. This is an increase of roughly 16,000 AM peak period trips from 2011 and is growing much more rapidly than travel to or from Downtown Toronto, which is decreasing.

2.3.4. Future Transportation System Performance Gaps & Needs

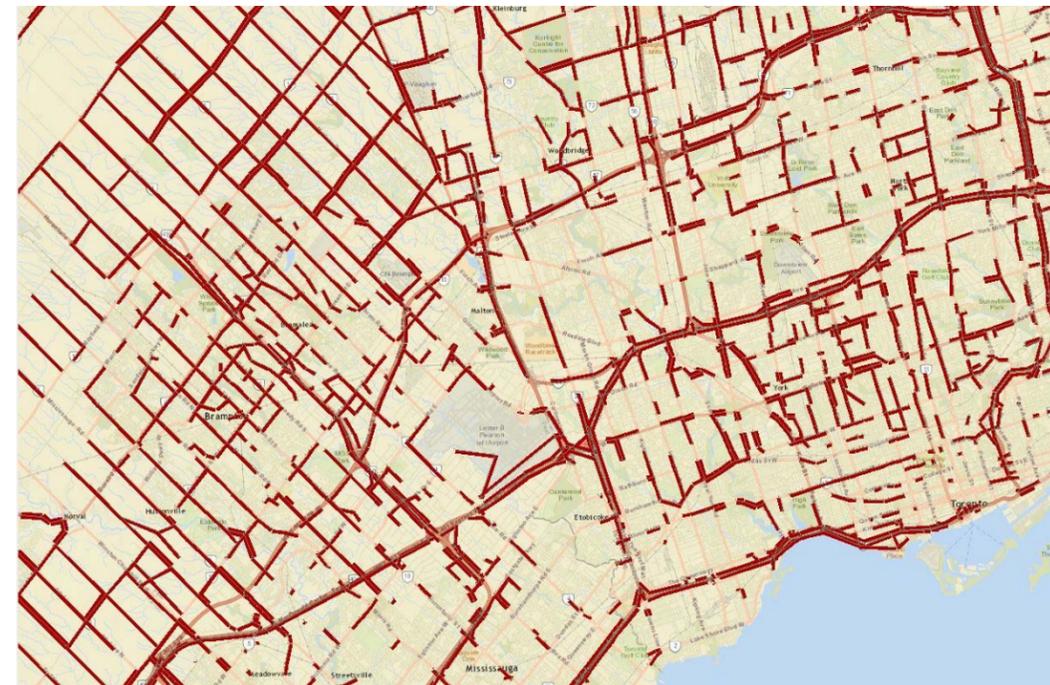
Large increases in population and employment across the GTHA will lead to increased road congestion on most highways and arterial roads in the study area. **Figure 2.9** and **Figure 2.10** show the road network during typical AM peak period in 2011 and 2041 respectively, indicating roads where volume exceeds 95% of the capacity. Travel on these facilities would be extremely slow and unattractive. In 2011, road facilities in the study area experience congestion, specifically in the western part of the study area. By 2041, nearly all facilities will experience high congestion levels.

Overall the growth and transportation context for the west corridor point to a significant need for transit capacity, though the nature of demand is different than typical urban high-density corridors. The transitway is aligned with major east-west travel demand for long distance trips that is currently dominated by private auto travel. It is likely that attracting these ‘choice’ riders will depend on provision of high quality and fast service with attractive travel times. Park-and-ride is likely one of the better tools to attract demand as it can reduce end-to-end travel times and leads to a lower number of transfers compared to municipal bus service. Municipal services could play an important role in connecting some of the higher density growth areas away from the corridor including downtown Mississauga, downtown Brampton, and other mid to high-density areas in the corridor at Bramalea City Centre and in Malton.

FIGURE 2.9: ROAD NETWORK CAPACITY DEFICIENCIES, 2011 AM PEAK PERIOD



FIGURE 2.10: ROAD NETWORK CAPACITY DEFICIENCIES, 2041 AM PEAK PERIOD



2.4. 407 Transitway West Service Concept

The following section outlines the role and function of a potential 407 Transitway, evaluates the merits and benefits of station locations, and discusses different service strategies and route structures. The service concept and station evaluation build on the land use and travel context developed in the prior section.

2.4.1. Conceptual Operating & Service Strategy

Transitways are grade-separated facilities that provide an exclusive route for use by buses. The dedicated facilities allow transit operators to maintain a high level of service and rapid speeds even during peak periods when traffic congestion would otherwise result in significant service degradation. Due to the dedicated right-of-way, a transitway can provide competitive travel times compared to driving as well as a high level of reliability.

Transitways are becoming increasingly common in cities around the world, though the operating characteristics vary from city to city. The vehicle technology, service strategy, and route structure can all be modified to better fit the intended role and function. The following discusses the differences and advantages of various service strategies, vehicle technologies and route structures as they relate to the western section of the 407 Transitway.

One factor for the 407 Transitway is its adjacency to a privately-operated toll highway. 407ETR sets tolls at levels to maintain good travel speeds for traffic. Therefore, there could be an opportunity to operate a transit service between proposed stations on the highway as an interim service strategy. In the long term, high demand for travel will likely lead to congestion on 407 ETR or high tolls that suppress demand for travel, thus leading to a need for the grade-separated dedicated runningway. For the 2041 planning horizon in this study, the grade-separated dedicated runningway was selected as the most viable operating strategy.

2.4.1.1. Service Strategy

An integrated operating system was selected as the preferred service strategy for the 407 Transitway. This type of operation allows for vehicles to leave the transitway to directly access major residential and employment centres, eliminating the need to transfer from a feeder route onto the core route. Integrated operations would allow for a one-seat ride for suburb-to-suburb travel while coordinated operations would require one or more transfers. Integrated operations better fit the role and function envisioned for the 407 Transitway, is consistent with the anticipated service strategy for the central section of the 407 Transitway and allows for the fastest and most seamless travel between key origins and destinations along the 407 ETR corridor.

With an integrated operating system, transit services including GO Transit can schedule long distance trips using the Transitway without having riders transfer from different services. This integration is used for the Bramalea City Centre in Brampton to Scarborough Town Centre GO Bus route, which seamlessly

transfers onto the transitway without having riders disembark at stations to wait for vehicles exclusively using the transitway, reducing wait time and the number of transfers.

2.4.1.2. Vehicle Technology

Buses were designated as the appropriate vehicle technology to serve the 407 Transitway as they allow for great flexibility and convenient integrated operations as they can divert from the dedicated corridor and connect key nodes that are not directly on the right-of-way.

Appropriate bus size will be a function of demand but standard buses should be used if possible as they are more flexible in providing point-to-point service when accessing nodes off of the transitway. Articulated buses can provide higher throughput where appropriate. Buses should have low floors and several sets of doors to provide service to those with mobility impairments and reduce boarding and alighting times. For the 407 Transitway corridor, buses are the preferred vehicle technology however the transitway could be converted to a light-rail corridor in the future if demand patterns and route capacity necessitate it and the design of the facility will make the necessary provisions for an eventual conversion to light rail.

2.4.1.3. Route Structure

The proposed route structure and service concept was developed considering two types of service: base spine services along the transitway, and no-transfer services providing access to other parts of the GTHA. **Figure 2.11** shows the service concept with both route types.

BASE SPINE SERVICES

Base spine services will provide continuous line-haul service on the transitway with a short effective headway of between 3 to 10 minutes. Spine services are considered oriented mainly towards the transitway itself with service either end to end on the transitway or departing for a stop at an offline destination such as Bramalea City Centre. Base spine services developed for the west corridor include:

- End-to-end bus service on the transitway only;
- A route that connects Bramalea City Centre to Bramalea GO station and then to the transitway via Bramalea Road with service continuing beyond the Jane Street station;
- A route connecting Pearson Airport to Highway 50 (via Highway 427) and continuing (no transfer) to the east on the transitway (westbound from airport would be required to transfer).

A spine service from Mississauga Square One to Pickering was removed for the West Transitway under the assumption that the service will be replaced by the HuLRT. The LRT will connect Mississauga Square One to the Hurontario Street Station of the transitway, where riders can transfer to the continuous line haul-service on the transitway.

These spine routes would be operated as a rapid transit service and vehicles would only stop at transitway stations, their origin, and final destinations. Spine services could also operate as express runs

to provide faster service between major activity centres, but would require passing lanes at some transitway stations. Given the flexibility of buses, spine services could be added or modified based on measured demand and changing development patterns.

NO-TRANSFER SERVICES

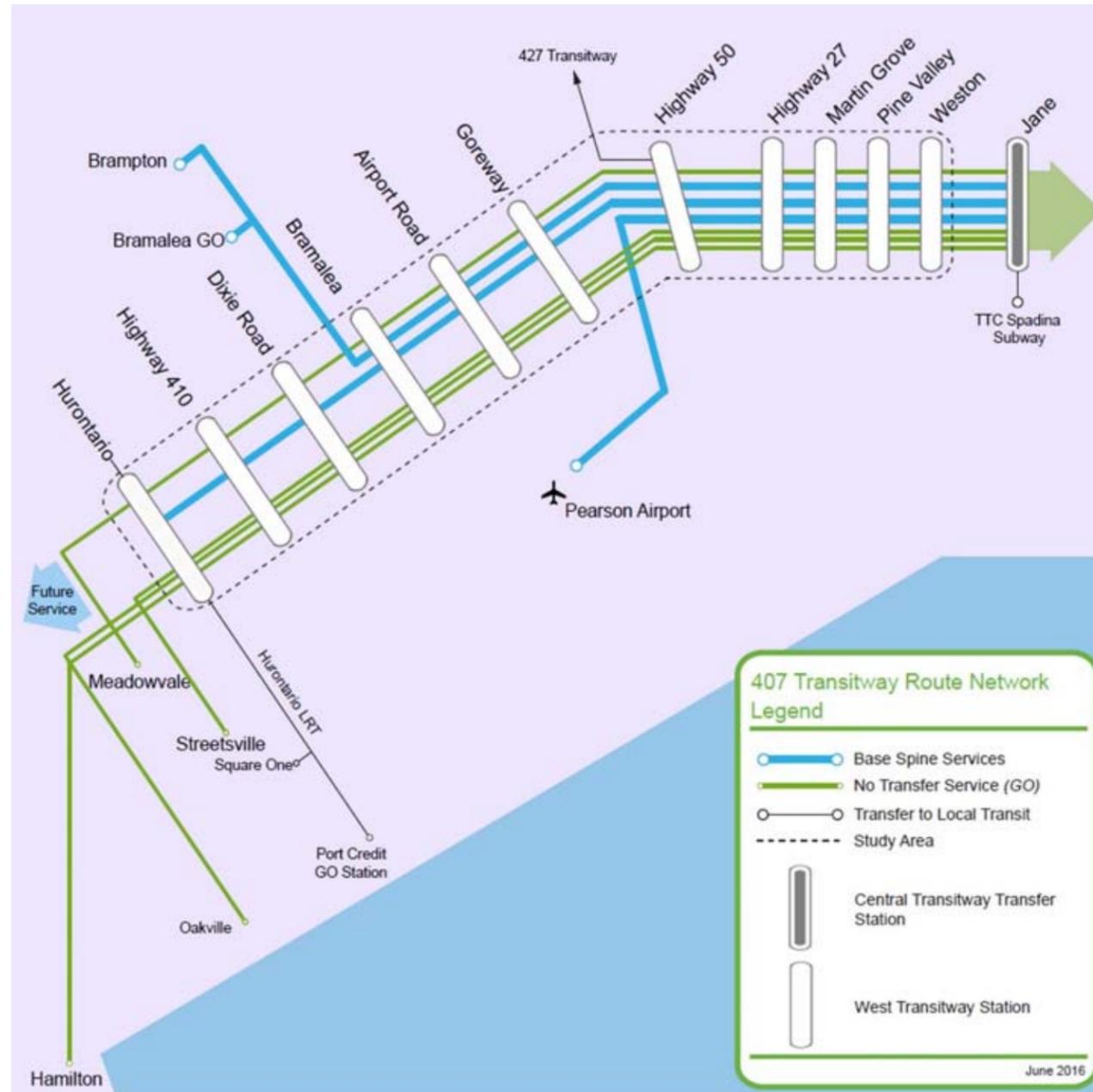
No-transfer services would provide direct connections between major activity centres and residential areas across the GTA, general with lower headways in the order of 10 to 30 minutes. Potential routes using the Western Transitway include:

- Hamilton to Richmond Hill Centre;

- Oakville to North York;
- Streetsville to Union Station; and
- Meadowvale to York University.

Similar to the 407 ETR GO bus, these routes would serve long-distance trips and connect to local transit at major transfer points. No-transfer services could be integrated into the regional network by operating on other committed and proposed transit corridors like the 403 Transitway in Mississauga and the 427 Transitway. Like spine services, no-transfer services could be altered and modified to meet demand. These routes would be served by a combination of GO coach buses and local transit buses.

FIGURE 2.11: CONCEPTUAL 407 TRANSITWAY ROUTE STRUCTURE



2.5. Transitway Ridership Forecasts

The following sections describe forecasting methodology and limitations, station assumptions AM peak hour ridership forecasts, and the impact the transitway would have on encouraging transit and reducing auto travel.

2.5.1. Forecasting Methods and Limitations

The Greater Golden Horseshoe Travel Demand Model (GGHM) is a comprehensive four-stage model that is sensitive to a number of factors such as auto congestion, travel time, transit fares and parking costs, and land use. The model is ‘behavioural’ in that it is able to predict how travelers make changes to decisions such as route and mode choice in relation to these factors.

Though the model is a powerful strategic planning tool, it has some limitations. The model was originally developed and calibrated to 2006 travel data and updated per the Central and East 407 Transitway EAs and the current TPAP. The model assumes that the travelers of the future will behave and make choices as travelers do today. This may or may not be accurate given that many users currently perceive transit as inferior to driving – especially in less urban areas. It is possible that society evolves towards one that is more environmental and energy conscious which would drive up the price of fuel and make transit seem more attractive. The 2041 horizon year represents a 30-year period over which much will change in terms of how transportation is consumed and provided. The GGHM is unable to evaluate the impact of future technologies such as driverless cars and paradigm shifting changes in fuel costs. The model is also unable to evaluate ride sharing, an emerging way of travel.

For the 407 Transitway West Corridor, specific sensitivities were noted in the development of forecasts to different service concepts and assumptions. For example, high demand is forecasted for trips from Bramalea City Centre and from Bramalea GO using the direct interlining service assumption documented above. Investigation into the demand indicated that some trips were being diverted from the GO Kitchener line to parts of Toronto such as midtown Toronto. Other trips were being diverted from existing parallel service such as along Highway 7 and Steeles Avenue. While these diversions could be accurate, it should be noted that if interline service is not provided (e.g. Brampton chooses not to use the transitway) then additional transfers would be required for travelers from these origins to use the transitway, and ridership could be lower. Because the 407 Transitway corridor in this segment serves primarily as a feeder to other services, rather than serving core high-density areas on its own, ridership forecasts are developed with a less level of confidence compared to other segments.

Finally, as transit ridership forecasts are dependent on land use inputs, the ridership forecasts are limited to the accuracy of our current understanding of where and how the GTHA will develop by 2041.

2.5.2. Strategic Forecasts

Part of the scope of the forecasting task was to provide input into the need and justification of stations and to identify potential consolidation or removal of stations. Accordingly, two sets of forecasts were developed – one including all eleven stations from the corridor protection study and a second with a reduced seven-station structure. The modelled routes were shown previously in **Figure 2.11** and each station included park-and-ride facilities. A full discussion of the eleven-station operation will be presented followed by a discussion of the changes observed when reducing the number of stations to seven. Forecasts were developed for the 2041 AM peak period (3-hour) and converted to AM peak hour based on TTS data. It was found that the AM peak hour represents 46% of the AM peak period.

Ridership projections from the Central and Eastern 407 Transitway reports forecasted a peak of 5,400 riders eastbound and 2,300 riders westbound in the AM peak hour, respectively.

2.5.2.1. Eleven Station Operation

The 2041 AM peak hour ridership forecast for the eleven station 407 Transitway West is shown in **Figure 2.12**, with a station-by-station breakdown detailed in **Table 2.6**. The western section of the transitway has a peak point of 6,200 eastbound passengers entering Weston Station. Demand is highly directional with over two times as many riders travelling eastbound as westbound. Stations tend to get busier moving east.

Table 2.7 shows the access modes for the AM peak hour 407 West Transitway riders (both east and westbound). In general, park-and-ride demand greatly varies among the stations, with significant demand occurring at Martin Grove, Highway 27, Highway 50, and Goreway Drive, and Hurontario Street stations. These stations have at least three times the demand as the Torbram/Bramalea and Highway 410 stations. Walk/transit demand also fluctuates among the stations due to population and employment use in the immediate vicinity of the station. Hurontario sees the highest station board demand due to a connection with the Hurontario-Main LRT. The Highway 50 station also sees high walk/transit demand due to a connection with the Highway 427 Transitway. Park-and-ride users account for 20% of the 407 Transitway West demand while walk/transit demand accounts for the other 80%.

The 407 Transitway West peak ridership of 5,300 in the AM peak hour is higher than the Central and Eastern 407 Transitway peak ridership. The difference is attributed to three factors: the Hurontario-Main LRT, the Bramalea GO Station, and the Bramalea City Centre GO Bus.

- **Hurontario-Main LRT** services a stop by the Hurontario Station, connecting the two stations with a short walk of less than five minutes. This connection results in a transfer demand of 1,000 riders during the AM peak hour to the 407 Transitway West. This demand comes from connecting the UGCs of Mississauga and Brampton to the 407 Transitway West and the removal of the GO Bus spine service from Mississauga Square One to Pickering under the assumption that the service is replaced by the BRT (see Section 4.1.3)
- **Bramalea GO Station** is located by the Torbram station and has a transfer demand of 2,300 trips in the AM peak hour. This is potentially a diversion of trips destined to midtown and northern Toronto due to travel time savings from the transitway versus travelling through Union Station. Riders are also attracted from GO services, including the Kitchener and Georgetown rail lines. Riders are transferring from the GO to the transitway to access northern Toronto, southern York Region, York University, and the UGCs of Vaughan, Richmond Hill, Markham, and North York. This demand was tested under various scenarios and is sensitive to travel times along the transitway – reduced service levels such as lower design speed or increased stops or dwell time would reduce transfer demand.
- **Bramalea City Centre GO Bus** travels along the 407 Transitway to reach the Scarborough Town Centre, and serves 920 eastbound riders travelling on the segment between Bramalea City Centre and Torbram Station during the AM peak hour. This demand is significantly higher than current

GO Bus demand and stems from diversions in the model from other east-west transit services including Züm and YRT on Queen Street / Highway 7 and Steeles Avenue due to travel time savings. A significant number of riders using this service are destined for York University.

The sum of these factors results in a large demand of 3,300 eastbound riders to the 407 Transitway West which is in addition to a base demand of 3,500 during the AM peak hour. The analysis indicates that overall the 407 Transitway West has the potential for a high ridership as a result of its route structure, good service levels, however specific components of demand such as GO transfers are sensitive to travel times.

FIGURE 2.12: 2041 AM PEAK HOUR STRATEGIC RIDERSHIP FORECASTS, 11 STATION OPERATION (ROUNDED TO NEAREST 500)

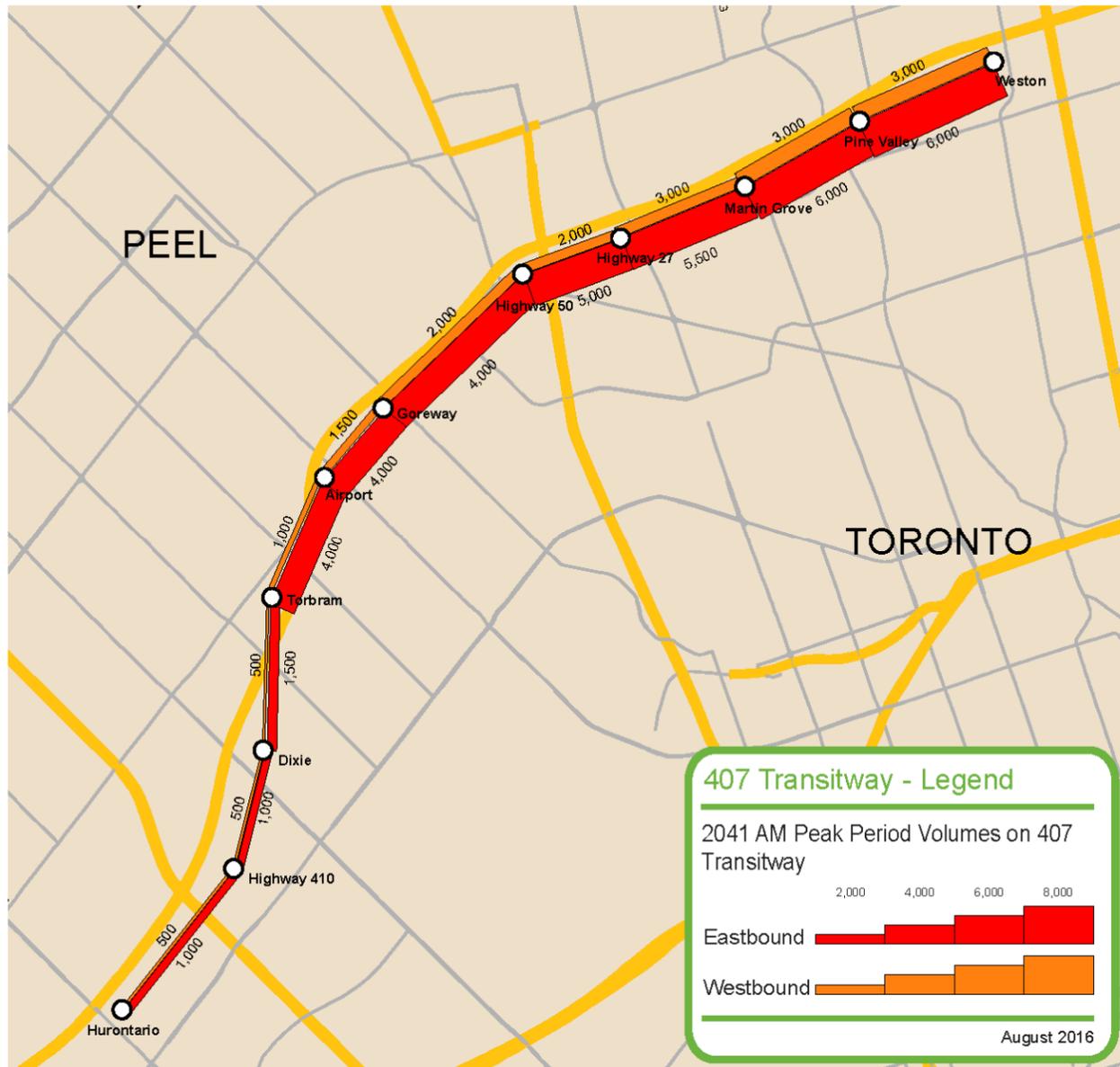


TABLE 2.6: 2041 AM PEAK HOUR BOARDINGS AND ALIGHTINGS BY STATION, 11 STATION OPERATION

STATION	EASTBOUND					WESTBOUND				
	STATION BOARD	BRANCH ON	STATION ALIGHT	BRANCH OFF	VOLUME	STATION BOARD	BRANCH ON	STATION ALIGHT	BRANCH OFF	VOLUME
Weston	200	0	100	0	6,200	0	0	200	0	3,000
Pine Valley	200	0	0	0	5,900	100	0	100	0	2,800
Martin Grove	500	0	0	0	5,400	0	0	900	0	2,800
Highway 27	500	0	200	0	5,200	100	0	200	0	2,000
Highway 50	1000	0	100	0	4,300	100	0	300	0	1,800
Goreway	400	0	100	0	4,000	0	0	200	0	1,600
Airport Road	400	0	100	0	3,700	0	0	700	0	1,400
Torbram / Bramalea	100	2,400	0	0	1,400	0	0	0	200	700
Dixie Road	200	0	0	0	1,200	0	0	100	0	500
Highway 410	100	0	0	0	1,100	0	0	100	0	400
Hurontario	1,200	0	0	0	0	0	0	300	0	300
Total	4,800		600			300		3,100		

Note: Branch On and Branch Off refer to Base Spine and No-Transfer services entering and exiting the western 407 Transitway at a station.

TABLE 2.7: 2041 AM PEAK HOUR 407 TRANSITWAY WEST ACCESS MODES, 11 STATION OPERATION

STATION	TOTAL BOARDINGS	PARK AND RIDE	WALK / TRANSIT	% PARK AND RIDE	% WALK / TRANSIT
Weston	200	100	100	63%	38%
Pine Valley	200	100	100	52%	48%
Martin Grove	500	200	400	31%	69%
Highway 27	500	200	400	31%	69%
Highway 50	1000	200	700	24%	76%
Goreway	400	200	300	38%	62%
Airport Road	400	100	300	30%	70%
Torbram / Bramalea	2,400	100	2,300	3%	97%
Dixie Road	200	100	100	63%	38%
Highway 410	100	100	100	60%	40%
Hurontario	1,200	200	1,000	13%	87%
Total	7,100	1,600	5,800	20%	80%

2.5.2.2. Sensitivity Analysis

Four sensitivity forecasts were developed:

- 1) Realigning the transitway to provide a direct connection to Bramalea GO station;
- 2) A forecast with seven stations to test the impact of eliminating stations that have low ridership or accessibility / feasibility constraints;
- 3) A forecast with increased parking provision at Highway 427 Transitway stations and a reduced parking provision at Highway 50 station; and
- 4) A forecast with seven stations to test the impact of the preferred alternative.

DIRECT CONNECTION TO BRAMALEA GO

In the study area the alignment of the 407 Transitway is to the south of 407 ETR. Although this is favourable throughout the majority of the corridor due to hydro lines, rail corridors, and environmentally significant areas, it is a hindrance for access to Bramalea GO Station which is located on the north side of 407 ETR along Bramalea Road. A connection between the two would facilitate any potential for transfer demand.

To test a direct connection, the model network was re-coded with an alignment across to the north side of 407 ETR and directly adjacent to Bramalea GO. It is noted that the model does not simulate physical barriers or constraints and the alignment is hypothetical.

Table 2.8 summarizes the total boardings (east and westbound) for the 2041 AM peak period original analysis and the sensitivity analysis. In total, the model predicts approximately 320 additional riders at Torbram Station, however it also resulted in a penalty of approximately 30 riders at other stations, resulting in a total of 290 new riders, which represents an increase of 4%. It was noted that the majority of new riders are diverting from the GO rail connection to Toronto, and are therefore not new transit riders, but riders where a small travel time savings of a few minutes can result in a change in path choice from Union Station to the transitway.

Feasibility analysis later in this report highlights several significant constraints to an alignment that connects directly to Bramalea GO. It would involve property acquisition and several bridge structures, some of which could be of significant length. Because of the high cost, it is likely that the ridership difference of 290 riders, most of them not new transit riders, is insufficient to justify the alternative alignment. However, the results do point to an important conclusion which is that a high-quality connection between Bramalea GO and the 407 Transitway is important and will be used by a high number of travelers. The interlining could take the form of a priority access to the alignment on the south side of 407 ETR. With priority treatments and no transfer service, riders from Bramalea GO could access the 407 Transitway and downstream destinations with a similar level of service compared to a shifted transitway alignment.

TABLE 2.8: 2041 AM PEAK HOUR SENSITIVITY ANALYSIS COMPARISON

STATION	ORIGINAL RUN			SENSITIVITY ANALYSIS			DIFFERENCE		
	TOTAL BOARDINGS	PARK & RIDE	WALK / TRANSIT	TOTAL BOARDINGS	PARK & RIDE	WALK / TRANSIT	TOTAL BOARDINGS	PARK & RIDE	WALK / TRANSIT
Weston	160	100	60	160	100	60	0	0	0
Pine Valley	230	120	110	230	110	120	0	-10	10
Martin Grove	510	160	350	510	160	350	0	0	0
Highway 27	520	160	360	520	160	360	0	0	0
Highway 50	980	240	740	990	230	760	10	-10	20
Goreway	420	160	260	420	160	260	0	0	0
Airport Road	370	110	260	370	100	270	0	-10	10
Torbram / Bramalea	2,390	70	2,320	2,710	70	2,640	320	0	320
Dixie Road	160	100	60	150	90	60	-10	-10	0
Highway 410	100	60	40	100	60	40	0	0	0
Hurontario	1,150	150	1,000	1,120	150	970	-30	0	-30
Total	6,990	1,430	5,560	7,280	1,390	5,890	290	-40	330

2.5.2.3. Seven Station Operation

Forecasts were developed for an alternate seven station transitway by removing stations located at Highway 410, Torbram Road, Martin Grove, and Weston Road. The following provides a brief explanation for their removal in this scenario:

- **Highway 410:** the ridership was low at 100 boardings in the peak hour, likely due to lack of arterial road access. In particular it was noted that Dixie Road is an alternative park-and-ride destination with better connectivity.
- **Torbram Road:** the Torbram Road station is located near the ‘triangle’ of CN rail in the utility corridor. The station is poorly connected to the road and highway network. The high branch-on boardings recorded for the station could be served by an interlining access without a full station.
- **Martin Grove:** while acceptable ridership was recorded for Martin Grove station, the site has access / constructability issues as recorded later in the EPR. It is also noted that the station is relatively close to the Highway 27 station (spacing at less than 1kilometre), potentially leading to an undesirable penalty in travel time for background travelers. For this scenario, the station was disabled to determine the impact on corridor ridership, under the possibility that trips could divert to other stations and overall transitway use would be maintained or even increased.
- **Weston Road:** ridership forecasts are low, likely due to YRT Viva service on Highway 7 which provides alternative access to the Toronto Subway at Vaughan City Centre. It is also noted later in the EPR that station accessibility is poor, with no space to provide a park-and-ride facility and limited space to implement a station.

Figure 2.13 illustrates the 2041 AM peak hour strategic forecast for the seven-station operation with detailed outputs in Table 2.9.

Table 2.10 shows the access modes for the AM peak hour 407 West Transitway riders (both east and westbound). The primary difference between seven-station and eleven-station operations is in how passengers access transitway services. With reduced transit connections and walk-in access points, the walk/transit demand share decreases by 6%, from 80% with eleven station operation to 74% with seven station operation.

Although the number of stations was reduced by four stations, the total boardings (both east and westbound) for the 407 West Transitway is only reduced by 800 riders. With less stations, faster operating speeds are experienced, decreasing the amount of time passengers spend on buses.

Table 2.11 summarizes the differences between the eleven-station and seven-station operations for eastbound travel during the 2041 AM peak period. In total, the 800 additional riders by the eleven-station operation represent an increase of 13%. Operating the western section of the 407 Transitway with seven stations does not greatly diminish ridership, but has lower capital costs while reinforcing the role and function of the transitway with limited stop, high speed service.

FIGURE 2.13: 2041 AM PEAK HOUR STRATEGIC RIDERSHIP FORECASTS, 7 STATION OPERATION (ROUNDED TO NEAREST 500)



TABLE 2.9: 2041 AM PEAK HOUR BOARDINGS AND ALIGHTINGS BY STATION, 7 STATION OPERATION

STATION	EASTBOUND					WESTBOUND				
	STATION BOARD	BRANCH ON	STATION ALIGHT	BRANCH OFF	VOLUME	STATION BOARD	BRANCH ON	STATION ALIGHT	BRANCH OFF	VOLUME
Pine Valley	200	0	0	0	5,400	0	0	100	0	2,600
Highway 27	600	0	200	0	5,100	100	0	800	0	2,600
Highway 50	1,000	0	100	0	4,100	100	0	300	0	1,800
Goreway	500	0	100	0	3,800	0	0	300	0	1,700
Airport Road	700	0	100	0	3,200	0	0	800	0	1,400
Dixie Road	200	1,800	0	0	1,100	0	0	200	100	600
Hurontario	1,100	0	0	0	0	0	0	300	0	300
Total	4,300		500			200		2,800		

Note: Branch On and Branch Off refer to Base Spine and No-Transfer services entering and exiting the western 407 Transitway at a station.

TABLE 2.10: 2041 AM PEAK HOUR 407 TRANSITWAY WEST ACCESS MODES, 7 STATION OPERATION

STATION	TOTAL BOARDINGS	PARK AND RIDE	WALK / TRANSIT	% PARK AND RIDE	% WALK / TRANSIT
Pine Valley	240	150	90	63%	38%
Highway 27	630	260	370	41%	59%
Highway 50	1,050	430	620	41%	59%
Goreway	460	270	190	59%	41%
Airport Road	690	170	520	25%	75%
Dixie Road	2,060	150	1,910	7%	93%
Hurontario	1,150	220	930	19%	81%
Total	6,280	1,650	4,630	26%	74%

TABLE 2.11: 11 STATION VS. 7 STATION SCENARIO, 2041 EASTBOUND AM PEAK PERIOD TRAVEL

CATEGORY	11 STATION SCENARIO	7 STATION SCENARIO	DIFFERENCE
Station Boardings	4,800	4,500	-300
No. Transfer Boardings	2,300	1,800	-500
Total Boardings	7,100	6,300	-800
% Park and Ride	20%	26%	6%
Peak Point	6,000	5,600	-400

CAPPED PARK AND RIDE LOT AT HIGHWAY 50

High park-and-ride demand for the Highway 50 station was noted in the 2041 model runs, along with low utilization of the Highway 427 Transitway. Park and ride origins for the station were mapped as shown in **Figure 2.14**. In the model, trips originating in Bolton and east Peel Region were choosing to drive to the 407 Transitway station at Highway 50 rather than use the Highway 427 park-and-ride lots and transfer to the 407 Transitway.

Generally, it would be preferable from a planning perspective to encourage those trips to use the Highway 427 lots. A sensitivity run with a cap at Highway 50 of 300 parking spaces was undertaken. Differences in ridership at each station are shown in **Table 2.12**. The cap leads to a net loss of ridership on the 407 Transitway of approximately 110 riders. Generally, the analysis indicates that capping the lot size has only a minor effect on ridership, while providing a benefit of reduced auto travel as drivers are re-directed to closer lots on Highway 427. As input to preliminary design tasks later in the EA, it was recommended that the Highway 50 park-and-ride size should be limited so that it serves its catchment area and encourages greater use of the 427 Transitway. It is also noted that more complex routing structures (e.g. with interlining between the 427 Transitway and the 407 Transitway could in the future be pursued and may reduce or eliminate the loss in ridership forecasted herein.

FIGURE 2.14: PARK AND RIDE ORIGINS FOR HIGHWAY 50 STATION

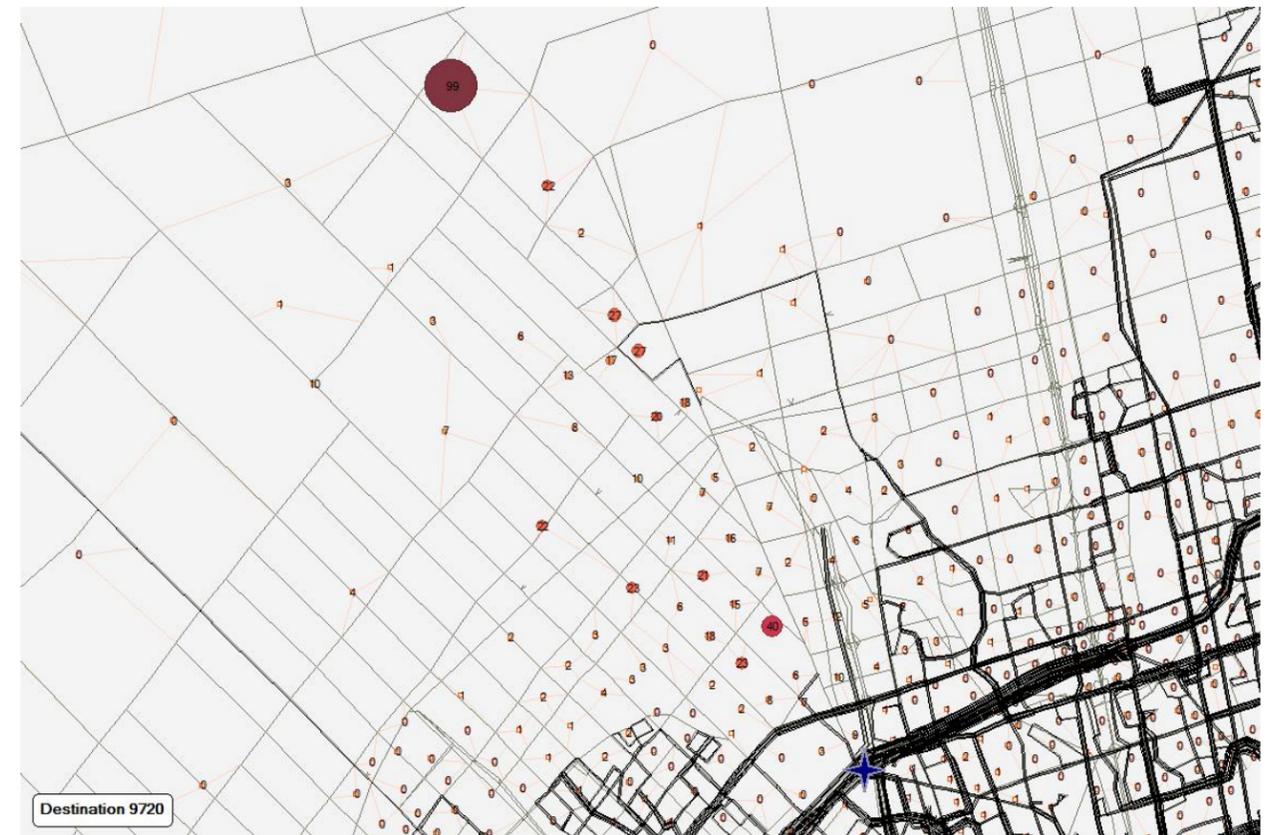


TABLE 2.12: 2041 AM PEAK HOUR 407 TRANSITWAY WEST ACCESS MODES, 7 STATION OPERATION

SCENARIO	TOTAL BOARDINGS	PARK AND RIDE	WALK / TRANSIT	% PARK AND RIDE	% WALK / TRANSIT
Highway 50 - Base Scenario	980	370	610	38%	62%
Highway 50 - Reduced Parking	870	90	780	10%	90%
Total	-110	-280	+170	-28%	+28%

2.5.2.4. Eight Station Operation

The demand model was also run with an Eight-Station configuration with Martin Grove included, to determine the relative benefit of the additional station. The eight-station run results are provided in the following exhibit. Results indicated that the station could attract some riders from Goreway, Highway 50, Highway 27, and Pine Valley, and provide an overall benefit of approximately 300 riders to the transitway.

TABLE 2.13: EIGHT STATION FORECAST

STATION	TOTAL BOARDINGS	PARK AND RIDE	WALK / TRANSIT	% PARK AND RIDE	% WALK / TRANSIT
Pine Valley	230	130	100	57%	43%
Martin Grove	510	210	300	41%	59%
Highway 27	520	220	300	42%	58%
Highway 50	980	370	610	38%	62%
Goreway	430	250	180	58%	42%
Airport Road	670	160	510	24%	76%
Dixie Road	2,080	140	1,940	7%	93%
Hurontario	1,150	220	930	19%	81%
Total	6,570	1,700	4,870	26%	74%

2.5.3. Station Assessment from Service and Demand Perspective

2.5.3.1. Assessment Criteria

Eleven potential transitway stations (from Hurontario Street to Weston Road in **Figure 2.11**) were evaluated to determine the preferred station locations from a ridership and transit service concept perspective. It is desirable to select the appropriate number of stations to ensure proper coverage and speeds, as well as to select the ideal station locations to ensure major demand and transfer nodes are served. Including too many stations reduces running speeds on the 407 Transitway, while having too few stations could mean major nodes are not being adequately served and ridership is being missed.

The preferred alignment of the 407 Transitway Central (from Highway 400 to Kennedy Road) has seven stations spaced roughly 3.4 kilometre apart. As the study area has similar urban development, stop spacing for the 407 Transitway West should be similar or greater on average, due to sensitivities to travel time and low-density land use discussed in this report. The length of the section from Hurontario to Weston is approximately 23 kilometre, and if all eleven potential stops are to be used, the average stop spacing would be 2.1 kilometre.

In order to select station locations, each station was evaluated based on the following criteria:

- **Potential transfer demand:** What present or future transit routes are located near the station?
- **Connections to other transportation hubs:** Are there GO Rail Stations or other transportation hubs near the station?
- **Potential walk-in demand:** How many jobs/residents are located within walking distance (1 kilometre) of the station?
- **Major trip generators served:** Are there or will there be any major employment or residential nodes near the station?

Table 2.14 summarizes the evaluation process.

TABLE 2.14: STATION EVALUATION PROCESS FROM SERVICE AND DEMAND PERSPECTIVE

EVALUATION CRITERIA	POTENTIAL STATIONS																					
	HURONTARIO		HIGHWAY 410		DIXIE ROAD		TOBRAM / BRAMALEA		AIRPORT ROAD		GOREWAY		HIGHWAY 50		HIGHWAY 27		MARTIN GROVE		PINE VALLEY		WESTON	
A. POTENTIAL TRANSFER DEMAND	●		○		●		●		●		●		●		●		●		●		●	
1. Rapid Transit (BRT / LRT)	Hurontario LRT Züm Route 502: Main Route 511: Steeles				Züm Route 511: Steeles		Züm Route 511: Steeles		Züm Route 511: Steeles		Züm Route 511: Steeles		427 Transitway Züm Route 501A: Queen Route 511: Steeles		Züm Route 501: Queen		YRT Viva Orange Züm Route 501: Queen		YRT Viva Orange Züm Route 501: Queen		YRT Viva Orange Züm Route 501: Queen	
2. Local Bus	BT Route 2: Main Route 6: James Potter MiWay Route 19: Hurontario Route 103: Hurontario Express				BT Route 18: Dixie Route 40: Central Industrial MiWay Route 185: Dixie Express		BT Route 14: Torbram MiWay Route 15: Drew		BT Route 5A: Bovaird Route 11: Steeles Route 20A: East Industrial Route 30: Airport Road MiWay Route 7: Airport Route 15: Drew		BT Route 5: Bovaird Route 11: Steeles Route 29A: Williams MiWay Route 16: Malton		BT Route 11: Steeles Route 50: Gore Road		YRT Route 28: Huntington Route 77/77a: Queen TTC Route 60: Steeles West		YRT Route 7: Martin Grove Route 77/77a: Queen TTC Route 60: Steeles West		YRT Route 12: Pine Valley Route 77/77a: Queen		YRT Route 10: Woodbridge Route 77: Highway 7 TTC Route 165: Weston Road North	
3. Go Transit Bus	Route 25: Waterloo / Mississauga Route 33: Kitchener Route 48: 407 West		Route 46-48: 407 West		Route 31: Kitchener Route 32: Brampton Trinity Common / North York Route 36: Brampton / North York Route 46-48: 407 West		Route 31: Kitchener Route 32: Brampton Trinity Common / North York Route 36: Brampton / North York Route 46-48: 407 West		Route 31: Kitchener Route 38: Bolton / Malton / North York Route 46-48: 407 West		Route 31: Kitchener Route 38: Bolton / Malton / North York Route 46-48: 407 West		Route 46-48: 407 West		Route 46-48: 407 West		Route 46-48: 407 West		Route 46-48: 407 West		Route 46-48: 407 West	
B. OTHER CONNECTIONS	○		○		●		●		●		●		●		●		●		○		○	
1. GO Stations					Bramalea		Bramalea		Malton		Malton		427 Transitway									
2. Pearson Airport									Potential Connection		Potential Connection		Potential Connection									
C. PARK AND RIDE DEMAND	●		○		●		○		●		●		●		●		●		●		●	
D. WALK-IN DEMAND	●		●		●		●		●		●		●		●		○		●		●	
1. Adjacent Development	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041	Current	2041
(i) Population	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low

EVALUATION CRITERIA	POTENTIAL STATIONS																					
	HURONTARIO		HIGHWAY 410		DIXIE ROAD		TOBRAM / BRAMALEA		AIRPORT ROAD		GOREWAY		HIGHWAY 50		HIGHWAY 27		MARTIN GROVE		PINE VALLEY		WESTON	
(ii) Employment	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>	<i>Medium</i>	<i>Low</i>	<i>Medium</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>
E. MAJOR TRIP GENERATORS	●		◐		◐		◐		●		◐		◐		○		○		○		○	
1. Supports Residential Developments	Meadowvale Village								Malton		Malton											
2. Supports Employment Centres	Shoppers World Brampton and Mississauga Convention Centre		Brampton and Mississauga Industrial Area		Pearson Airport Brampton and Mississauga Industrial Area		Pearson Airport Brampton and Mississauga Industrial Area		Pearson Airport CN Brampton		Pearson Airport Brampton and Mississauga Industrial Area		Pearson Airport Highway 427									
F. ALIGNMENT LENGTH AND STATION SPACING	●		◐		◐		◐		◐		◐		◐		◐		◐		◐		◐	
1. Distance Between Stations	0 kilometre		2.5 kilometre		2.1 kilometre		2.3 kilometre		2.0 kilometre		1.5 kilometre		2.9 kilometre		1.8 kilometre		1.2 kilometre		2.4 kilometre		2.6 kilometre	
OVERALL STATION RATING:	◐		◐ Consider combining with adjacent station.		◐		◐		◐		◐ Consider combining with adjacent station.		◐		◐		◐ Consider combining with adjacent station.		◐		◐ Consider combining with adjacent station.	

2.5.3.2. Station Selection Results from the Service and Ridership Perspective

The objective of the station selection process was to evaluate the individual stations in order to identify an optimal set of stations from a service and ridership perspective. **Table 2.14** provides a summary of the results of the station selection process with the most suitable locations being Hurontario Street, Dixie Road, Airport Road, Goreway Drive, and Highway 50, Highway 27, and Pine Valley. This would be a seven-station operation with a 21 kilometre length and an average spacing of 2.6 kilometre. The seven-station operation also has a reduction of only 11% in ridership from the eleven-station operation.

- **Hurontario Street** also known as Main Street in Brampton and Highway 10 elsewhere, is a necessary transitway station due to its potential to develop as a future commuter hub with connections to the Hurontario-Main LRT. It is the most western station and connects the central corridor of Mississauga and Brampton to the 407 Transitway. Hurontario Street is also connected by local transit to several transportation hubs in Brampton and Mississauga, including Brampton GO Station, Square One, and Port Credit GO Station. This station is recommended.
- **Highway 410** located 2.5 kilometre east of Hurontario Street is seen as a less suitable station location, given its close proximity to Hurontario and limited opportunities to attract walk-in demand. In addition, due to lack of existing and future transit routes near the station, the potential transfer demand at this station is very low. This station does not appear justified based on ridership, connections to transit and land-use, and the availability of adjacent stations.
- **Dixie Road** is a good potential transitway station due to its location on a major arterial, access to 400-series highways, availability of lands for the station, and potential to accommodate any shifted park-and-ride trips from Highway 410 station and Torbram Road station, if they are not provided.
- **Torbram Road** is the next candidate station location and was determined to be less suitable given its proximity to Dixie Road and Airport Road and limited opportunities to attract walk-in demand. A significant transfer demand does exist between Bramalea City Centre, Bramalea GO, and the 407 Transitway which could interconnect at Torbram Road but could also interconnect elsewhere. The road configuration is also constrained to the south due to Pearson Airport, therefore better connections are provided to Dixie Road and Airport Road. Provision of a park-and-ride lot and station facilities does not appear justified, however interconnection of the 407 Transitway to Bramalea GO is required.
- **Airport Road** is a strong potential transitway station due to its close proximity to Pearson Airport and the industrial area surrounding the airport, including the Canadian National Railway Intermodal Terminal. The station is also close to the Malton development, a large neighbourhood located to the east. While Airport Road is largely commercial and industrial, it is an important spine for traffic and transit through Brampton.
- **Goreway Drive** located 1.5 kilometre east of Airport Road is seen as a medium-need transitway station. It provides access to the Malton community and several large industrial and commercial developments are also along the corridor, however there is some redundancy with Airport Road

and Highway 50 stations. It was initially recommended that this station be carried forward provisionally (in this Systems Planning component of the study), on the basis that Airport Road could potentially accommodate demand at Goreway Drive. However, it was determined that traffic constraints will likely limit capacity for access to Airport Road, and therefore the Goreway Station will likely be needed at least in the longer term.

- **Highway 50** was evaluated as being a necessary station location given the higher potential for transit transfer demand from the Highway 427 Transitway and park-and-ride demand from the Highway 50 corridor in Brampton and Caledon. This demand was tested under various alternatives, and station access by mode was found to be sensitive to park and ride opportunities in the vicinity. The Highway 427 Transitway stations do not include park and ride facilities in the eleven stations or eight station scenarios. However, when park-and-ride lots at the Langstaff / Highway 427 station were introduced and capacity at Highway 50 was constrained, demand was seen to shift to the 427 Transitway. As such, station access by park and ride decreased and access by transit connections increased.
- **Highway 27** is the next candidate station location and was determined suitable due to high traffic volumes on the Highway and potential transfer demand. Highway 27 is a major north-south route that connects to several employment areas. It also acts as an alternative route to the Highway 427 during congested peak periods. Highway 427 is close to Martin Grove Road and both stations show strong demand, however due to proximity investigation into combining the stations should be undertaken if a large enough station and parking lot can be provided.
- **Martin Grove Road** is a potential transitway station that has connections to a neighbourhood to the south and an employment area to the north. There are accessibility constraints at Martin Grove Road, and it is close to the Highway 27 station. Both stations show strong demand, however due to proximity, investigation into combining the stations was undertaken. Generally, it was determined that Highway 27 could not accommodate diverted traffic from Martin Grove. It was recommended that the station be carried forward provisionally for detailed evaluation.
- **Pine Valley Drive** is a suitable transitway station due to its location at the edge of the industrial areas located in Vaughan and Toronto. It would also serve the residential demand of Woodbridge through local transit connections. With Weston Road potentially removed as indicated below, it also serves as an intermediate connection point to Martin Grove Road / Highway 27.
- **Weston Road** has a low walk-in demand and limited transfer demand due to constrained station access and likely a constrained parking lot size. There seems to be good potential to consolidate with Pine Valley Drive, and among the two locations Pine Valley Drive appears to have better access and station size potential.

2.5.4. Impacts of the 407 Transitway

The following section presents an analysis of the travel markets that most benefit from the transitway and what impacts the transitway is projected to have on nearby auto and transit network. **Table 2.15** shows major travel markets served by the transitway during the 2041 AM peak period.

TABLE 2.15: 2041 AM PEAK PERIOD (3-HOUR) TRIPS USING THE 407 TRANSITWAY WEST, 11 STATION OPERATION

DESTINATION	FROM CORRIDOR	FROM WEST OF CORRIDOR	TOTAL
To Corridor	380	650	1,030
To Brampton	80	70	150
To Mississauga	130	110	240
To Other Peel Region	30	40	70
Total Peel Region	240	220	460
To Vaughan	-	-	-
To Other York Region	-	-	-
Total York Region	-	-	-
To Downtown Toronto	1,550	880	2,430
To Other Toronto	2,170	3,430	5,600
Total Toronto	3,720	4,310	8,030
Total to Other	-	-	-
Total	4,340	5,180	9,520

Though the 407 Transitway operates in Peel and York Region, Toronto is the main destination for 407 Transitway riders, attracting nearly 85% of eastbound transit demand during the AM peak period. More than 2,400 daily riders will use the 407 Transitway for travel between the corridor and downtown Toronto, and about 59% of Transitway trips are destined for northern Toronto which includes York University, North York Centre, and other locations between Steeles Avenue and Highway 401.

460 travellers are expected to use the 407 Transitway for trips to employment areas located in Peel Region including Brampton and Mississauga. In addition, over 1,000 travellers are expected to use the 406 Transitway for trips located in the study area corridor.

Table 2.16 summarizes the local and regional travel impacts of the 407 Transitway West.

TABLE 2.16: 2041 AM PEAK PERIOD (3-HOUR) TRAVEL DEMAND, CHANGES DUE TO 11-STATION 407 TRANSITWAY WEST (STUDY AREA)

TRAVEL MARKET	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
NO WEST 407 TRANSITWAY				
Within Corridor	4,100	33,700	37,800	11%
To/From South	11,500	82,400	93,900	12%
To/From West	4,700	55,800	60,500	8%
To/From North	5,300	77,100	82,500	6%
To/From East	16,700	54,800	71,500	23%
Through Eastbound	1,400	3,900	5,400	26%
Through Westbound	200	14,000	14,300	1%
Total	43,900	321,700	365,900	12%
WITH WEST 407 TRANSITWAY				

TRAVEL MARKET	TRANSIT	AUTO	MOTORIZED	MODE SPLIT
Within Corridor	4,100	33,400	37,400	11%
To/From South	11,800	82,000	93,700	13%
To/From West	4,600	55,500	60,200	8%
To/From North	6,100	76,700	82,800	7%
To/From East	17,900	54,700	72,600	25%
Through Eastbound	1,700	3,900	5,600	30%
Through Westbound	300	13,900	14,100	2%
Total	46,500	320,100	366,400	13%
CHANGES DUE TO ADDING 11-STATION WEST 407 TRANSITWAY				
Within Corridor	0	-300	-400	0%
To/From South	300	-400	-200	0%
To/From West	-100	-300	-300	0%
To/From North	800	-400	300	1%
To/From East	1,200	-100	1,100	1%
Through Eastbound	300	0	200	4%
Through Westbound	100	-100	-200	1%
Total	2,600	-1,600	500	1%

Note: Trips to/from the south is defined as the areas of Mississauga and Toronto, south of the Transitway. The west area is defined as some areas of Brampton, Halton Region, and Hamilton Region. The north area encompasses areas of Brampton, Caledon, and parts of York Region. The east area is defined as Durham Region, and areas of York Region and the City of Toronto.

The 407 Transitway West will have an impact on travel within and through the corridor. The 407 Transitway will cause an increase of 2,600 AM peak period transit trips, a nearly 6% increase in the overall transit travel.

The increase of 2,600 transit trips represents approximately 17% of the approximately 15,600 trips served by the 407 Transitway in the AM peak period. These net new riders are trips that have shifted from auto modes as well as from other parallel routes, and is a reasonable number for a corridor with established transit travel.

Though demand on parallel east/west corridors would decrease, demand on major north/south transit corridors would increase with the addition of the 407 Transitway West. Southbound ridership on the Yonge-University Subway would increase. As well, trips to and from the east would increase, as this West 407 Transitway would extend high-frequency service beyond Jane Street.

2.6. Systems Planning – Summary of Findings

The West 407 Transitway would connect Brampton and Mississauga to the central and eastern section of the Transitway, providing a new convenient option for transit users to cross the northern portions of the Greater Toronto and Hamilton Area. The 407 Transitway would provide connections to the GO Rail system at Bramalea (Kitchener line) and to the planned Toronto York Spadina Subway Extension (TYSSE).

The stations evaluated for the 407 Transitway West are based on the 1998 MRC report, *Transitway Corridor Protection Study, 407 ETR/Parkway Belt West Corridor (from Highway 403 to Markham Road)*.

This Systems Planning component of the TPAP has identified a strong potential travel market for the west transitway, however there are also challenges and constraints in this portion of the corridor.

There is a high demand for long-distance, east-west travel through the study area. High commuter flows exist from Mississauga and Brampton to York Region and northern Toronto. Strong population and employment growth in Peel Region and in particular York Region is anticipated by 2041, adding to background travel demand.

While the travel market for east-west capacity is large, the corridor is primarily low-density industrial with no major growth centres served directly by the 407 Transitway. The travel market is currently served by private transport with a 10% transit mode share in the corridor. These characteristics could make attracting ridership to the 407 Transitway a challenge, and forecasts were determined to be highly sensitive to assumed operating speeds, number of transfers, and provision of parallel rapid transit service (e.g. Viva Highway 7).

Given the above context, it was determined that the 407 Transitway is still a necessary part of the transportation network and gets high use in the 2041 horizon with approximately 5,500 peak passengers per hour. This ridership is well suited to bus rapid transit. The strong ridership is mainly driven by the 407 Transitway providing an attractive connection choice to existing and planned rapid transit routes including the Hurontario LRT, the Toronto Spadina Subway extension, and GO Kitchener. It also attracts park-and-ride users which tend to have dispersed origins away from rapid transit but use the 407 Transitway to access either other rapid transit routes or some of the key destinations adjacent to 407 ETR in York Region.

This section of the report evaluated 11 potential stations, of which seven are recommended to be implemented, plus two (Martin Grove and Goreway Drive stations) are recommended to be carried forward provisionally for detailed evaluation in traffic and preliminary design / environmental constraints evaluation. The two dropped stations are Highway 410, which showed low demand and good alternative stations, and Weston Road, which showed low demand plus physical / feasibility constraints documented elsewhere in the EPR.