

**The City of**



# **TRANSPORTATION MASTER PLAN**

Appendix A – Transit Technical Memorandum

April 2019



# TRANSPORTATION MASTER PLAN TRANSIT TECHNICAL MEMORANDUM

CITY OF BARRIE

TECHNICAL MEMORANDUM

PROJECT NO.: 171-08853-00  
DATE: APRIL 08, 2019

WSP  
100 COMMERCE VALLEY DRIVE WEST  
THORNHILL, ON  
CANADA L3T 0A1

T: +1 905 882-1100  
F: +1 905 882-0055  
WSP.COM  
WSP.COM

1	INTRODUCTION.....	1
2	BACKGROUND.....	2
2.1	<b>Barrie Transit – 2011 Plan .....</b>	<b>2</b>
2.2	<b>2014 Multi-Modal Active Transportation Master Plan</b>	<b>3</b>
2.3	<b>Allandale Mobility Hub Study.....</b>	<b>6</b>
2.4	<b>Metrolinx Planned Improvements.....</b>	<b>7</b>
3	EXISTING CONDITIONS .....	8
3.1	<b>Barrie Transit .....</b>	<b>8</b>
3.1.1	Transit Hubs .....	8
3.1.2	Route Summary .....	9
3.1.3	Barrie Transit Ridership .....	11
3.1.4	Transit Service Access .....	11
3.1.5	Barrie Specialized Transit Service .....	15
3.1.6	Operations and Maintenance .....	15
3.2	<b>GO Transit.....</b>	<b>15</b>
3.2.1	Stations.....	15
3.2.2	Train Services.....	16
3.2.3	Bus Services.....	16
3.3	<b>Greyhound Bus Line .....</b>	<b>16</b>
3.4	<b>Hammond Transportation .....</b>	<b>16</b>
3.5	<b>Linx Transportation.....</b>	<b>16</b>
3.6	<b>Ontario Northland.....</b>	<b>17</b>
3.7	<b>Current Transit Mode Share .....</b>	<b>19</b>
4	FUTURE TRANSIT SERVICE DEVELOPMENT .....	20
4.1	<b>Population and Employment Forecasts.....</b>	<b>20</b>
4.2	<b>Future Transit Mode Share Target.....</b>	<b>22</b>
4.3	<b>Potential Transit Initiatives.....</b>	<b>22</b>
4.4	<b>Complementary Transit Strategies.....</b>	<b>25</b>
4.4.1	Ride-Sharing Integration with Transit (Private Service Model) .....	25
4.4.2	On-Demand Transit (Public Service Model) .....	26
5	BARRIE TRANSIT – FUTURE READY .....	27
5.1	<b>Contactless Payment .....</b>	<b>27</b>

5.2	Mobile Phone Payment .....	28
5.3	Integration of Automation .....	28
5.4	Mobility as a Service .....	29
5.5	Future Rapid Transit and Transit Priority .....	29
6	PROPOSED 2041 TRANSIT NETWORK .....	30
6.1	Changes Between 2031 and 2041 Networks.....	33
6.2	Phasing and Implementation .....	33
7	SUMMARY .....	34

---

**TABLES**

TABLE 2-1	FUTURE POPULATION FORECASTS AND TRANSIT MODE SHARES FOR SIMILAR MUNICIPALITIES.....	4
TABLE 4-1	POTENTIAL TARGET AREAS AND TRANSIT INITIATIVES.....	23

---

## *FIGURES*

FIGURE 2-1	FINAL PLAN FOR TRANSIT ROUTE NETWORK (2014) .....	5
FIGURE 2-2	OVERVIEW OF TERMINAL ACCESS MODIFICATIONS .....	6
FIGURE 2-3	OVERVIEW OF SURROUNDING ROAD NETWORK MODIFICATIONS ..	7
FIGURE 3-1	EXISTING BARRIE TRANSIT SYSTEM MAP .....	10
FIGURE 3-2	HOURLY DISTRIBUTION OF BARRIE TRANSIT PASSENGERS BASED ON BOARDING DATA .....	11
FIGURE 3-3	BARRIE TRANSIT ACCESS COVERAGE ANALYSIS .....	12
FIGURE 3-4	DAILY UTILIZATION OF BARRIE TRANSIT ROUTES .....	13
FIGURE 3-5	BARRIE TRANSIT RIDERSHIP CATEGORIES .....	14
FIGURE 3-6	GO TRANSIT SYSTEM MAP (GO TRANSIT, 2018) .....	18
FIGURE 3-7	EXISTING (2016) MODE SHARE OF ALL TRIPS TO OR FROM BARRIE ..	19
FIGURE 3-8	EXISTING (2016) MODE SHARE OF YORK REGION AND TORONTO TRIPS TO OR FROM BARRIE .....	19
FIGURE 4-1	PROJECTED POPULATION AND EMPLOYMENT GROWTH BETWEEN 2016 AND 2041 .....	21
FIGURE 4-2	BARRIE POPULATION AND EMPLOYMENT DISTRIBUTION IN 2041 .....	22
FIGURE 4-3	POTENTIAL TARGET AREAS AND TRANSIT INITIATIVES .....	25
FIGURE 6-1	2041 POPULATION AND EMPLOYMENT DENSITIES .....	31
FIGURE 6-2	PROPOSED 2041 TRANSIT ROUTE NETWORK CONCEPT .....	32

---

## *APPENDICES*

A-1	Detailed Future Transit Ridership Calculations
-----	--



# 1 INTRODUCTION

The City of Barrie, located along the Western Shores of Lake Simcoe, has been one of the fastest-growing communities in all of Canada. With the addition of the Secondary Plan Areas to the southern portion of the City, the population is expected to grow from approximately 145,800 to 253,000 persons by 2041. The Secondary Plan Areas currently consist of primarily agricultural land uses are to be urbanized into future residential and employment uses.

The provincial government designated the City of Barrie as an Urban Growth Centre (UGC); employment within Barrie is set to reach 129,000 jobs by 2041. UGCs are areas that will be focal points for investment in institutional and region wide public services, as well as commercial, recreational, cultural and entertainment uses. In addition, they will serve as major employment centres, be planned to support major transit infrastructure and accommodate a significant share of population and employment growth. The population and employment forecasts are to meet the growth targets identified in the 2017 Growth Plan for the Greater Golden Horseshoe (GGH) area.

This Technical Memorandum provides a detailed review of the history of Barrie Transit including the timeline of significant changes, assessment of the existing transit facilities and utilization, development of the future 2041 transit network and facilities. This will be followed by a comparison between the 2031 transit recommendations from the 2014 Multi-Modal Active Transportation Master Plan (MMATMP) and the proposed recommendations for 2041.

## 2 BACKGROUND

Prior to 2013, Barrie Transit consisted of 21 unidirectional radial routes that originated and terminated at the Downtown Terminal, located at the intersection of Maple Avenue and Simcoe Street. These transit routes operated with headways of 30 minutes during the day, and 60 minutes after 7:00 p.m. throughout the week only. In 2011, Barrie identified the following major issues with the transit system:

- High travel times and unreliable services due to the radial route structure;
- Lack of transit hubs and transfer points outside of the downtown core, except for the two GO stations that have limited bus services;
- High demand for direct north-south services within Barrie;
- Poor direct or scheduled connections to the services at GO Stations;
- The convergence of all routes to the Downtown Terminal (formerly known as the Central Terminal), which increased congestion, and did not easily accommodate growth and compromises service reliability;
- Poor service headways on major corridors resulting in longer passenger wait times; and
- A need for additional service coverage in the south end of Barrie.

Subsequently, Barrie initiated a study into revamping its transit system to address the above-identified issues entitled “*Barrie Transit – Plan for Transit*” in 2011, which was followed by the 2014 MMATMP. Both studies and their outcomes are discussed in the sections below.

---

### 2.1 BARRIE TRANSIT – 2011 PLAN

In February 2011, City Council approved Transit Staff’s request to develop a new transit route system for Barrie. Some key components of the 2011 Plan for Transit included:

- Introducing a new route and scheduling model for transit that includes:
  - Using multiple hubs around the city, instead of a single primary hub downtown;
  - Providing more frequent service on major corridors;
  - Operating services to similar areas as today, but diverting services to local hubs instead of downtown terminal, where appropriate;
  - Operating services to new hubs, including Holly Community Centre, Mapleview Drive / Highway 400 area, and Allandale GO Station; and
  - Service to meet growth of key institutions, such as Georgian College and Royal Victoria Hospital (RVH).
- Investigating the relocation of intercity buses out of the downtown terminal, to a more appropriate location closer to Highway 400; and
- Examining the potential for new and other uses of the downtown terminal if platform or building capacity requirements change under the new route model.

Based on the study conclusions and the collaborative efforts with Barrie Transit staff, a service concept was developed. The service concept was a branch service, and focused on corridor routes complemented by modified feeder services to non-corridor areas. A major feature of the developed concept that promotes passenger convenience was that most routes operated north-south passing through the downtown, to reduce the need to transfer at the Downtown Barrie Transit Terminal.

Additionally, the concept established six transit hubs in the north, central, and southern parts of the City, which included:

- Barrie Downtown Terminal
- Georgian Mall
- Georgian College/Royal Victoria Hospital
- Holly Community Centre
- Park Place Shopping Centre
- Barrie South GO Station

These six hubs reduced the requirement for services to converge at a downtown terminal. However, service to downtown destinations continued with reduced capacity requirements at the existing terminal.

---

## 2.2 2014 MULTI-MODAL ACTIVE TRANSPORTATION MASTER PLAN

The 2011 Plan for Transit was used as a platform for the 2014 MMATMP development. The levels of intervention were developed to achieve different non-auto modal shares. The low level of intervention provided limited active transportation facilities, intended to just accommodate the current levels of pedestrian and cycling activity. The higher levels (medium and high) intended to not just accommodate, but to encourage, walking and cycling, as well as transit usage. The transit modal share targets for each of the considered alternatives in the 2014 MMATMP are as follows:

- **Alternative 1 – Do Nothing:**
  - Target – less than 2.6%
- **Alternative 2 – Low/Existing Modal Share:**
  - Target – 2.6%;
  - Modest route extensions in the Secondary Plan Areas; and
  - Increased transit route frequencies and expansion of service hours during weekends.
- **Alternative 3 – Medium Modal Share:**
  - Target – 7%;
  - Route extensions to better serve the Secondary Plan Areas;
  - Increased service to GO Transit stations (feeder routes); and
  - Additional increase in transit route frequencies throughout Barrie.
- **Alternative 4 – High Modal Share:**
  - Target – 12%; and
  - Same as Alternative 3 with further increase transit route frequencies.

The network alternatives were evaluated based on the following criteria:

- Planning and Land Use
- Natural Environment
- Social and Cultural Environment
- Transportation
- Financial

Alternative 3 was identified as the preferred option to increase the use of active transportation and transit; an extension of the transit network for the 2031 horizon year was developed around the following principles:

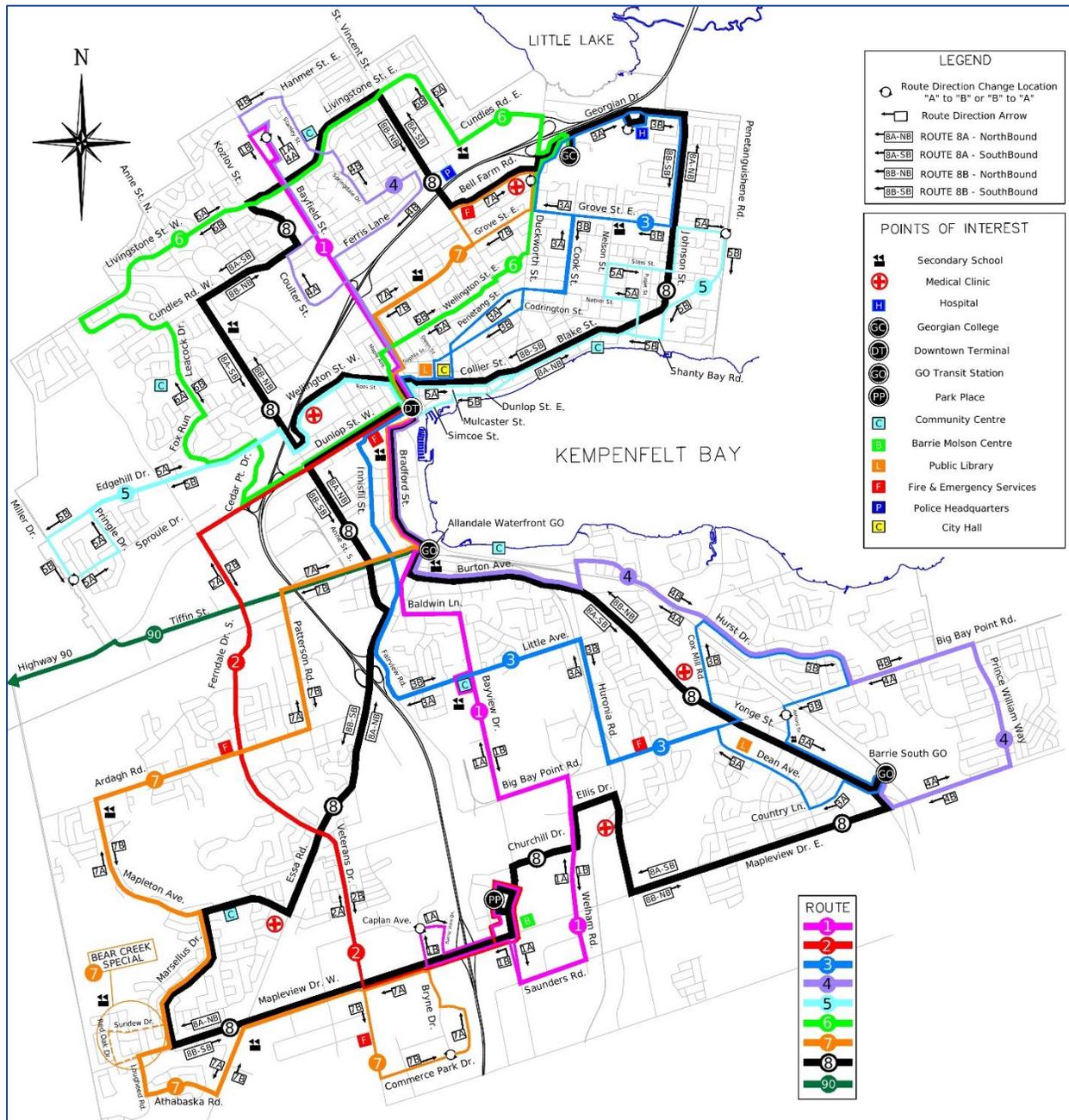
- Making transit and active transportation a cornerstone of the transportation network to reduce auto dependency.
- Planning the Secondary Plan Areas to support land uses and urban form that promote active transportation and transit usage.

The proposed seven percent future transit mode share target is in line with similar municipalities within the GTA, as noted in Table 2-1. The Recommended Transit Route Network Plan, which was implemented in 2014, is presented in Figure 2-1.

**Table 2-1 Future Population Forecasts and Transit Mode Shares for Similar Municipalities**

Municipality TMP	Existing Transit Mode Share	Future Population	Planning Horizon Year		
			2031	2034	2041
Barrie	2% (2016)	253,000 (2016)	-	-	7%
Peterborough (2012)	4% (2006)	102,652 (2031)	6%	-	-
Kingston (2015)	5% (2008)	142,850 (2041)	-	9%	-
Oakville (2013)	6-8% (2011)	246,400 (2031)	20%	-	-
Whitby (2010)	6% (2010)	192,860 (2031)	13%	-	-

Figure 2-1 Final Plan for Transit Route Network (2014)



Source: City of Barrie Transit Staff

## 2.3 ALLANDALE MOBILITY HUB STUDY

In 2018, the City of Barrie developed a vision for investing in its historic downtown waterfront and accommodating growth through intensification within its Urban Growth Centre. Part of this vision includes the potential of creating an event hall and permanent home for the City's Farmer's Market. Facilitating this would require the relocation of the transit hub function to the Allandale Station area.

A Mobility Hub Study was conducted by WSP to assess the feasibility of shifting the main Barrie Transit Terminal from its current location on Maple Avenue in the Downtown to an expanded facility immediately adjacent to the Allandale Waterfront GO Station. The study examined several factors to assess the potential impacts of relocating the bus terminal including the planning context, traffic impact, planned GO transit service expansion, operational, safety and financial impacts.

The Mobility Hub Study determined that the relocation of the main Barrie Transit Terminal to the Allandale Waterfront GO Station site is feasible. The site can accommodate the program requirements of Barrie Transit service, GO Transit and inter-city coach operators utilizing, to a large extent, existing infrastructure. The operational review demonstrated the safe and efficient operation of 13 bus bays on the existing property. As such, the relocation will incur minimal incremental costs and disruptions to the existing bus and road networks.

A summary of the recommended improvements to the station area and surrounding network to enhance the transit facilities and efficiency within the area is provided below and illustrated in Figure 2-2 and Figure 2-3. It should be noted that further study and design is required to refine the proposed road network changes.

— Terminal Access Modifications:

- 1 Close the current station access on Essa Road; add lay-by lanes on the east and west side of Essa Road.
- 2 Sever the station access road so that public access to the passenger pick-up and drop-off is exclusively through the signalized intersection east of the historic station building.
- 3 Convert the western Station Access Road to a bus-only facility.
- 4 Introduce the following transit priority measures on Tiffin Street:
  - a Dedicated transit lane starting at Lakeshore east of the Station Access Road and extending to the left-turn lane for Essa Road.
  - b A transit-only eastbound right-turn lane at the Station Access Road.

**Figure 2-2 Overview of Terminal Access Modifications**



Source: Allandale Mobility Hub Study Final Report, prepared by WSP, dated May 2018

- Surrounding Road Network Modifications (illustrated in Figure 2-3 below):
  - 1 Introduction of a bus-only lane on Tiffin Street that merges into a general left-turn lane before the intersection of Tiffin Street and Essa Road/Bradford Street – with protection for future extension of the turn lane.
  - 2 Introduction of a bus-only right-turn lane at Tiffin Street and Lakeshore Drive to allow buses to bypass any queued traffic heading eastbound.
  - 3 Conversion of the far-left westbound through lane to a transit-only left turn lane at Tiffin Street and Lakeshore Drive.
  - 4 Continuation of transit priority measures at Tiffin Street and Lakeshore, with new measures to accommodate the dedicated left-turn phase at Tiffin Street and Essa Road/Bradford Street.

**Figure 2-3 Overview of Surrounding Road Network Modifications**



Source: Allandale Mobility Hub Study Final Report, prepared by WSP, dated May 2018

The Mobility Hub Study was completed in 2018 and determined that the relocation of the Transit Hub function from its current location on Maple Avenue to an expanded facility immediately adjacent to the Allandale Waterfront GO Station site is feasible.

## 2.4 METROLINX PLANNED IMPROVEMENTS

Under GO Transit’s Regional Express Rail (RER) program, rail service along the Barrie line will be upgraded to a two-way, all-day rail service. According to the Metrolinx Regional Transportation Plan 2041, this service will operate along the entire length of the Barrie line from Toronto Union Station to Allandale Waterfront GO Station, and is expected to be implemented by 2025. Service will operate with 15-minute frequencies in both directions between the Toronto Union and Aurora GO stations, and 30-minute frequencies between the Toronto Union and Allandale Waterfront stations. During the midday, evening and weekend periods, 60-minute, two-way service between the Allandale Waterfront GO and Toronto Union stations will also be included in this program.

The electrification of the GO service is also expected by 2025, which is anticipated to reduce travel times by up to 20 percent. Construction is currently underway to improve the infrastructure on the line to facilitate all the above-listed improvements.

Furthermore, a future GO station is proposed south of Barrie in Innisfil, with an estimated daily ridership of 2,800 patrons. This station is expected to alleviate some of the existing parking demand at both Barrie South GO and Bradford GO Stations.

## 3 EXISTING CONDITIONS

The City of Barrie is accessible by regional transit service, namely GO Transit, and a local network providing conventional and specialized transit services. The conventional service, Barrie Transit, is the municipally-owned local network currently operating 11 fixed bus routes throughout Barrie and Essa Township. Barrie also provides specialized transit service for users with mobility restrictions. The various transit services within and surrounding Barrie are described in detail in the section below.

---

### 3.1 BARRIE TRANSIT

The 11 fixed routes noted above are bi-directional with five transit hubs within the City. The system operates a 30-minute peak and a 60-minute off-peak service on several direct north-south routes. The current network also provides direct services to all GO Trains, including early morning departures. The transit system operates a fleet of 48 conventional transit buses and has an estimated system ridership of approximately 2.7 million annual passenger trips.

---

#### 3.1.1 TRANSIT HUBS

Barrie Transit operates its fixed routes along most of the major arterial roadways, with connections to the five transit hubs. The route structure primarily consists of the “hub and spoke” system, operating out of the five hubs, of which, two are in the northern half of the City, one in the middle of the City, and two in the southern half of the City. A brief description of each transit hub is provided below.

##### DOWNTOWN TERMINAL

Built in 1991, the Downtown Terminal, also called the Barrie Central Terminal, Barrie Transit Terminal or Barrie Bus Terminal, is located on Simcoe Street between Maple Avenue and Mary Street, central to the City’s development pattern. It serves as an intercity and municipal bus station, with nine of the City’s 11 transit routes connecting at this location. In addition to Barrie Transit services, GO Transit interregional bus services, Ontario Northland and Greyhound also stop at this location. This terminal replaced the old terminal across the street, which was built in 1956; some Barrie Transit administration offices are also housed within the building.

##### GEORGIAN COLLEGE

The Georgian College transit hub is located central to the campus and connects four routes. This hub is located at the southeast corner of Highway 400 and Duckworth Street.

##### PARK PLACE

Park Place (formerly known as Molson Park) is the City’s regional outdoor shopping mall with a variety of restaurants, upscale fashion and specialty retail stores. It is located in the south end of the City along the north side of Mapleview Drive between Highway 400 and Bayview Drive. There are two accesses to Park Place along Mapleview Drive: one signalized full-movement and one unsignalized right-in-right-out (RIRO) access. Bayview Drive also provides three full-movement accesses and one RIRO access to the shopping centre. The Park Place Transit Hub is located on the east end of the development, near Bayview Drive and LA Fitness. This hub connects six out of the 11 bus routes within Barrie, with the existing four on-street bus bays. All buses utilize Bayview Drive to enter and exit Park Place.

##### ALLANDALE-WATERFRONT AND BARRIE SOUTH GO STATIONS

The Barrie South GO Station was first introduced in 2007 on an extension of the existing Bradford GO line. Following this, the Allandale-Waterfront GO Station was constructed in 2012. Four routes provide connections between the Downtown Transit Terminal and the Allandale-Waterfront GO Station, and three routes connecting Downtown to the Barrie South GO Station.

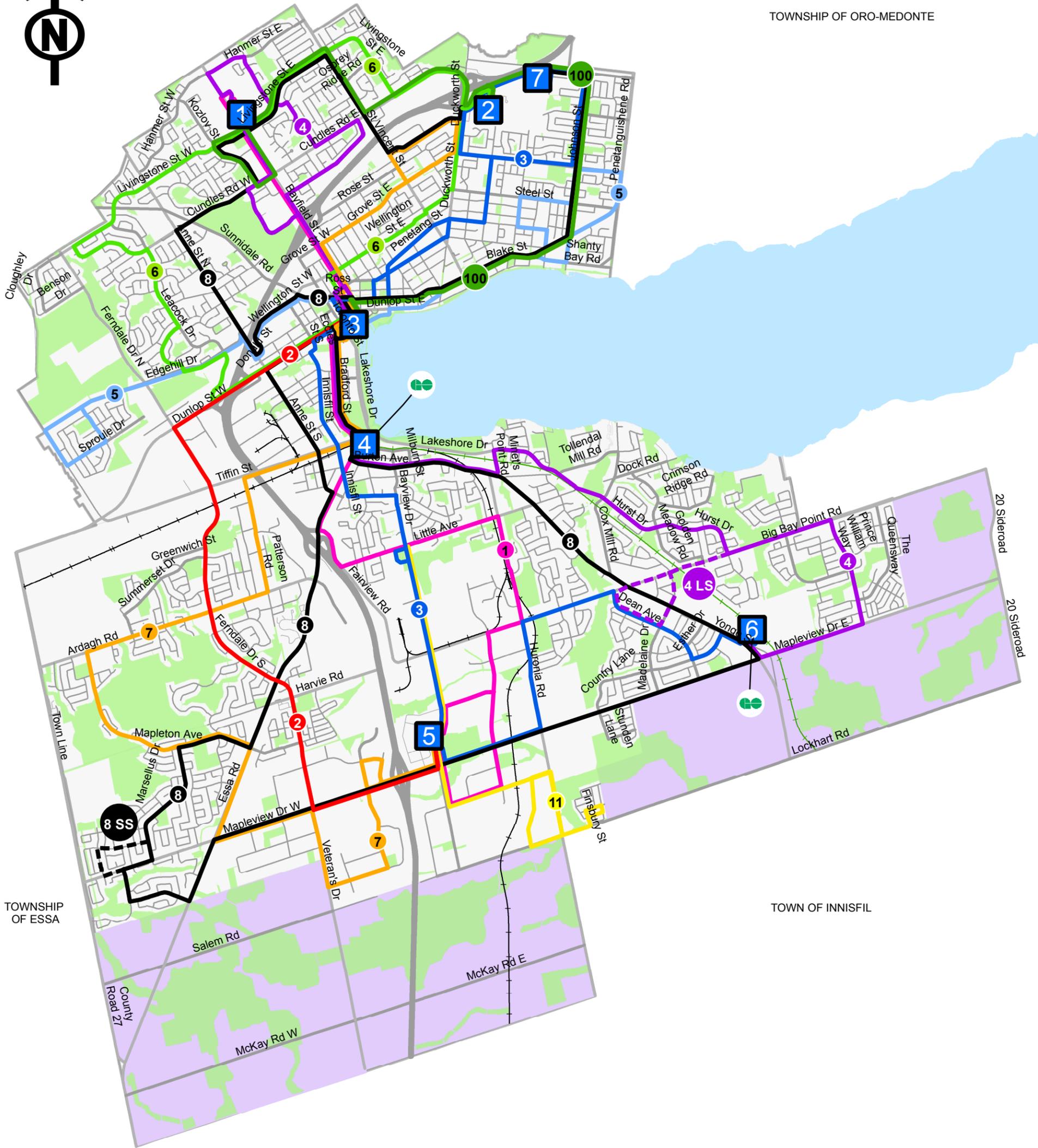
---

### 3.1.2 ROUTE SUMMARY

Barrie Transit currently operates a total of 10 routes within the municipality and one inter-municipal transit service within the Township of Essa to Angus/Canadian Force Base (CFB) Borden. The following describes the existing transit service routes, which are also illustrated in Figure 3-1.

- **Route 1 Welham/Georgian Mall:** this route operates between Park Place and Georgian Mall and travels along Welham Road, Huronia Road, Little Avenue, Bradford Street, Maple Avenue and Bayfield Street. There are 46 stops along this route, including the Downtown Terminal. During the weekday and Saturday peak/mid-day periods, this route operates with a headway of 30 minutes. On Sundays, this route operates every 45 minutes.
- **Route 2 Dunlop/Park Place:** this route operates between Downtown Terminal and Park Place and travels along Dunlop Street, Femdale Drive, Veterans Drive and Maple View Drive. There are 33 stops along this route. During the weekday and Saturday peak/mid-day periods, this route operates with a headway of 30 minutes. On Sundays, the service frequency is 60 minutes.
- **Route 3 Georgian Dr/ Painswick:** this route services Georgian College and Barrie South GO Station and travels along Grove Street, Penetang Street, Collier Street, Dunlop Street, Innisfil Street, Bayview Avenue, Mapleview Drive, Big Bay Point Road and Dean Avenue. There are 33 stops along this route, including the Downtown Terminal. The route operates with a 30-minute headway during the weekday and Saturday peak/mid-day periods. On Sundays, the service frequency is 60 minutes.
- **Route 4 East Bayfield/South GO:** this route operates between Barrie South GO Station and East Bayfield between Hammer Street and Livingstone Street and travels along Prince William Way, Big Bay Point Road, Hurst Drive, Bradford Street and Bayfield Street. There are 54 stops along this route, including the Downtown Terminal. During the weekday/Saturday peak/mid-day periods, this service operates with a headway of 35 minutes. On Sundays, the service frequency is 65 minutes.
- **Route 5 Blake/Edgehill:** this route operates between Penetanguishene Drive and Miller Drive and travels along Edgehill Drive, Ross Street, Collier Street, Blake Street, Johnson Street and Lakeshore Rd. There are 39 stops along this route, including the Downtown Terminal. During the weekday/Saturday peak/mid-day periods, this route operates with a headway of 30 minutes. On Sundays, the service frequency is 60 minutes.
- **Route 6 Letitia/College:** this route operates in a loop between the Downtown Terminal and Georgian College and travels along Wellington Street, Duckworth Street, Cundles Road, Livingstone Street, Leacock Drive and Dunlop Street. There are 64 stops along this route. During the weekday and Saturday peak/mid-day periods, the route operates with a headway of 30 minutes. On Sundays, the service frequency is 60 minutes.
- **Route 7 Bell Farm/Bear Creek:** this route operates between Park Place and Georgian College and travels along Mapleview Drive, Mapleton Avenue, Ardagh Road, Patterson Road, Tiffin Street, Bradford Street, Maple Avenue, Bayfield Street, Grove Street and Bell Farm Road. During the weekday and Saturday peak/mid-day periods, the route operates with a headway of 30 minutes. On Sundays, the service frequency is 60 minutes.
- **Route 8 RVH/Yonge/Crosstown/Essa:** this route operates between Park Place and Georgian College in a Figure 8 pattern. The first route includes Mapleview Drive, Yonge Street, Bradford Street, Wellington Street, Anne Street, Cundles Road, Kozlov Street, Livingstone Street, St Vincent Street and Bell Farm Road. The second route includes Mapleview Drive, Athabaska Road, Marsellus Drive, Mapleton Avenue, Johnson Street, Essa Road, Anne Street, Collier Street Blake Street and Johnson Street. During the weekday/Saturday peak/mid-day periods, this service operates at a headway of 30 minutes, and 60 minutes on Sundays.
- **Route 11 Lockhart:** this route operates in a loop between Allandale Recreation Centre and Fenchurch Manor. There are 10 stops along this route. During the weekday/Saturday peak/mid-day periods, the route operates with a headway of 30-minute. This route does not operate on Sundays.
- **Route 100 Georgian Express:** this route operates two services: one between Georgian College and the Downtown Terminal (Route 100A & B), and the other only between Georgian Mall and the Downtown Terminal (Route 100C & D). During the weekdays this service operates at headways of approximately 45 minutes, with no service provided on weekends.
- **Route 90 Angus Borden/ Peacekeepers Way:** this route operates in a loop between Allandale GO Station and Base Borden Area. The route travels along Tiffin Street, Dunlop Street, Highway 90, Cambrai Road, Dieppe Road, King Street and Centre Street. There are 35 stops along this route. This service is only available during weekdays (Monday to Friday) with a limited number of trips (two trips during the a.m. peak period, one trip during mid-day and two during the p.m. peak period).





**Transit Routes**

- 8** RVH / Yonge - Crosstown / Essa
- 8 SS** Bear Creek (Special Service)
- 3** Georgian / Painswick
- 6** Letitia / College
- 5** Blake / Edgehill
- 7** Bell Farm / Bear Creek

- 100** Express to G.C. / G.M. / D.T.
- 1** Georgian Mall / Welham
- 4** East Bayfield / South GO
- 4 LS** East Bayfield / South GO (Limited Service)
- 2** Dunlop / Park Place
- 11** Lockhart

**Existing Transit Hub**

- 1** Georgian Mall
- 2** Georgian College
- 3** Downtown Terminal
- 4** Allandale/Waterfront GO Station
- 5** Park Place
- 6** Barrie South GO Station
- 7** Royal Victoria Hospital

**Transportation Features**

- GO Station
- BCRY Railway
- GO Transit Railway

**Natural Features**

- Park / Open Space
- Water

**Other Features**

- Secondary Plan

Date Updated: April 5, 2019  
 Project: 171-08853-00  
 Map Created By: WSP Thornhill

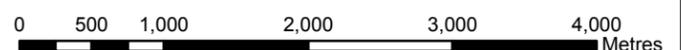


Figure 3-1  
 Existing Barrie Transit System Map  
 City of Barrie Transportation Master Plan



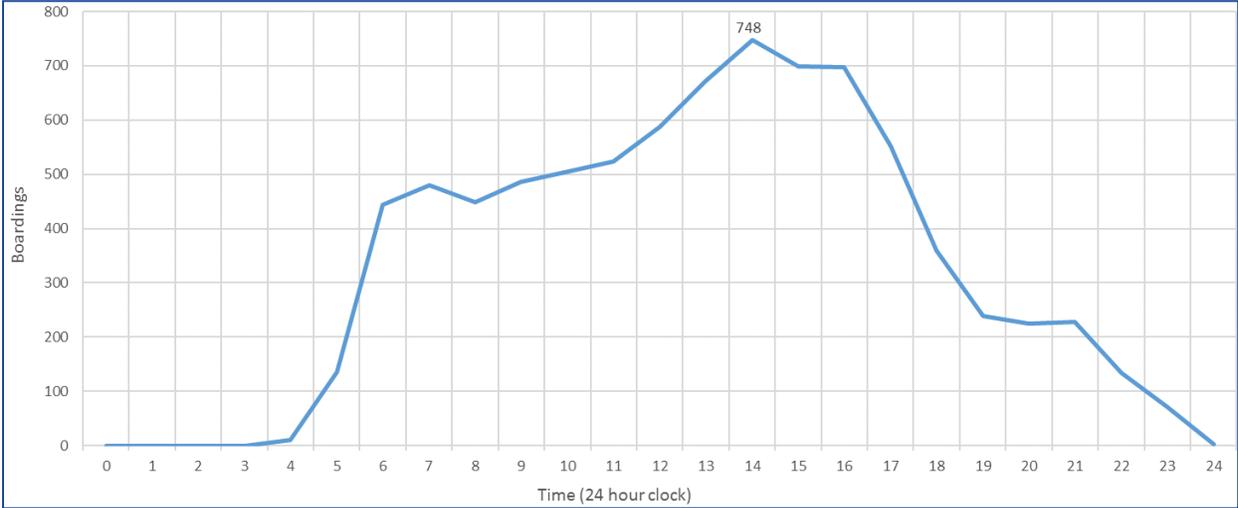


### 3.1.3 BARRIE TRANSIT RIDERSHIP

Transit ridership data was obtained from the City’s online database for the 2016 base year to maintain consistency with the travel patterns data obtain from the 2016 Transportation Tomorrow Survey, discussed in Section 3.1.2 of the Transportation Master Plan (TMP) main report. This data was analyzed to determine current trends and distribution of ridership. The average weekday ridership on local transit is approximately 8,700 boardings, with an additional 925 boarding at the two GO stations for a total 9,625 daily transit ridership.

The analysis results identified the daily peak transit ridership occurs during the midday period, between 1:00 p.m. and 4:00 p.m., as illustrated in Figure 3-2. The hourly distribution of transit passengers does not reflect peaking characteristics typically exhibited by commuter work trips. Therefore, there is an opportunity to attract transit trips by commuters to increase ridership during the underutilized morning and afternoon periods.

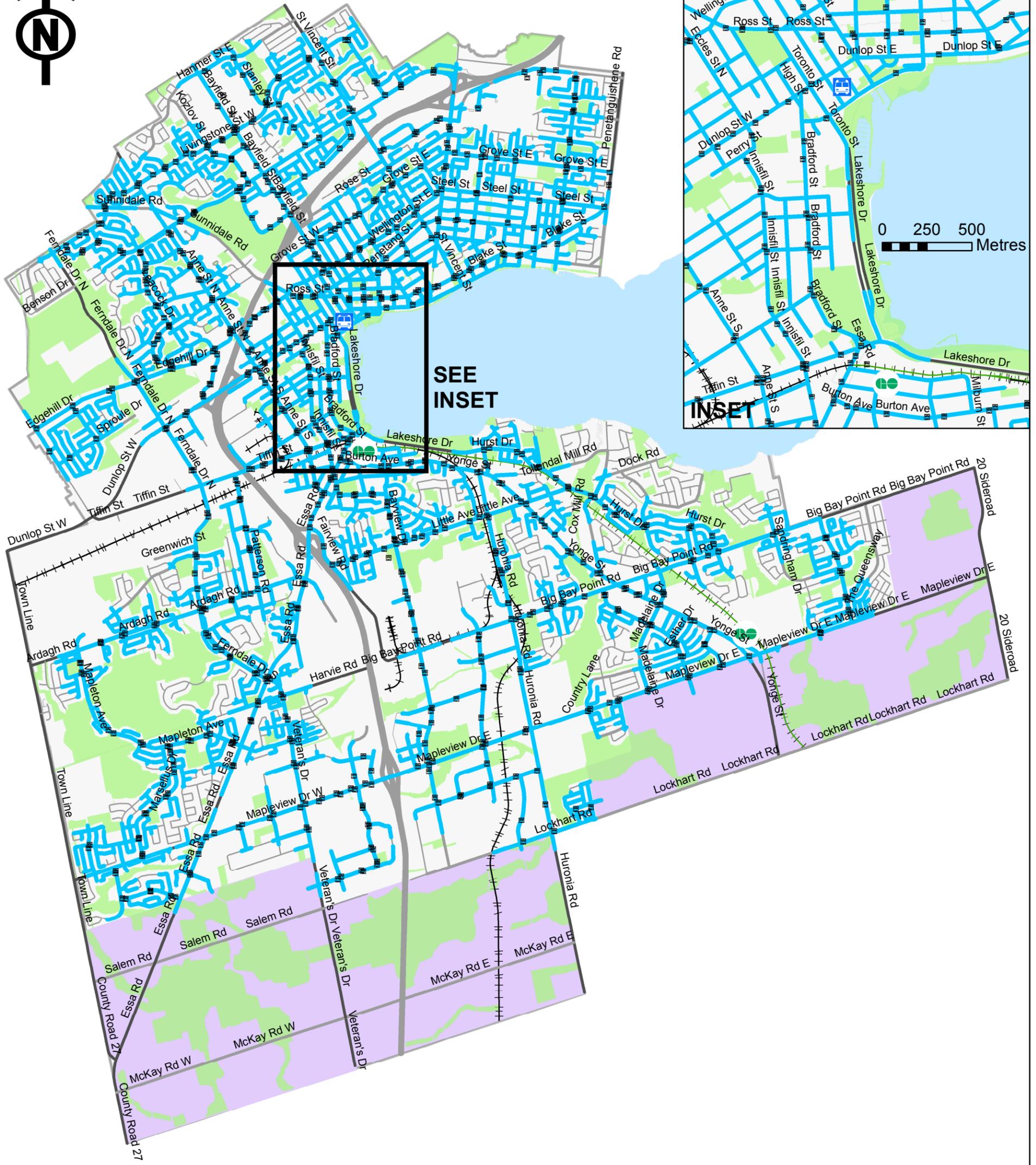
**Figure 3-2 Hourly Distribution of Barrie Transit Passengers based on Boarding Data**



### 3.1.4 TRANSIT SERVICE ACCESS

According to the Transit Capacity and Quality of Service Manual by the Transportation Research Board, most transit riders that would wish to utilize a bus service generally start their trip within 400 meters of a bus stop, with the attractiveness of the transit route dropping significantly beyond this distance. An analysis of the existing transit coverage based on the current network and stop locations was conducted, which is illustrated in Figure 3-3. The analysis determined that approximately 87 per cent of the City is located within 400 meters walking distance of a transit stop.





**Transit Access Coverage**

-  Transit Stops
-  Transit Access Coverage - 400m

**Transportation Features**

-  GO Station
-  Barrie Bus Terminal
-  GO Transit Railway
-  BCRY Railway

**Natural Features**

-  Park / Open Space

**Other Features**

-  Secondary Plan Area

Data Sources: City of Barrie  
 Date Updated: April, 2019  
 Project: 171-08853-00  
 Map Created By: WSP Thornhill



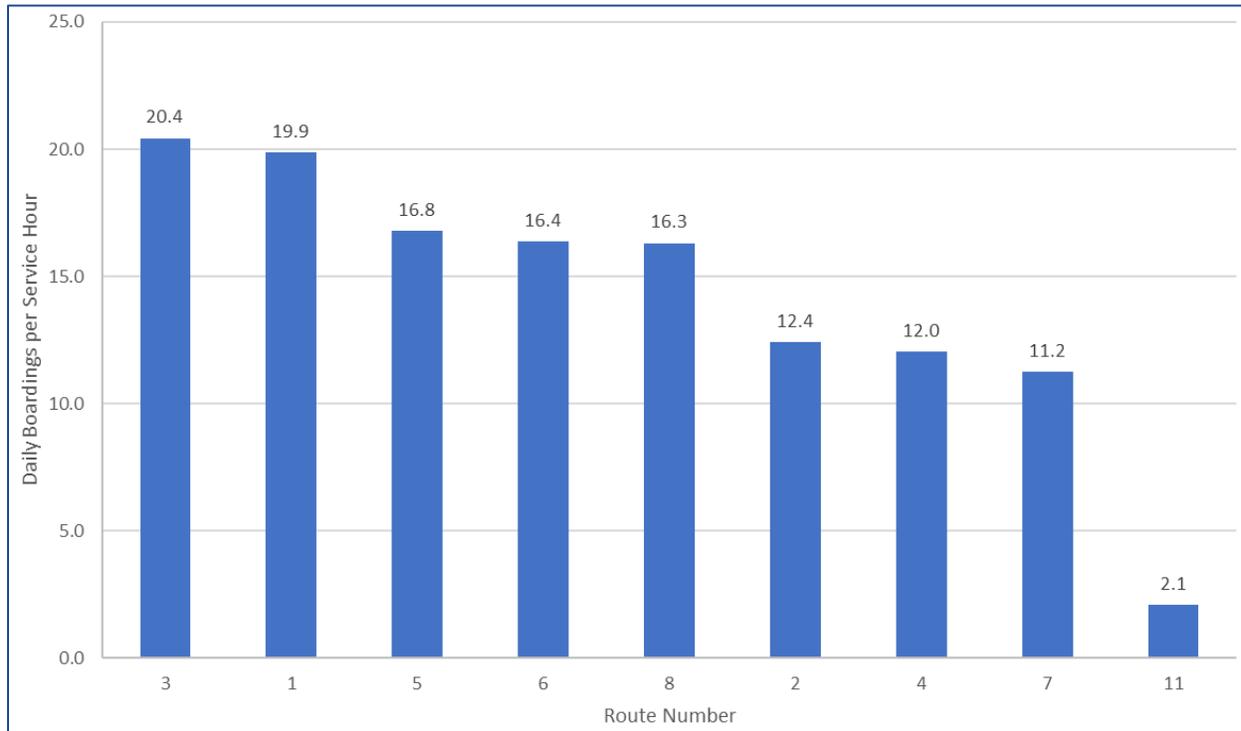
Figure 3-3  
 Barrie Transit Access Coverage Analysis  
 City of Barrie Transportation Master Plan





Boardings per service hour data was utilized to determine the boardings per service hour and identify the range of utilization of the services. The daily utilization for each route is illustrated in Figure 3-4.

**Figure 3-4 Daily Utilization of Barrie Transit Routes**



Out of the nine local transit routes analyzed (based on 2016 transit services, Route 100 was implemented in September 2018), Route 3 is the most utilized with approximately 20.4 boardings per service hour. While majority of the local transit routes pass through the Downtown Terminal, Route 3 provides the most coverage throughout the entire City and connects to all the transit hubs and both GO stations. Based on the boardings per service hour calculations for each route, the following three distinct categories were evident, which are also illustrated in Figure 3-5:

- High Utilization – Routes 3 and 1.
- Medium Utilization – Routes 5, 6, and 8.
- Low Utilization – Routes 2, 4, 7, and 11.



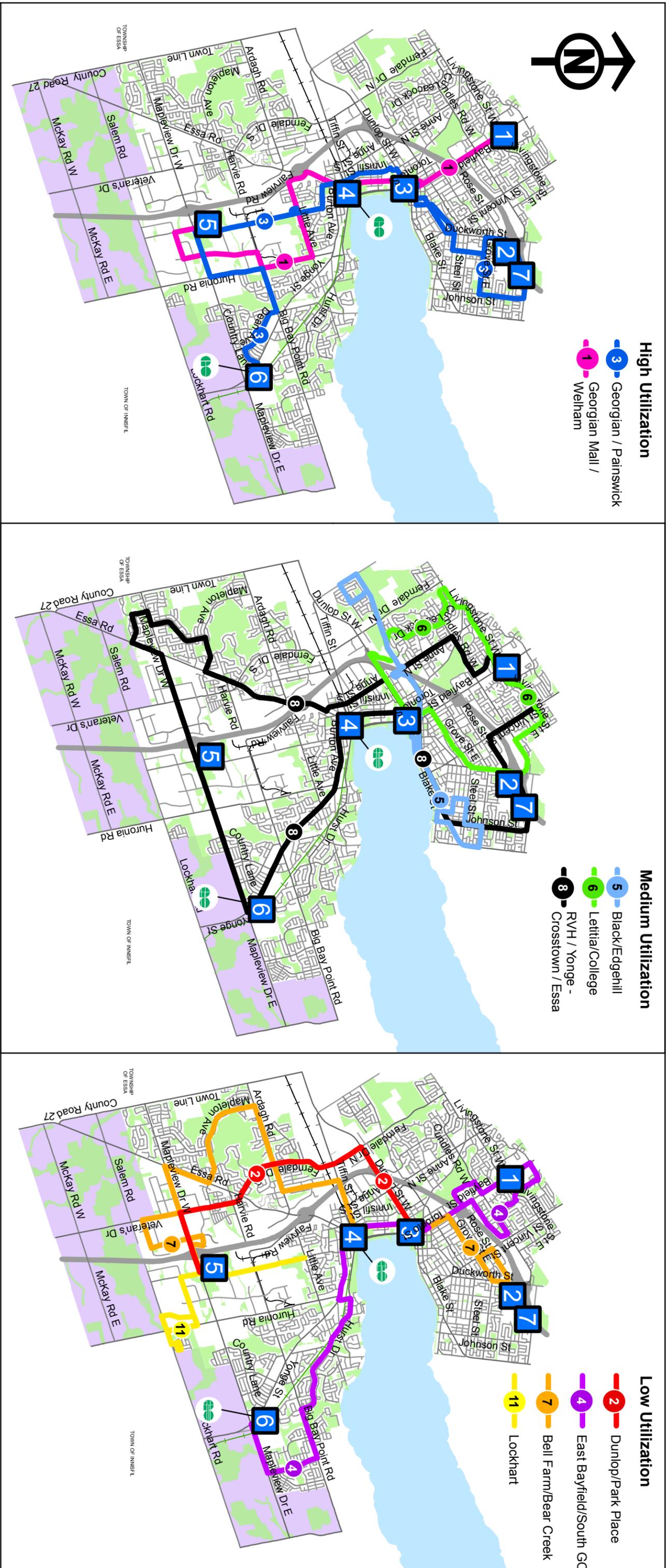


Figure 3-5  
 Barrie Transit Ridership Categories  
 City of Barrie Transportation Master Plan





---

### 3.1.5 BARRIE SPECIALIZED TRANSIT SERVICE

Barrie's Specialized Transit is the municipally-owned specialized door-to-door transit service offered to people with limited mobility. The service spans from 4:15 a.m. to 12:30 a.m. on weekdays, 6:45 a.m. to 12:30 a.m. on Saturdays and 8:30 a.m. to 10:30 p.m. on Sundays. The service is operated on an on-demand basis, with users calling ahead; the fare structure is equivalent to that of conventional service. This service is operated by 15 vehicles varying from mini-buses to specialized vans.

The service operates on a 30-minute scheduling window; passengers are required to call up to one week in advance for service. Trip confirmation is available 24 hours daily, on all days of the week by calling the specialized booking agents. On the day of the trip, the vehicle arrives at the passenger's pick-up location and the passenger has a five-minute window to board the vehicle. Travel times are expected to be up to 60 minutes, as the service also serves multiple passengers on one trip to improve vehicle utilization.

---

### 3.1.6 OPERATIONS AND MAINTENANCE

The operations and maintenance of the transit system are contracted out to MVT Canadian Bus. A new facility was constructed in 2015 with a storage capacity of up to 80 vehicles; the facility can be further expanded to increase capacity to 120 vehicles. Seven maintenance bays are currently available with provisions in place for a future addition of two more bays.

Barrie Transit vehicles are equipped with a sophisticated Computer Aided Dispatch (CAD) and Automatic Vehicle Locating (AVL) system that provides a wealth of operations data such as passenger volumes and vehicle delays. Furthermore, the CAD/AVL system permits them to interface with external platforms, such as Google Maps, to provide estimations for vehicle arrival times for any passenger. Some vehicles are also equipped with on-board and exterior camera systems for improved passenger safety. Further investments are being made into a future smart card system, similar to the PRESTO system in the GTA and Ottawa, or the EasyGO fare card utilized by Grand River Transit in Waterloo.

All regular Barrie Transit buses are fitted with bike racks that can carry at least two bicycles. This feature provides transit users with greater transportation options by allowing passengers to incorporate a bike trip on both ends of their transit trip.

---

## 3.2 GO TRANSIT

GO Transit, a division of Metrolinx, is a provincially owned and operated interregional transit system serving the Greater Golden Horseshoe Area with over 3,000 kilometers of rail and bus routes. It operates the largest commuter rail network in Canada, of which all seven lines feed into Toronto Union Station. The transit system owns over 80 locomotives, 750 double-decker passenger railcars, and over 500 buses, of which all are wheelchair accessible. The GO Transit system map is illustrated in Figure 3-6.

---

### 3.2.1 STATIONS

Barrie is currently served by two GO Rail stations along the Barrie Line. The first station, Barrie South GO, is located at the southern limit of the town in the northeast corner of Mapleview Drive East and Yonge Street. This station is well served by Barrie Transit, connecting to three local routes, with five bus bays available to accommodate these services. A single platform and single track is available for the Barrie Line service.

The second station within Barrie, Allandale Waterfront GO, acts as the terminus for the Barrie Line and is located in the center of Barrie and in the southeast corner of Lakeshore Drive and Bradford Street. This station is served by five Barrie Transit routes with six available bus bays. Like the Barrie South Station, a single platform and track serves the station, while a secondary track is available for freight services.

Both GO stations are wheelchair accessible; the platform is level with adjacent parking spaces, bus bays and existing pick-up drop-off locations.

The GO Transit Allandale yard provides train storage during the overnight hours, with trains laying over in preparation for the next day of service. The Allandale yard is located immediately southeast of Allandale Waterfront GO Station for operational access. Trains shuttle to Allandale Waterfront GO from the yard, reverse at Allandale Waterfront GO, and then operate southbound for their trip into Toronto.

---

### 3.2.2 TRAIN SERVICES

Currently, both stations are served by seven trains during the weekday a.m. and p.m. peak periods respectively, providing unidirectional direct rail service to and from Toronto Union Station. The trains make station stops in Bradford, East Gwillimbury, Newmarket, Aurora, Vaughan, and Toronto. The service hours for these trains range from approximately 5:18 a.m. to 7:18 a.m., and 3:40 p.m. to 7:40 p.m. Rail service consists of a mix of six-car to twelve-car double-decker trains hauled by up to two locomotives. Two-way hourly weekday rail service is available on the Barrie Line during off-peak hours terminating at Aurora Station, while bidirectional bus service carries passengers north to Barrie, from Aurora. Bus service is typically conducted by single decker coach buses; however, based on GO Transit's fleet replacement program, they are slowly being replaced by double-decker buses.

On weekends, three trains service both Allandale Waterfront and Barrie South GO station in the southbound direction only during the a.m. peak period, and the northbound direction during the p.m. peak period. Similar to the weekday off-peak service arrangement, trains serve Aurora Station hourly in both directions, supplemented by all-day coach bus service to Newmarket GO, Bradford GO and both Barrie stations.

---

### 3.2.3 BUS SERVICES

Metrolinx currently operates four bus routes servicing the Barrie Transit Terminal with different branches connecting to the East Gwillimbury GO Station, Newmarket GO Bus Terminal, and Aurora and Union GO Stations. The four routes are described as follows:

- **Route 68, 68B** – Weekday service heading southbound from the Barrie Transit Terminal operates between 4:09 a.m. and 9:55 p.m. alternating between the East Gwillimbury and Aurora GO Stations; while northbound service operates between 6:10 a.m. and 11:53 p.m. from East Gwillimbury and Aurora GO Stations to the Barrie Transit Terminal.
- 

## 3.3 GREYHOUND BUS LINE

Greyhound provides service between Barrie and Toronto. Greyhound operates four trips in the morning (5:15 a.m. – 10:30 a.m.) from Barrie to Toronto and four trips in the afternoon (3:15 p.m. – 5:15 p.m.) from Toronto to Barrie during the week. On weekends, there are two trips in each direction between 10 a.m. and 3 p.m.

---

## 3.4 HAMMOND TRANSPORTATION

Hammond Transportation operates the Barrie – Lakehead University link routes from/to the City of Barrie on the Toronto-Barrie-Orillia line. This route operates with three services on weekdays and no service on weekends or holidays. Service spans from 7:00 a.m. to 6:00 p.m. between Barrie and Lakehead University. One additional early trip (at 6:30 am) is also available from Orillia to Barrie.

---

## 3.5 LINX TRANSPORTATION

Simcoe County provided a conventional public transit system linking major urban hubs and local transit services in the County, also known as LINX. Currently, LINX operates one route serving Midland/Penetanguishene to Barrie, which was initiated on August 7, 2018. The following routes are anticipated to be added between 2019 and 2021:

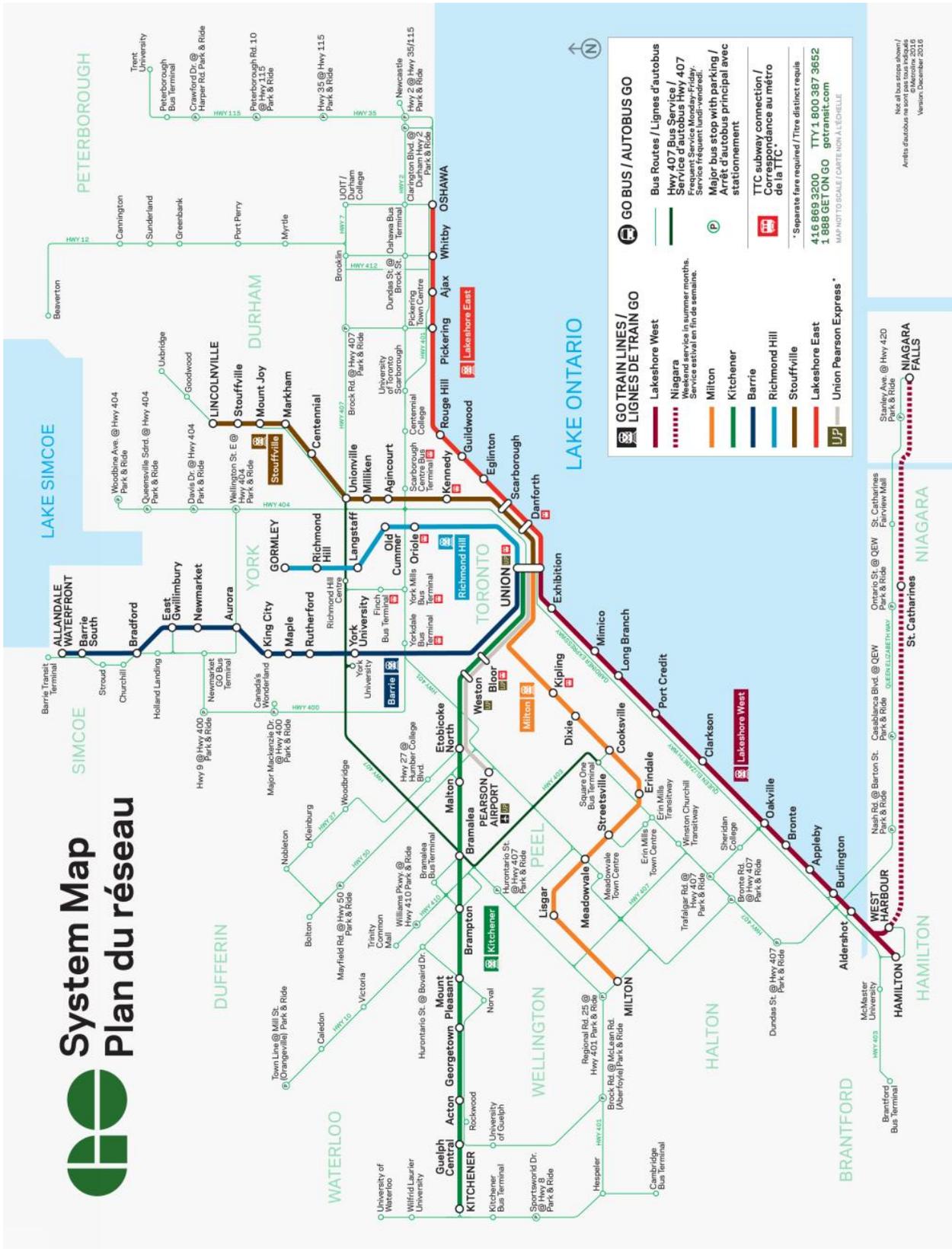
- Orillia to Barrie
- Collingwood to Barrie

- Alliston to Bradford West Gwillimbury
  - Midland to Orillia
- 

## 3.6 ONTARIO NORTHLAND

The Ontario Northland provides bus service connections between Toronto and North Bay, and Toronto and Sudbury; both routes travel via Barrie. Stops between Barrie and Toronto include Yorkdale and the Vaughan 407 Terminal. Several services are provided during the weekday and Sunday periods only.

# System Map Plan du réseau



Source: GO Transit System Map



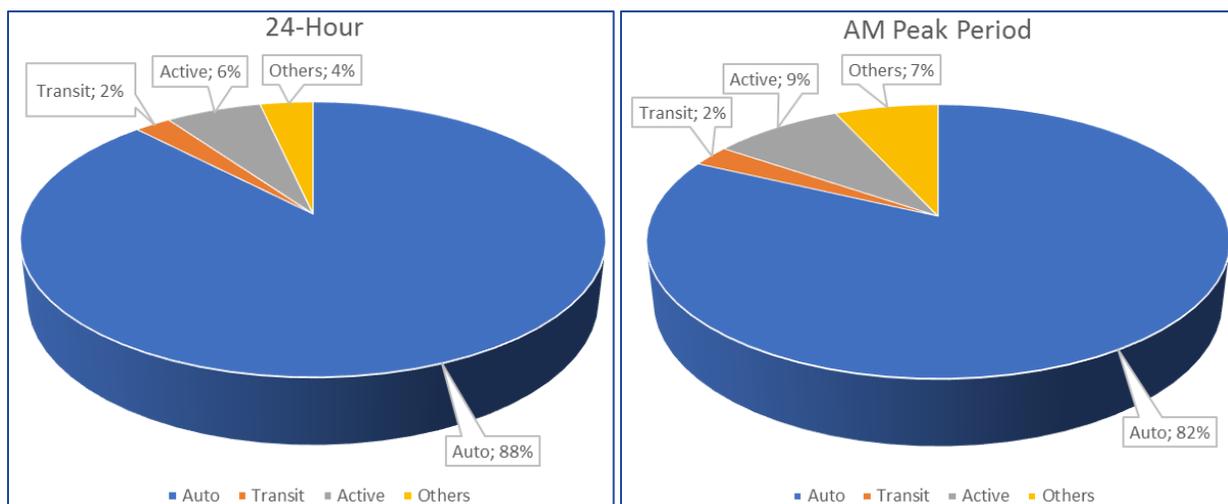
FIGURE 3-6  
GO Transit System Map (GO Transit, 2018)

### 3.7 CURRENT TRANSIT MODE SHARE

To understand travel to and from Barrie, travel behaviour data was obtained from the Transportation Tomorrow Survey (TTS), which is a comprehensive travel survey conducted in the Greater Toronto and Hamilton Area (GTHA) and Barrie every five years since 1986. The data collected during the survey is maintained in a database and utilized to make transportation planning and investment decisions within local, regional, and provincial governments and transit agencies, among others.

Based on the 2016 TTS data, majority of trips made into and out of Barrie are made via automobile (either as a driver or passenger), with two percent utilizing transit as illustrated in Figure 3-7. The figure illustrates the 24-hour and the morning peak period mode shares, both indicating a transit mode share of two percent.

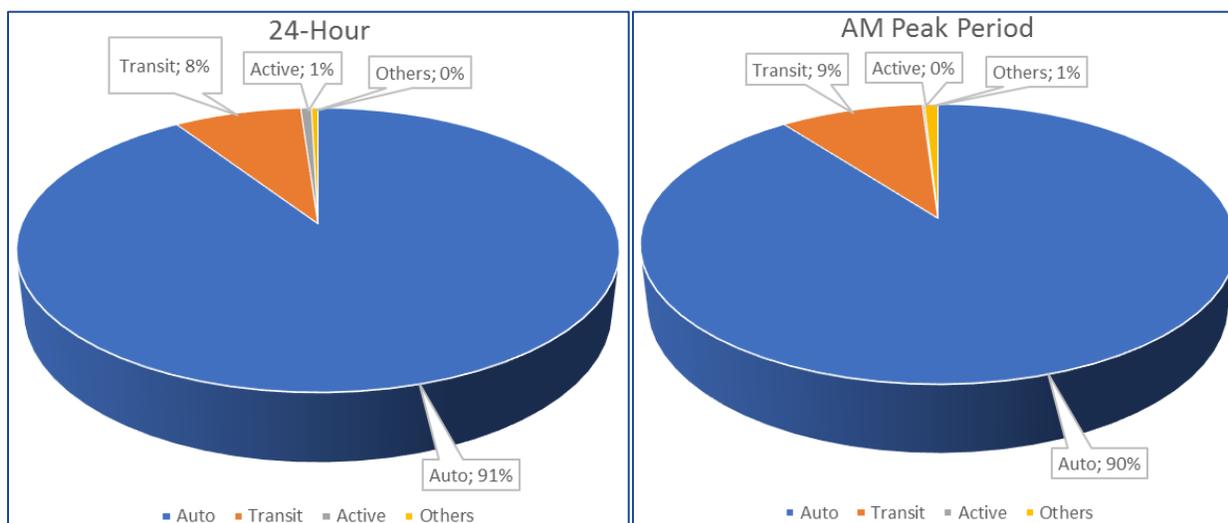
**Figure 3-7 Existing (2016) Mode Share of All Trips to or from Barrie**



Note: - 'Auto' includes auto-driver and auto-passenger trips  
 - 'Other' includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

While the overall transit mode share is two percent, approximately 10 percent of trips destined to York Region and Toronto are made via transit during the morning peak period, as illustrated in Figure 3-8. This can be attested to the connections provided by GO Transit services. While the City is working towards improving their transit services, commuting patterns still demonstrate a heavy reliance on auto trips for the daily commute.

**Figure 3-8 Existing (2016) Mode Share of York Region and Toronto Trips to or from Barrie**



Note: - 'Auto' includes auto-driver and auto-passenger trips  
 - 'Other' includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

# 4 FUTURE TRANSIT SERVICE DEVELOPMENT

The development of the future transit system accounted for various factors including the population and employment forecasts, future transit mode share targets, and the provision and enhancements of the conventional transit system under future conditions. Details of each factor and the impact to the development of the transit network is provided in this section. Additionally, the possibility of complementing the conventional Barrie Transit system with additional transit strategies such as ride-share integration in transit or on-demand transit services was explored and is also discussed in this section.

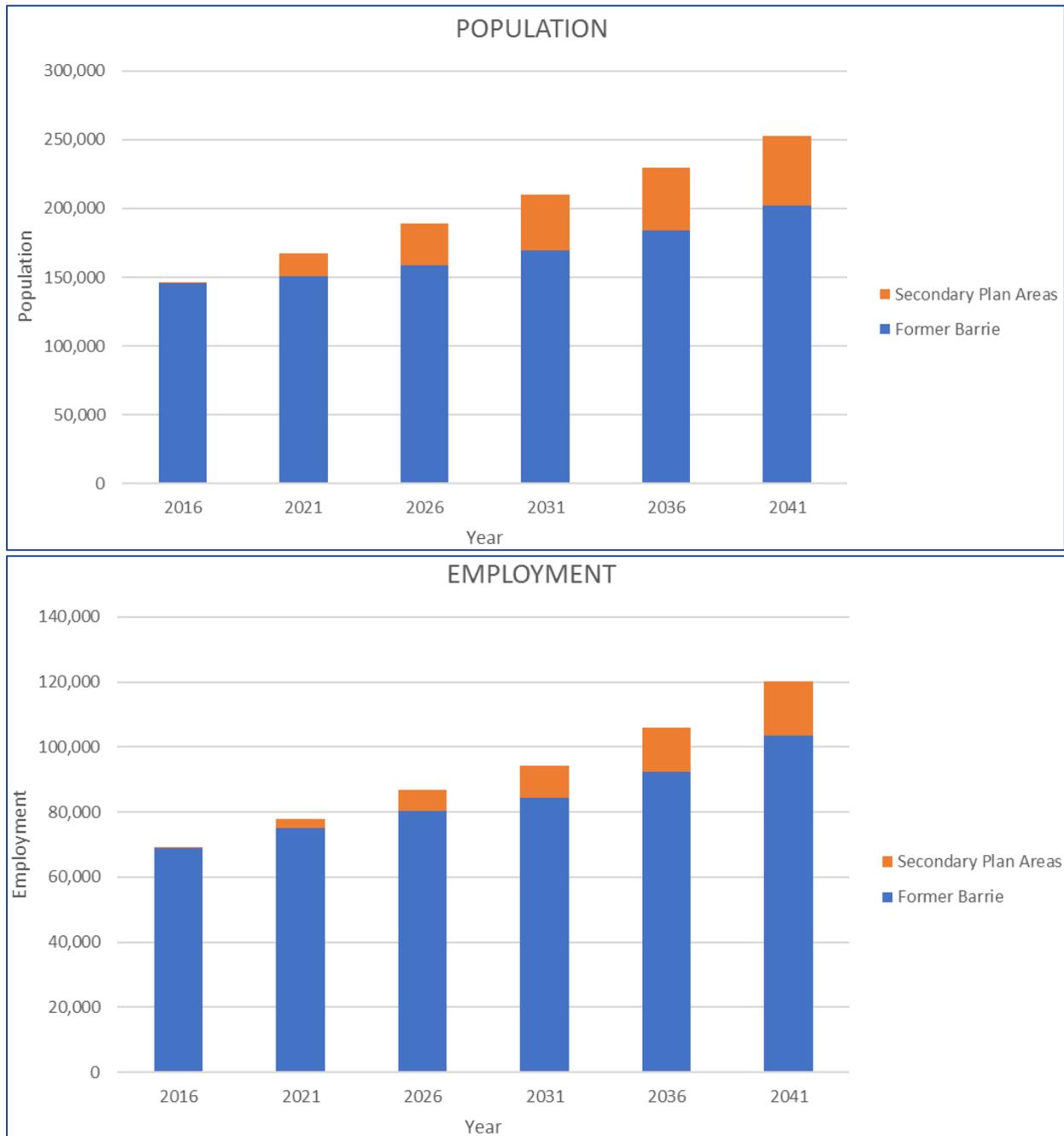
---

## 4.1 POPULATION AND EMPLOYMENT FORECASTS

The City of Barrie has experienced rapid development and expansion in the past 20 years with land uses generally segregated in different parts of the City. The commercial areas are mostly concentrated along Bayfield Street, portions of Yonge Street, and near the Dunlop Street and Mapleview Drive Interchanges. The industrial areas are mainly clustered near Highway 400 south of the Dunlop Street 400 Interchange. The rest of the City is mostly comprised of residential areas, most of which are single-family and low-density developments.

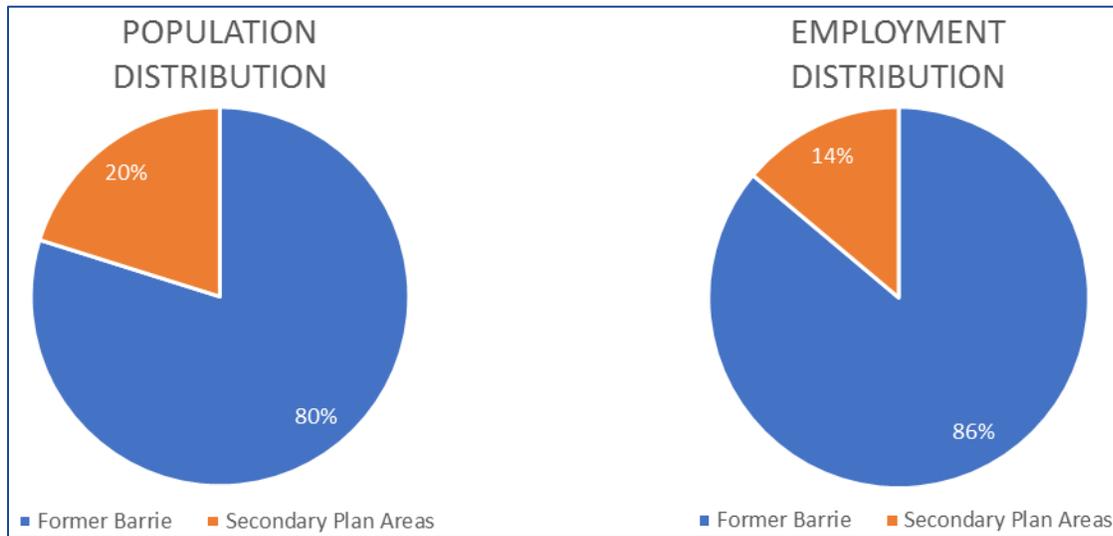
Based on the growth targets defined in the 2017 Growth Plan for the City of Barrie, Barrie's population is expected to grow from approximately 145,800 in 2016 to 253,000 by 2041. Employment is also projected to grow from 73,800 in 2016 to 129,000 jobs by 2041. Both population and employment would experience an approximate 75% growth from 2016 to 2041. The population and employment forecasts for Barrie from 2016 to 2041 are illustrated separately in Figure 4-1.

**Figure 4-1 Projected Population and Employment Growth between 2016 and 2041**



Despite the development of the Secondary Plan Areas accounting for a significant portion of future growth, former Barrie will account for most of the population and employment within Barrie, as illustrated in Figure 4-2. As such, ensuring that transportation interventions balance the needs of both the Secondary Plan Areas and the more densely populated areas in Barrie will be a key directive.

Figure 4-2 Barrie Population and Employment Distribution in 2041



## 4.2 FUTURE TRANSIT MODE SHARE TARGET

As discussed in Section 2.2, the 2014 MMATMP Alternative 3 – Medium Modal Share was selected as the preferred transportation network for the 2031 horizon year, with a transit mode share target of seven percent, which is in line with other similar municipalities as discussed in Section 2.2.

Considering the investment in transit services and infrastructure in the recent years, and the current travel mode share, the seven percent mode share target may not be achieved by horizon 2031. However, with the appropriate financial and human resources, and improvements, it is believed that this target will be achievable by 2041. As such, the seven percent mode share target will be maintained for the 2041 horizon year.

## 4.3 POTENTIAL TRANSIT INITIATIVES

The proposed increase in transit mode share translates to an increase from 9,625 current to 76,900 daily transit ridership (boardings) in 2041, after accounting for the population and employment growth. As such, achieving this increase of almost 70,000 daily boardings will require strategic planning and co-ordination of services and measures from multiple City departments, and partnerships with other agencies and stakeholders.

There are several transit initiatives that could be successfully implemented in Barrie to increase transit ridership, such as increasing bus frequencies, transit fare strategies, and special and express services. Considering an increase of almost 70,000 daily trips is required by 2041, implementing a single transit initiative alone will not be effective enough to achieve this ridership increase; the most effective approach to achieve the target transit mode share would be to implement a combination of the various transit initiatives.

Several potential target areas for additional or enhanced services were explored along with transit-specific initiatives to provide a more connected and user-friendly transit system, which will translate to an increase in ridership. Each target area or initiative explored is described in detail in Table 4-1. The table contains one combination of the various transit measures that could potentially be utilized. The daily ridership presented for each of the initiatives below is an estimate of the possible effectiveness should they be implemented independently; the actual ridership increase will be subject to the financial and human resources, and the combination of initiatives implemented by Barrie Transit.

The estimated increase in transit ridership associated with each initiative included in Table 4-1 is based on WSP's experience and industry best practices; the estimated impact is also illustrated in Figure 4-3. It should be noted that the calculations are based on the existing Barrie Transit daily ridership of 8,700 trips. Although GO transit trips within Barrie is included in the transit mode share, Metrolinx will be responsible for increasing GO transit ridership. As such, the GO transit ridership for 2041 included in Table 4-1 is for calculation of future transit mode share only.

Table 4-1 Potential Target Areas and Transit Initiatives

Transit Initiative	Daily Ridership Estimate	% of City-Wide Daily Future Ridership
<b><i>EXISTING BARRIE TRANSIT RIDERSHIP</i></b>	8,700	11%
<b><i>IMPROVE FREQUENCY AND ROUTING:</i></b> New hierarchical route system should facilitate links to popular destinations and decrease overall travel time, which incorporates walking access, waiting for boarding, riding on-board, and transfers. For maximum return, frequency improvements should align to peak and commuter periods. This measure is expected to have the biggest impact to transit usage, causing an approximate 400% increase of the existing Barrie Transit daily ridership (8,700) <sup>1</sup> .	35,000	46%
<b><i>PRIORITIZE THE SECONDARY PLAN AREAS:</i></b> New population and employment growth introduces new potential transit growth. The <b>Secondary Plan Areas</b> should be prioritized for new service and connection. These lands are geographically far from the major destinations located in the north, such as Downtown, Georgian College, and the commercial uses. To achieve this, new services should prioritize connections to significant landmarks such as Georgian College, Essa employment uses, and Downtown; thus, connecting north and south Barrie. <b>Based on the population and employment for the Secondary Plan Areas versus the rest of Barrie, approximately 17% of transit trips are expected to be from the Secondary Plan Areas<sup>1</sup>.</b> These trips are assumed to be internal trips, which do not include GO Transit trips. <b>Detailed calculations of this ridership estimate are provided in Appendix A-1.</b>	12,700	17%
<b><i>REGIONAL EXPRESS RAIL PROGRAM:</i></b> The RER Program forecasts a conservative increase of between 2,000 to 4,000 daily riders in 2031 at both Barrie GO stations combined <sup>2</sup> . The 2,500 trips are purely GO Transit trips, it does not estimate or include Barrie Transit bus trips to the GO stations. Barrie Transit services should be coordinated to match the GO train and bus schedules (GO Meet) to encourage transit usage to and from the GO stations.	2,500	3%
<b><i>U-PASS:</i></b> The analysis showed that transit to Georgian College is a notable origin and destination for transit trips. As such, convenient transit travel for college students should be facilitated through an affordable U-Pass distributed by education institutes. <b>Note: The U-Pass was implemented in September 2018 and has seen an increase in daily ridership by approximately 4,000 trips. It is expected that this will grow with increased registration.</b>	5,000 <sup>3</sup>	7%

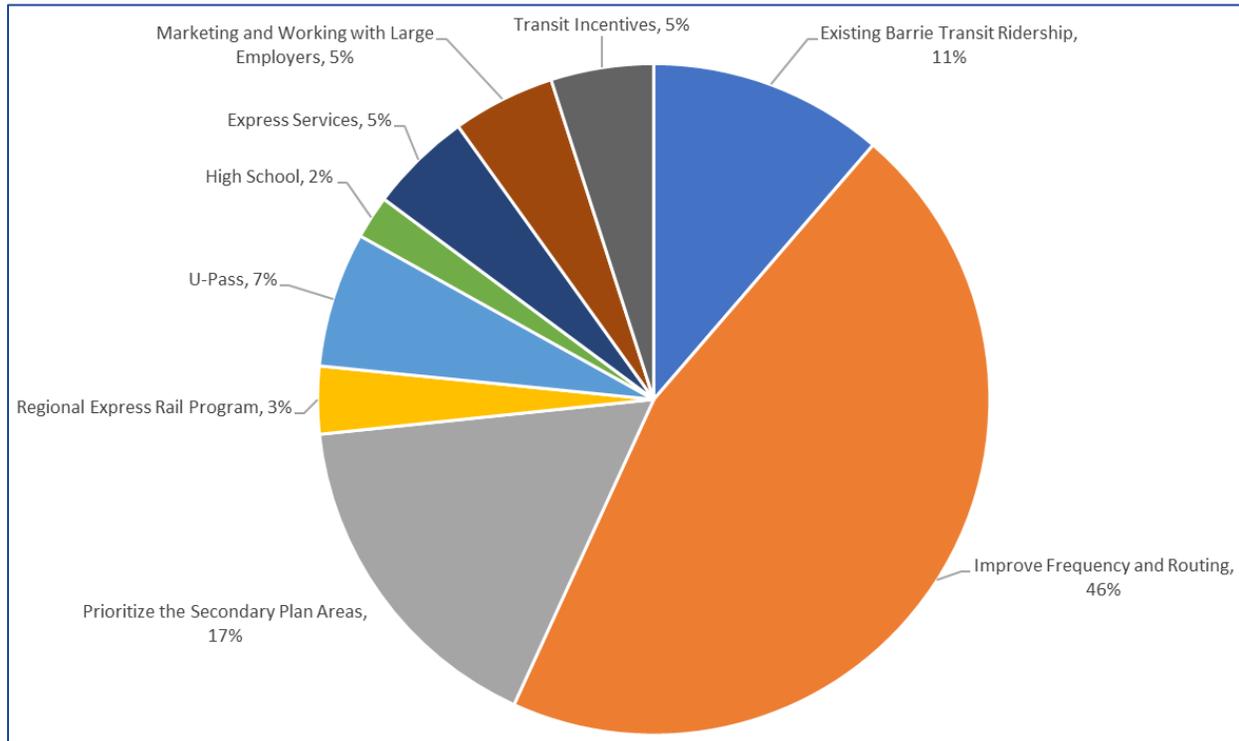
**Table 4 1 Potential Target Areas and Transit Initiatives (continued)**

<b>Transit Initiative</b>	<b>Ridership Impact</b>	<b>% of Future Ridership</b>
<b>HIGH SCHOOL:</b> Transit use by high school students is an additional sector that has potential to increase transit operations. Currently, 26% of high school trips are passenger drop-off (PDO) trips. Introducing direct trips to high schools and implementing an affordable U-Pass distributed by educational institutes is estimated to convert approximately half of the PDO trips to <b>transit trips</b> . <b>Detailed calculations of this ridership estimate are provided in Appendix A-1.</b>	1,600 <sup>4</sup>	2%
<b>EXPRESS SERVICES:</b> Providing new express routes to significant landmarks, such as between Barrie South GO Station to Georgian College, Downtown or new employment areas, is estimated to account for approximately five percent of the future transit ridership. This initiative would be in addition to the ‘Improve Frequency and Routing’ initiative.	3,800 <sup>1</sup>	5%
<b>MARKETING AND WORKING WITH LARGE EMPLOYERS:</b> The analysis indicates the peak transit ridership falls outside of the roadway peak. To encourage commuter transit trips in the roadway peak (morning and afternoon) Barrie Transit should work with large employers to provide transit incentives to employees such as discounted transit passes. Another example would be private express services for the Health Centre tailored towards the different shift schedules for staff. Providing these employer-specific incentives is estimated to account for approximately five percent of future transit ridership.	3,800 <sup>1</sup>	5%
<b>TRANSPORTATION DEMAND MANAGEMENT (TDM) AND POLICY CHANGES:</b> Implementing TDM measures that increase transit ridership could account for approximately 12% of future transit ridership. The TDM measures include, but are not limited to: <ul style="list-style-type: none"> <li>– Increasing parking fees to be higher than transit fares.</li> <li>– Discounted transit fare program in which businesses can participate.</li> <li>– New developments offering free transit passes as part of their TDM package, and reduce parking and/or charging for employee parking.</li> <li>– Reducing on-site parking supply for new developments and providing transit passes for non-auto owners.</li> <li>– Large developments providing shuttle services to connect to major transit hubs.</li> <li>– Providing auto share services in Barrie.</li> </ul>	3,800 <sup>1</sup>	5%
<b>TOTAL</b>	<b>76,900</b>	<b>100%</b>
<b>RESULTING MODE SHARE</b>	<b>7%</b>	

Notes:

1. Based on WSP experience and industry standards.
2. GO Rail Station Access Plan, dated December 12, 2016; pages 124 and 126.
3. Based on communications with City of Barrie Transit Staff.
4. Based on 2016 Census Data.

**Figure 4-3 Potential Target Areas and Transit Initiatives**



The calculations illustrated above show that improvements to frequency and routing will have the greatest impact on increased growth of transit mode share at 46%. Other significant contributors to increasing transit ridership include prioritizing the Secondary Plan Areas and U-Passes.

## 4.4 COMPLEMENTARY TRANSIT STRATEGIES

The private automobile provides the highest level of mobility, allowing users to drive to and from any destination of their choosing, while transit users must travel to a focal pick-up/drop-off point. This section discusses potential strategies that can be combined with a Fixed Route transit system to provide a higher level of service for transit users. These strategies will require further investigation on how effective it will be in this context and the best methodology to implement the services.

### 4.4.1 RIDE-SHARING INTEGRATION WITH TRANSIT (PRIVATE SERVICE MODEL)

The integration of Ride-Sharing in transit utilizes private vehicles, which are requested from a specific point of pick-up, to and from a transit hub for seamless transition between travel modes. Emulating already existing ride-share models such as Uber and Lyft, implementing ride-share to facilitate the first and last mile trips would attract ridership while reducing transit costs to the City by limiting the number of buses required to mirror the ride-share impact.

Ride-sharing transit programs have been successfully implemented in several municipalities such as Innisfil and Milton. In both situations, the user is charged the price of a transit ticket and the rest is subsidized by the Transit Agencies, depending on where they are travelling to. For Milton, the ride-sharing integration with transit is provided for the areas of low demand and the ride-sharing vehicle travels between the pick-up / drop-off location to a designated transit hub. Whereas Innisfil's transit system relies solely on the ride-sharing program and does not have a fixed route service to accommodate regular transit trips.

## BENEFITS AND COSTS

The benefit of implementing ride-sharing with a fixed route transit system is that areas of low demand can be serviced by transit at a lower cost to the Transit Agency, thus increasing transit access and coverage. However, utilizing private vehicles to transport transit users from one location to another will increase the number of vehicles on the road.

## RELEVANCE TO BARRIE TRANSIT

To provide a further refined ride-share strategy for a higher level of service, the City of Barrie could implement a ride-sharing program during off-peak periods to provide prioritized service to points of interest to and from transit terminals within Barrie. These key destinations could include educational institutions, industrial or commercial hubs and transit terminals, both local and regional. Once implemented successfully ride-share could potentially deliver higher express service during off-peak periods to encourage higher transit usage.

---

### *4.4.2 ON-DEMAND TRANSIT (PUBLIC SERVICE MODEL)*

Similar to ride-share integration with transit, on-demand transit is a form of alternative service delivery which achieves a high value for dollar while minimizing the number of trips with low passenger utilization. The transit vehicles, which range from taxis, vans to accessible transport vehicles, are dispatched by the control center to serve specific areas or stops when a rider calls in to complete a trip, and interfaces with other available nearby transit services. For example, York Region Transit (YRT) is a strong proponent of on-demand transit, as its service area is extremely large and consists of unevenly developed plots of land. On-demand transit would be used for more rural areas, where it is unfeasible to operate a fixed route transit service on a set schedule. YRT has a detailed flow chart to determine how to accommodate a rider using on-demand transit, such as slightly deviating a Mobility Plus vehicle (their accessible transit service) to accommodate a rider.

## BENEFITS AND COSTS

Implementation of on-demand transit would be advantageous at times where fixed routes experience a significant drop in ridership, such as during mid-day, evenings, or weekends. YRT has reported that although ridership has dropped since conversion of fixed route services to on-demand transit, cost efficiencies have been realized with operating costs reduced by up to almost one third of a fixed route.

## RELEVANCE TO BARRIE TRANSIT

Considering on-demand transit has the potential to reduce transit ridership, if Barrie Transit were interested in exploring this option, further study would be required to determine the most effective strategy to implement this service whilst maintaining or increasing transit ridership. Once again, this service would be in addition to the fixed route system that Barrie currently has.

# 5 BARRIE TRANSIT – FUTURE READY

Technology-driven increases in automation, connectivity and information sharing have enable more efficient use of resources in general, including transit services, making many aspects of our life easier and more convenient. From real-time tracking of transit service schedules, online multi-modal trip planners, integrating Uber or taxi services within a transit system, and contactless payment systems such as PRESTO, utilizing transit has become increasingly more effortless. In a data-driven world with an increasing emphasis on connectivity, technology improvements are consistently required to ensure safety and equity. The following sections will discuss some potential technological improvements that could be explored to ensure Barrie Transit is future ready.

---

## 5.1 CONTACTLESS PAYMENT

PRESTO is a contactless smart card fare payment system used by participating public transit systems in the province of Ontario, specifically in the Greater Toronto and Hamilton Area (GTHA), and Ottawa. It is an electronic payment system that offers faster transit fare payment and boarding time by eliminating the need for cash, tokens, tickets and passes. The PRESTO system was designed to be an integrated transit fare system providing one common method of fare payment for various participating public transit agencies.

### BENEFITS

The key benefits of implementing the PRESTO smart card fare system for both the customer and transit agency are:

#### Customer

- Always pay the lowest fare.
- Flexible fare policy options.
- Transfer to most other transit systems without any charge.
- Single method of payment acceptable in all participating municipalities.
- Protection of funds if card is lost or stolen.
- Multiple loading options to meet customers' needs.
- Future mobile application as well as open payment system means more convenient ways to pay transit fares.

#### Transit Service Agency

- Faster boarding times and improved service levels.
- Data to inform pricing, service planning, and operational decisions. The PRESTO system will allow Barrie Transit to:
  - Minimize Automated Passenger Counter (APC) data collection for ridership estimation.
  - Build origin-destination matrices that provide details on both direct and transferred connections.
  - Analyze transfer patterns and identify major transfer locations.
- Increased customer satisfaction with a modern smart card and future open payment system.
- Automated enforcement.

### COSTS

Based on a review of the agreements between Metrolinx and the various transit agencies, the following financial requirements were found to be common for several established agreements to initiate the PRESTO system:

- The initial costs to implement PRESTO was jointly-funded by the Ministry of Transportation, Ontario (MTO) and participating GTHA municipalities.
- MTO funded 100 percent of the initial capital costs and ongoing operating costs for the common central system required to operate PRESTO, and 33 percent of the initial capital cost for each transit system (on-bus and remote devices located in bus garages, terminals and bus stations).
- Transit agencies are responsible for the on-going operating costs of PRESTO on their systems.

The cost of installing PRESTO on a transit vehicle is dependent on the existing level of technology such as built-in Global Positioning System, wireless capability and data transfer systems to name a few; installation cost could range from \$2,000 to \$15,000 per bus. However, the implementation costs will be dependent on Barrie Transit technology, and discussions with MTO and Metrolinx.

Metrolinx bears the responsibility of providing the operation and maintenance of the common central system that manages all PRESTO card transactions and provides fare and customer data. Considering the financial investment, Metrolinx developed an Annual Commission Fee schedule for the duration of the agreement to recover the initial capital investment. The appropriate fee schedule would be determined based on discussions between Barrie Transit and Metrolinx, and would be expected to fall in the range of two to six percent of fare collection revenue.

#### FUNDING ASSISTANCE

In addition to the province of Ontario funding 100 percent of the PRESTO central system costs and one-third of the municipal costs, municipalities that contribute financially to public transit services or begin providing fully-accessible transit services are eligible for the Ontario Dedicated Gas Tax Funds for Public Transportation Program.

#### RELEVANCE TO BARRIE TRANSIT

Barrie Transit should investigate implementing a contactless payment method as part of the Metrolinx plan to integrate PRESTO payment system across the GTHA. Adopting this payment system will not only benefit the customer by always paying the lowest fare but also Barrie Transit with the wealth of data that can be collected by such a system. Dialogue with Metrolinx and MTO would also be required to determine the costs associate and the level of funding Barrie can receive to implement the payment system.

---

## 5.2 MOBILE PHONE PAYMENT

Mobile phone payments are becoming increasing more popular in the travel industry such as air travel and parking payment systems, but slowly entering the major metropolitan transit systems. As more transit agencies integrate mobile technology into their systems, mobile payments may eventually become the primary or preferred payment method. Barrie Transit should investigate mobile phone and PRESTO payment systems simultaneously, as they both have similar benefits but very contrasting costs.

#### BENEFITS AND COSTS

Mobile phone payment systems provide several benefits, such as reduced payment times and dwell time, as well as costs to transit agencies as tickets or cards would no longer be required. Passengers would be able to pay via a mobile application, either prior to entering the transit vehicle or while on the vehicle. Like PRESTO, utilizing mobile phone payment systems will allow Transit Agencies to collect substantial data, such as origin-destination and transfer information, and travel patterns for future transit investment decisions.

The costs associated with implementing mobile phone payment would be the installation of sensors or beacons on the bus fleet, cost of purchasing the associate application, and staff time in training employees and/or public information sessions to learn and understand the system.

---

## 5.3 INTEGRATION OF AUTOMATION

Autonomous vehicles (AV) or driverless vehicles are slowly becoming reality with the technology being deployed in test-beds around the world. While fully automated systems will be achieved in the future, there are certain levels of automation that can be utilized today to improve safety and operation of vehicles. There are five levels of automation:

- **Level One – Driver Assistance:** The driver controls all accelerating, braking, and monitoring of the surrounding environment. However, the vehicle can assist with some functions such as brake assist.
- **Level Two – Partial Automation:** The vehicle can assist with steering or acceleration functions but the driver must always be ready to take control of the vehicle and is still responsible for most safety-critical functions and all monitoring of the environment.

- **Level Three – Conditional Automation:** The vehicle controls all monitoring of the environment (using GPS, LIDAR and radar). While the driver’s attention is still critical at this level, they can disengage from “safety critical” functions like braking, which can be left to technology when conditions are safe.
- **Level Four – High Automation:** The vehicle is capable of all functions, including steering, braking, accelerating, monitoring the vehicle and roadway as well as responding to events, determining when to change lanes, turn, and use signals. At this level the driving system first notifies when conditions are safe and then the driver would switch the vehicle into this mode, as it is not able to determine between more dynamic driving conditions such as traffic jams or merging onto a highway.
- **Level Five – Complete Automation:** At this level, no human attention is required as the system is capable of all functions, and can monitor the environment and identify unique driving conditions like traffic jams.

As an initial step towards automation, certain aspects such as automated braking, lane keeping, adaptive cruise control, which all fall under Levels 1 and 2 of automation, can be explored to enhance safety and operations of the transit fleet.

---

## 5.4 MOBILITY AS A SERVICE

Mobility as a Service (MaaS) is a distribution model that integrates transportation services from both public and private providers into one mobile application, allowing travellers to plan and pay for their mobility needs through a single portal. The goal of MaaS is to be more attractive than auto ownership by providing a higher level of accessibility and choices, such as transit, taxi, bike share and car share.

The trend toward MaaS is motivated by the anticipation of self-driving cars, and its growth is expected to have a significant impact in reducing auto ownership. The draw to MaaS is further enhanced by the integration of multiple transportation modes into seamless trip chains, with payments managed collectively for all legs of the trip. The additional benefit of this system is the rich data gathered that can be utilized to assist travelers with more efficient journeys and make more informed decisions regarding infrastructure or system improvements.

---

## 5.5 FUTURE RAPID TRANSIT AND TRANSIT PRIORITY

There are many benefits of rapid transit within a City, most of all being the decrease in transit travel time which in turn increases the attractiveness of transit. Additionally, rapid transit also limits urban sprawl, protecting farmland and creating a more vibrant community by promoting intensification. There are several approaches to providing future rapid transit within Barrie, including:

- Utilizing future HOV lanes to provide bus rapid transit.
- Utilizing Highway 400 for express services.
- Utilizing the City’s railway as potential active transportation and / or transit corridors for inter-city travel.

Transit signal priority should also be considered in and around the Downtown Terminal and Allandale Station with connections to the HOV network.

# 6 PROPOSED 2041 TRANSIT NETWORK

As previously mentioned, the 2031 preferred transit network was utilized as a base to build upon for the 2041 horizon year. The changes in the City's development, including population and employment forecasts, and infrastructure, between 2031 and 2041 was analyzed to establish the evolution of the transit route network.

Between the 2031 and 2041, new industrial zones will be developed within the Secondary Plan Areas, specifically the lands enclosed between Lockhart Road and McKay Road, and Huronia Road and Highway 400. Considering these zones will account for approximately 5,250 jobs by 2041, this will provide a significant opportunity for new transit ridership. As such, the 2041 transit network will include service between the Salem and Park Place transit hubs to accommodate transit usage for these lands.

Additionally, an emphasis was put on the development of frequent routes along the major corridors based on the following transit service principles:

- 1 Core Frequency: 10-minute service
  - a Direct connection between significant landmarks (attractions)
- 2 Supporting Network: 20-minute service
  - a Connection to core routes and minimization of walking transit access (coverage)
- 3 Transfer
  - a Minimum transfers, only where required

These transit service principles focus on creating a hierarchical route network structure with core services along the major corridors, to be complimented with a supporting network to increase transit coverage and reduce walking distances. This strategy aims to minimize transfer rates and provide transit solutions for reasonable origin-destination links. The supporting network should ensure required walking access standards are met to maximize transit coverage within the City.

The 10 and 20-minute frequencies are recommended during the peak commuter periods (morning and afternoon), with longer frequencies during off-peak periods. Overall, the main purpose of implementing a hierarchical route network is to decrease overall travel time, which includes walking access, waiting for boarding, riding on-board, and transfers.

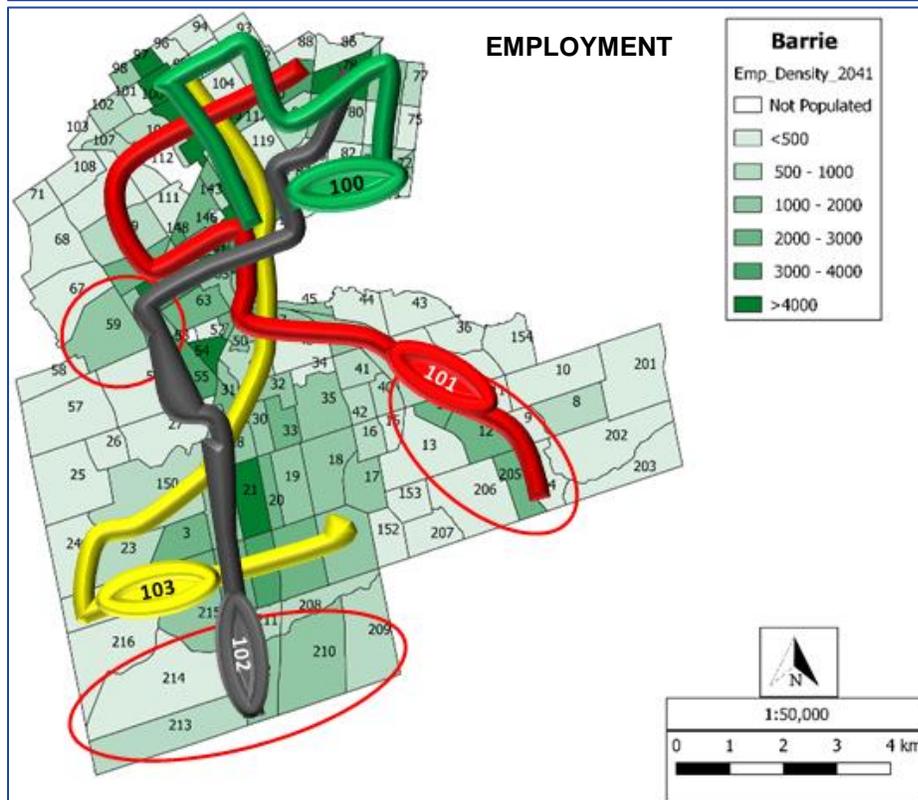
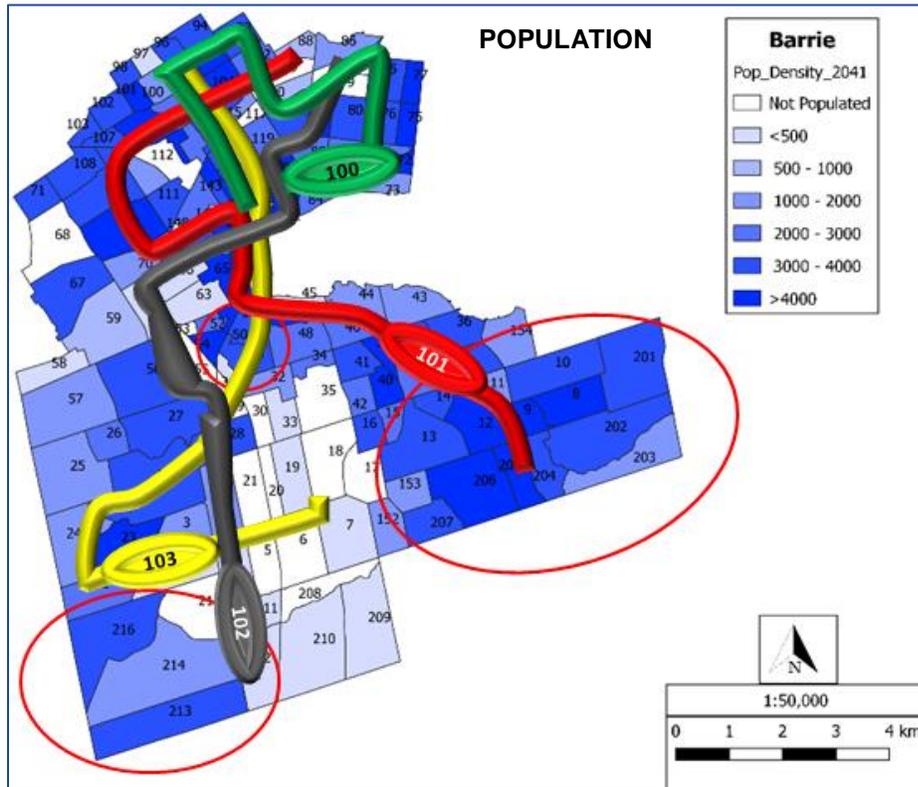
The corridors for the core routes were selected based on a combination of population and employment densities, and the recommended corridors for future high occupancy vehicle (HOV) lanes. The 2041 population and employment densities are illustrated in Figure 6-1.

As illustrated in Figure 6-1 below, the future population forecasts will be highly concentrated in the north, and southeast and west corners, and the Allandale and Downtown areas; the employment forecasts are more concentrated along the Highway 400 corridor. The following corridors will see high population and employment densities:

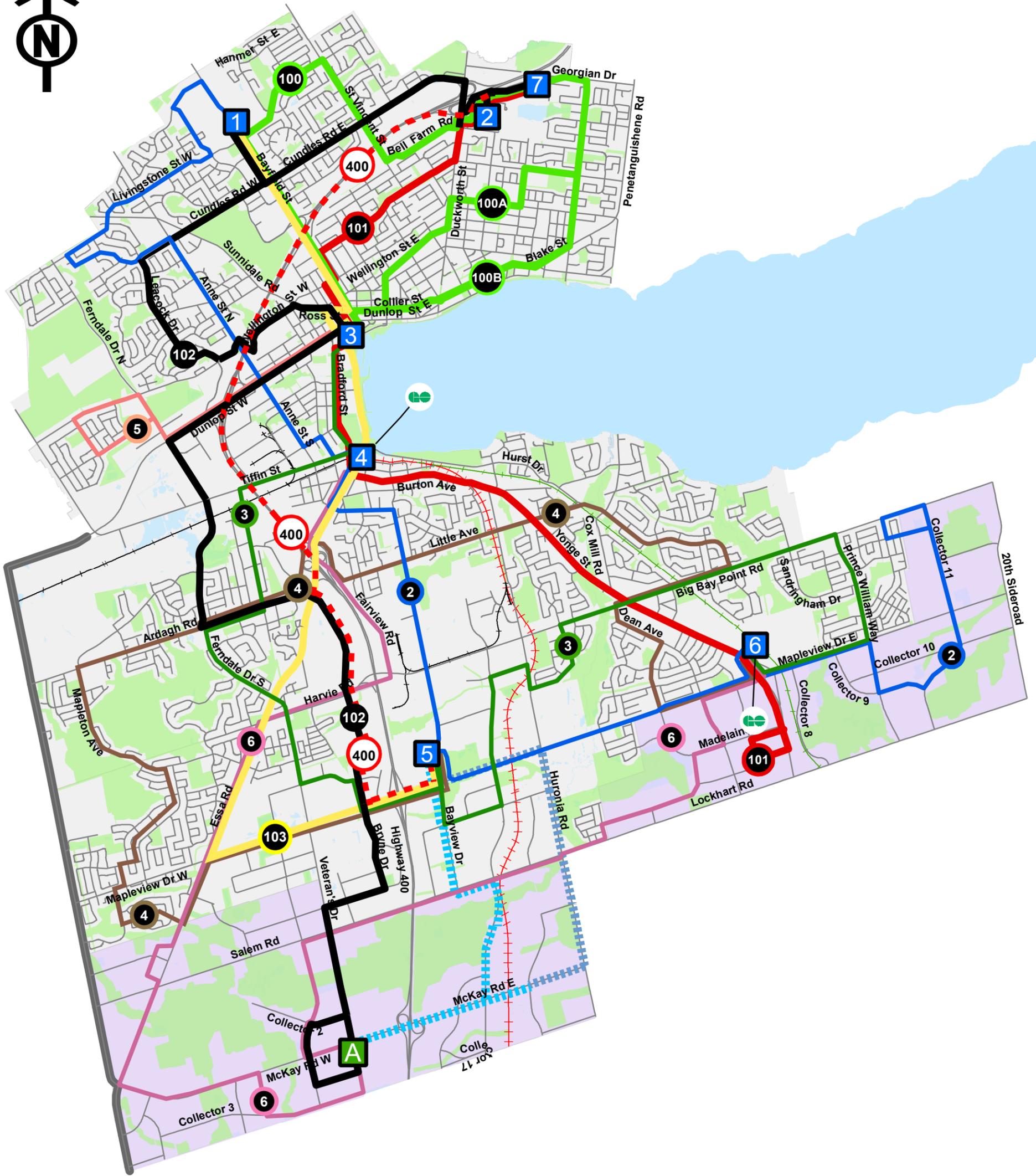
- Yonge Street;
- Essa Road;
- Bayfield Street;
- Mapleview Drive; and
- Big Bay Point Road.

Of the above listed corridors, HOV lanes were recommended along Yonge Street, Bayfield Street, Mapleview Drive, and Essa Road, which can be utilized by transit vehicles to reduce travel times. These core routes will be complemented with local supporting routes providing connections to the residential areas. The 2041 preferred transit network is illustrated in Figure 6-2 and includes the core network, denoted by the 100-series routes, and the supporting route network.

Figure 6-1 2041 Population and Employment Densities







**Transit Routes**

-  Core Routes
-  Support Routes
-  Business Service
-  Optional Business Service (2041)
-  Highway 400 Express Route

**Existing Transit Hub**

-  1 Georgian Mall
-  2 Georgian College
-  3 Downtown Terminal
-  4 Allandale/Waterfront GO Station
-  5 Park Place
-  6 Barrie South GO Station
-  7 Royal Victoria Hospital

**New Transit Hub**

-  A Salem Transit Hub

**Transportation Features**

-  BCRY Railway
-  GO Transit Railway
-  Protection for Active Transportation and / or Transit Corridor
-  GO Station

**Natural Features**

-  Park / Open Space
-  Water

**Other Features**

-  Secondary Plan Areas
-  Under Jurisdiction of Simcoe County

Data Sources: City of Barrie  
 Date Updated: Thursday, April 18, 2019  
 Project: 171-08853-00  
 Map Created By: WSP Thornhill

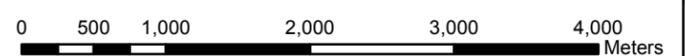


Figure 6-2  
 Proposed 2041 Transit Route Network Concept  
 City of Barrie Transportation Master Plan





---

## 6.1 CHANGES BETWEEN 2031 AND 2041 NETWORKS

While the preferred transportation network and transit mode share for the 2031 horizon year were utilized in the development of the 2041 transit network, several significant changes have been incorporated into the 2041 network, as noted below.

- 1 The main difference between the proposed 2031 Transit Network from the 2014 MMATMP and the proposed network for 2041 is the development of a Core and Supporting Transit System to include:
  - a Core Routes with 10-minute frequencies.
  - b Supporting Routes with 20-minute frequencies.
  - c Minimal transfers.
- 2 Implementation of Transit Priority using the proposed HOV lanes along the following corridors:
  - a Yonge Street.
  - b Bayfield Street.
  - c Essa Road.
  - d Mapleview Drive.
- 3 Service between the Salem and Park Place transit hubs to accommodate transit usage for the new industrial zones within the Secondary Plan Area.
- 4 Consider transit signal priority in and around the Downtown Terminal and Allandale Waterfront GO Station to connect to the proposed HOV lanes.

---

## 6.2 PHASING AND IMPLEMENTATION

The Core and Supporting Transit System is proposed as the final transit system for the 2041 horizon year. However, the implementation of the transit network should be phased to proactively respond to intensification and changing travel demands within the City of Barrie. The phased implementation of the transit network will have the following benefits:

- Allow for quicker implementation of the core route concept in the existing dense areas such as northeast Barrie;
- Staged implementation of the core route service in the Secondary Plan Areas as development is implemented, so the service is available to influence travel behaviour very early;
- Minimized disruption to transit users;
- Availability to further tweak the 2041 system map as more information becomes available;
- Gradually increase resources, such as bus fleet and transit staff, to support the core routes at high frequencies while still being able to start implementing a more reliable transit network for existing users;
- Annual reviews and monitoring will allow for changes in service, to better meet user demand; and
- More flexibility to adapt or respond to changes in technology that will affect the operations of the transit fleet and system or the surrounding environment in which they operate.

To influence change in travel behaviour and make transit a convenient and attractive alternative to auto travel, many of the proposed changes could be implemented in phases. However, to achieve the targeted 2041 mode share, significant changes from the existing network should occur by 2031.

The following items will be required for the successful implementation of the recommended Transit System:

- Technology improvements such as contactless payment methods and integration of automation in the transit fleet.
- Non-Peak Service either less frequent fixed routes or switching to either ride-share integration or on-demand transit.
- Coordination with Metrolinx and surrounding Regional Transit Agencies.

The capital cost of implementation including the number of buses and facilities required is discussed in the 'Roadway and Transit Costing Technical Memorandum' provided as Appendix H of the main Transportation Master Plan report.

# 7 SUMMARY

This Technical Memorandum included a detailed review of the history of Barrie Transit, assessment of the existing transit facilities and utilization, development of the future 2041 transit network and facilities, the proposed 2041 Transit Network and implementation, and the changes from the 2031 proposed network.

## BARRIE TRANSIT BACKGROUND

Prior to 2011, Barrie Transit consisted of 21 unidirectional radial routes that originated and terminated at the Downtown Terminal (formerly known as the Central Terminal), operating with headways of 30 minutes during the morning and afternoon peak periods, and 60 minutes after 7:00 p.m. throughout the week.

In 2011, after identifying several major issues with the transit system, Barrie initiated a study into revamping its transit system entitled '*Barrie Transit – Plan for Transit.*' The key components from this Plan were utilized to develop a service concept that included more direct and frequent services on key corridors, while reducing transit services from the existing downtown terminal. The service concept was a branch service, and focused on corridor routes complemented by modified feeder services to non-corridor areas. Additionally, the concept established the following six transit hubs in the north, central, and southern parts of the City:

- Barrie Downtown Terminal
- Georgian Mall
- Georgian College/Royal Victoria Hospital
- Holly Community Centre
- Park Place Shopping Centre
- Barrie South GO Station

This was utilized in the 2014 Multi-Modal Active Transportation Master Plan (MMATMP), which developed four levels of intervention with varying transit mode share targets for the 2031 horizon year, including:

- **Alternative 1** – Do Nothing: existing mode share.
- **Alternative 2** – Low/Existing Modal Share: existing mode share.
- **Alternative 3** – Medium Modal Share: 7% transit mode share.
- **Alternative 4** – High Modal Share: 12% transit mode share.

Alternative 3 was identified as the preferred option to increase the use of active transportation and transit by implementing the following strategies:

- Route extensions to better serve the Secondary Plan Areas.
- Increased service to GO Transit stations (supporting routes).
- Further increased transit route frequencies throughout Barrie.

The Recommended Transit Route Network Plan was implemented in 2014.

## EXISTING CONDITIONS

The City of Barrie is accessible by regional transit service, namely GO Transit, and a local network providing conventional and specialized transit services. The conventional service, Barrie Transit, is the municipally-owned local network currently operating 11 bi-directional fixed bus routes throughout Barrie and Borden. Barrie also provides specialized transit service for users with mobility restrictions.

### **Barrie Transit**

Barrie Transit currently operates the 11 bi-directional fixed bus routes with five transit hubs within the City. The current network also provides services to all GO Trains, including early morning departures. The transit system operates a fleet of approximately 48 conventional transit buses and has an estimated system ridership of approximately 2.7 million annual passenger trips.

The average weekday ridership on local transit is approximately 8,700 boardings, with an additional 925 boardings at the two GO stations for a total of 9,625 daily ridership. The daily peak transit ridership occurs during the midday period, between 1:00 p.m. and 4:00 p.m.

## **GO Transit**

Barrie is currently served by two GO Rail stations along the Barrie Line. The first station, Barrie South GO, is located at the southern limit of the town in the northeast corner of Mapleview Drive East and Yonge Street. The second station within Barrie, Allandale Waterfront GO, acts as the terminus for the Barrie Line and is in the center of Barrie and in the southeast corner of Lakeshore Drive and Bradford Street.

Currently, both stations are served by seven trains during the weekday morning (5:18 a.m. to 7:18 a.m.) and afternoon (3:40 p.m. to 7:40 p.m.) peak periods providing unidirectional direct rail service to (morning) and from (afternoon) Toronto Union Station. The trains make station stops in Bradford, East Gwillimbury, Newmarket, Aurora, Vaughan, and Toronto. Two-way hourly weekday rail service is available on the Barrie Line during off-peak hours terminating at Aurora Station, while bi-directional bus service carries passengers north to Barrie, from Aurora.

On weekends, three trains service both Allandale Waterfront and Barrie South GO station in the southbound direction only during the morning period, and the northbound direction during the afternoon peak period. Similar to the weekday off-peak service arrangement, trains serve Aurora Station hourly in both directions, supplemented by all-day coach bus service to Newmarket GO, Bradford GO and both Barrie stations.

Metrolinx currently operates one bus route servicing the Barrie Transit Terminal with different branches connecting to the East Gwillimbury GO Station, Newmarket GO Bus Terminal, and Aurora and Union GO Stations.

## **Current Transit Mode Share**

The transit mode share within Barrie is currently at two percent, based on the 2016 Transportation Tomorrow Survey, with most trips being made by auto-drivers at 78 percent. It should be noted that while the overall transit mode share is at two percent, approximately 10 percent of trips destined to York Region and Toronto are made via transit. This can be attested to the connections provided by GO Transit services. While the City is working towards improving their transit services, commuting patterns still demonstrate a heavy reliance on auto trips for the daily commute.

## **FUTURE TRANSIT DEVELOPMENT**

The development of the future transit system accounted for various factors including the population and employment forecasts, future transit mode share targets, and the provision and enhancements of the conventional transit system under future conditions.

## **Future Growth and Transit Mode Share Target**

Based on the growth targets defined in the 2017 Growth Plan for the City of Barrie, population is expected to grow from approximately 145,800 in 2016 to 253,000 by 2041, and employment from 73,800 in 2016 to 129,000 jobs by 2041. Considering the investment in transit services and infrastructure in the recent years, and the current travel mode share, a seven percent mode share target is set for the 2041 horizon year.

The proposed increase in transit mode share from the current two percent to seven percent in 2041 translates to an increase from 9,625 current to 76,900 daily transit ridership (boardings) in 2041, after accounting for the population and employment growth. Achieving this increase of almost 70,000 daily boardings will take strategic planning; the following potential target areas for additional or enhanced services were explored along with transit-specific initiatives to provide a more connected and user-friendly transit system in the future:

- Improved Frequency and Routing – Core and Supporting network.
- Prioritizing the New Growth / Secondary Plan Areas – new services and connections in this area should be prioritized.
- Regional Transit and GO Service – increasing Barrie Transit connections in line with the proposed GO Transit enhancements in the future.
- U-Pass – discounted transit passes for college students (the U-Pass was implemented in Barrie in September 2018).
- High School – introducing direct trips to high schools and implementing an affordable U-Pass.
- Express Services – providing express routes between significant attractions.
- Marketing and Working with Large Employers – increase of directed marketing and working with major employers to encourage transit usage.

- Transportation Demand Management and Policy Changes – implementing various TDM measures such as increasing parking fees to higher than transit fare, discounted transit fare, and reduced parking supply for new developments to increase transit ridership.

### **Complementary Transit Strategies**

The first and last mile prove to be a prevailing obstacle in attracting new riders to alternative travel options. Urban centers, such as Barrie, where densities are much lower and where the built environment lends itself to private automobile ownership, are having trouble in reaching transit mode share targets. The private automobile provides the highest level of mobility, allowing users to drive to and from any destination of their choosing, while transit users must travel to a focal pick-up/drop-off point. Potential solutions to the first and last mile issue are either integrating ride-sharing into transit or providing transit on-demand.

The integration of Ride-Sharing in transit utilizes private vehicles, which are requested from a specific point of pick-up, to and from a transit hub for seamless transition between travel modes. Implementing ride-share to facilitate the first and last mile trips would attract ridership while reducing transit costs to the City by limiting the number of buses required to mirror the ride-share impact. Ride-sharing transit programs have been successfully implemented in several municipalities such as Innisfil and Milton.

On-demand transit is a form of alternative service delivery which achieves a high value for dollar while minimizing the number of trips with low passenger utilization. The transit vehicles, which range from taxis, vans to accessible transport vehicles, are dispatched by the control center to serve specific areas or stops when a rider calls in to complete a trip, and interfaces with other available nearby transit services. On-demand transit would be used for more rural areas, where it is unfeasible to operate a fixed route transit service on a set schedule. For example, York Region Transit (YRT) is a strong proponent of on-demand transit, as its service area is extremely large and consists of unevenly developed plots of land.

### **BARRIE TRANSIT – FUTURE READY**

Technology-driven increases in automation, connectivity and information sharing have enable more efficient use of resources in general, including transit services, making many aspects of life easier and more convenient. From real-time tracking of transit service schedules, online multi-modal trip planners, integrating uber or taxi services within a transit system, and contactless payment systems such as PRESTO, utilizing transit has become increasingly more effortless. In a data-driven world with an increasing emphasis on connectivity, technology improvements are consistently required to ensure safety and equity. Implementing a contactless fare collection system such as PRESTO, Levels 1 and 2 of automation on the transit fleet, and mobility as a service (MaaS) mobile application are a few examples of technological improvements for consideration.

Future rapid transit should also be considered as it provides many benefits such as reduced travel times, limits urban sprawl, creates vibrant communities, and encourages intensification. Rapid transit can be provided by utilizing the future HOV lanes or Highway 400 for express services, or utilizing the City’s railway corridors as potential light rail transit for inter-city travel.

### **PROPOSED 2041 TRANSIT NETWORK**

The 2031 preferred transit network, from the 2014 MMATMP, was utilized as a base to build upon for the 2041 horizon year. The only change between 2031 and 2041 is a new industrial zone within the Secondary Plan Areas, specifically the lands enclosed between Lockhart Road and McKay Road, and Huronia Road and Highway 400. The 2041 transit network will include service between the Salem and Park Place transit hubs to accommodate transit usage for these lands.

Additionally, an emphasis was put on the development of frequent routes along the major corridors based on the following transit service principles:

- 1 Core Frequency: 10-minute service
  - a Direct connection between significant landmarks (attractions)
- 2 Supporting Network: 20-minute service
  - a Connection to core routes and minimization of walking transit access (coverage)
- 3 Transfer
  - a Minimum transfers, only where required

These transit service principles focus on creating a hierarchical route network structure with core services along the major corridors, to be complimented with a supporting network to increase transit coverage and reduce walking distances. The 10 and 20-minute frequencies are recommended during the peak commuter periods (morning and afternoon), with longer frequencies during off-peak periods; however, through annual reviews and monitoring, the City will be able to ascertain the frequencies and modifications required to meet demand.

In addition to the proposed Core and Support routes, transit signal priority should also be considered in and around the Downtown Terminal and Allandale Station with connections to the future HOV network.

#### IMPLEMENTATION

The Core and Supporting Transit System is proposed as the final transit system for the 2041 horizon year. However, the implementation of the transit network should be phased to pre-emptively respond to intensification and changing travel demands within the City of Barrie. The phased implementation of the transit network will have the following benefits:

- Allow for quicker implementation of the core route concept in the existing dense areas such as northeast Barrie;
- Delayed implementation of the core route concept in areas that require the density such as the Secondary Plan Areas;
- Minimized disruption to transit users;
- Availability to further tweak the 2041 system map as more information becomes available; and
- Gradually increase resources, such as bus fleet and transit staff, to support the core routes at high frequencies while still being able to start implementing a more reliable transit network for existing users.

To influence change in travel behaviour and make transit a convenient and attractive alternative to auto travel, many of the proposed changes must evolve in a phased and planned manner, which includes changes from 2019 continuously to 2041. As such, by 2031, significant changes should occur over existing conditions to achieve the change in mode share.



# APPENDIX

## ***A-1*** DETAILED FUTURE TRANSIT RIDERSHIP CALCULATIONS

# APPENDIX

# Daily Transit Ridership from the Secondary Plan Areas

## Step 1: Two-Way Auto Trips for the 2041 AM Peak Hour

To calculate the number of transit passengers from the ‘Prioritize the Secondary Plan Areas’, the existing and forecasted peak hour total auto trips data was sourced from the EMME Model, refer to Appendix E of the main Transportation Master Plan report. This allowed the total future peak hour auto trips to be calculated for the City under future 2041 AM peak hour conditions to be **94,936**.

Location	2016		2041	
	AM	PM	AM	PM
Former City of Barrie	55,238	64,103	78,786	91,336
Secondary Plan Areas	296	49	16,150	17,077
<b>Sub-total for City</b>	<b>55,534</b>	<b>64,152</b>	<b>94,936</b>	<b>108,413</b>
<b>Growth (%) for City</b>	Base Year		<b>71%</b>	<b>69%</b>

## Step 2: Two-Way Total and Transit Trips for the 2041 AM Peak Hour

With the target of auto trips representing approximately 72% of all trips in Barrie under future 2041 conditions, the total number of trips during the AM peak hour was calculated to be **131,856**. From this value and the future mode share targets, the AM peak hour trips for each mode was calculated. Thus, the total number of transit trips during the future horizon AM peak to be calculated to be **9,230**.

### Future 2041 Mode Share Targets:

Mode Shares of All Trips		
Mode	24-Hour Future	AM Peak Future
Auto	78%	72%
Transit	7%	7%
Active	12%	14%
Others	3%	7%
<b>Total</b>	<b>100%</b>	<b>100%</b>

### Future 2041 AM Peak Hour Trips by Mode:

Travel Mode	Percentage	AM Peak Hour Total
Auto	72%	94,936
Transit	7%	9,230
Active	14%	18,460
Other	7%	9,230
<b>Total</b>	<b>100%</b>	<b>131,856</b>

### Step 3: 2041 AM Peak Hour Transit Trips from the Secondary Plan Areas

From forecasted population and employment data, it was calculated that the Secondary Plan Areas represent approximately 17% of the total population and employment for the City. With this percentage, the future horizon AM peak trips in the Secondary Plan Areas for each mode were calculated, with the transit trips equating to **1,483**.

#### Population and Employment:

	Population					Employment				
	Former Barrie		Secondary Plan Areas		Total	Former Barrie		Secondary Plan Areas		Total
2016	145,500	100.0%	300	100.0%	145,800	100.0%	1	100.0%	69,001	100.0%
2021	150,400	103.4%	17,200	5733.3%	167,600	115.0%	2700	270000.0%	77,900	112.9%
2026	158,400	108.9%	30,800	10266.7%	189,200	129.8%	6500	650000.0%	86,900	125.9%
2031	169,400	116.4%	40,600	13533.3%	210,000	144.0%	10000	1000000.0%	94,200	136.5%
2036	184,200	126.6%	45,400	15133.3%	229,600	157.5%	13500	1350000.0%	105,800	153.3%
2041	202,000	138.8%	51,000	17000.0%	253,000	173.5%	16700	1670000.0%	120,200	174.2%

	Pop	Emp	Avg
2016	0.21%	0.00%	0.10%
2021	10.26%	3.47%	6.86%
2026	16.28%	7.48%	11.88%
2031	19.33%	10.62%	14.97%
2036	19.77%	12.76%	16.27%
2041	20.16%	13.89%	17.03%

#### 2041 AM Peak Hour Transit Trips from the Secondary Plan Areas:

Travel Mode	Percentage	AM Peak Hour Total	Secondary Plan Areas (~17%)
Auto	72%	94,936	16,164
Transit	7%	9,369	1,571
Active	14%	18,770	3,143
Other	7%	9,017	1,571
<b>Total</b>	<b>100%</b>	<b>132,091</b>	<b>22,449</b>

## Step 4: Relationship between AM Peak Hour and Daily Trips based on 2016 Transit Data

Currently approximately 6% of the daily transit trips occur during the AM peak hour, as calculated below.

		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
		4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00	
		5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0:00	1:00	
Line	Boarding	8276	10	135	446	483	451	487	505	525	591	676	749	702	698	554	362	239	225	228	134	72	3
	Alighting	7908	9	138	427	497	445	477	499	484	571	626	678	658	638	526	353	238	208	216	140	74	6
1	Trips	68		3	4	4	4	4	4	4	4	4	4	4	4	4	3	2	4	2	2		
	Board	1016		9.8	17.1	14.4	11.4	13.9	14.9	16.3	18.9	20.9	22.8	21.5	20.7	15.2	10.6	11.0	9.3	8.0	6.2	8.4	
	Alight	986		9.9	16.7	14.1	11.6	13.6	14.2	15.2	17.0	20.8	20.3	20.9	20.4	14.9	11.2	10.4	9.0	8.8	5.6	8.9	
2	Trips	60		4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2				
	Board	371		5.8	7.4	5.9	5.9	4.1	5.6	5.8	6.2	6.0	8.5	8.3	7.2	5.2	4.4	4.6	5.8	6.8			
	Alight	371		7.0	7.0	6.2	5.1	4.9	5.3	6.3	6.4	5.2	8.5	8.1	7.3	4.5	4.9	5.2	5.6	6.6			
3	Trips	60		4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2				
	Board	1222		19.5	16.5	18.3	20.0	19.7	20.8	23.7	24.6	30.2	27.6	22.0	16.0	15.5	16.4	18.8	16.4	10.5			
	Alight	1226		19.3	16.6	18.2	19.4	19.2	20.6	22.3	24.1	28.6	27.3	23.3	17.3	14.8	19.6	18.4	19.1	13.4			

Relationship of AM Peak Hour to Daily Ridership		
7:00-8:00	8:00-9:00	Avg
0.06	0.05	<b>0.06</b>

## Step 5: Calculation of Daily Transit Trips from the Secondary Plan Areas

With the target to double the percentage of peak hour trips versus daily trips, a 12% relationship was assumed for future 2041 calculations to determine a daily ridership of **76,900** trips. The estimated 2,500 GO Transit trips were deducted from the total ridership to avoid double-counting.

It was assumed the transit ridership in the Secondary Plan Areas will be approximately 17% of the entire city ridership (relationship of population and employment forecasts), the daily transit ridership in the Secondary Plan Areas is determined to be **12,700**, as shown below.

Relationship of Peak Hour to Daily Ridership	0.12
Daily Transit Ridership (including future 2,500 GO Transit trips)	<b>76,900</b>
Daily Transit Ridership (without GO Transit Trips)	<b>74,416</b>
Percentage of Secondary Plan Areas from Entire City	17.03%
Daily Transit Ridership - Secondary Plan Areas Component	<b>12,700</b>

It should be noted that while the daily ridership accounts for boardings, which typically counts a trip with a transfer as 2 boardings, the calculation above did not account for transfers; accounting for transfers would increase the daily ridership. As such, the results presented are conservative.

# Daily Transit Ridership from High School

## Step 1: 2016 High School Population

To calculate the number of transit passengers for 'High-school', census data for the City of Barrie from 2016 was sourced from Statistics Canada to determine that the number of individuals aged 15 to 19 (assumed high school population) years is **13,155**.

**Census Profile, 2016 Census**  
 Barrie [Census metropolitan area], Ontario and Ontario [Province]

Select a view: Population

Characteristic	Barrie Ontario [Census metropolitan area]			Ontario [Province]		
	<input type="button" value="Data quality"/> <input type="button" value="Map"/>			<input type="button" value="Data quality"/> <input type="button" value="Map"/>		
	<input type="button" value="Change geography"/>			<input type="button" value="Change geography"/>		
	Total	Male	Female	Total	Male	Female
<b>Population and dwellings</b>						
Population, 2016 <sup>1</sup>	197,059	...	...	13,448,494	...	...
Population, 2011 <sup>1</sup>	187,013	...	...	12,851,821	...	...
Population percentage change, 2011 to 2016	5.4	...	...	4.6	...	...
Total private dwellings <sup>2</sup>	76,336	...	...	5,598,391	...	...
Private dwellings occupied by usual residents <sup>3</sup>	72,534	...	...	5,169,174	...	...
Population density per square kilometre	219.4	...	...	14.8	...	...
Land area in square kilometres	898.02	...	...	908,699.33	...	...
<b>Age characteristics</b>						
Total - Age groups and average age of the population - 100% data <sup>4</sup>	197,055	96,470	100,590	13,448,495	6,559,390	6,889,105
0 to 14 years	35,280	18,060	17,220	2,207,970	1,131,615	1,076,350
0 to 4 years	10,640	5,485	5,160	697,360	357,300	340,055
5 to 9 years	12,105	6,195	5,910	756,085	387,320	368,765
10 to 14 years	12,535	6,380	6,150	754,530	387,000	367,530
15 to 64 years	133,615	65,995	67,620	8,988,865	4,412,115	4,576,750
<b>15 to 19 years</b>	<b>13,155</b>	6,670	6,485	811,670	416,730	394,945
20 to 24 years	13,285	6,930	6,355	894,390	457,815	436,570

## Step 2: 2016 TTS Mode Share for High School Trips in Barrie

Data was then obtained from the 2016 Transportation Tomorrow Survey, to determine that the share of individuals aged 15 to 19 who utilize get dropped off to or picked up from high school is approximately **27%**.

Tue Jan 22 2019 15:41:25 GMT-0500 (Eastern Standard Time) - Run Time: 1660ms								
Cross Tabulation Query Form - Trip - 2016 v1.1								
Row: Age of person – age								
Column: Primary travel mode of trip - mode_prime								
Filters:								
Regional municipality of household - region_hhld In 16, and								
Age of person - age In 15-19, and								
Trip purpose - trip_purp In 2, and								
Start time of trip - start_time In 0600-0900								
Trip 2016								
Age	Transit excluding GO Rail	Cycle	Auto Driver	Joint GO Rail and Local Transit	Auto Passenger	School Bus	Walk	Total
15	0	0	0	0	446	946	660	2052
16	29	26	128	0	605	756	172	1716
17	43	0	206	0	546	526	520	1841
18	0	0	49	7	54	84	118	312
19	0	0	144	0	0	0	85	229
Total	<b>72</b>	<b>26</b>	<b>527</b>	<b>7</b>	<b>1651</b>	<b>2312</b>	<b>1555</b>	<b>6150</b>
Percentage	1%	0%	9%	0%	<b>27%</b>	38%	25%	100%

The auto passenger trips are the ones most likely to be converted into transit trips. As such, a conservative assumption that half of trips, **or 12%** of all students, would switch to using transit to get to school if direct services were provided and an affordable U-pass was distributed, resulting in 12% of the 13,155 if no increase in registration by 2041 to get **1,600** high school trips.