



Final Report

Belleville Transit Operational Review

Belleville, Ontario
June 14, 2023





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1 Introduction

1.1 Belleville Transit Operational Review

The City of Belleville (the City) is undertaking an Operational Review of Belleville Transit. The purpose of the study is to develop a service and operations plan that will meet the near-term future needs of Belleville.

The Project Scope of Work identified the main objectives of the Operational Review:

1. Engage external and internal stakeholders to inform recommendations that will be part of the final report.
2. Identify opportunities for improved service coverage and operational efficiency.
3. Recommend improvements for a more legible and predictable transit network structure and service plan.
4. Recommend stop polices and standards that strike a balance between efficiency and access.
5. Identify fleet needs to support recommended service and network improvements and which are focused on a near-term fleet transition to Zero Emission Buses (ZEB).
6. Make fare structure, pricing, and payment recommendations that consider revenue and equity implications.
7. Recommend changes in staff levels and organizational structure that can better position the system to grow.
8. Deliver a final report that synthesizes findings and recommendations that will be submitted for City review and comment.

The Study process includes an overview of the City of Belleville and Belleville Transit, and a series of technical memorandums (see Appendices A to H) which develop an understanding of the Belleville Transit and recommendations.

1.2 Community Background

The City of Belleville is located on the north shore of the Bay of Quinte and had a population of 55,071 in 2021. Belleville has a geographic area of 247 km² and is divided into Ward 1, which includes the city centre and most of the urban area of Belleville, and Ward 2 which is primarily rural. The average household size is 2.3 people per household and the median age is 45.2. The largest visible minority population are the South Asian, making up 28.51% of the total visible minority population. A 23.6% of the population is over 64 years of age.

There are approximately 100,000 people working in Belleville. The largest employment sector is commercial (37%) followed by industrial (23%). Manufacturing, transportation, and warehousing were some of the fastest growing employment sectors within industrial uses from 2011 to 2016 and continue to be major components of economic activity. Major shopping destinations include Walmart and Quinte Mall, and other main

destinations are Loyalist College, Downtown, Jamieson Bone industrial area, the Front and College area, the Sydney and Bridge area and Bayview Mall.

There are four hospitals in the region, including Belleville General Hospital, which is the largest and operates as the main Centre for healthcare in the region. Belleville has public and privately funded elementary and secondary schools as well as specialty schools.

Loyalist College is the main post-secondary institute.

1.3 Existing Transit System

The current Belleville Transit bus route network is made up of ten fixed daytime routes and two evening routes, plus late evening, and Sunday early morning on-demand service. Eight of the ten regular fixed routes operate as a one-way loop, providing most corridors with service in only one direction. In some cases, there are overlapping routes that serve the opposite direction. Routes 3 and 10 are the only routes that mostly service the same corridor in both directions.

North Front Street, the main central north-south corridor, is served by Route 4 northbound and Routes 5 and 8 southbound. Sidney Street, the north-south corridor on the west side of the City, is serviced only by Route 5 northbound. Route 7 connects Loyalist College with the Downtown Terminal, and Route 10 connects Loyalist College with Quinte Mall. Route 3 connects the Jamieson Bone industrial area with both the Downtown Terminal and Quinte Mall. Route 9 which served the south end of Ward 2 was cancelled in March 2023.

Most of Belleville Transit’s regular fixed routes (Routes 1 to 10) operate at a 30- to 60-minute headway from about 6:00 am to 10:00 pm on weekdays and until about 7:00 pm on weekends. Routes 31 and 101 offer service in the evenings after the hours of the regular daytime routes. Table 1 shows the details of the service levels and operating hours of each route and Figure 1 shows the current system map.

Table 1: Headway and Span of Belleville Transit Bus Routes on Weekdays, Saturdays, and Sundays

Route	Weekday			Saturday			Sunday		
	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip
1	30	6:30	18:00	60	8:00	18:00	60	9:30	17:30
2	30/60	5:00	22:00	30	7:30	19:00	60	9:00	18:00
3	30	5:30	21:00	30/60	6:00	18:00	60	8:30	17:30
4	30/45	6:15	21:15	45	7:15	18:30	45	8:45	17:45
5	30	5:00	21:30	60	5:30	18:30	60	9:00	18:00
6	30/45	6:30	18:00	60	8:00	18:00	60	9:00	18:00
7	30/60	6:30	22:00	60	7:00	19:00	60	9:30	17:30
8	30-60	6:30	21:30	30	7:30	18:30	60	9:30	17:30
9	45	6:30	20:45	45	7:30	17:45	45	9:00	18:00

Route	Weekday			Saturday			Sunday		
	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip
10	60	7:30	21:30	60	8:30	18:30	60	9:30	17:30
31	30	22:00	24:00	30	19:30	24:00	60	19:00	24:00
101	30	22:15	24:15	30	19:45	24:15	30	19:15	24:15

Figure 1: Belleville Transit System Map



In addition to the fixed-route network, an on-demand service operates in the evening when fixed route service does not operate. Three vehicles operate on weekdays between 9:30 pm to 12:00 am and Saturdays between 7:00 pm and 12:00 am. Two

vehicles operate on Sunday evenings from 6:30 pm to 12:00 am. An on-demand trip can be booked at www.btletsgo.ca or through the “On Demand Transit – Rider App” or by email or phone Monday to Friday from 8:30 am to 4:00 pm. A trip can be booked between any two of the regular bus stops.

Belleville transit also offers a door-to-door paratransit service called the Mobility Bus. Passengers must apply to be eligible to use the Mobility Bus Service. The paratransit service is not within the scope of this review.

2 Findings

This section includes a compilation of the primary findings based on research, analysis, and engagement conducted throughout the project.

2.1 Transit Planning Philosophy

The **Transit Planning Philosophy Memo** presents a fundamental rationale for the provision of public transit and established best practice in bus route network design. See **Appendix A: Transit Planning Philosophy**.

Recommendation:

It is recommended that Belleville Transit follow the best practice in bus route network design as a template for the future planning and operation of Belleville Transit.

2.2 Transit Service Guidelines

The **Transit Service Guidelines Memo** provides *System Performance Indicators* which may be used to monitor overall transit system performance, and *Service Guidelines* which are used to manage the design and operation of the transit system. See **Appendix B: Transit Service Guidelines**.

The System Performance Indicators include metrics for Service Provided, Service Utilization and Financial Performance. Whereas the Service Guidelines include metrics on Service Coverage, Span of Service, Minimum Frequency, Vehicle Capacity, On Time Performance, and New Service Implementation.

It is also recommended that Belleville consider Operations / Maintenance Performance Measures which would include Missed Trips, Mean Distance Between On-Road Failures, Vehicle Accident Rates, and Passenger Accident Rates.

Recommendation:

It is recommended that Belleville Transit adopt the following *System Performance Indicators*.

Service Provided:	Hours of Operation Per Capita = 1.25
Service Utilization:	Passengers Per Operating Hour = 20 Trips Per Capita = 25
Financial Performance:	Revenue to Cost Ratio = 35%

It is recommended that Belleville Transit adopt the following *Service Guidelines*.

Service Coverage

- 90% of urban area residents and jobs are within a maximum walking distance of 500 metres of a bus stop

Span of Service

- Weekdays: 0600 to 2330
- Saturdays: 0600 to 2330
- Sundays: 0700 to 2230

Minimum Frequency

- Weekday Residential (0630 to 1830): 30 minutes
- Weekday Residential Evenings (1830 to 2330): 60 minutes
- Weekday Industrial (Peak): 30 minutes
- Weekday Industrial (Off-Peak): 60 minutes
- Saturday: 60 minutes
- Sunday: 60 minutes

Vehicle Capacity

- Maximum vehicle capacity equal to 150% of seated capacity

Route Performance

- Passenger Boardings Per Vehicle Operating Hour: 30

On Time Performance

- All trips should depart timepoints from 0 to -3 minutes from scheduled departure time
- No trips should leave a timepoint early

2.3 Peer System Comparison

The **Peer System Comparison Memo** provides an understanding of how much transit service is provided to the community; how the service is utilized or consumed by the community; and the transit system's financial performance.

The overview of the industry-accepted performance indicators serves as a benchmark of reasonable expectations and helps identify areas for improvement.

The peer review compares Belleville Transit with five transit systems of similar size throughout Canada with a primary focus on transit agencies in Ontario. As well, the

review provides the average of data for 35 Canadian transit systems with service area populations under 50,000 and 29 Canadian transit systems with service area populations between 50,000 and 150,000 populations. See **Appendix C: Peer Comparison**.

2.4 Engagement Findings

To help identify transit customer, non-customer, employer, and transit operator perceptions regarding Belleville Transit, several engagement initiatives were undertaken.

- An online survey was conducted from December 14, 2022, to February 6, 2023, and received 840 responses.
- Two Pop-Up events were hosted on February 9, 2023, at Loyalist College and the Downtown Terminal. Seventy-three people engaged with transit representatives at the Pop-Up events.
- An Employer and Northeast Industrial Park online survey was sent to employers to solicit input on employee needs and commuting patterns. Over 130 responses were received.
- A focus group discussion with Belleville Transit operators was conducted which provided input from front-line staff on the route network, schedule issues, bus stops and on demand service.

The key engagement findings and main issues are as follows:

- Most survey respondents would prefer a quicker, more direct service.
- About one half of the respondents said the directness of current transit service is not satisfactory.
- There were multiple comments regarding circuitous routes and long travel times.
- There were significant concerns with schedule adherence and missed transfers.
- About two thirds of the respondents requested more frequent service.
- Significant concerns were noted with routing, span of service, frequency, and capacity of service to Loyalist College.
- Three quarters of the respondents were not satisfied with the hours of service on the weekend.
- The respondents were evenly split regarding satisfaction with the weekday hours of operation.
- There was general satisfaction with the current fare levels.
- Most employers responded that transit service does not impact their business operations or their ability to hire employees.
- Multiple comments noted concern with the loss of Route 9.
- About two thirds of the respondents indicated they require a transfer to complete their journey; and waiting for or missing the transfer is a concern.

- There were comments regarding bus stop spacing, stop locations, requirements for shelters and sidewalk connections.
- There were concerns noted with the accessibility of service information.
- There were concerns with the functionality of the on-demand service.
- There were concerns noted regarding service connections to areas outside of Belleville (service to Trenton).

2.5 Growth Patterns and Transit-Oriented Community Review

The current and future community development was reviewed to gain an understanding of how the existing Belleville transit network will need to be restructured to provide efficient and accessible transit service to the residents. In addition, this memo makes recommendations on policies and guidelines needed to ensure that, as new development is planned, transit use is encouraged by transit friendly land use and development policies. See **Appendix D: Growth Patterns and Transit-Oriented Community Review**.

2.5.1 Forecasted Growth

Belleville is a rapidly growing city, with growth forecasts showing an increase of 8% - 12% in population over the next five years and 13% - 19% total growth over ten years. To plan for the forecasted growth in population and housing, the City's Official Plan identifies Special Policy Areas to which additional policies and guidelines apply and in which growth will be focused:

- City Centre
- Loyalist Secondary Plan Area
- Bayshore Planning Area
- Cannifton Planning Area
- Corbyville Village Planning Area

2.5.2 Commercial and Industrial Land Uses

The largest employment sector in Belleville is commercial (37%) followed by industrial (23%). Four areas of major commercial activity outside of the City Centre are also identified:

- Bell Boulevard Corridor
- North Front/Highway 62 Corridor
- Bayview Mall/Dundas Street East Corridor
- Dundas Street West Corridor

2.5.3 Transit-Supportive Policies

Aside from redesigning the transit network as the City expands, Belleville can also support sustainable growth with policies and guidelines for transit-supportive development and corridors. Focusing growth and development of jobs and housing along corridors already served by transit will not only improve access but support transit operations and foster a greater share of non-private-auto trips. This document provides policies and guidelines to support transit-supportive growth. The policy summary is noted below:

- Encourage development that is contiguous to the current urban development and transit service.
- Promote more compact, mixed-use type of residential, commercial, and office development uses along the transit network and within transit-supportive corridors.
- Update the zoning code to include mixed-use, transit-supportive development.
- The community form and road network should be developed in a linear form that is conducive to efficient transit routes.
- The City should have a walkable public realm. The community walking network should encourage access to and along the transit route(s), or in other words encourage a high “Walk Score.”
- Define and identify transit supportive development and corridors.
- Prioritize multimodal development along identified transit supportive corridors.

2.6 Existing Service Coverage Analysis

This memo reviews community development patterns, major transit trip generators, population distribution, demographics, and income as related to the existing transit service coverage. See **Appendix E: Existing Service Coverage Analysis**.

2.7 Route Network Analysis

The Route Network Analysis memo reviews the route structure, service levels, passenger activity and operational performance of the current system. See **Appendix F: Route Network Analysis**. These findings were used along with other background study components and customer feedback to develop future transit route and service recommendations.

The findings show that Belleville has a hub-and-loop style bus network, with many trips requiring the passenger to travel through the Downtown Terminal or Quinte Mall to transfer to another route. These two locations see significant passenger boardings due to transfers and being major destinations. Most routes have only a few stops or route segments with a reasonable level of stop activity with very little stop activity for the rest of the route. Ridership peaks during the 15:00 hour on weekdays, Saturdays, and Sundays.

2.8 Bus Stop Analysis

The Bus Stop Analysis memo reviews current bus stop locations and configurations, bus stop planning best practice, and makes recommendations on improvements to bus stop placement and infrastructure. See **Appendix G: Bus Stop Analysis**.

The memo findings show that the location and infrastructure at many bus stops do not meet transit industry best practice. There is an inconsistent assignment of stop locations (far-side, near-side, mid-block), provision of customer waiting pads and stop signage locations.

Recommendations:

Following implementation of the new Service Plan, Belleville Transit should review the spacing, placement and design of all bus stops as input into an ongoing bus stop refurbishment capital program.

2.9 Fare Strategy

The Fare Strategy memo reviews Belleville Transit fares as compared to several peer agencies. Fare policies should seek a balance between recovering current operational costs and developing service improvements, while also ensuring a reasonable and equitable price for transit. The review of Belleville Transit fares noted that the cash fare is priced like other peer agencies; however, the pass price is significantly below peer agencies. See **Appendix H: Fare Strategy**.

There were three fare scenarios developed for consideration: existing fare categories (with fare increases per category over the next five years); flat fare (a simplified scenario that has one price point for everyone); and discounted concession fare. Based on a review of fare models, it is recommended that Belleville Transit adopt an Adult / Concession Fare Model. The Adult / Concession Fare Model includes a concession fare, or a discounted fare for mobile tickets and passes offered to children, students, and seniors, and the same cash fare for all riders. Table 2 shows the recommended Adult and Concession fares over the next five years.

Table 2: Adult/Concession Fare Model

	Adult			Concession Fare *		
	Cash	Mobile Ticket	Pass	Cash	Mobile Ticket	Pass
2023 (Current)	\$3.00	\$2.75	\$65.00	\$3.00	\$2.25 / \$2.50	\$65.00
2024	\$3.00	\$3.00	\$70.00	\$3.00	\$2.75	\$65.00
2025	\$3.25	\$3.25	\$75.00	\$3.25	\$3.00	\$70.00
2026	\$3.25	\$3.25	\$80.00	\$3.25	\$3.00	\$75.00
2027	\$3.50	\$3.50	\$85.00	\$3.50	\$3.25	\$80.00
2028	\$3.50	\$3.50	\$90.00	\$3.50	\$3.25	\$85.00

* Concession fare – Child, Student and Senior

U-Pass

Although there have been differing opinions on the implementation of a U-Pass program for Loyalist College, the program would be of significant benefit to both Belleville Transit and Loyalist students. It is recommended that Belleville Transit continue to pursue the initiation of a U-Pass Program with Loyalist College that would be both fair to Belleville Transit and Loyalist students and meet the requirements of the Ontario Ministry of Colleges and Universities Policy.

Recommendation:

It is recommended that Belleville Transit implement an Adult/Concession Fare Model with regular annual fare increase as noted in Table 2.

2.10 Fleet Plan

The new Belleville Transit Service Plan identifies a need for 15 in-service buses during peak periods. Belleville Transit currently has 18 vehicles, which would leave three spare buses for a spare ratio of 20%. However, given the age of the vehicles and the difficulty maintaining the fleet, it is likely that a maximum of 13 buses may be used at any time. Therefore, additional buses are required to be able to operate the recommended Service Plan.

The Battery Electric Bus (BEB) Transition Plan which is a parallel separate project will identify a roadmap for Belleville Transit to convert the existing petroleum fueled transit fleet to 100% zero emission by 2050. The Fleet Transition Plan is being developed in conjunction with the Metrolinx Transit Procurement Initiative and will identify the feasible transition pathway(s), associated capital and operating costs, service impacts, and, ultimately, the preferred transition pathway. This Fleet Transition Plan meets the federal requirements for the Zero Emission Transit Fund (ZETF). See **Appendix I: Fleet Plan**.

Belleville's transit fleet replacement plan is shown in Table 3. The existing transit fleet includes 18 full-size, 40' Nova Low Floor diesel buses. The buses are maintained and stored at the 400 Coleman Street facility.

Table 3: Belleville Transit's Fleet Replacement Plan

Make	Model	Purchase Year	Scheduled Retirement Year
Nova	LFS	2005	2024
Nova	LFS	2006	2024
Nova	LFS	2008	2024
Nova	LFS	2008	2024
Nova	LFS	2010	2025
Nova	LFS	2010	2025
Nova	LFS	2010	2025
Nova	LFS	2010	2025
Nova	LFS	2010	2025

Make	Model	Purchase Year	Scheduled Retirement Year
Nova	LFS	2011	2026
Nova	LFS	2013	2028
Nova	LFS	2013	2028
Nova	LFS	2014	2029
Nova	LFS	2021	2033
Nova	LFS	2021	2033
Nova	LFS	2021	2033
Nova	LFS	2021	2033
Nova	LFS	2021	2033

Recommendation:

In addition to Belleville Transit's Fleet Replacement Plan outlined in Table 3, it is recommended that Belleville Transit's fleet be increased to 20 buses by purchasing two new buses as soon as possible.

2.11 Organizational Structure Review

The transit operator is the most visible member of the transit service delivery team; however, there are many other human resources required to plan, promote, operate, and maintain a transit system.

The staffing of a transit system may entirely, within one or more municipal departments or components, be contracted out.

A typical transit system requires staffing or contracts to provide the following services:

Human Resources: Recruit and hire, benefits and compensation, training and development, performance management.

Service Planning: Service performance guidelines, route, and bus stop planning, frequency, and span of service.

Service Design: Vehicle schedules (public timetable), vehicle blocks / vehicle assignments, operator runs, rostering (weekly run packages), board period / sign-up.

Infrastructure / Facilities: Bus stop / sign / shelter cleaning and maintenance / component rebuild.

Fleet: Cleaning, servicing / preventative maintenance, major maintenance / component rebuild.

Technology: Acquisition and management of cell phones, radios, fare boxes, GPS, APC, fare app, etc.

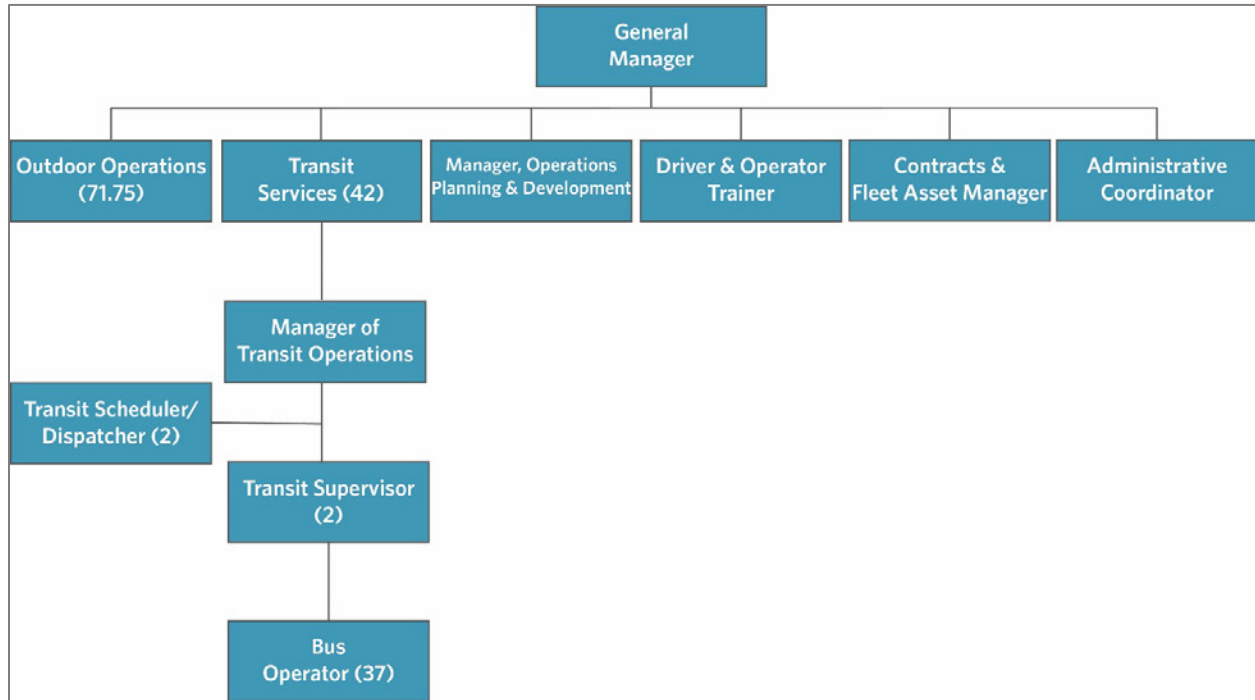
Marketing and Communication Services: Marketing strategy, promotion / advertising, public and customer communications (web, print, media, call centre, etc.).

Fare system: Farebox dumping, cash management, fare app.

Financial System: Accounting, payroll.

Belleville’s current transit organization is composed of 43 positions; a Manager of Transit Operations, two Transit Scheduler / Dispatcher positions, one Customer Service Representative, two Transit Supervisors and 37 Transit Operators. The Transit staff reside within the Transportation & Operations Department.

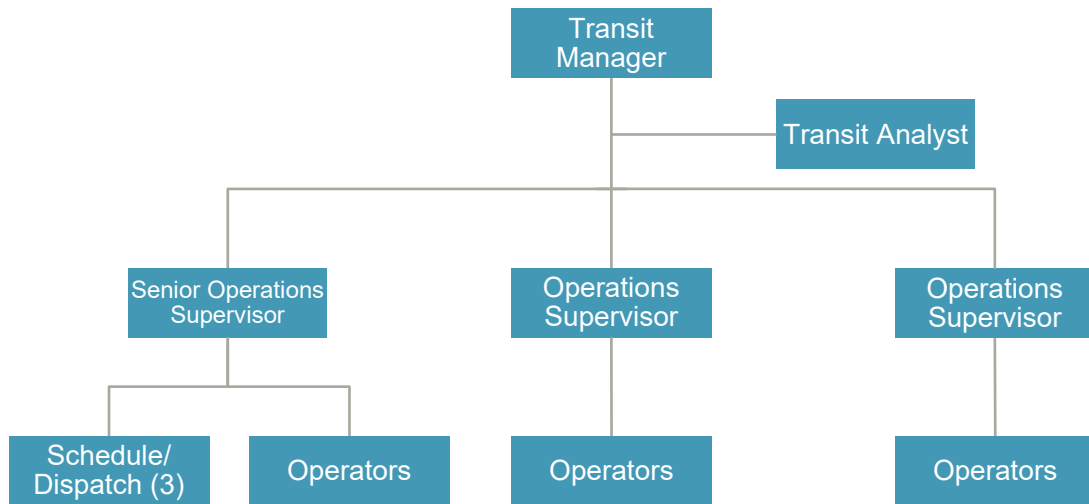
Figure 2: Belleville Transit Organization – Current Structure



The current Belleville Transit organizational structure is focused on the Service Planning, Service Design and Service Delivery components. The balance of the other required organizational components is provided by resources within Transportation & Operations, Human Resources, Finance & Taxation, and Corporate Services.

To better understand the efficacy of the current Belleville Transit organization and staffing levels, the organization charts of 11 peer transit organizations were reviewed. The systems reviewed included Airdrie, Brandon, Brantford, Codiac, Grande Prairie, Saint John, St. Catharines, Thunder Bay, Cornwall, Sarnia, and Kingston.

The shortcomings identified with the current Belleville transit organization are the capacity to analyze transit data and develop service recommendations, field supervision of transit operations, and bus maintenance. With the redesign of transit routes and engaging a schedule consultant, a transit analyst position is critical to achieving the benefits of a new service plan. An additional field supervisor is also required to ensure service quality. As well, in consideration of the age of the current fleet and the ongoing bus maintenance challenges, an additional bus mechanic should be added to ensure the peak bus commitment can be delivered. Figure 3 illustrates the recommended organization of Belleville Transit.

Figure 3: Belleville Transit Organization – Recommended

It is recognized that staffing all the required technical capabilities within a small transit system may be cost prohibitive at this time and need to be phased in. Further, there may be a synergy found with initially having with another City of Belleville fleet mechanic looking after both transit issues as well as Fire Department's Fleet. However, ultimately as the transit fleet grows an additional transit mechanic will be required by Belleville Transit to ensure the service commitments can be met.

As well, it may be prudent to explore amalgamating several smaller local systems to achieve synergy in critical staffing areas to increase regional transit capabilities to serve the greater Bay of Quinte Region, and South Hastings.

Recommendation:

It is recommended that a Transit Analyst and Fleet Mechanic positions be added to the Transit organization with the implementation of the new service plan and schedules. An additional Transit Supervisor should be added in 2024 or earlier.

2.12 Service Plan

The project developed two proposed bus networks for Belleville Transit. These proposals have the following key features:

- Eight fixed two-way routes, including one bi-directional loop
- 15-minute weekday peak and Saturday afternoon headways along the North Front Street corridor
- A late evening "Night" trip instead of late evening On-Demand service
- Eight buses per hour operating between the Downtown Terminal and Loyalist College during the peak period, including an express route during the peak and midday periods
- Additional run time added to routes where there are currently schedule adherence issues
- Total fleet requirement of 18 buses, with 15 in peak service and three spare buses.

- 66,222 annual revenue service hours.

In 2022 Belleville Transit operated 69,129 revenue service hours. This proposal requires 66,222 annual revenue service hours, leaving some buffer for Belleville Transit to add service where needed based on emerging priorities.

Recommendation:

It is recommended that Route Network Option 2 be implemented.

2.12.1 Addressing Existing Concerns

Service to Loyalist College

Currently, one route connects the Downtown Terminal and Loyalist College. The route operates at a 30-minute headway with extra trips running on the same schedule on weekdays to cover overflow passengers. There is also an express service operating at a 25-minute headway on weekdays. Currently there are a combined six trips per hour between the Downtown Terminal and Loyalist College.

The proposed network would provide eight trips per hour during the peak periods between the Downtown Terminal and Loyalist College. This includes three trips on Route 3 along Moira Street, two trips on Route 3 Express along Moira Street, and three trips on Route 4 along Dundas Street. This provides an average headway of 7.5 minutes for service connecting the Downtown Terminal to Loyalist College during the peak period.

Schedule Adherence

Currently, many routes experience schedule adherence issues due to their scheduled trip times not matching actual run times. Additional run time has been provided to ensure buses will adhere to the schedule, minimizing delays and missed connections for passengers.

Late Evening Service

The service proposal removes the current late evening and Sunday morning On-Demand service. Instead, the service plan provides a 23:45 final “clean-up” or “Night” trip, stopping at Walmart, Quinte Mall, the Jamieson Bone Industrial Area, Downtown, and Loyalist College.

2.12.2 Network Proposal

The service plan provides two Route 7 options with service on either Cannifton Road or Prince of Wales Drive, with the Prince of Wales Drive option providing additional coverage between North Front Street and the River. All routes connect to the Downtown Terminal, two routes connect to Loyalist College, and three routes connect to Quinte Mall.

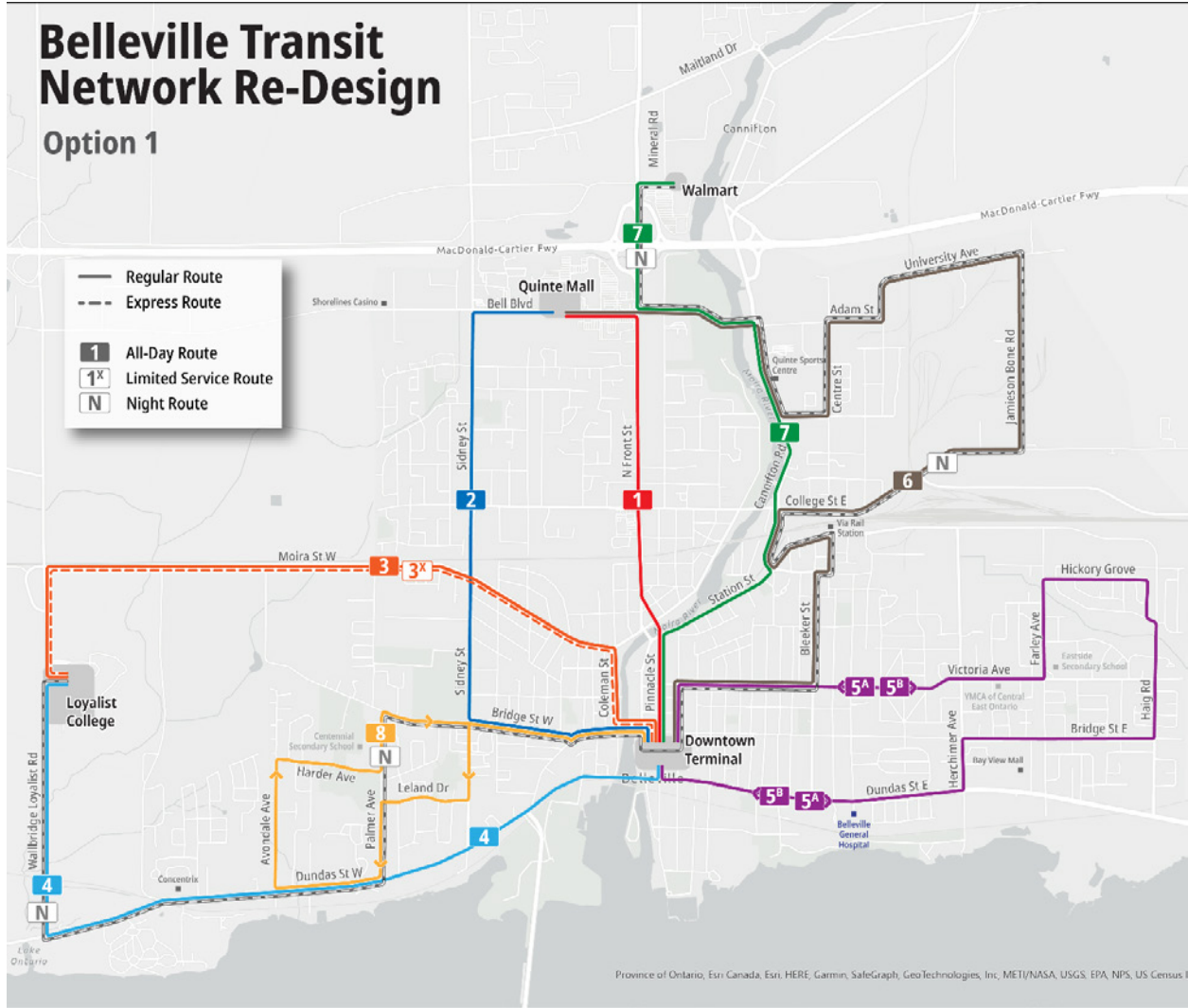
Table 4: Route Overview (Peak and Weekday Midday Periods)

Route		Round-trip Length (km)	Speed (km/h)	Trip Time (min)	Cycle Time (min)	Recovery Time (min)
1	Front	7.7	22	22	30	8
2	Sidney	10.6	22	28	40	12
3	Moira	13.3	28	28	40	12
3X	Moira Express	13.3	40	20	30	10
4	Dundas West	14	26	32	40	8
5A	Dundas East – Victoria	9.7	23	26	30	4
5B	Victoria – Dundas East	9.7	23	26	30	4
6	Industrial	23.0	26	54	60	6
7	Cannifton	10.0	24	26	35	9
8	Palmer	8.0	22	22	30	8
N	Night Trip	18.5	26	42	42	0

2.12.3 Proposed Network Maps

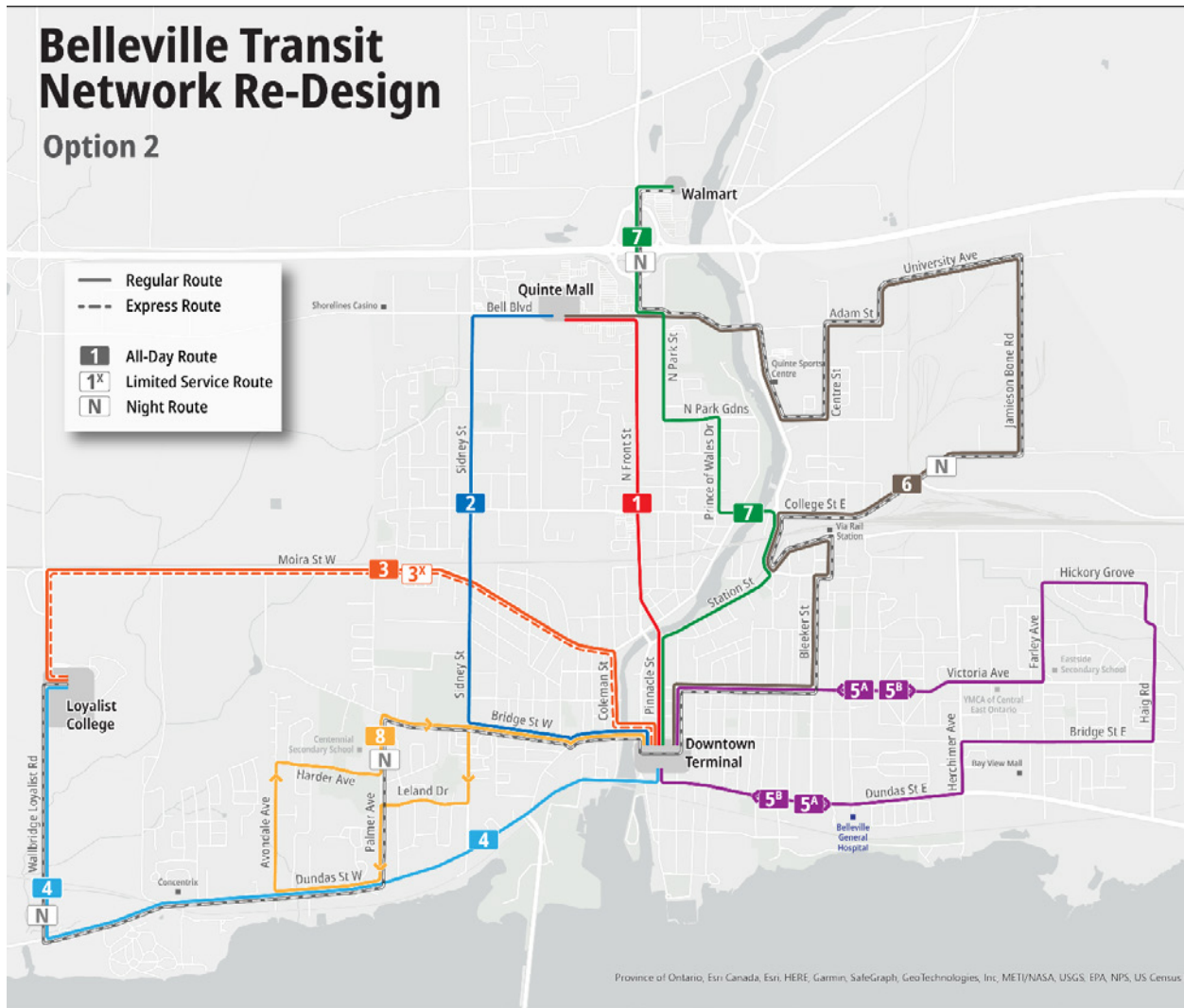
Option 1

Figure 4: Proposed Option 1 Route Network Map



Option 2

Figure 5: Proposed Option 2 Route Network Map



2.12.4 Headways

Table 5: Proposed Service Plan Headways

	Wd	Wd	Wd	Wd	Wd	Wd	Sat	Sat	Sat	Sat	Sat	Sun	Sun	Sun	Sun
Start	0600	0700	0930	1530	1830	2100	0600	0800	1200	1830	2100	0700	0800	1200	1830
End	0700	0930	1530	1830	2100	2330	0800	1200	1830	2100	2330	0800	1200	1830	2230
1	30	15	30	15	30	30	60	30	15	30	60	60	30	30	60
2	60	20	40	20	40	60	60	40	20	40	60	60	40	40	60
3	60	20	20	20	20	60	60	40	20	40	60	60	40	40	60

	Wd	Wd	Wd	Wd	Wd	Wd	Sat	Sat	Sat	Sat	Sat	Sun	Sun	Sun	Sun
Start	0600	0700	0930	1530	1830	2100	0600	0800	1200	1830	2100	0700	0800	1200	1830
End	0700	0930	1530	1830	2100	2330	0800	1200	1830	2100	2330	0800	1200	1830	2230
3X	-	30	30	30	-	-	-	-	-	-	-	-	-	-	-
4	40	20	40	20	40	40	40	40	20	40	40	40	40	40	40
5A	60	30	30	30	30	60	60	30	30	60	60	60	60	60	60
5B	60	30	30	30	30	60	-	30	30	60	-	-	60	60	-
6	60	30	30	30	30	60	30	60	60	60	60	60	60	60	60
7	70	35	35	35	70	70	70	35	35	70	70	70	70	35	70
8	60	30	30	30	60	60	60	30	30	60	60	60	60	30	60
N							One daily trip departing Walmart at 2330								

2.12.5 Fleet Requirements

Table 6: Proposed Service Plan Fleet Requirements

	Weekday						Saturday					Sunday			
Start	0600	0700	0930	1530	1830	2100	0600	0800	1200	1830	2100	0700	0800	1200	1830
End	0700	0930	1530	1830	2100	2330	0800	1200	1830	2100	2330	0800	1200	1830	2230
1	1	2	1	2	1	1	0.5	1	2	1	0.5	0.5	1	1	0.5
2	0.5	2	1	2	1	0.5	0.5	1	2	1	0.5	0.5	1	1	0.5
3	0.5	2	2	2	2	0.5	0.5	1	2	1	0.5	0.5	1	1	0.5
3X	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
4	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1
5A	0.5	1	1	1	1	0.5	0.5	1	1	0.5	0.5	0.5	0.5	0.5	0.5
5B	0.5	1	1	1	1	0.5	0	1	1	0.5	0	0	0.5	0.5	0
6	1	2	2	2	2	1	2	1	1	1	1	1	1	1	1
7	0.5	1	1	1	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	1	0.5
8	0.5	1	1	1	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	1	0.5
	6	15	12	15	10	6	6	9	13	7	5	5	7	8	5

2.12.6 Annual Operating Hours

Table 7: Service Plan Proposal Annual Operating Hours

Route	Annual Operating Hours
1	7,787
2	7,332
3	9,542
3X	2,990
4	8,034
5A	5,226
5B	4,979
6	10,010
7	5,070
8	5,070
Night Trip	182
TOTAL	66,222

2.12.7 Fleet Availability Contingency

The recommended service plan is contingent on the availability of 15 in-service buses during peak periods. Belleville Transit currently has 18 buses and is limited to 13 in-service buses due to their current maintenance challenges.

In the case that the recommended service plan is implemented before sufficient buses and maintenance capacity are available to operate 15 peak buses, service on certain routes will need to be reduced. Impacted routes should be selected in a way that results in the least possible negative impact to the network. For example, the bus on Route 3X and one of the buses on Route 1 could be removed during the peak period to reduce fleet requirements to 13 buses.

2.12.8 Analysis of Proposed Networks

Service Area Coverage

The service plan options provide good service coverage of most of the urban areas of Ward 1 with few gaps. Option 2 covers the neighbourhood northeast of North Front Street and College Street that is not fully covered in Option 1.

Figure 8: 30-Minute Travel Time Range to Downtown

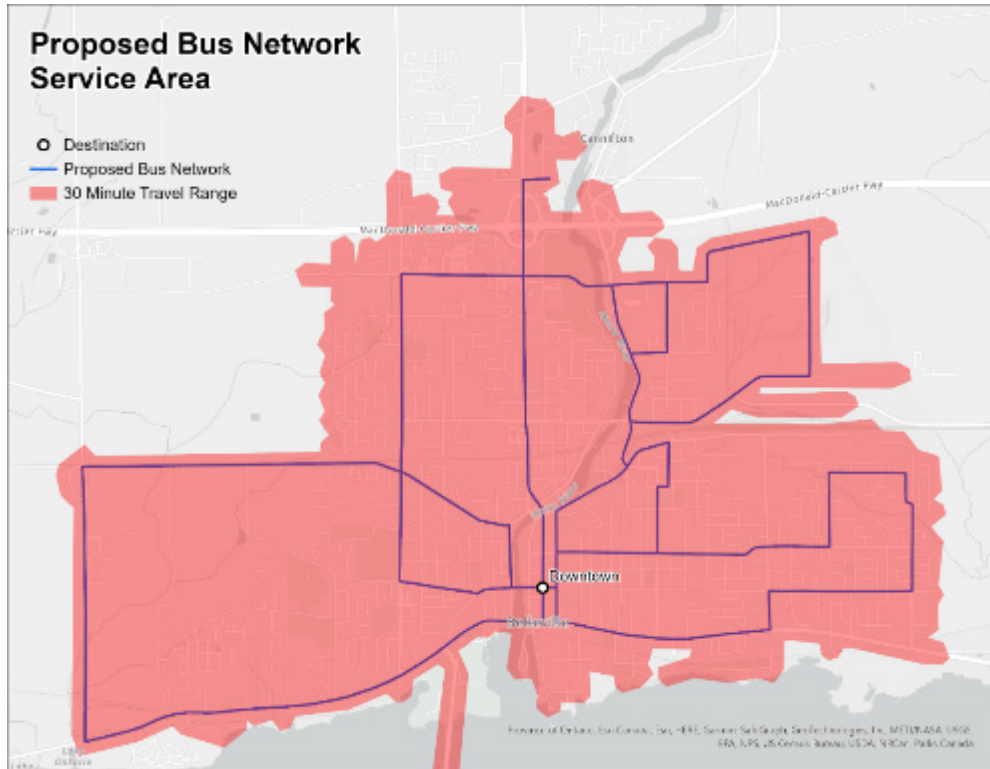


Figure 9: 30-Minute Travel Time Range to Quinte Mall

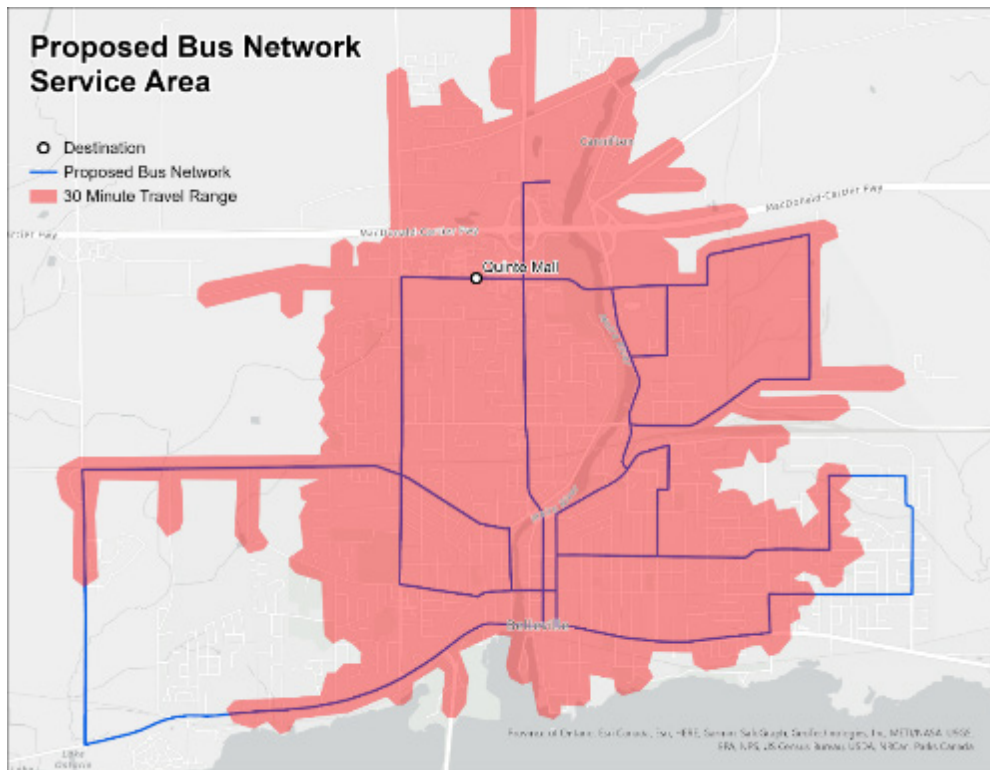


Figure 10: 30-Minute Travel Time Range to Loyalist College

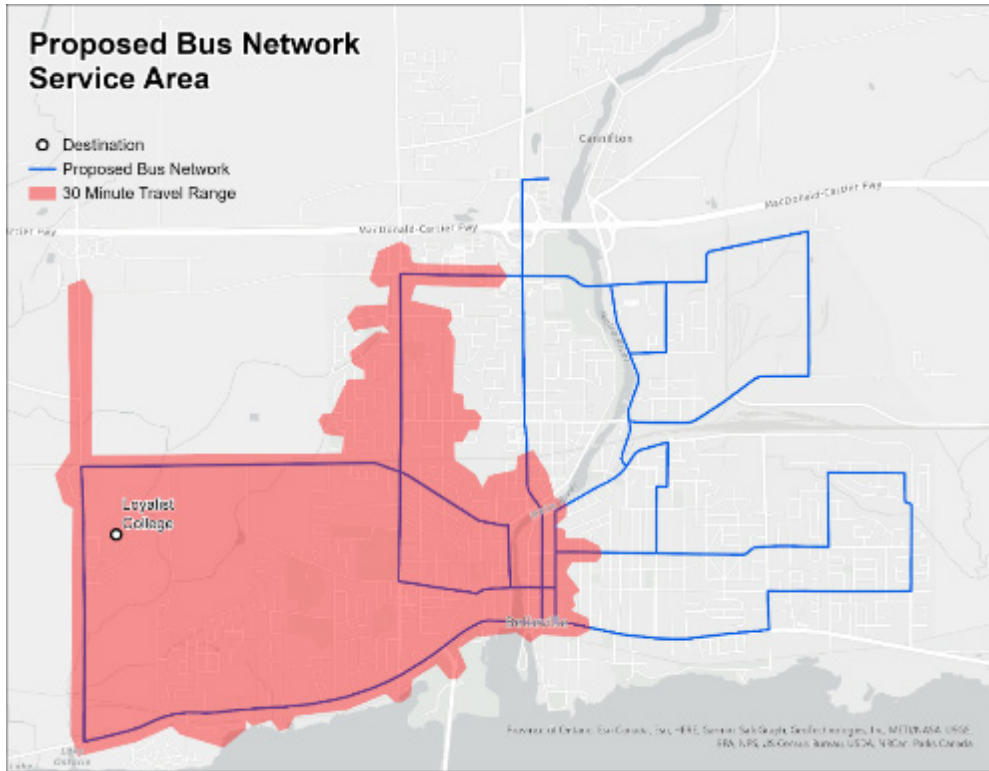


Figure 11: 30-Minute Travel Time Range to Jamieson Bone

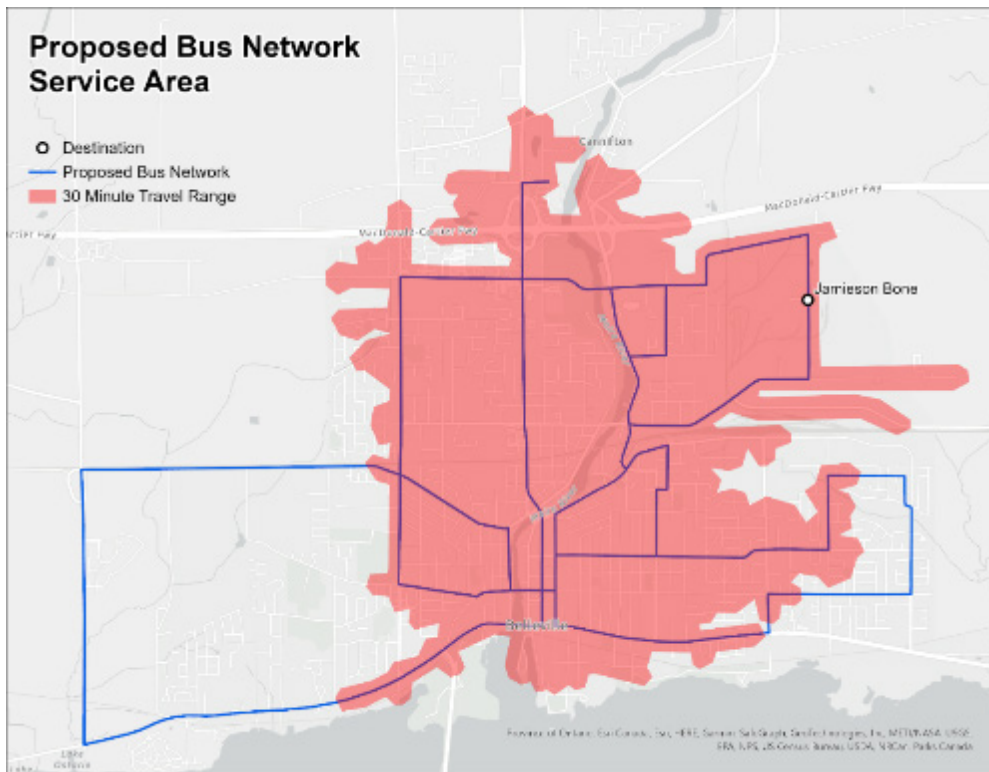


Figure 12: 30-Minute Travel Time Range to Walmart

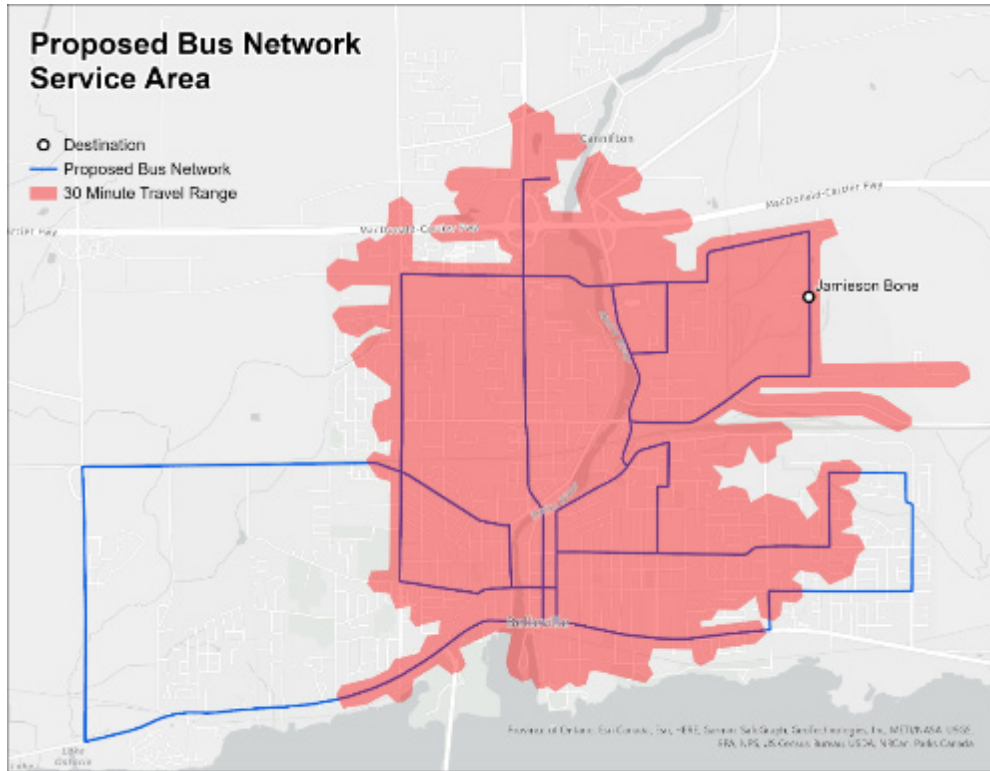
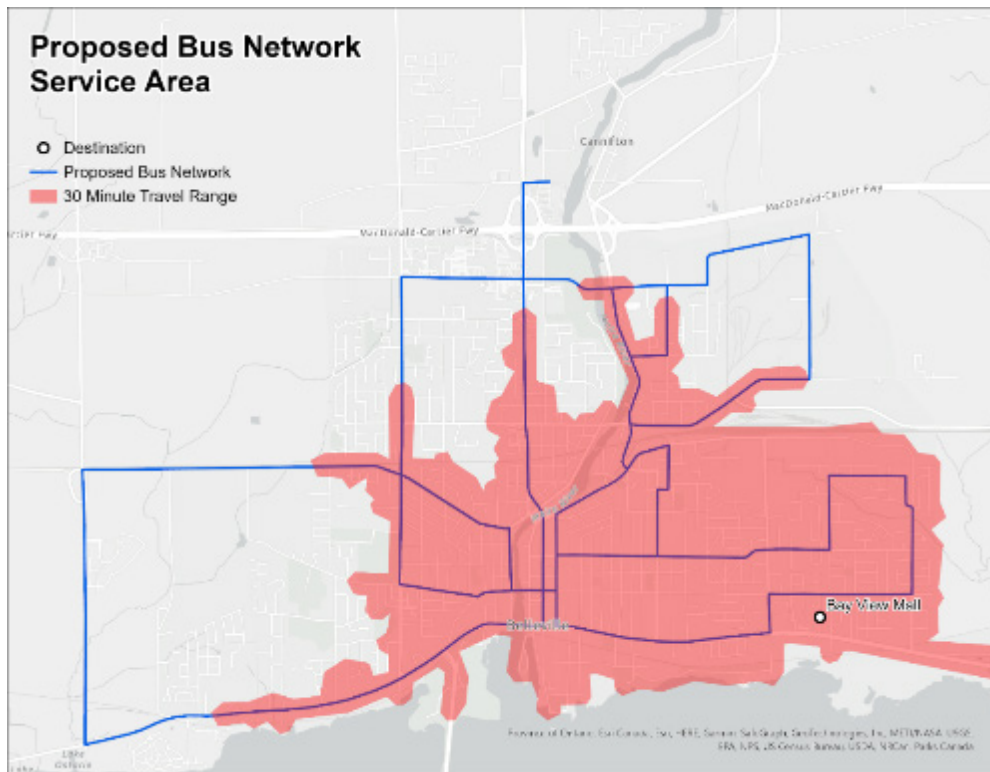


Figure 13: 30-Minute Travel Time Range to Bay View Mall



2.12.9 Interlining

Interlining is a scheduling process where vehicles are used to operate on multiple bus routes over the course of a vehicle block. This is done to reduce the fleet requirements in cases where there are two or more bus routes with a common terminal, the same headway, and where their combined cycle time divided by their headway is less than the sum of each of their individual cycle times divided by their headway.

There is a possibility of interlining Routes 6 and 7 at certain times to offer Route 6 some additional run time to improve on-time performance. There is also a possibility of interlining Routes 2, 3, and 4 at certain times to offer 30-minute service headways on each route using four buses total.

Interlining would be determined during the scheduling stage of implementation.

2.12.10 Community Growth

It is expected that the City of Belleville will continue to grow, resulting in new built-up areas within the city limits. In Section 2.5, areas of the City where growth is expected to occur in the future were identified. The current recommended service plan considers transit service to existing built-up areas. When newly built-up areas reach a state where they require transit service, then resources will need to be added to serve these new areas with a reconfigured route network.

3 Recommendations

The recommendations below address the project findings and provide direction to address the project requirements identified in the Scope of Work.

3.1 Transit Planning Philosophy

It is recommended that Belleville Transit follow the best practice in bus route network design as a template for the future planning and operation of Belleville Transit. **See Appendix A: Transit Planning Philosophy.**

3.2 Transit Service Guidelines

It is recommended that Belleville Transit adopt the *System Performance Indicators* and *Service Guidelines* noted below.

3.2.1 System Performance Indicators

Service Provided

Hours of Operation Per Capita (Revenue vehicle hours per capita)

- **Goal = 1.25**

Service Utilization

Passengers Per Operating Hour (Total regular service linked trips / Revenue vehicle hours)

- **Goal = 20**

Trips Per Capita (Total regular service linked trips per capita)

- **Goal = 25**

Financial Performance

Revenue to cost ratio (Revenue / Cost)

- **Goal = 35%**

3.2.2 Service Guidelines

Service Coverage

- 90% of urban area residents and jobs are within a maximum walking distance of 500 metres of a bus stop

Span of Service

- Weekdays: 0600 to 2330
- Saturdays: 0600 to 2330
- Sundays: 0700 to 2230

Minimum Frequency

- Weekday Residential (0630 to 1830): 30 minutes
- Weekday Residential Evenings (1830 to 2330): 60 minutes
- Weekday Industrial (Peak): 30 minutes
- Weekday Industrial (Off-Peak): 60 minutes
- Saturday: 60 minutes
- Sunday: 60 minutes

Vehicle Capacity

- Maximum vehicle capacity equal to 150% of seated capacity

Route Performance

- Passenger Boardings Per Vehicle Operating Hour: 30

On Time Performance

- All trips should depart timepoints from 0 to -3 minutes from scheduled departure time
- No trips should leave a timepoint early

3.3 Bus Stop Analysis

It is recommended that, following implementation of a new Service Plan (Route Network), all bus stops be reviewed. Recommendations on new stops, relocation of existing stops and the upgrading of existing stops should be input into a future bus stop refurbishment capital program.

3.4 Fare Strategy

It is recommended that Belleville Transit implement an *Adult/Concession Fare Model* with regular annual fare increase as noted in Table 2.

3.5 Fleet Plan

In addition to Belleville Transit's Fleet Replacement Plan outlined in Table 3, it is recommended that Belleville Transit's fleet be increased to 20 vehicles by purchasing two new buses as soon as possible.

3.6 Organizational Structure

It is recommended that a Transit Analyst and Fleet Mechanic position be added to the Transit organization with the implementation of the new service plan and schedules. An additional Transit Supervisor should be added in 2024 or earlier.

3.7 Service Plan

It is recommended that *Route Network Option 2* be implemented.

Appendices

Appendix A: Transit Planning Philosophy

Appendix B: Transit Service Guidelines

Appendix C: Peer Comparison

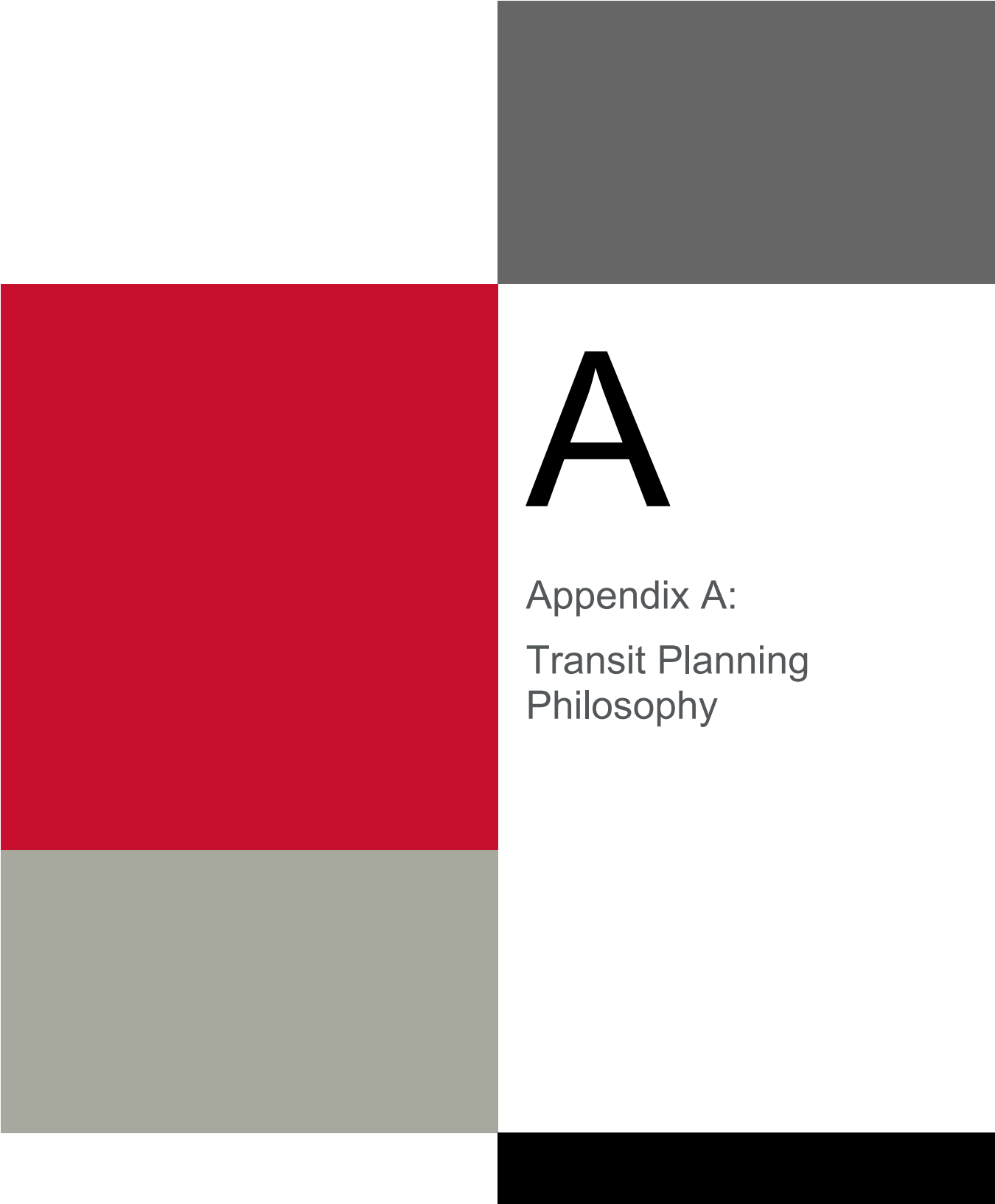
Appendix D: Growth Patterns and Transit-Oriented Community Review

Appendix E: Existing Service Coverage Analysis

Appendix F: Route Network Analysis

Appendix G: Bus Stop Analysis

Appendix H: Fare Strategy



A

Appendix A: Transit Planning Philosophy

Appendix A: Transit Planning Philosophy

Public transit is generally implemented to help communities be more sustainable from social, economic, and environmental perspectives. Specifically, transit is implemented within communities to accomplish the following:

Social Goal – Transit provides mobility for those individuals who are unable to transport themselves due to a variety of reasons. With improved mobility, all residents may be more involved in the community, and have better access to job, health, educational and social opportunities.

Economic Goal – Transit reduces the individual cost of urban travel and reduces community costs by reducing required transportation infrastructure and maintenance.

Environmental Goal – Transit reduces the environmental impact of urban travel.

To attain the social, economic, and environmental benefits noted above, public transit agencies must design their services around clear and defined principles and have a method for monitoring and responding to performance results. This requires having sound service design guidelines and an effective performance measurement system.

Bus Route Network Design

The design of transit service is very much dependent on the community's urban form and their aspirations for a specific type of service. Urban form influences what is possible from a route network design perspective; whereas community aspiration influences the type of transit service the community wishes to develop – a focus on general community transit service coverage or development of higher ridership along defined corridors.

The following service design criteria are generally accepted as best practice in the development of effective transit networks.

Serve Major Trip Purposes – Design the transit services to accommodate work, school, shopping, medical and social trips.

Connect Major Trip Destinations – Design the transit network to connect major trip destinations and residential communities.

Directness of Travel – Design routes to be as straight and direct as possible to minimize customer travel time and operating costs. Large one-way open loops should be avoided. Loops and one-way service should be limited to the ends of a route where the bus must use a small on-street loop to turn around.

Roadway Context – Routes should mostly be operated on arterial streets that permit reasonable travel speeds.

Ridership Catchment – Routes should be located where adequate pedestrian catchment is possible on either side of the route.

Two-way Service – Design routes with bi-directional travel to minimize customer travel time, make the network more understandable, facilitate transfers and allow simple return trips.

Duplication – Avoid duplication of routes on the same street. In some cases, a route may need to use a portion of a street that another route already serves due to the layout of the street network. A major corridor near a transit terminal may also have several routes for the portion of the corridor close to the terminal where different routes converge to travel to and from the same terminal. Other cases of duplication of service should be avoided.

Interconnected Network – Routes should form part of a coherent interconnected network. Although some passengers may only need to use one route, many passenger trips will not be accommodated by one route, requiring that routes must work together to provide direct routing to as many locations as possible with consideration for transfers between routes.

On Street Route to Route Transfers – Design the route network to accommodate passenger transfers between routes on-street rather than in off-street terminals to minimize customer travel time and operating costs. Unless the connecting buses are visible to each other, the buses should continue their journey after a passenger has disembarked. Schedules should be designed to minimize passenger transfer waiting time; however, a moving bus provides a better service to most customers.


An exception to on-street transfers would be a major terminal where many routes connect and many passengers are transferring, and where passenger amenities are available.

Walking Distance to Transit – the distance and time to access transit is a function of urban form, available streets suitable for transit operation, route placement, bus stop placement, and available walking paths. A policy that defines that all but the outlying or isolated areas of the community or 90% of the community should be within 500 metres (variable) walking distance to transit service helps guide good route design and bus stop placement.

Bus Stop Design and Placement – All transit customers start and end their journey as a pedestrian and the bus stop is the point where they connect with the transit system. The number and location of bus stops is important for pedestrian access and safety, the convenience of transfers, operational efficiency, and system navigation. Bus stops should be designed and placed:

- Adjacent to major trip generators/destinations, at major cross streets or paths, and 400 to 800 metres apart along the route (depending on the type of route).
- Generally located in pairs along the route to accommodate both the outbound and homebound trip ends.
- With high quality walkable access.
- Generally located farside of an intersection.
- Provide a safe, comfortable waiting environment.

Bus Bays or Bus Laybys - Bus bays or bus laybys should only be used on streets with a posted speed limit of 65 KPH or greater; at end of route timepoints; or a major boarding / alighting bus zones where buses are consistently dwelling for greater than 45 seconds.



B

Appendix B: Transit Service Guidelines

Appendix B: Transit Service Guidelines

Transit Service Guidelines are the foundation for providing effective transit service. Although agencies may refer to them as “guidelines” and others refer to them as “standards”, they are effectively a set of clear and defined rules that serve as the basis for implementing and evaluating transit service. The three key functions of transit service guidelines are:

1. To provide a set of **design standards and guidelines** for establishing new services.
2. To provide a set of performance indicators used to **monitor the system**.
3. To outline a set of clear and defined principles that are **transparent to the public** and define a **commitment to the Community** to providing a certain level of service and facilitate meaningful communications with stakeholders.

System Performance Indicators

Service Provided

Hours of Operation Per Capita (Revenue Vehicle Hours Per Capita)

- **Goal = 1.25**
- 2019 = 1.1 and 2021 = 1.4

Service Utilization

Passengers Per Operating Hour (Total Regular Service Linked Trips / Revenue Vehicle Hours)

- **Goal = 20**
- 2019 = 21.2 and 2021 = 8.0

Trips Per Capita (Total Regular Service Linked Trips Per Capita)

- **Goal = 25**
- 2019 = 23.8 and 2021 = 11.1

Financial Performance

Revenue to Cost Ratio (Revenue / Cost Ratio)

- **Goal = 35%**
- 2019 = 39% and 2021 = 14%

Service Guidelines

Service Coverage

90% of urban area residents and jobs are within a maximum walking distance of 500 metres of a bus stop.

Span of Service

- Weekdays 0630 to 2130
- Saturdays 0700 to 1900
- Sundays 0900 to 1800

Minimum Frequency

- Weekdays Residential (0630 – 1830) - 30 mins
- Weekday Residential Evenings – 60 mins
- Weekday Industrial (Peak) – 30 mins
- Weekday Industrial (Off Peak) – 60 mins
- Saturday - 60 mins
- Sunday - 60 Mins

Vehicle Capacity

- Maximum vehicle capacity equal to 150% of seated capacity.

Route Performance

- Passenger Boardings Per Vehicle Operating Hour
- Goal = 30

On Time Performance

- All trips should depart timepoints from 0 to -3 mins from scheduled departure time.
- No trips should leave a timepoint early.

New Service Implementation

The implementation of new service should be based on the following considerations:

- That service implementation be subject to the provision of streets adequately located and constructed for transit use.
- That service implementation be subject to a minimum of 500 residents/employees within a 500 metres radius of service.
- That the location of developing service areas be contiguous to existing service areas so that service is provided in accordance with approved minimum ridership policies.

- That ridership on new routes be monitored monthly, and minimum ridership targets should be achieved within 6 months. Service should only be provided if the minimum ridership target can be achieved.
- Expansion of service be staged by the service periods for implementing a route, based on achieving the ridership target for boarding passengers per operating hour. While the sequencing is subject to the individual characteristics of the service area and customer demand, transit service within a service area should generally be implemented in the sequence as follows:
 1. Weekday AM and PM peak period service
 2. Weekday midday service between the AM and PM peak periods
 3. Saturday service
 4. Evening service on all weekdays and Saturdays
 5. Sunday service

When the minimum ridership targets are achieved during the first service period, service can then be expanded into additional service periods. As the ridership increases on the route, the higher peak hour ridership can support lower ridership during off-peak hours.

Operations / Maintenance Performance Measures

Although not recommended for inclusion at this time, Belleville Transit should consider adopting some operations and maintenance performance measures. Examples are noted below.

Missed Trips or “Trips not accounted for” are trips that have not been delivered as scheduled (minus ten minutes). These may include the following:

- Mechanical breakdowns
- Operator sick / late
- Delay due to traffic
- Accidents
- Police, Fire and Emergency Services
- Inclement weather

Mean Distance Between On Road Failures

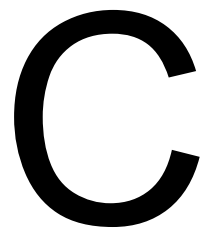
- The mean distance travelled between on road vehicle failures (road calls).

Vehicle Accident Rate (Vehicle is in contact with an object.)

- Number of vehicle accidents per month.

Passenger Accident Rate

- Number of passenger slips, trips, or falls per month.

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Appendix C:
Peer Comparison

Appendix C: Peer Comparison

Transit systems should routinely monitor system performance and strive to continually adjust and improve services to meet changing customer and operational needs. Although every transit system is unique, a peer system comparison using industry-accepted performance indicators serves as a benchmark of reasonable expectations and helps identify areas for improvement.

The peer review compares Belleville Transit with five transit systems of similar size throughout Canada with a primary focus on transit agencies in Ontario. As well, the review provides the average of data for 35 Canadian transit systems with service area populations under 50,000 and 29 Canadian transit systems with service area population between 50,000 and 150,000 populations.

The data source is the Canadian Urban Transit Association (CUTA), Canadian Transit Fact Book., 2019 and 2021. The 2019 data provides a snapshot of pre-pandemic conditions, and the 2021 data illustrates the impact of the pandemic and partial recovery. The 2021 CUTA data is the most recent available as CUTA has a one-year reporting lag. The 2022 data will be available in November 2023 and will likely show additional recovery from the ridership loss experienced during the pandemic.

Observations

The review of the CUTA data provides an understanding of how much transit service is provided to a community; how the service is utilized or consumed by the community; and the transit system's financial performance.

Service Provided

Belleville Transit's hours of operation increased from 56,942 in 2019 to 70,212 in 2021 (plus 23%) while the peer systems only increased slightly by 1-3% or decreased hours of operation.

Belleville's additional service hours increased the service provided to the community from 1.1 to 1.4 hours of operation per capita. This is the greatest amount of service provided per capita among the peer systems.

Service Utilization

Belleville Transit's ridership decreased from 1,207,077 riders to 561,349 riders between 2019 and 2021 (minus 53%). Although Belleville Transit experienced a significant ridership reduction due to the pandemic, the reduction was slightly less than the 58% reduction experienced by the peer system group.

Belleville Transit's passengers per operating hour fell significantly from 21.2 in 2019 to 8.0 in 2021. Only Timmins, at 7.1 passengers per operating hour, is experiencing a lower service utilization rate.

Belleville experienced a similar reduction in transit trips per capita from 23.8 in 2019 to 11.1 trips per capita in 2021.

Financial Performance

Belleville Transit had a revenue to cost ratio of 39% in 2019 which was one of the best financial performances within the peer group. The Belleville revenue to cost ratio fell 64% to 14% in 2021. The peer transit systems also had reductions of between 14% and 53%.

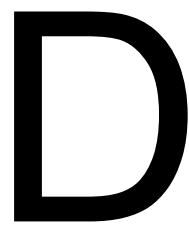
At a more detailed level, it is noted that between 2019 and 2021 Belleville Transit's cost per passenger increased from \$4.14 to \$9.71 and the cost per capita increased from \$60.02 to \$73.87.

Summary

In summary, from 2019 to 2021 Belleville Transit's hours of operation increased 23%, ridership fell 53%, and the revenue to cost ratio decreased 64%. The performance statistics are largely due to the impact of the pandemic and performance improvements are expected in 2022 and beyond. However, there are questions regarding the amount and type of service provided, and system revenues that will be explored within sections of the Belleville Transit Operational Review.

Table 8: Conventional Transit System Comparison

	Belleville		Group 50K - 150K (29 Systems)		Group < 50K (35 Systems)		Timmins		Charlottetown		North Bay		Sault Ste Marie		Sarnia	
	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021
Service Area Population	50,716	55,071					38,622	38,000	49,000	49,500	46,878	46,878	69,900	69,900	74,779	71,419
Annual Ridership	1,207,077	561,349					1,002,733	251,765	754,021	558,854	1,481,713	434,552	1,894,611	710,238	1,718,574	654,856
Annual Hours of Operation	56,942	70,212					47,358	35,372	24,709	25,414	61,626	37,831	81,799	83,006	81,799	83,006
Annual Operating Expenses	\$4,996,410	\$5,448,153					\$4,722,151	\$3,424,379	\$2,456,691	\$2,495,493	\$6,164,985	\$5,386,832	\$8,862,415	\$9,947,541	\$6,508,932	\$9,947,541
Annual Revenue	\$1,952,212	\$755,640					\$1,925,003	\$811,231	\$1,297,149	\$1,207,972	\$3,103,733	\$1,326,120	\$2,695,691	\$1,535,960	\$2,027,550	\$1,535,960
Annual Net Operating Cost	\$3,044,198	\$4,692,513					\$2,797,148	\$2,613,148	\$1,159,542	\$1,287,521	\$3,061,252	\$4,060,711	\$6,166,724	\$8,411,584	\$4,481,382	\$8,411,581
Cost Per Capita	\$60.02	\$73.87	\$80.12	\$88.25	\$45.07	\$44.44	\$57.38	-	\$22.46	\$22.55	\$54.42	\$53.67	\$77.06	\$79.67	\$53.56	\$79.67
Cost Per Passenger	\$4.14	\$9.71	\$5.26	\$10.67	\$9.72	\$9.47	\$4.71	\$13.60	\$3.09	\$4.47	\$4.16	\$12.38	\$4.68	\$14.01	\$3.73	\$14.01
Revenue to Cost Ratio	39%	14%	32%	18%	17%	18%	38%	24%	56%	48%	50%	25%	30%	15%	32%	15%
Hours of Operation Per Capita	1.1	1.4	1.16	1.01	0.6	0.71	1.2	0.9	0.5	0.5	1.3	0.8	1.2	1.2	0.8	1.2
Passengers Per Operating Hour	21.2	8.0	22.6	12.0	13.5	13.1	21.2	7.1	30.5	22	24.0	11.5	23.2	8.6	37.2	8.6
Trips Per Capita	23.8	11.1	26.1	12.2	8.6	9.2	26.0	6.6	15.4	11.3	31.6	9.3	27.1	10.2	23.0	10.2

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Appendix D:
Growth Patterns and
Transit-Oriented
Community Review

Appendix D: Growth Patterns and Transit-Oriented Community Review

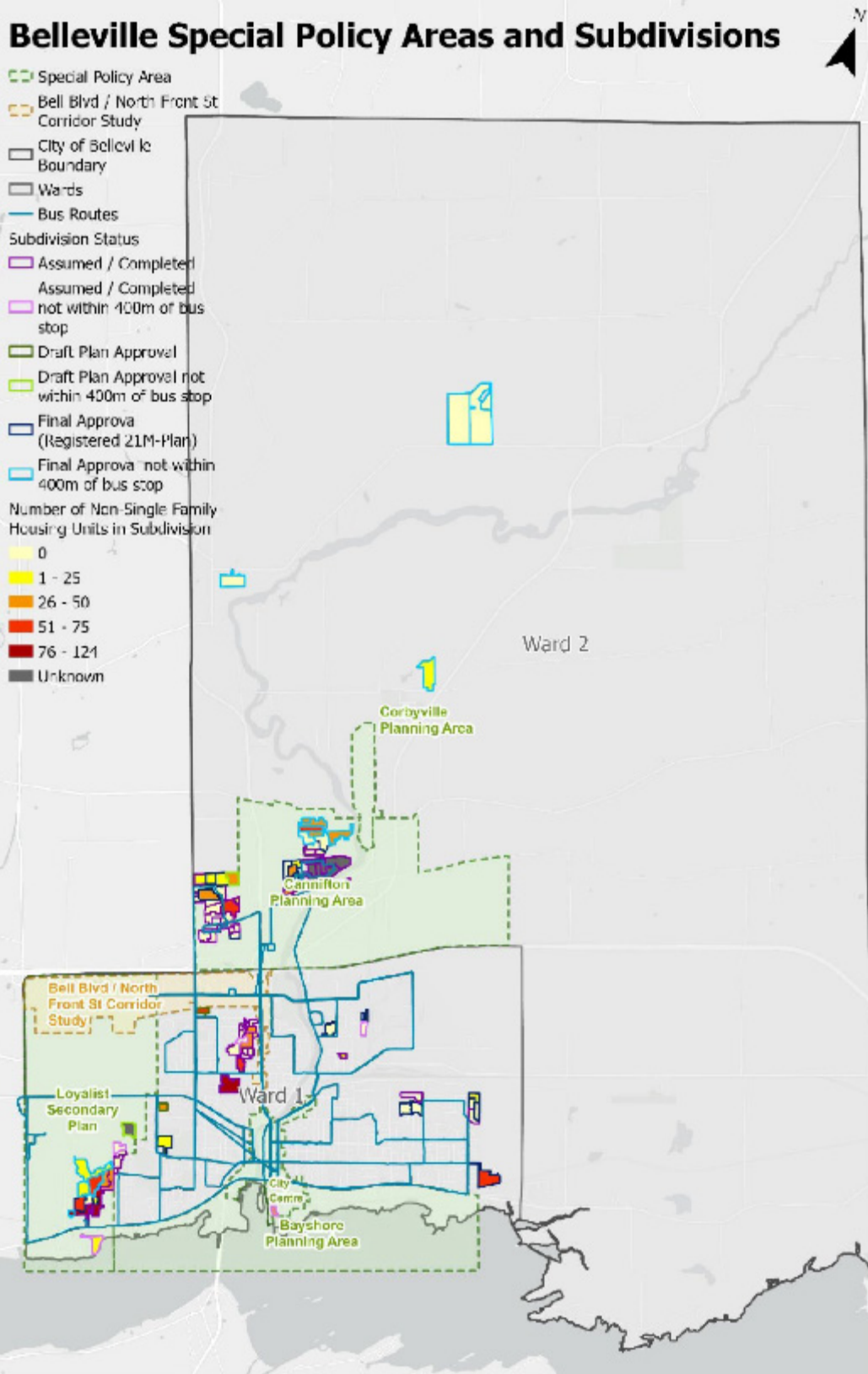
The chief objective of this memo is to review current and future development to gain an understanding of how the existing Belleville transit network will need to be restructured to provide efficient and accessible transit service to the residents of these new areas. In addition, this memo makes recommendations on policies and guidelines needed to ensure that as new development is planned, transit use by new residents is encouraged and facilitated by land use and development policies.

Forecasted Growth

Belleville is a rapidly growing city, with growth forecasts showing an increase of 8% - 12% in population over the next five years and an even greater 13% - 19% total growth over ten years. To plan for the forecasted growth in population and housing, the City's Official Plan identifies Special Policy Areas to which additional policies and guidelines apply and in which growth will be focused:

- City Centre
- Loyalist Secondary Plan Area
- Bayshore Planning Area
- Cannifton Planning Area
- Corbyville Village Planning Area

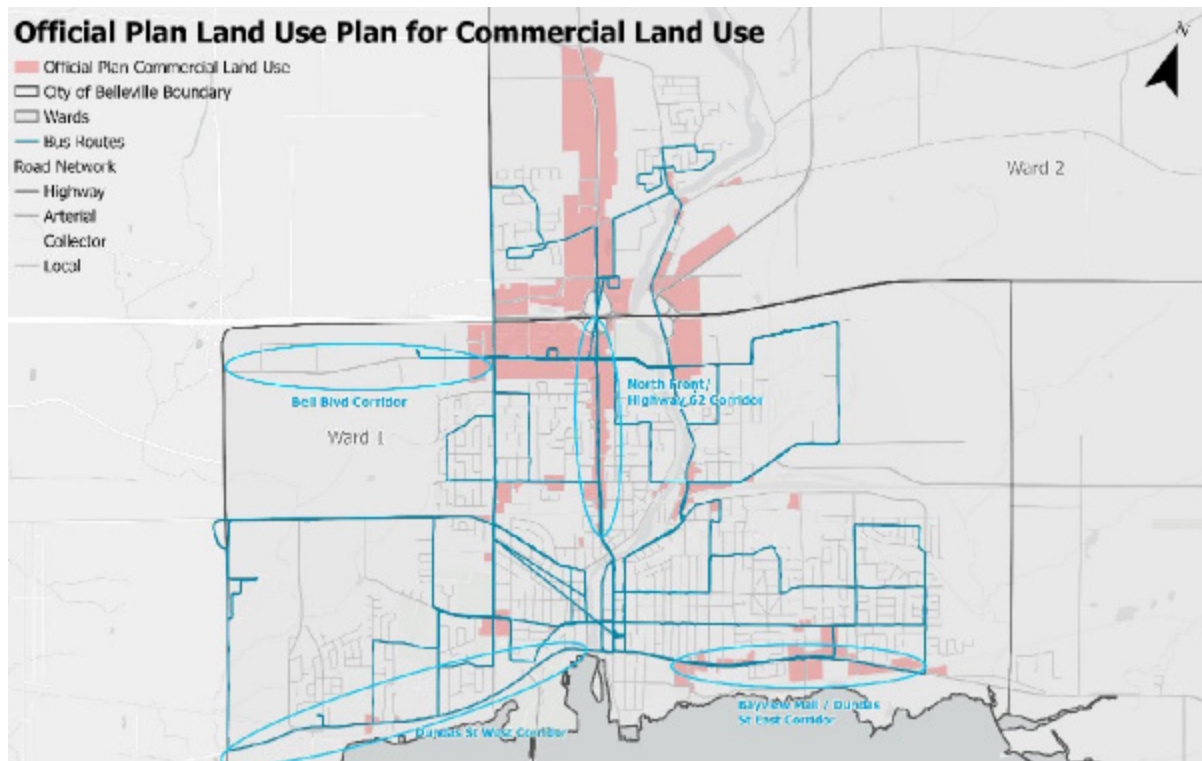
The image below shows where new development is slated and identifies development that is within walking (400 metres) distance of a current bus stop. Almost 1,000 new residential units in the draft and final plan stage will be located beyond a short walking distance to transit, including higher density locations within the Loyalist Secondary Plan area. Additionally, 143 completed new units are also outside of a walking distance to transit. The new developments in Belleville that extend into undeveloped areas beyond the current transit network will need to be addressed with a reconfiguration of the transit network to better serve the community today and in the future.



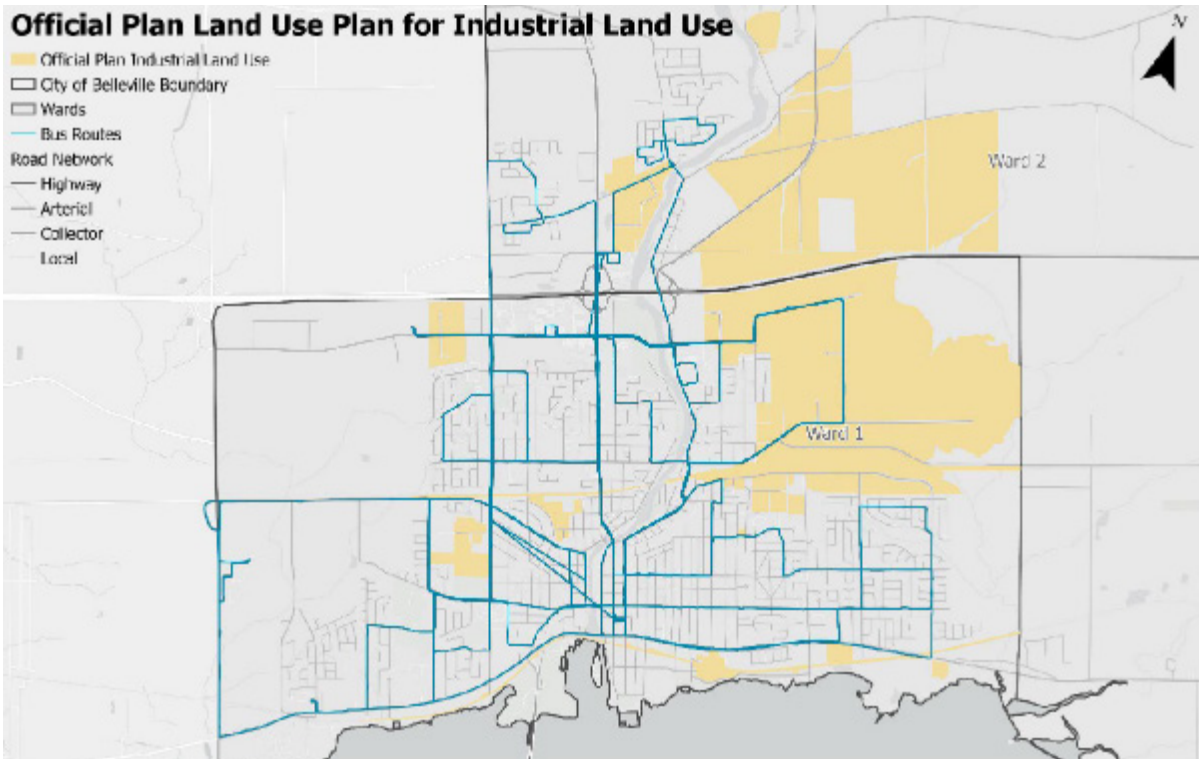
Commercial and Industrial Land Uses

The largest employment sector Belleville is commercial (37%) followed by industrial (23%). The figure below shows the designated commercial land use in the Land Use Plan, which notably extends outside of the current transit network's coverage and areas of highest frequency. Four areas of major commercial activity outside of the City Centre are also identified (circled in blue). These coincide with the transit network to a greater degree.

- Bell Boulevard Corridor
- North Front/Highway 62 Corridor
- Bayview Mall/Dundas Street East Corridor
- Dundas Street West Corridor



Industrial Land Use areas outlined in the Official Plan and shown in the figure below will serve as major areas of industrial activity and employment in the future. The industrial areas within walking range from transit, including the industrial area in the northeast, generate strong ridership, as is evident in Route 3's outstanding ridership resiliency during the pandemic.



Transit-Supportive Corridors

Aside from redesigning the network as the City expands, Belleville can also support growth with policies and guidelines for transit-supportive development and corridors. Focusing growth and development of jobs and housing along corridors already served by transit will not only improve access but support transit operations and foster a greater share of non-private-auto trips. This memo concludes with a set of recommendations to adopt additional policies and guidelines to support transit-supportive growth. The recommendations are based on principles to create a successful transit-supportive corridor:

- Principles: Medium to Higher Density Development, A Mix of Land Uses, High-Frequency of Enhanced Transit, and Managed and Limited Parking Options:
 - Policies:
 - Encourage development that is contiguous to the current urban development and transit service.
 - Promote more compact, mixed-use type of residential, commercial, and office development uses along the transit network and within transit-supportive corridors.
 - Guideline:
 - Update the zoning code to include mixed-use, transit-supportive development.
- Principles: Compact, Pedestrian Friendly Environment, Active Vibrant Center, and Encourage Multimodal Connectivity:
 - Policies:

- The community form and road network should be developed in a linear form that is conducive to efficient transit routes.
- The City should have a walkable public realm. The community walking network should encourage access to and along the transit route(s), or in other words, encourage a high “Walk Score.”
- Guidelines:
 - Define and identify transit supportive development and corridors.
 - Prioritize multimodal updates and additions along the identified transit supportive corridors.

Introduction

The chief objective of this memo is to review the current and future development to gain an understanding of how the existing transit network in the City of Belleville will need to be restructured to provide efficient and accessible transit service to the residents of these new areas. In addition, this memo makes recommendations on policies and guidelines needed to ensure that as new development is planned, that transit use by new residents is encouraged and facilitated by land use and development policies.

This memo first provides an overview of expected growth in the 5 to 10-year horizon for residential, commercial, and industrial uses and notes how these areas match the current transit network and levels of service. Recognizing that the transit network will need to be restructured in the future for new developments, the second section provides details about what new developments will especially need transit in the future. It also lists policy recommendations related to development and transit so the restructuring includes efficient transit service. The second section provides an overview of transit-supportive corridors and concludes with specific policy recommendations to strengthen Belleville’s policy support for transit-oriented communities.

Population and Residential Growth

Belleville is a rapidly growing city with 55,071 residents in 2021 and growth forecasts showing an increase of 8% - 12% in population over the next five years and an even greater 13% - 19% total growth over ten years.^{1 2} These numbers are from a recently updated population forecast showing the City’s population is expected to grow more than the initial 2021 Official Plan projections that state a roughly 0.5% increase per year until 2041.³

¹ City of Belleville Census Profile, 2021, Statistics Canada.

² City of Belleville Growth Forecast Update, 2021 to 2051 – Population Forecast Scenarios, 2021 – 2031. The percentages are estimated based on the scenarios figure.

³ Due to the update of population numbers, density predictions in the Official Plan are lower than expected.

Historically, most of the housing developed in Belleville has consisted of single-family dwellings (64% of housing in 2021) and a very small share has been made up of higher-density development. However, this trend is expected to shift as medium- and high-density housing is forecasted to become 51% of the housing stock sometime between 2026 and 2031.⁴ This means that a significant portion of new growth in the City is slated to be in the form of medium- and higher-density housing. This new residential development is expected to occur primarily in the urban area, with a small amount of growth in rural areas in Belleville's two wards. Ward 1 consists of mostly urban areas and Ward 2 is made up of primarily rural and undeveloped land. Most of Belleville's transit service is in Ward 1, which pays taxes for transit services. One exception is Route 9, a new route being piloted, which operates in the south of Ward 2, primarily in the residential areas of Deerfield, Settlers Ridge, Heritage Park, and Canniff Mills. Ward 2 does not pay taxes for the services.

New Development and Future Growth Areas

Special Policy Areas

To plan for the forecasted growth in population and housing, the City's Official Plan identifies Special Policy Areas to which additional policies and guidelines apply:

- City Centre
- Loyalist Secondary Plan Area
- Bayshore Planning Area
- Cannifton Planning Area
- Corbyville Village Planning Area

The additional policies and guidelines differ for each area based on their specific current and planned land uses to encourage and/or enhance residential, commercial, and/or industrial uses in the areas. Most of the Special Policy Areas have plans for subdivisions and vacant land that will experience growth over the next 5 to 10 years.

For new development to occur across Belleville in places such as the Special Policy Areas, the Provincial Policy Statement (P.P.S.) requires "land with servicing capacity sufficient to provide at least a 3-year supply of residential units available through lands suitably zoned to facilitate residential intensification and redevelopment, and land in draft approved and registered plans."⁵ To comply with the P.P.S., there are registered and draft approved plans of subdivisions in and surrounding the Special Policy Areas in Belleville. Figure 14 shows the Special Policy Areas and the assumed/completed, registered and draft approved plans of subdivisions for all of Belleville as of October 2022. Figure 15 shows a close-up image of the Special Policy Areas in Ward 1 and 2 where most of the residential growth is expected to occur.

⁴ City of Belleville Growth Forecast Update, 2021 to 2051 – Housing Forecast by Structure type

⁵ Residential Land Supply, 2021, p. 3

The assumed / completed subdivisions in Figure 14 and Figure 15 consist of 1,061 single-family dwellings and 601 units within other housing types, including townhouses, semi-detached dwellings, duplexes, and condos. Currently, there are five completed subdivisions that are not within 400 metres of a transit route (outlined in red in Figure 15):

- Carriage Lea – Phase 4
- Green Acres – Phase 1
- St. James By The Bay
- Jackson Woods – Phase 6
- Harbour Landing development

Harbour Landing has 33 condo units, St. James by the Bay has 21 Townhouse units and all five subdivisions combined have 89 single family dwellings.

There are both registered and approved plans of subdivisions in the planning areas.

- **Registered plans** of subdivisions are plans that have received approval and have satisfied existing conditions.⁶ These subdivisions will likely be developed in the near future.
- **Draft approved plans** of subdivisions are plans that have received preliminary approval subject to certain conditions. These subdivisions are likely to occur further into the future as the applicant must demonstrate the ability to fulfill the required conditions of approval in order to enter into a Subdivision Agreement with Belleville.⁷

⁶ Residential Land Supply, December 31, 2021, p. 4

⁷ Residential Land Supply, December 31, 2021, p. 6

Figure 14: Belleville Special Policy Areas and Subdivisions

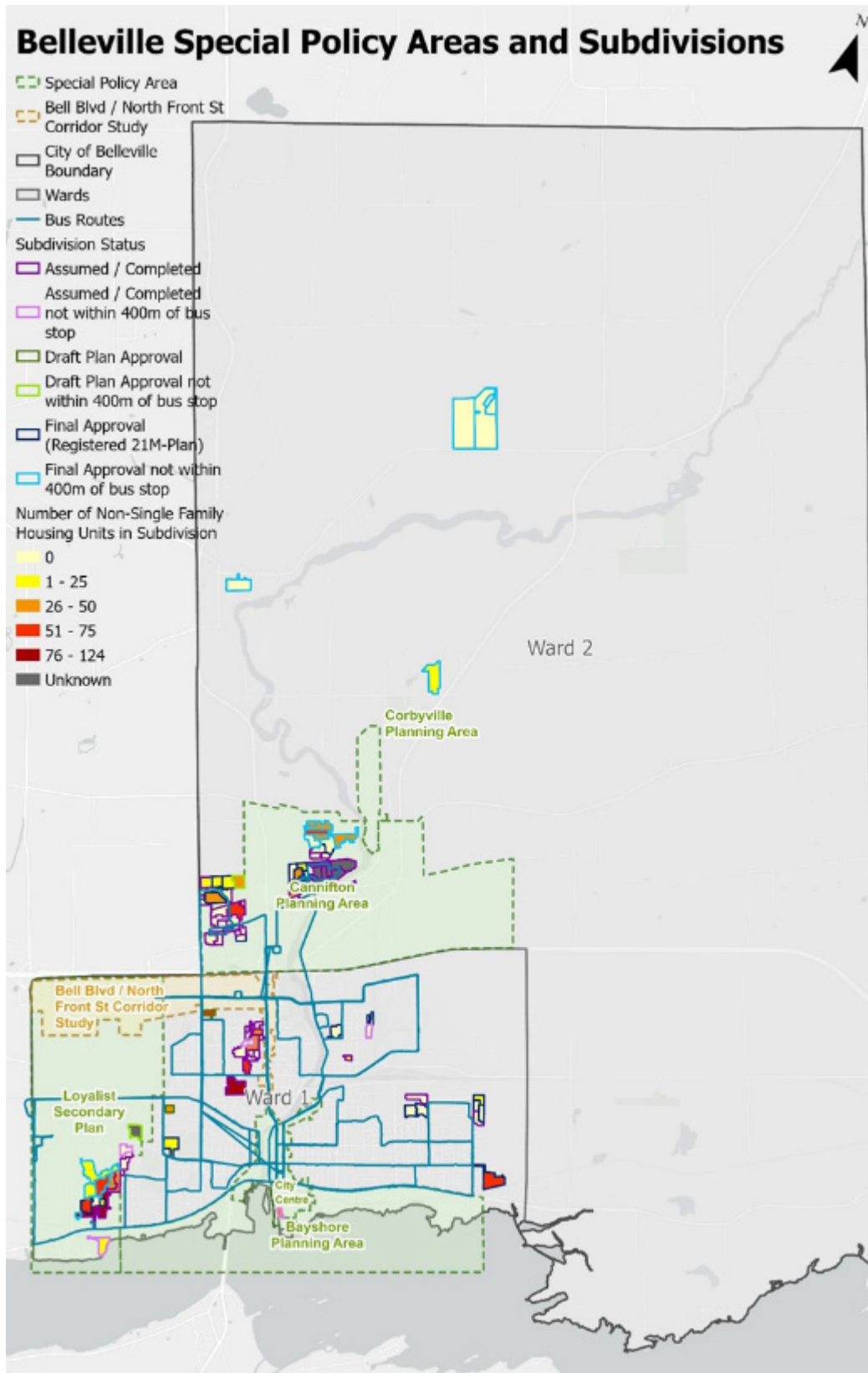
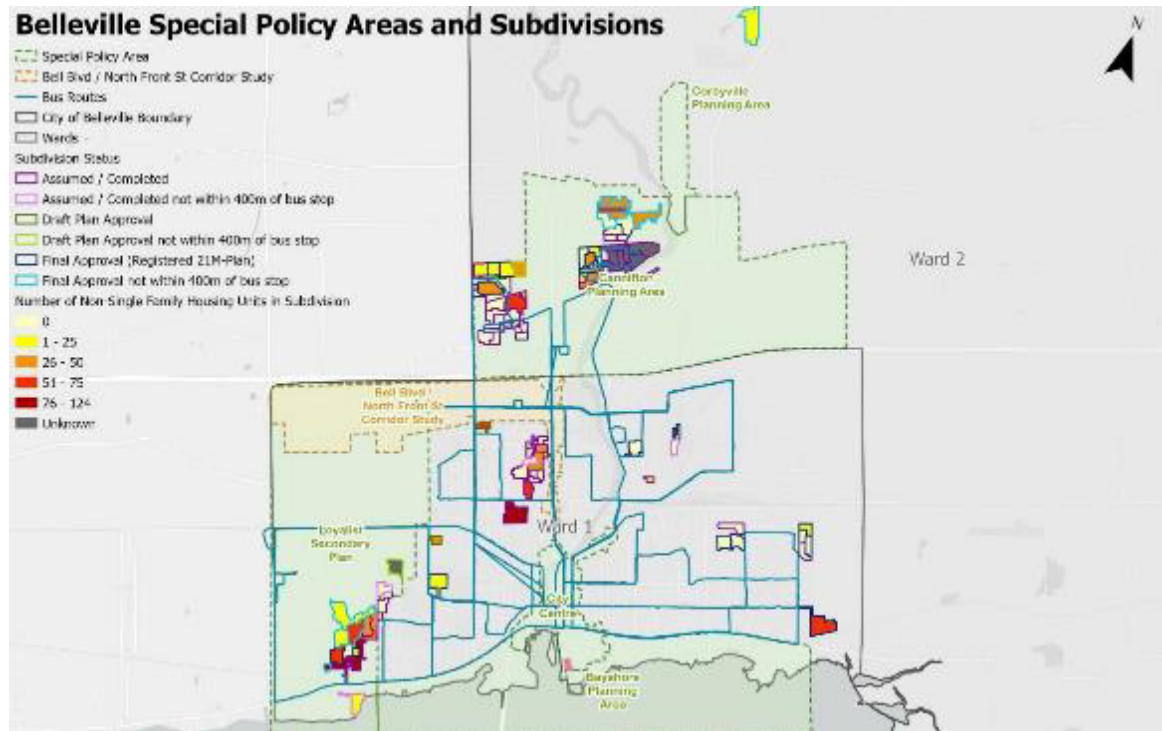


Figure 15: Special Policy Areas in Belleville (focused view)



City Centre

City Centre will have more development in the coming years focused on residential intensification, primarily including “mid and high rise buildings, infill, adaptive reuse and redevelopment, and live-work buildings.”⁸ The Official Plan contains a City Centre Intensification Plan in its Special Policy Area policies, which lists an intensification target of 1,280 potential dwelling units for 2030, alongside conceptual building intensification and building heights/stories for specific areas of City Centre.⁹ The City Centre area is well positioned to support and make use of frequent transit service based on the current network structure.

Loyalist Secondary Plan

The Loyalist Secondary Plan is west of the urban area of the City. The area is approximately 950 hectares (234 acres) of land located east of Wallbridge-Loyalist Road, south of Highway 401, and north of the Bay of Quinte, as shown in Figure 16. Loyalist College is in this area and is one of the main influences that will attract new development. This area will experience a high amount of growth and investment with approximately 6,000 to 6,500 dwelling units representing 18 years of supply to support population growth.

The Loyalist Secondary Plan contains details about planning and policy for the area and was originally completed in 2010. It is undergoing updates to make sure the lands will

⁸ Residential Land Supply, December 31, 2021, p. 9

⁹ Residential Land Supply, December 31, 2021, p. 9

accommodate future growth utilizing mixed use. The end goal of the Plan is compact and sustainable development. There are 987 residential dwelling units expected in the Loyalist Secondary Plan area in the near future.¹⁰ Table 9 includes a list of registered and draft approved plans of subdivisions in the Loyalist Secondary Plan area.

While a significant portion of the Loyalist Planning area is within 400 metres of a current transit stop, much of the development area is beyond current transit services. Routes 7 and 10 run along streets in the area and have Loyalist College as the main stop. Route 10 also connects people in the neighbourhood to Quinte Mall and Walmart north of Bell Boulevard.¹¹ Routes 4 and 6 provide service primarily outside of the area. Bell Boulevard and most of the Potters Creek and Mancuso subdivisions within the Loyalist Secondary Plan area do not have direct transit service. Currently, service is not within 400 metres of the Potters Creek – Phases 6, 8, 9A, which are the West subdivisions that are in final approval, and the Mancuso subdivision that is in the draft plan approval phase. The Potters Creek West and Potters Creek – Phase 6 subdivisions have no service within 400 metres. Table 9 shows the subdivisions not within 400 metres of transit service that will need to be considered in future.

Table 9: Registered and Draft Approved Plans of Subdivision in the Loyalist Secondary Plan Area

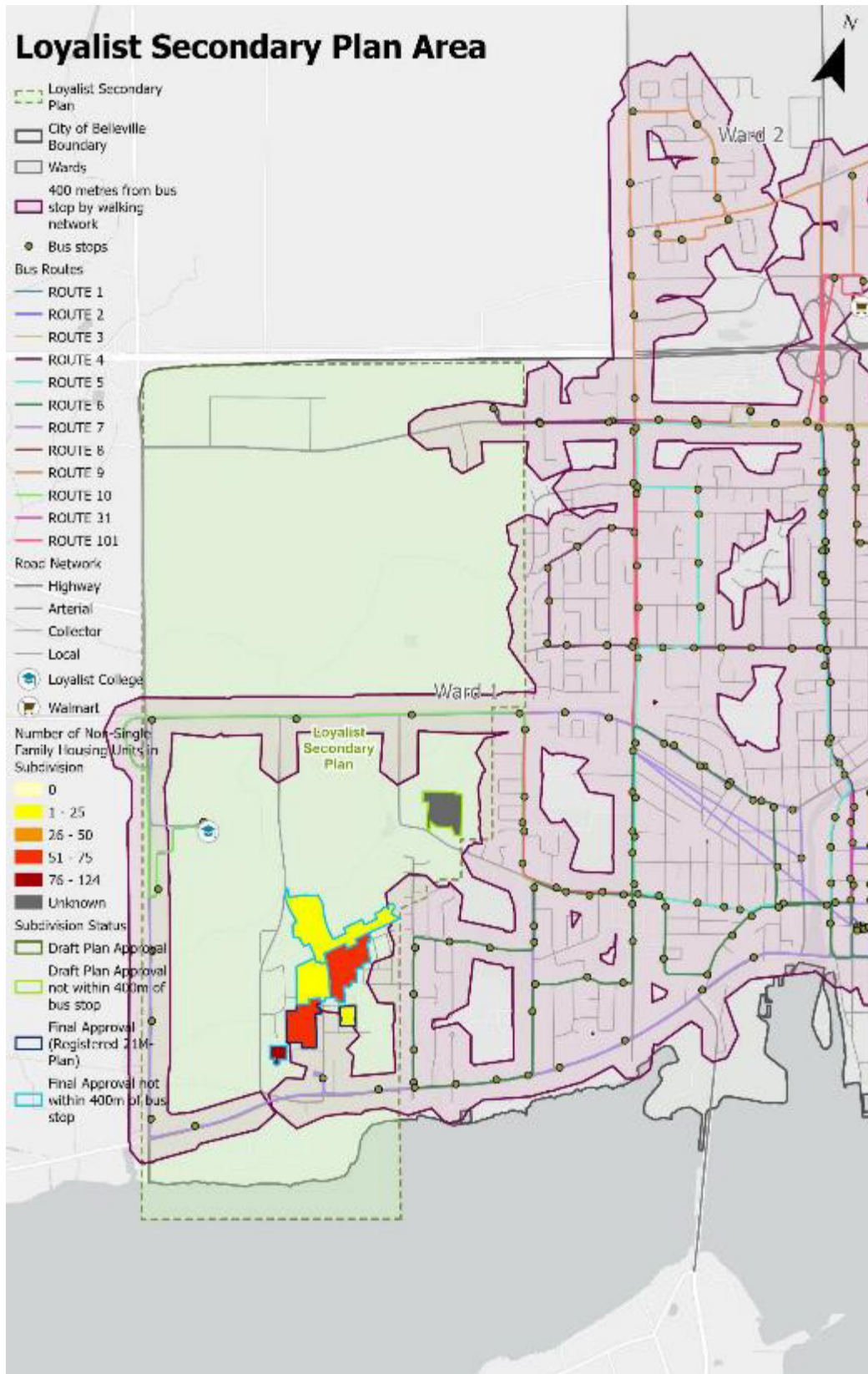
Subdivision	Status	Single Detached Dwellings	Townhouse Units	Semi-Detached Units	Duplex Units	Apartment Units	Condo Units	Year Registered
Potters Creek - Phase 9A	Final Approval (Registered 21M-Plan)	82	14					2022
Potters Creek - Phase 6	Final Approval (Registered 21M-Plan)	51	59					2018
Potters Creek Phase 8	Final Approval (Registered 21M-Plan)	41	15	8				2022
Potters Creek - Phase 7	Final Approval (Registered 21M-Plan)	30	18	24	14			2019
Potters Creek - Phase 5	Final Approval (Registered 21M-Plan)	7	20					2016
Potters Creek West	Final Approval (Registered 21M-Plan)				22	102		2016
Mancuso	Draft Plan Approval							2022

¹⁰ Loyalist West Secondary Plan Update, July 22, 2022. <https://www.belleville.ca/en/do-business/resources/Documents/Planning-Docs/LSP-Update/LWSP-Update---Interim-Report-Final-Revised-v2---2022-07-22.pdf>, p. 14

¹¹ <https://www.belleville.ca/en/do-business/resources/Documents/Planning-Docs/LSP-Update/LWSP-Update---Interim-Report-Final-Revised-v2---2022-07-22.pdf>, p. 15



Figure 16: Loyalist Secondary Plan Area with Subdivisions and Transit Service



Bayshore Planning Area

The Bayshore Planning Area is along the Bay of Quinte and could have high recreational activity in the future. No transit runs through the area but most of the developed land in the area is within 400 metres of a transit route. A review of the current transit network may consider better service to this area. No new subdivisions are planned. The main objective for the Bayshore Planning Area is to develop its mixed-use potential to make the area a destination within the City. The policies include adding additional open space areas and maximizing the utility of the areas, developing trails and public access points near the City's waterfront, and creating a waterfront extension of the downtown core.¹²

Cannifton Planning Area

The Cannifton Planning Area is in Ward 2 north of Highway 401 and contains the Cannifton Hamlet. The area will “accommodate a significant portion of the City’s future residential, commercial, and industrial development and has policies to “guide the servicing and development of the Cannifton Planning Area in a cost effective and efficient manner.”¹³ In relation to near future development opportunities, one subdivision has draft plan approval and 15 subdivisions have received final approval. Future development includes 508 single family dwellings and 384 medium/high density residential units in the near future. A list of future subdivisions is shown in Table 10.

Route 9 is the only transit service in the area that mainly covers the south part of the neighbourhoods within Cannifton. The route is within 400 metres of all existing subdivisions. Five registered subdivisions – Canniff Mills: Phases 10 and 11, Riverstone, and Riverstone: Phases 1 and 2 are not located within 400 metres of a transit stop, primarily in the north area of Canniffon Mills. In total, these add up to 108 single-family dwellings and 226 medium/high density units.

Table 10: Registered and Draft Approved Plans of Subdivision in the Cannifton Planning Area

Subdivision Name	Status	Single Detached Dwellings	Town-house Units	Semi-Detached Units	Duplex Units	Apartment Units	Condo Units	Year Registered
Settlers Ridge East - Phase 2	Draft Plan Approval	36	31					2022
Canniff Mills - Phase 10	Final Approval (Registered 21M-Plan)	17	30					2019
Canniff Mills - Phase 11	Final Approval (Registered 21M-Plan)	29	47					2022
Canniff Mills - Phase 8	Final Approval (Registered 21M-Plan)	45						2017
Canniff Mills - Phase 9	Final Approval	59						2018

¹² Belleville Official Plan, pgs. 76-77

¹³ Belleville Official Plan, pgs. 83-84

Corbyville Village Planning Area

The Coryville Village Planning area is a historic Corby Distillery site north of the Cannifton Planning area that is located along the Moira River. The Official Plan notes that the area will be redeveloped as a village with a range of housing and non-residential uses. The Plan also states that the area will include low and medium density residential uses. The timeline of this development is unclear. There is currently no transit service in this area as Corbyville Village has very little developed land.

Other Areas & Subdivisions

There are additional registered and draft approved plans of subdivisions in Belleville outside of the Special Policy Areas. Many of the subdivisions are in Ward 1, which will result in 417 single detached dwellings and 199 townhouse units added to the area. Ward 2 additions are north of Cannifton and Corbyville Village Planning Areas in Ward 2 and there will be 93 single-family dwellings and 14 apartment units. Most of the approved subdivisions in Ward 1 will have transit service within 400 metres except or the Green Acres – Phase 1 and Jackson Woods – Phase 6 subdivisions. The new Ward 2 subdivisions do not have transit service as they are in rural and largely undeveloped lands.

Table 11: Registered and Draft Approved Plans of Subdivision in Outside of Special Policy Areas

Subdivision	Status	Ward	Single Detached Dwellings	Town-house Units	Semi-Detached Units	Duplex Units	Apartment Units	Condo Units	Year Registered
Highpoint Subdivision	Final Approval (Registered 21M-Plan)	Ward 1	60						N/A
Bridgecrest Park	Final Approval (Registered 21M-Plan)	Ward 1	50	14					N/A
Parkville Greens - Phase 1	Final Approval (Registered 21M-Plan)	Ward 1	47	75					2022
Bell Creek Estates - Phase 3	Final Approval (Registered 21M-Plan)	Ward 1	40						2019
Mercedes Meadows - Phase 4	Final Approval (Registered 21M-Plan)	Ward 1	39						2017
Hearthstone Ridge - Phase 3	Final Approval (Registered 21M-Plan)	Ward 2	37						2016
Bell Creek Estates - Phase 2	Final Approval (Registered 21M-Plan)	Ward 1	35						2016

Subdivision	Status	Ward	Single Detached Dwellings	Town-house Units	Semi-Detached Units	Duplex Units	Apartment Units	Condo Units	Year Registered
Mercedes Meadows - Phase 2	Final Approval (Registered 21M-Plan)	Ward 1	30						2015
Hearthstone Ridge - Phase 1	Final Approval (Registered 21M-Plan)	Ward 1	30						N/A
Mercedes Meadows - Phase 3	Final Approval (Register	Ward 1	19	20					2017

Commercial/Mixed Use Growth

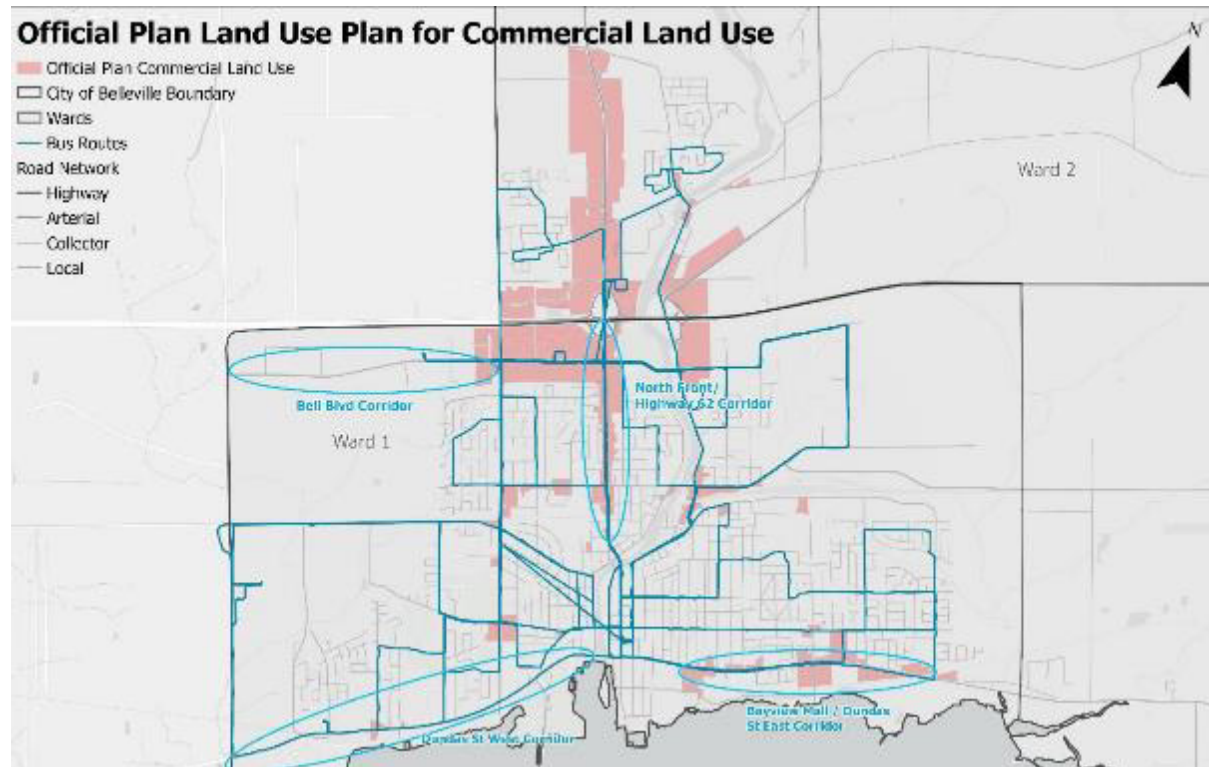
The Official Plan promotes the concentration of commercial uses. Figure 17 shows the designated commercial land use in the Land Use Plan, which notably extends outside of the current transit network’s coverage and areas of highest frequency. In addition to this plan, there are four areas of major commercial activity outside of the City Centre that are identified (circled in blue) in Figure 17

- Bell Boulevard Corridor
- North Front/Highway 62 Corridor
- Bayview Mall/Dundas Street East Corridor
- Dundas Street West Corridor

These are significant commercial areas that will continue to be developed. The largest employment sector in Belleville is commercial (37%) followed by industrial (23%).¹⁴ Thus, while transit access to commercial areas has implications for shopping and convenience, it will also have a major impact in access to jobs.

¹⁴ Watson & Associates Economists Ltd., 2022

Figure 17: Official Plan Land Use Plan for Commercial Land Use



Special Study: Bell Boulevard/North Front Street Corridor Study

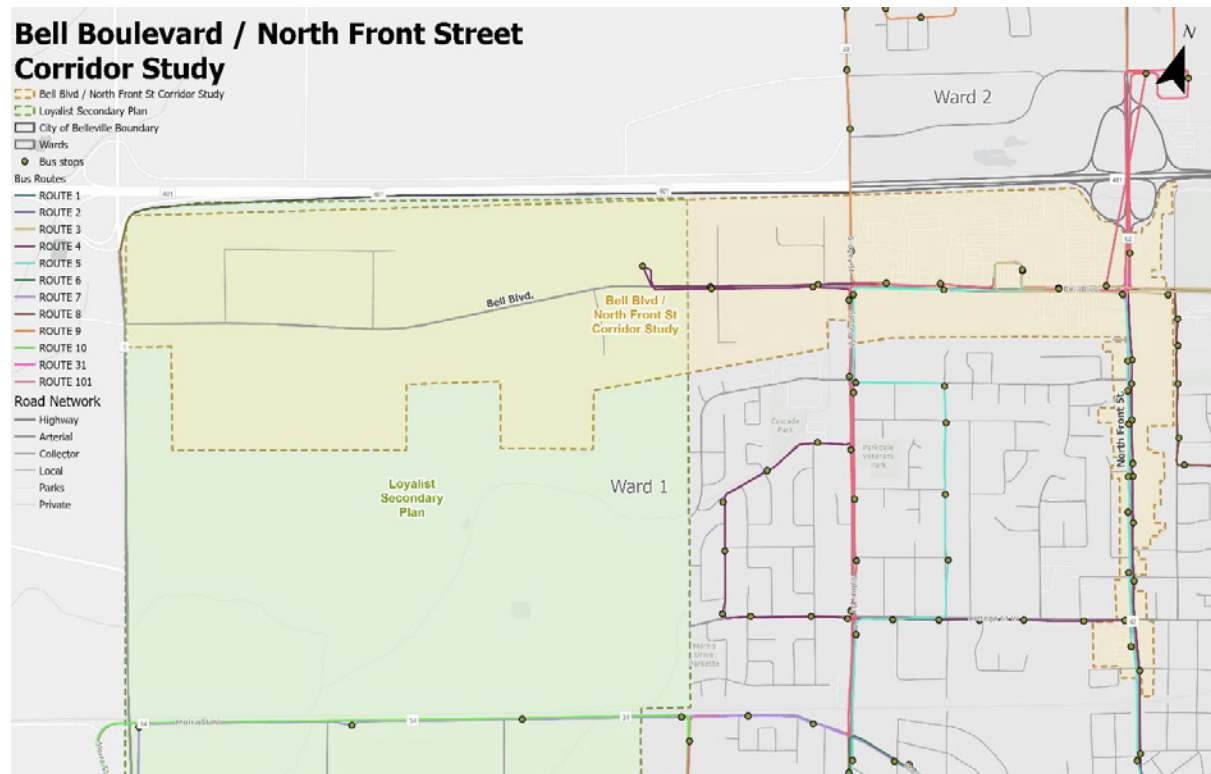
The Bell Boulevard Corridor is being studied as a potential area of mixed-use development. The Bell Boulevard/North Front Street Corridor Study is an ongoing study that will provide a detailed analysis and review of the area shown in Figure 18. The area is within Ward 1 and the western portion of the study area of scope overlaps with the Loyalist Secondary Plan study area. The Official Plan includes Bell Boulevard and North Front Street as important transportation connections within the major commercial activity areas of Bell Boulevard Corridor and North Front/Highway 62 Corridor. Bell Boulevard is an east-west connector that contains retail, employment, and light industrial uses. North Front Street runs north-south and connects to Highway 401, which is a main connection to downtown for many residents.¹⁵ Intensifying the use and mix of uses along this corridor has the potential of bringing more commercial uses within reach of the current transit network.

The study envisions the corridor as a mixed-use corridor in the future, focusing on the needs and opportunities, and provide direction for current and future development. It will include discussion of land use/mixed uses, the transportation network, and improvements to the public right-of-way. The project is currently in the strategic framework phase, which involves development of a draft corridor plan that identifies recommended land uses and policies. The plan will be released to Council and the Public for feedback in late 2022 and early 2023.

¹⁵ <https://www.belleville.ca/en/do-business/resources/Documents/Planning-Docs/Corridor-Study/220929-Bell-Boulevard-PIC2-Presentation-FINAL.pdf>

The corridor plan will include a proposal to review public transportation and how that may be improved along the corridor with the public realm. Currently, transit Routes 3, 4, 5, 9, 10 and 101 run along Bell Boulevard and Routes 4, 5, 8, 10, 31, and 101 move through North Front St. There is no transit service west of Jenland Way along Bell Boulevard as the area does not have much development. The area west of Jenland Way has primarily commercial zoning.

Figure 18: Bell Blvd & North Front St Corridor Study Area



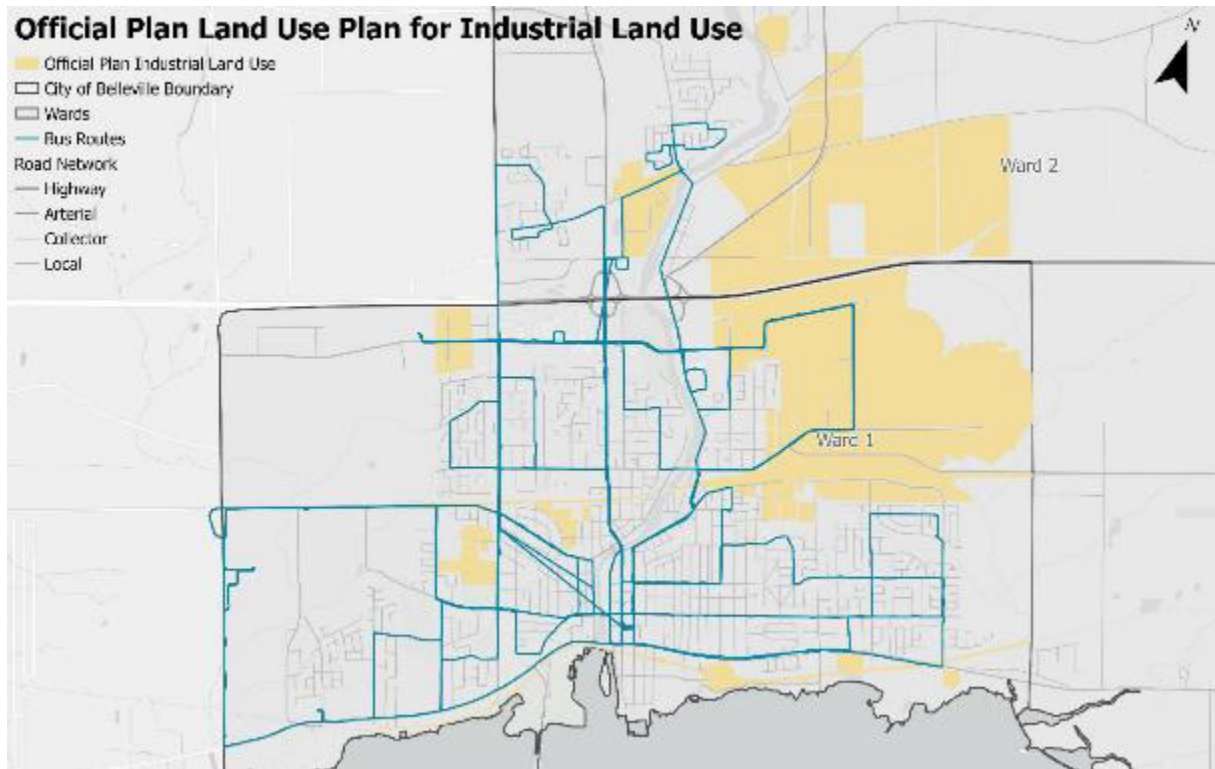
Industrial Growth

Industrial Land Use areas outlined in the Official Plan will serve as major areas of industrial activity and employment in the future. Figure 19 shows the industrial uses in the Official Plan. The City's north-east Industrial Park is one of the larger areas that will continue to have a high concentration of industrial activity and is served by transit Route 3, which saw the lowest rate of ridership decrease during the early days of the pandemic. This can be attributed to industrial jobs having a much lower rate of transition to work from home than other industries.

Manufacturing and Transportation and warehousing were some of the fastest growing employment sectors within industrial uses from 2011 to 2016.¹⁶

¹⁶ Residential Land Supply, December 31, 2021, p. 11

Figure 19: Official Plan Land Use Plan for Industrial Land Use

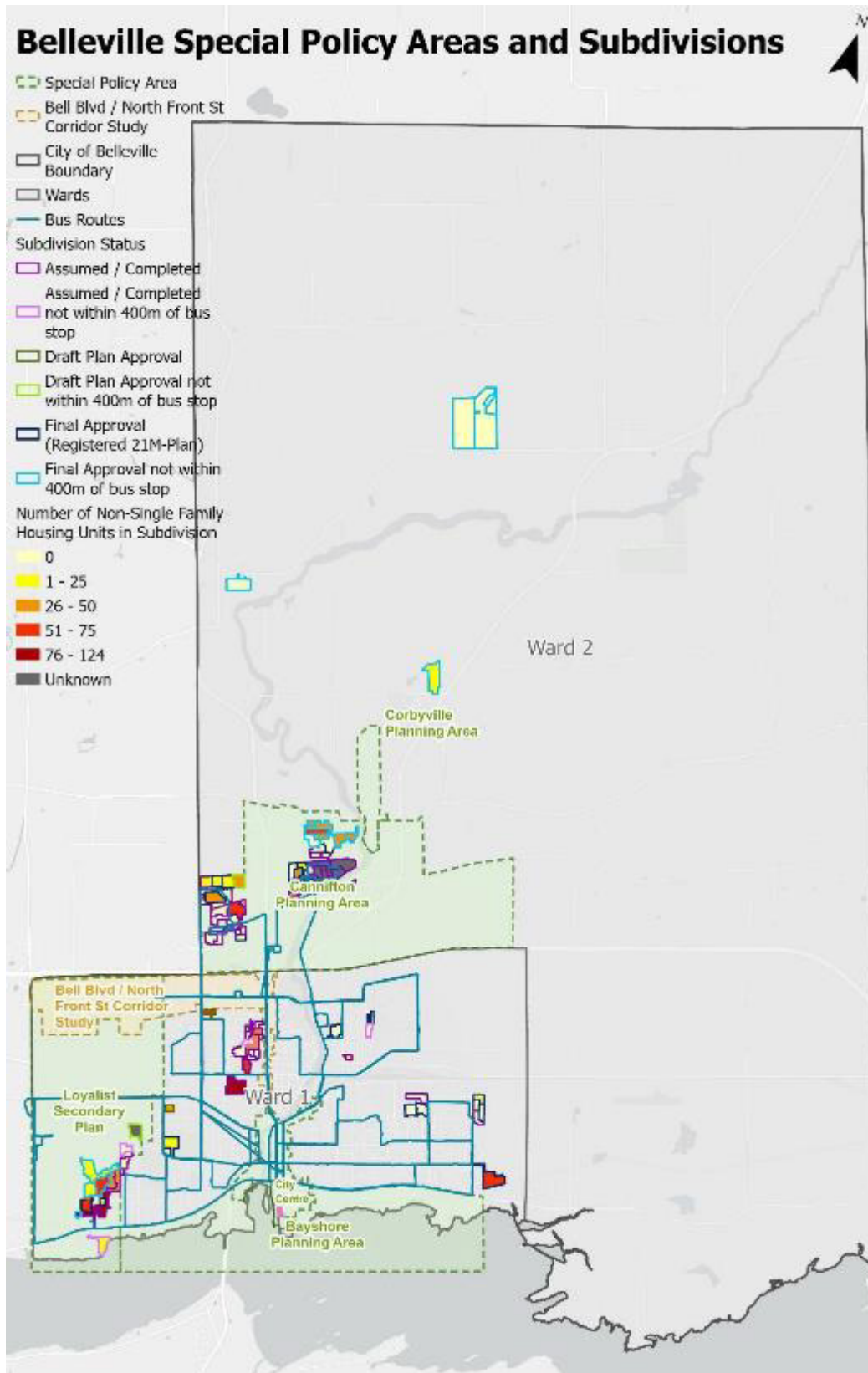


New Development and Transit

Some of the new developments in Belleville extend into undeveloped areas beyond the current transit network, which will need to be addressed with a reconfiguration of the transit network to better serve the community today and in the future. As discussed above, there are some new development locations that do not currently have access to the transit network, which is evident in Figure 20

Specifically, there are higher-density developments that will need transit service in the future. The main higher density locations without transit service are within the Loyalist Secondary Plan area, where the Potters Creek West development will have 22 duplex units and 102 apartment units. Potters Creek – Phase 6 will also be higher density for the area as it will have 59 townhouse units alongside 51 single detached dwellings. These two developments are not within 400 metres of transit service. While this type of development could support higher transit use, making that connection would require additional operating costs by Belleville Transit in the form of new or extended routes. Conversely, when higher-density development is in an area already served by transit, new users from this development would create a more efficient use of current investment in transit.

Figure 20: Special Policy Areas and Subdivisions



Transit Supportive Policy and Guidelines Recommendations

As Belleville grows, some new development will occur beyond the current transit service area. The current transit route structure should be redesigned to both improve the transit network functionality within the current developed area and serve and connect the new development areas within an integrated transit service network. Aside from redesigning the network as the City expands, Belleville can also support growth with policies and guidelines for transit-supportive development and corridors. Transit-oriented communities are compact, mixed-use communities that have easy access to jobs and service and increase the viability of transit by promoting multiple forms of transportation options. Belleville's Official Plan and Transportation Master Plan (TMP) include policies and guidelines that encourage transit-supportive corridors.

For example, the following policies on transit-supportive corridors are included in Belleville's Official Plan:

- “The Plan encourages development at transit-supportive densities and intensification where transit is planned, exists or may be developed.”¹⁷
- “Promote sustainability through encouragement of transit-supportive development and intensification in transit areas”¹⁸

Building on these policies, the TMP provides recommendations to the City of Belleville to identify corridors for promoting transit-supportive development. The TMP does not describe what a transit-supportive corridor is but notes that key factors in determining a transit-supportive corridor are “land use, roads with existing multiple transit routes, and availability of lands for intensification or redevelopment.”

Transit-supportive corridors are made up of transit-supportive development, which includes a mix of uses. This combination of a variety of activities, destinations and densities supports transit because it generates more trips due to a higher number of users (density) for a higher number of purposes (mixed-use). Thus, efforts such as those for turning the Bell Corridor into a mixed-use corridor prime the area to support even more transit service in the future.

The following are seven basic principles, which combined, create a successful transit-supportive corridor:

1. **Medium to Higher Density Development:** Higher density housing means more people have close access to transit and other services.
2. **A Mix of Land Uses:** A mix of land uses, such as residential, commercial, employment, and public uses makes for an area in which residents, workers, and visitors can rely less on private autos due to proximity of various needs. A strong mix of land uses also helps to diversify transit ridership, leading to more even loads throughout the day and to be more resilient in the face of change.

¹⁷ Official Plan, 2022, p. 18

¹⁸ Official Plan, 2022, p. 11

3. **Compact, Pedestrian Friendly Environment:** Compact, walkable areas prioritize people rather than autos. This emphasis on a pleasant and safe walking environment encourages non-motorized modes and public transit. Narrower streets at pedestrian scale result in reduced traffic speeds, which make for safer and more inviting areas for walking between uses, including to/from bus stops.
4. **Active & Vibrant Center:** Public spaces that bring people together, offering services, attractions, and areas in which to gather are key to supporting transit use.
5. **Encourage multimodal Connectivity:** Transit-supportive areas account for transit access beyond stops—they acknowledge the need to get to and from transit, providing connections for users on foot, bike, scooter, other transit routes/systems, and taxi/ride-share.
6. **High-Frequency of Enhanced Transit:** Frequent service encourages transit use by minimizing uncertainties in trip planning that can discourage transit use. If frequent enough, users know that they do not have to plan around a transit schedule but can instead show up at the stop and expect to have a minimum wait time.
7. **Managed and Limited Parking Options:** Managing parking by providing an adequate supply of parking to provide access and pricing according to demand discourages auto use while maintaining auto access.¹⁹

This list of principles focuses on the integration of transportation (including transit investments) and land use. Alignment of investment in transit with land use policy will support and foster transit use and vice versa. This cycle of support leads to vibrant and active areas of commercial activity.

The City of Belleville can benefit from strengthening efforts to meet objectives related to transit-supportive corridors by adopting additional policies and guidelines to support it. These policies and guidelines may provide the foundation to create a more accessible and efficient transit. The following are recommendations of policies and guidelines for transit-supportive development in Belleville based on practices from across North America.²⁰

¹⁹ Rochester Transit-Supportive Corridors Study, 2018, p. 14-17, <https://rochester2034.com/wp-content/uploads/2019/09/E.-Transit-Supportive-Corridors-Study.pdf>; Transit-Supportive Corridors: Existing Conditions and Implementation Tools, County of Kane 2040, 2015, <http://kdot.countyofkane.org/Planning%20Documents/Transit-Supportive%20Corridors%20-%20Existing%20Conditions%20and%20Implementation%20Tools/Final%20Report.pdf>

²⁰ Information is gathered from the following sources: Rochester Transit-Supportive Corridors Study, 2018; <https://rochester2034.com/wp-content/uploads/2019/09/E.-Transit-Supportive-Corridors-Study.pdf>; Planning and Policymaking for Transit-Oriented Development, Transit, and Active Transport in California Cities (Barbour, Grover, Lamoureaux, Chaudhary, Handy), 2010, <https://escholarship.org/uc/item/7j37k8ms>; Policy Support for and Barriers to Transit-Oriented Development in the Inner City (Hess & Lombardi), 2004 <https://journals.sagepub.com/doi/10.3141/1887-04>

Policies:

- The City should encourage development that is contiguous to the current urban development and transit service to take advantage of the current public investment in transit and community servicing (including roads, sewer, water, and electrical).
- The community form and road network should be developed in a linear form that is conducive to efficient transit routes. Avoid a circuitous and discontinuous road network.
- The City should promote more compact, mixed-use type of residential, commercial, and office development uses along the transit network and within transit-supportive corridors. There should be multiple land uses along a transit network.
- The City should have a walkable public realm. The community walking network should encourage access to and along the transit route(s), or in other words encourage a high “Walk Score.”

Guidelines:

Define and identify transit supportive development and corridors: The Official Plan and Transportation Master Plan state the importance of transit-supportive development for the City of Belleville. A clear definition of characteristics and outcomes of transit-supportive corridors will provide a clear idea of the what a transit-supportive corridor looks like. This definition will also help the City successfully address policies in the Official Plan that encourage transit-supportive development.


Echoing Belleville’s TMP recommendations, identifying a list of corridors that provide important transportation connections, have a high-level transit service and ridership, and have the potential for residential intensification and mixed-use development can help focus transit supportive development in those areas.

The Bell Boulevard/North Front Street Corridor is an example of a corridor that can be identified as promoting transit supportive development. There is an ongoing corridor study for the area that is already planning for transit supportive characteristics, such as mixed land uses and a proposal to review public transportation improvement along the corridor with the public realm. Explicitly calling out these characteristics as transit supportive can help define and clarify the goals of the corridor.

Update the Zoning Code to Include Mixed-Use, Transit-Supportive Development:

The zoning code currently does not have transit supportive zoning that promotes a mix of uses and higher densities along transit corridors. There is potential to update the zoning code to make residential zones and some commercial zones more transit supportive by increasing densities and adding more mixture of use into the zone requirements.

Prioritize multimodal upgrades and additions along the identified transit supportive corridors: A corridor that encourages transit use also supports other transportation options, particularly active transportation, and invests in infrastructure to support all modes. The Official Plan could add policy stating that Belleville will identify and prioritize pedestrian and bicycle infrastructure needs and enhanced transit stops along transit-supportive corridors.



E

Appendix E: Existing Service Coverage Analysis

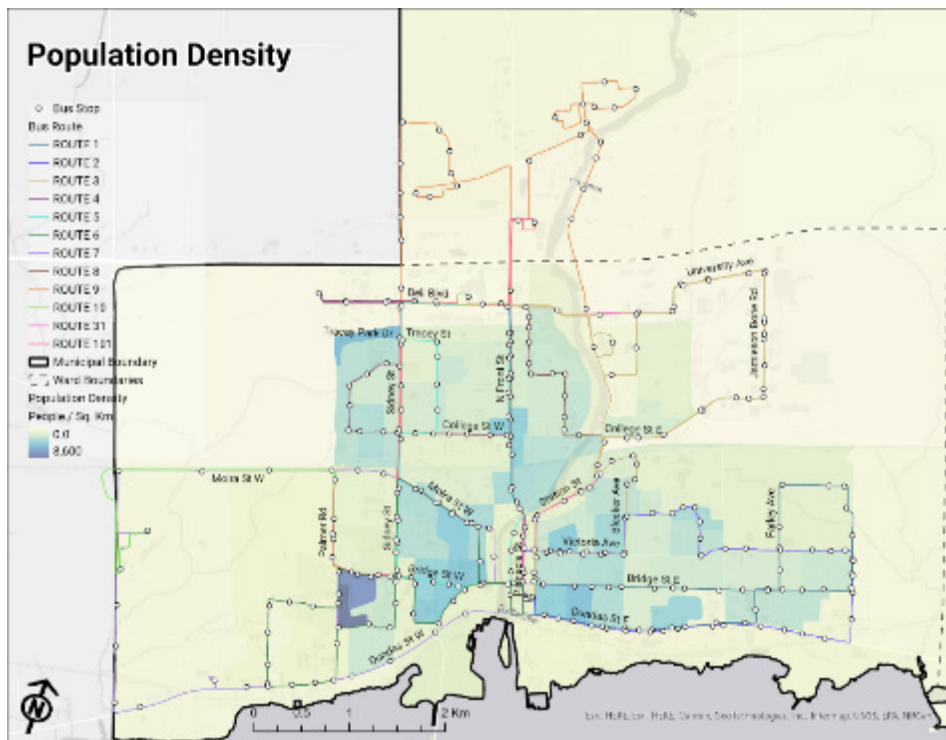
Appendix E: Existing Service Coverage Analysis

Summary

This memo examines transit service coverage by measuring access to transit stops within 400 metres (or 5-minute walk) from key trip attractors. It also provides an overview of demographic patterns in the context of transit access.

The City of Belleville is divided into Wards 1 and 2, with the majority of the population concentrated in Ward 1. Within Ward 1, most of the population lives closer to the City centre and within walking distance of at least one bus stop served by the transit network.

Figure 21: Population Density in Belleville by Dissemination Area (DA), overlaid with the bus network



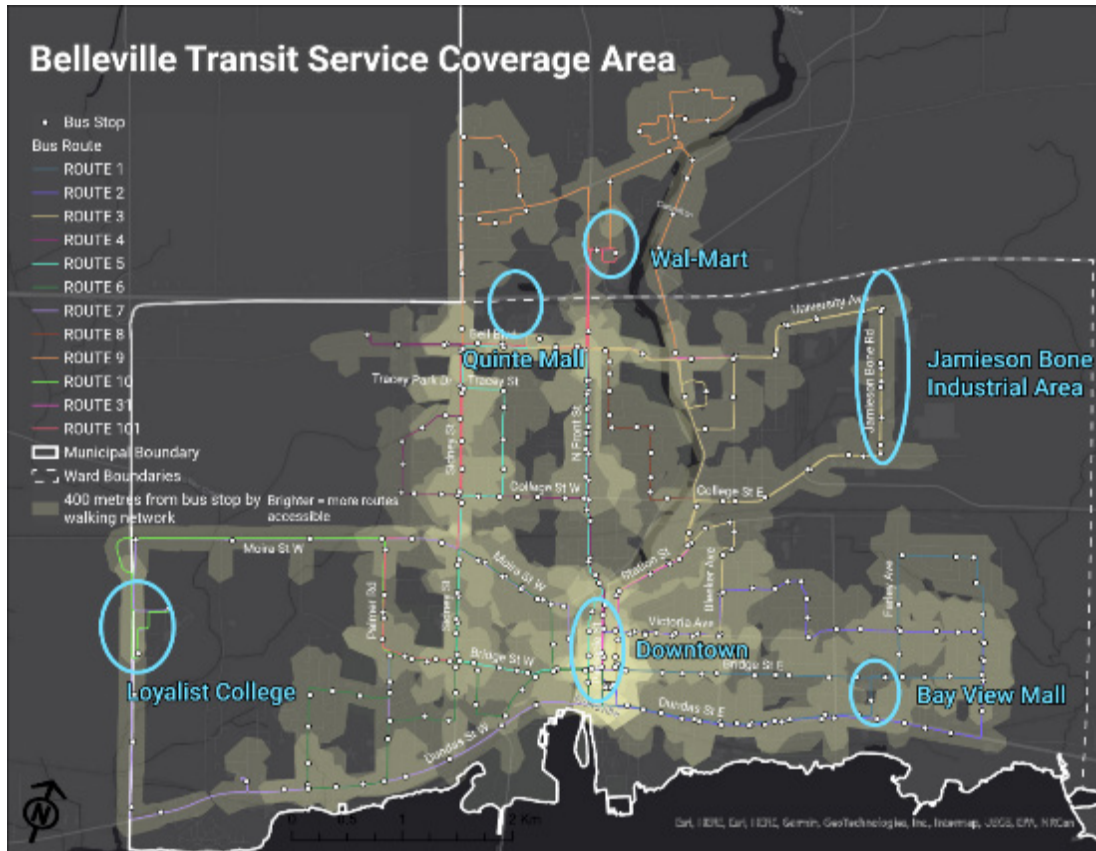
The largest employment sector is commercial (37%) followed by industrial (23%). Most commercial areas are within walking distance of at least one transit stop. Transit ridership on routes and stops serving industrial areas has been some of the most resilient throughout the pandemic.

The map below (Figure 22) highlights the main trip attractors based on current ridership data in order of ridership volume/stop activity:

1. Downtown, mostly along Pinnacle Street
2. Loyalist College
3. Quinte Mall

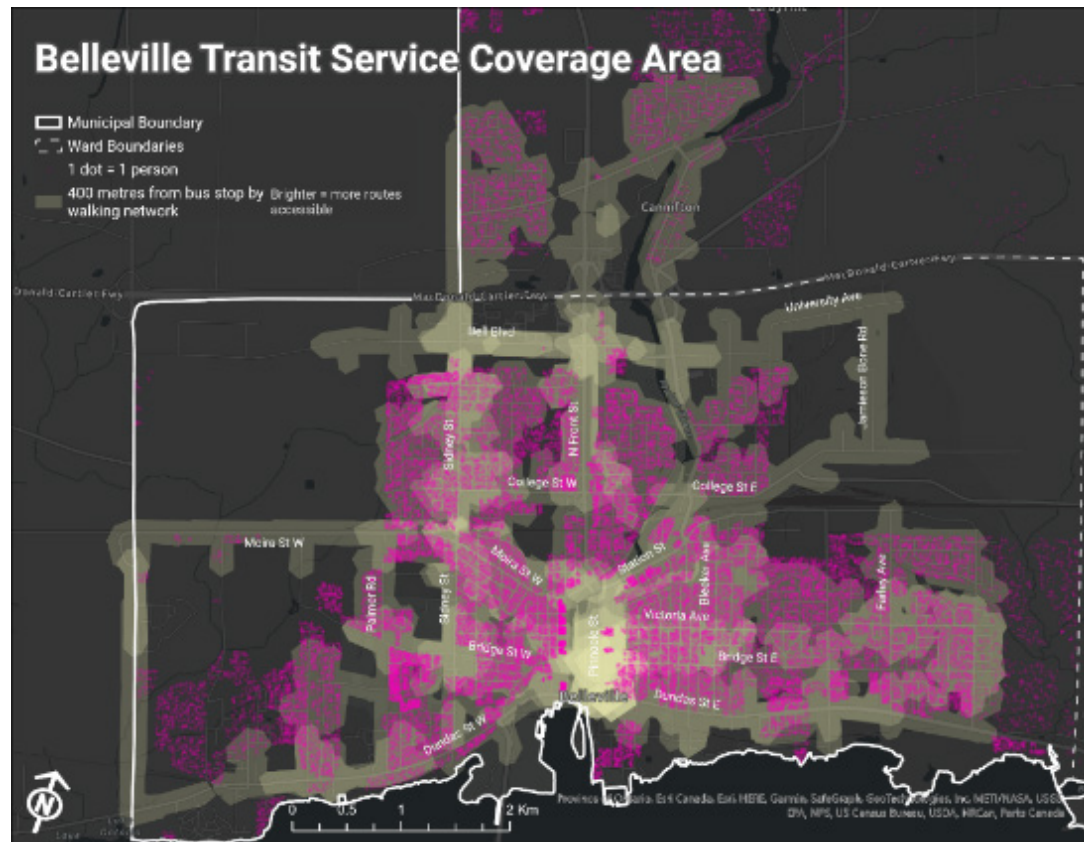
4. Walmart
5. Jamieson Bone Industrial Area
6. Bay View Mall

Figure 22: Existing bus network coverage area assuming a 400-metre walk along the road network to access a bus stop, where brighter red indicates more bus services available with major trip attractors labeled



There are currently no bus routes that operate more frequently than a 30-minute headway. However, having access to multiple bus routes increases transit accessibility by offering a one-seat ride to more places, or increased frequency along the same corridor due to overlapping service.

Figure 23: Existing bus network coverage area assuming a 400-metre walk along the road network to access a bus stop, where brighter yellow indicates more bus services available



While about 93% of the population of Ward 1 lives within a 400-metre walk of a bus stop, there are a few notable locations where people live in Ward 1 without convenient access to bus service, shown in the image above by areas with pink dots (representing population) that are outside of the yellow service coverage area. These areas include:

- Dundas Street East east of Haig Road
- The neighbourhoods on Sienna Avenue and Avonlough Road north of Dundas Street West
- Several areas in Ward 2 that are not served by Route 9

There are also several neighbourhoods with a bus stop nearby but not within 400 metres due to poor road connectivity. These include:

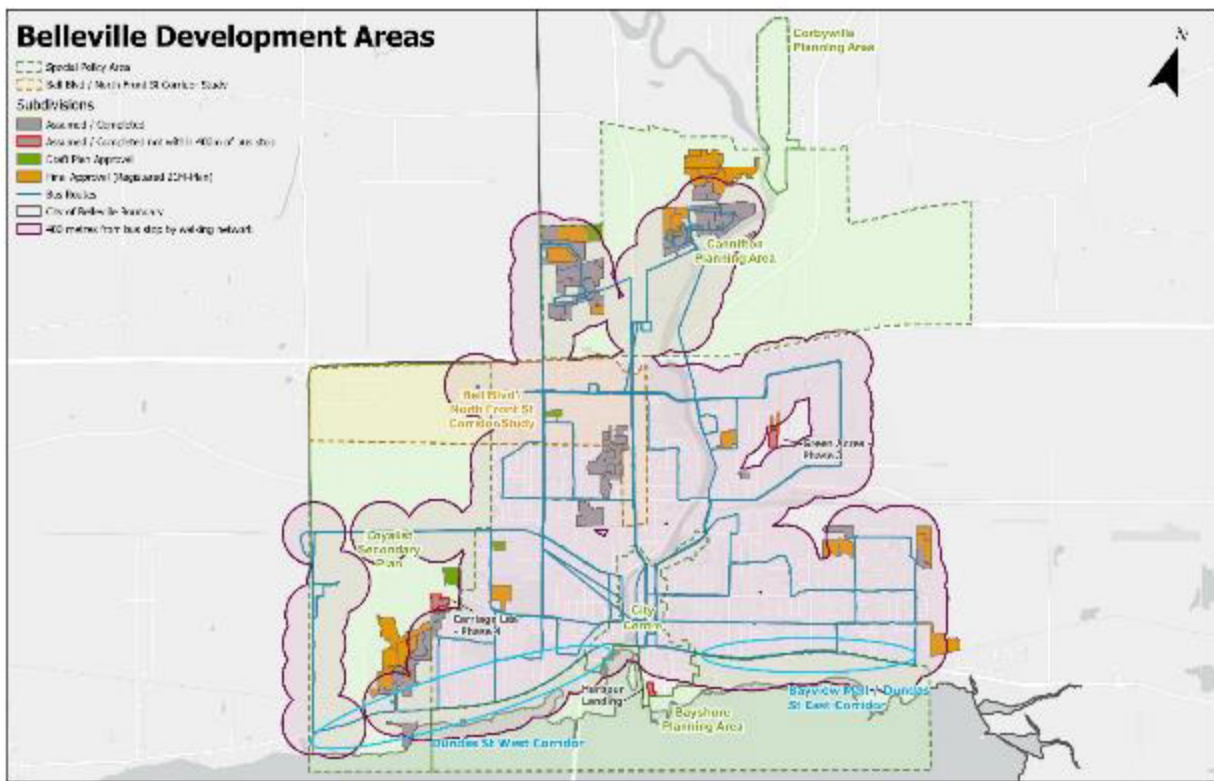
- Parts of the neighbourhood northwest of North Front Street and College Street
- Parts of the neighbourhood west of Sydney St. and south of Bell Blvd.
- The neighbourhood west of the Jamieson Bone industrial area
- The neighbourhood west of Pinnacle Street and south of Dundas Street

The largest employment sector is commercial (37%) followed by industrial (23%). Most commercial and industrial areas are within 400 metres of a transit stop, with exception of the following industrial areas:

- The area along Station Street near Herchimer Avenue
- The area along Mineral Road and Parks Drive in Ward 2, north of the Walmart

While the current transit network is within 400 metres of most current residents, a number of areas slated for future development or where new development has been constructed are outside of this threshold.

Figure 24: Special Policy Areas in Belleville, their expected residential size, and subdivisions that are outside the current transit network



Background

City of Belleville

The City of Belleville is located on the north shore of the Bay of Quinte and between Toronto and Montreal in Ontario. Belleville's population 55,071 in 2021, which is a 9% growth from 2016.²¹ Belleville spans 247 km² of land and is divided into the Ward 1, which includes the city centre and most of the urban areas of Belleville, and Ward 2, or the 'Thurlow' ward that is primarily rural. The average household size is 2.3 people per household and the median age is 45.2. The largest visible minority population are the South Asian, making up 28.51% of the total visible minority population. A 23.6% of the population is classified as 'Senior,' being over 64 years of age.

There are approximately 100,000 people working in Belleville as some of the 200,000 people who live half an hour away work in the City. The largest employment sector is commercial (37%) followed by industrial (23%).²² Manufacturing and Transportation and warehousing were some of the fastest growing employment sectors within industrial uses from 2011 to 2016 and continue to be major components of economic activity.²³

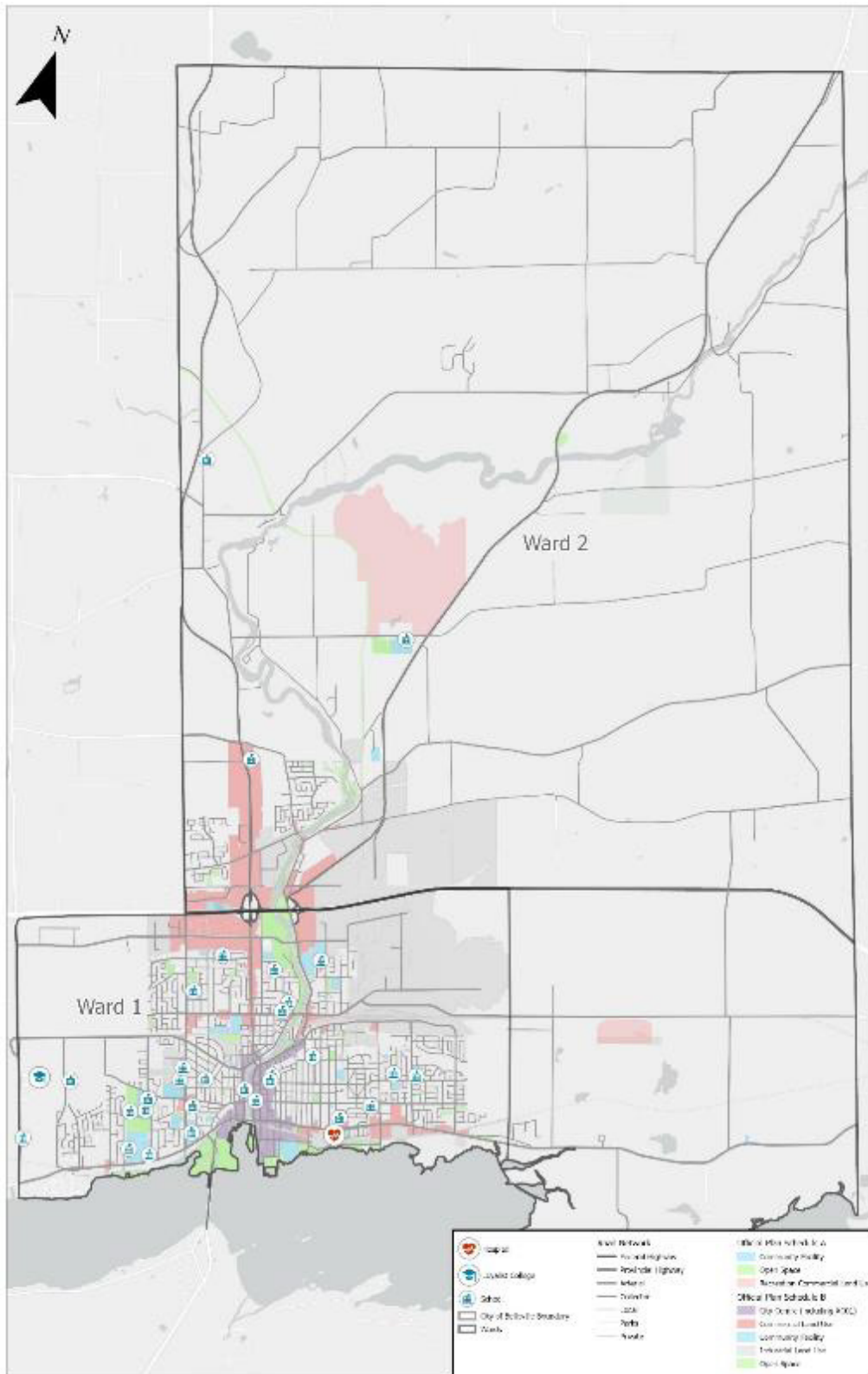
There are four hospitals in the region, including Belleville General Hospital which is the largest and operates as the main Centre for healthcare in the region. Belleville has public and privately funded elementary and secondary schools as well as specialty schools. Loyalist College is the main post-secondary institute in Belleville, but Queen's University and St. Lawrence College are other options within an hour's drive. A map of Belleville is provided below (Figure 25).

²¹ Statistics Canada, Census Profile, 2021

²² Watson & Associates Economists Ltd., 2022

²³ Residential Land Supply, December 31, 2021, p. 11

Figure 25: Belleville Land Use Designations and Key Destinations

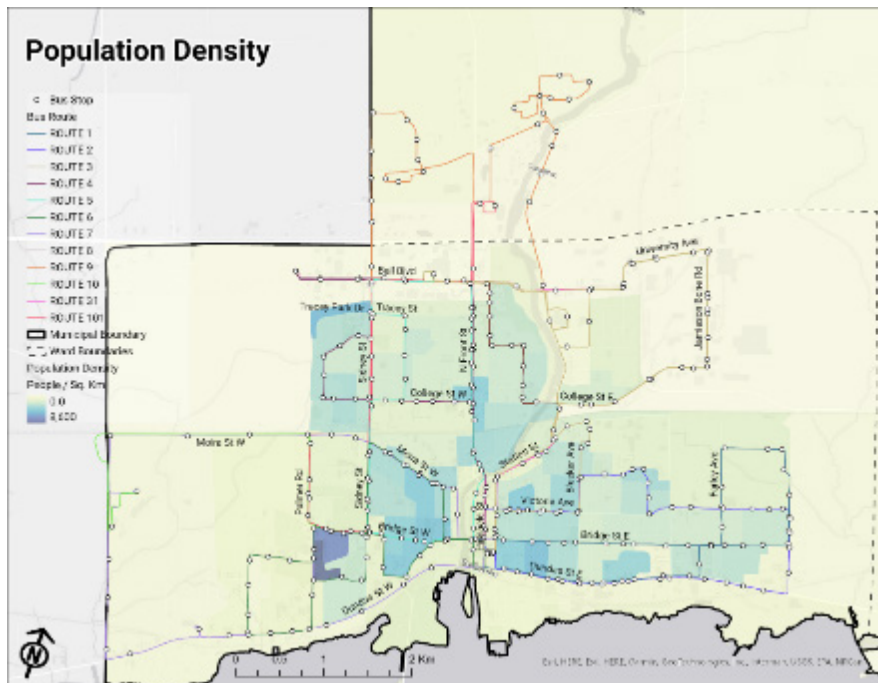


Population Distribution

Figure 26 shows the population distribution for the City of Belleville. In general, higher concentrations of population are located closer to the city centre. Most of the areas with higher population density are along Sidney Street south of Tracey Street/Tracey Park Drive on the west side of the City, and in the area of Victoria Avenue and Bleeker Street on the east side of the City. There are also several pockets of particularly high density. These include:

- Bridge Street West and Palmer Road, with several mid-rise and high-rise buildings along Bridge Street West and Palmer Road
- The neighbourhood near Bridge Street West between Everett Street and Wellington Street
- The neighbourhood along Bridge Street East near William Street

Figure 26: Population Density in Belleville by Dissemination Area (DA), overlaid with the bus network

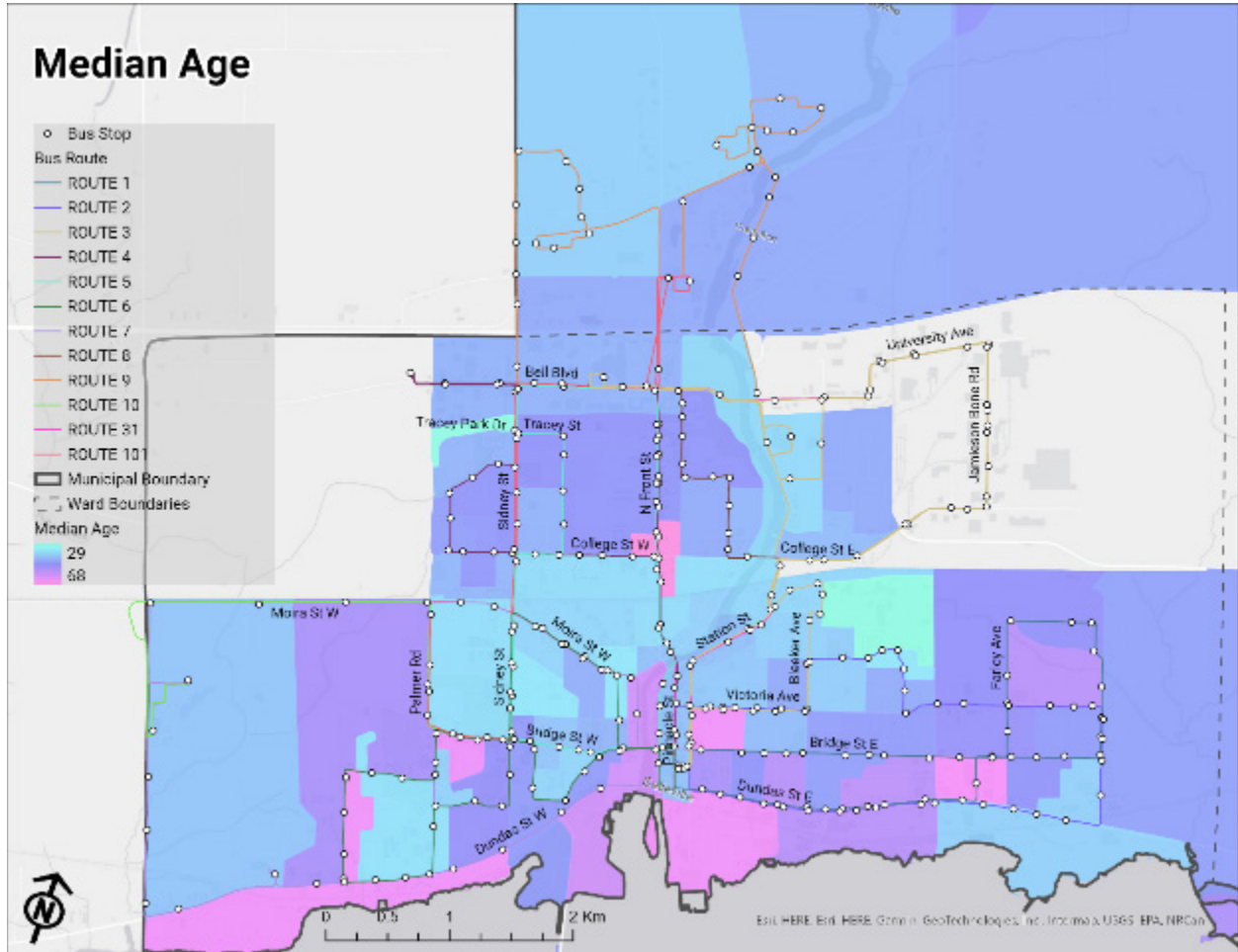


Demographics

Age

The median age by dissemination area (DA) shows that the median age tends to be higher towards the south end of the City and tends to be lower in the central and northern parts of the City.

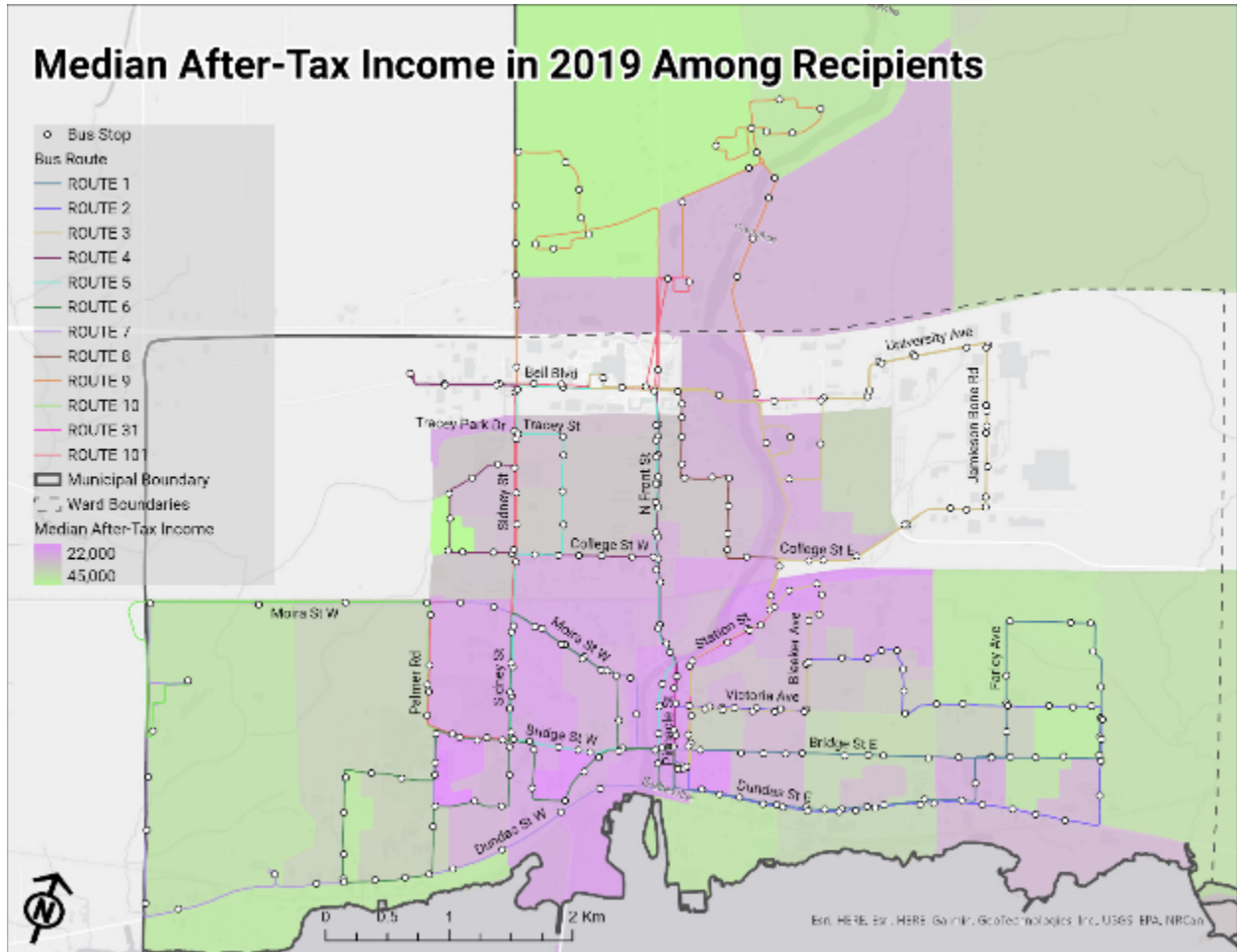
Figure 27: Median Age of the Population by Dissemination Area (DA), overlaid with the bus network



Income

Areas near downtown and on the west side of the City tend to have lower median income, while the east end and north end of the City tends to have higher median income.

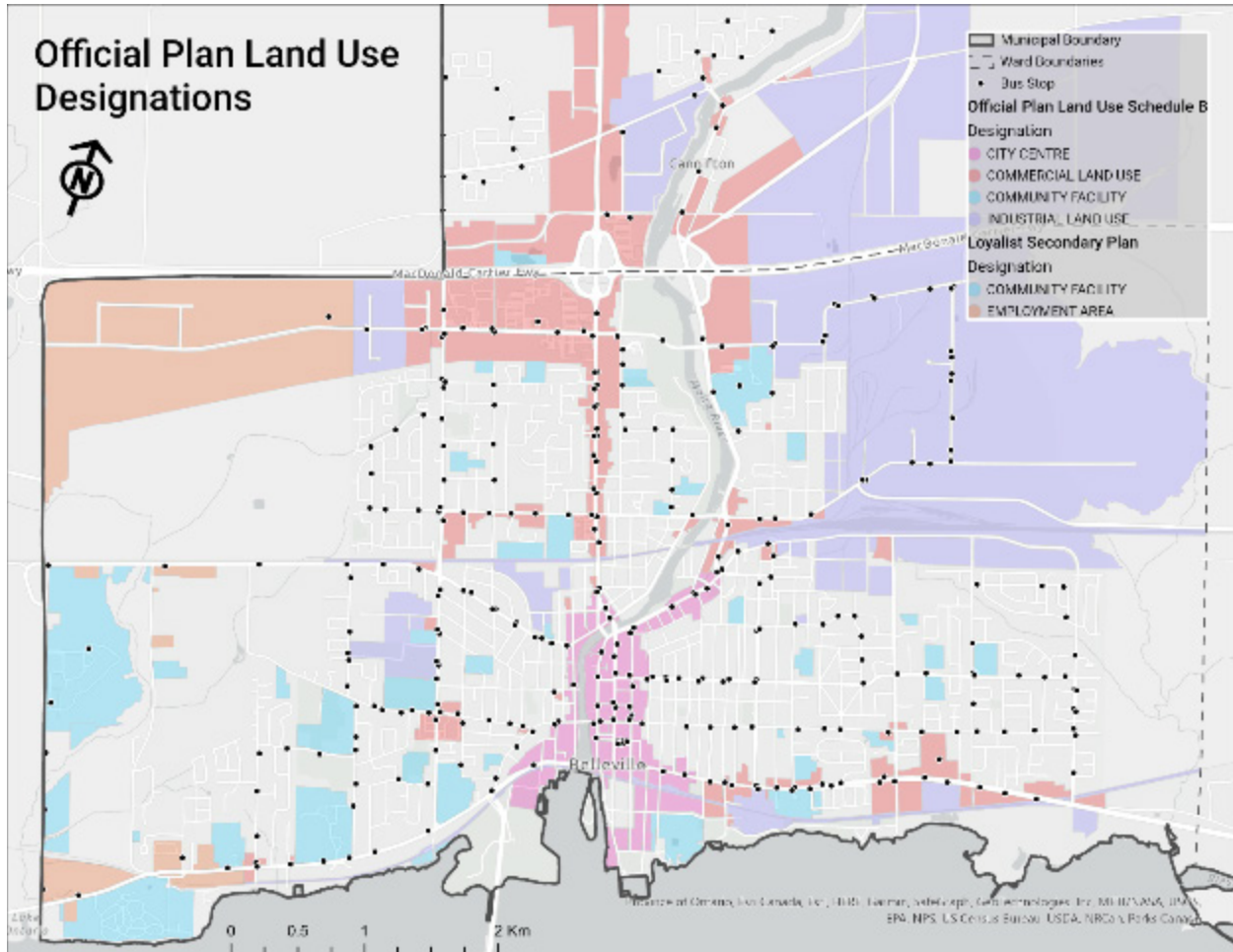
Figure 28: Median After-Tax Income in 2019 among Recipients by Dissemination Area (DA), overlaid by the bus network



4 Land Use and Major Trip Attractors

Figure 29 shows major land use designations associated with trip attractors as well as transit stops.

Figure 29: Official Plan Land Use Designations for City Centre, Commercial, Community Facility, and Industrial, with current bus stops overlaid



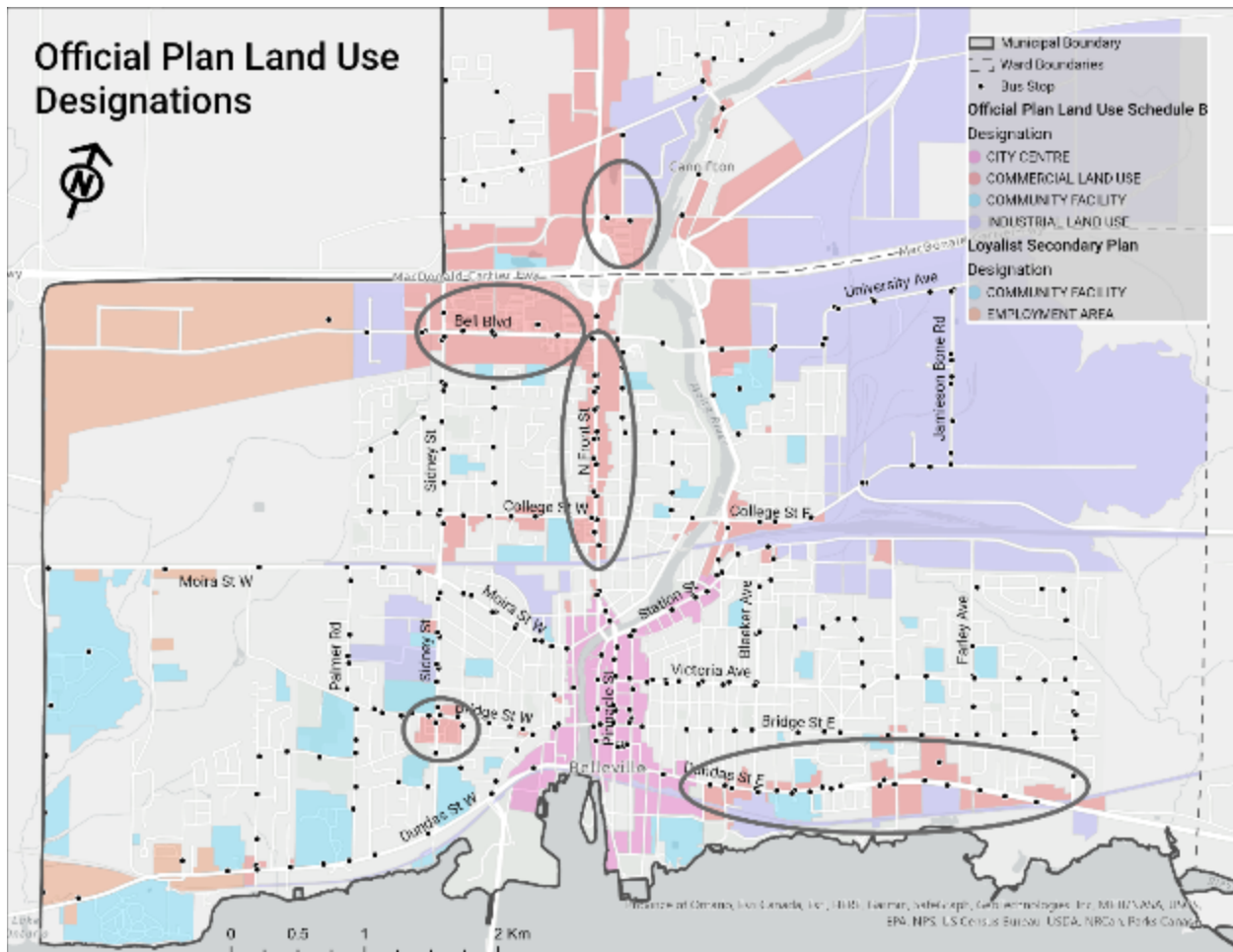
Commercial Areas

In general, commercial areas tend to attract trips from both workers and users of commercial services. Key commercial areas include (see Figure 30):

- The area near Quinte Mall along Bell Boulevard
- The North Front Street corridor north of the railroad tracks
- The Dundas Street East corridor
- The intersection of Sidney Street and Bridge Street West
- The Walmart north of Highway 401

All these commercial areas are served by at least two current routes, and the area near Quinte Mall on Bell Boulevard is served by the Quinte Mall Transit Terminal.

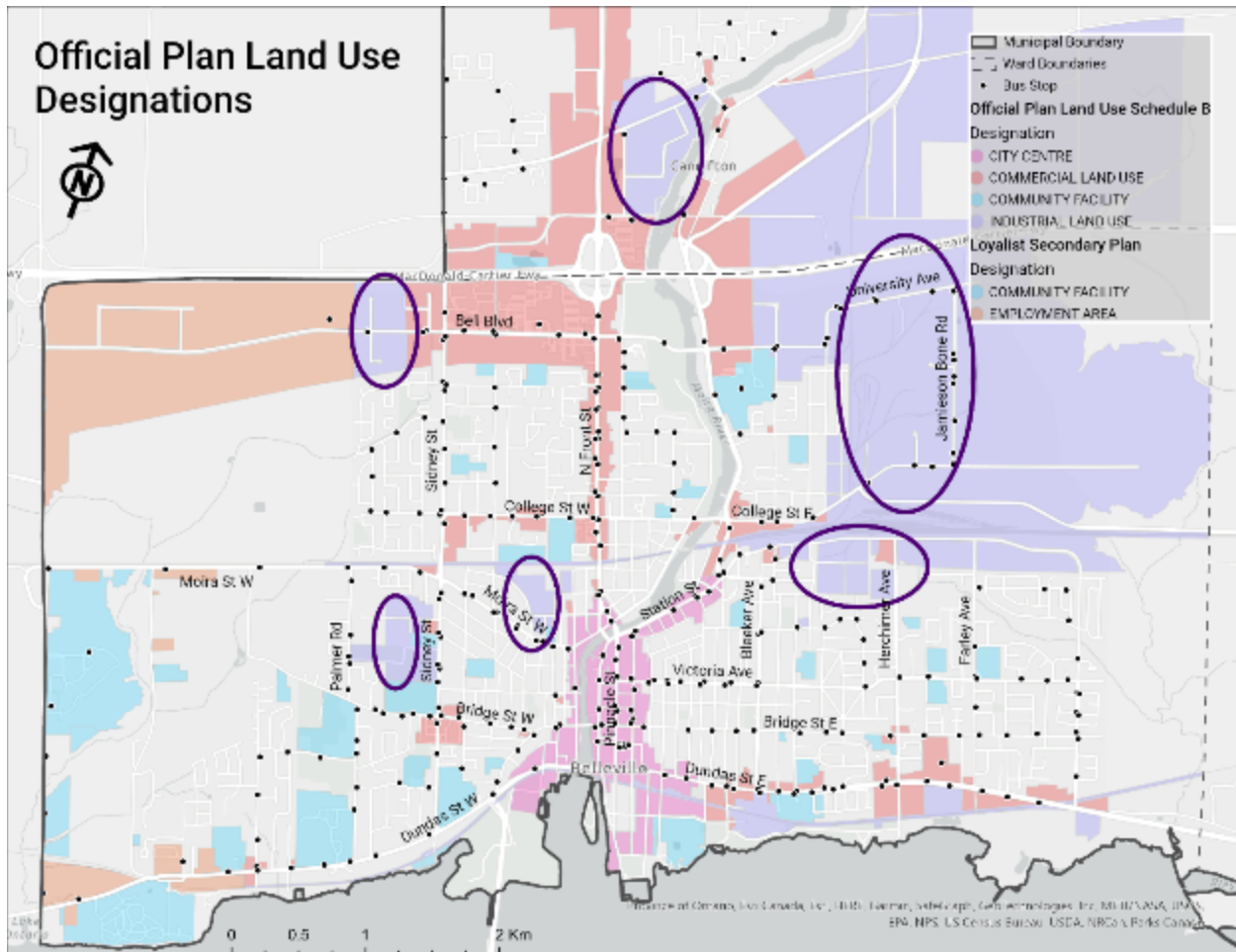
Figure 30: Official Plan Land Use Designations with key commercial areas circled, with current bus stops overlaid



Industrial Areas

Industrial areas often attract trips from workers, with trips that line up with shift start and end times that are not restricted to usual business hours. As an example from Belleville, data shows that stop activity tends to peak in the Jamieson Bone industrial area around 7:00 am, 3:00 pm, and 11:00 pm. Belleville Transit has also reported that ridership serving industrial areas has been most resilient during the pandemic. Key industrial areas in Belleville are circled in Figure 31.

Figure 31: Official Plan Land Use Designations with key industrial areas circled, with current bus stops overlaid



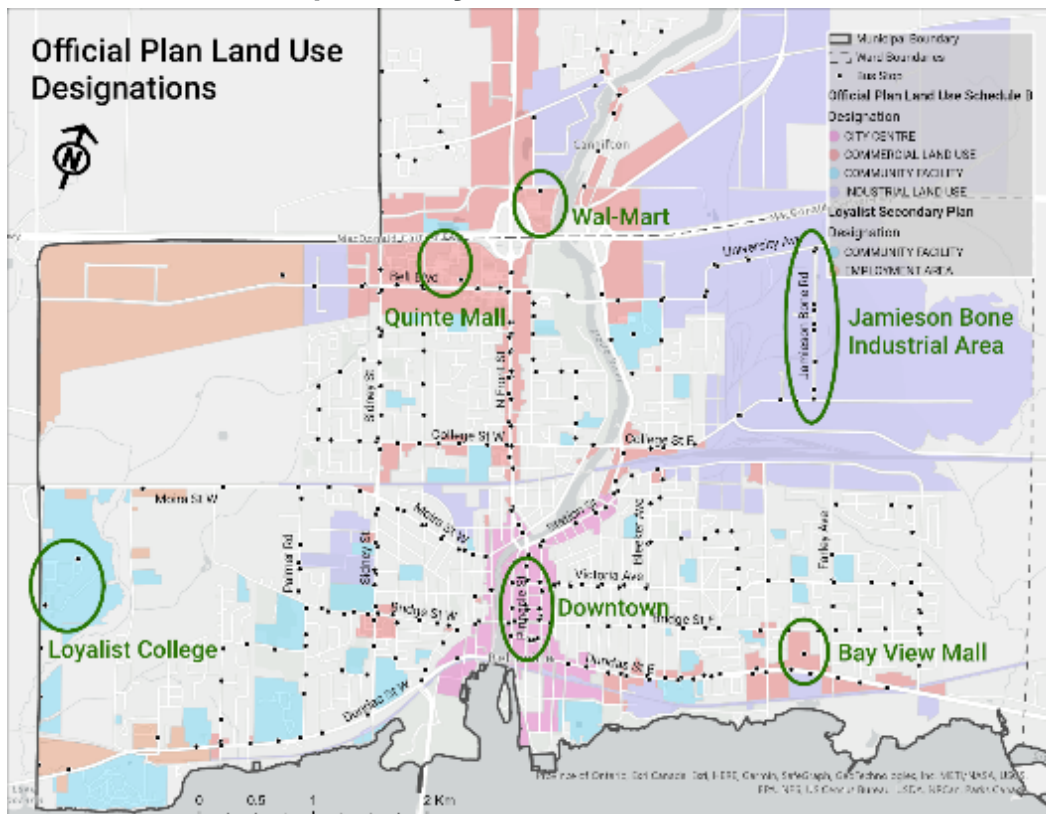
Key Trip Attractors Based on Ridership

Ridership data shows that the top six trip attracting locations in Belleville by public transit are (shown in Figure 32):

1. Downtown, mostly along Pinnacle Street
2. Loyalist College
3. Quinte Mall
4. Walmart
5. Jamieson Bone Industrial Area
6. Bay View Mall

All of these locations are served by at least one fixed bus route, and most of them are served by at least two fixed bus routes. There is demand for travel to these areas throughout the day, with slightly varying trip distributions at each location. Ridership in the Jamieson Bone industrial area tends to have peaks around 7:00 am, 3:00 pm, and 11:00 pm. Ridership at Loyalist College tends to be evenly distributed throughout the day. Ridership at Walmart is busiest in the evening with a peak around 11:00 pm on the on-demand route. The rest of the locations tend to peak between 3:00 pm and 6:00 pm.

Figure 32: Official Plan Land Use Designations with key trip attractors circled, with current bus stops overlaid



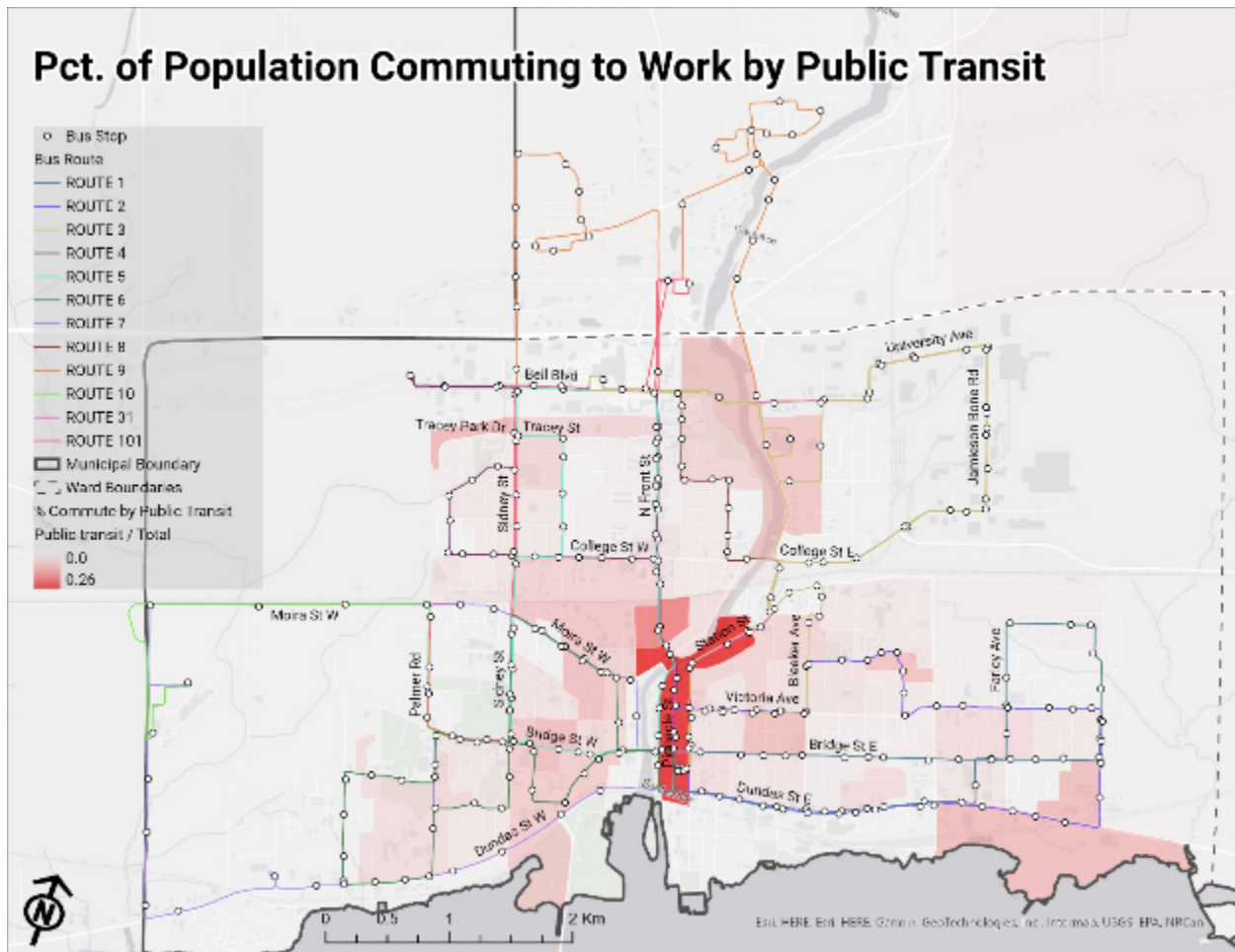
Travel to Work Mode

Areas with a higher transit mode share to commute to work (based on 2016 Census data) are concentrated in certain parts of the City. These include:

- Along Pinnacle Street and North Front Street just north of Moira River
- The neighbourhood near Bridge Street West between Everett Street and Wellington Street
- Along Dundas Street East east of Herchimer Avenue
- Near Queen Street between Ann Street and Bleeker Street

These patterns may be a result of where people either have convenient transit access to work with the current network, or an indicator of areas where people tend to be more reliant on public transit for economic reasons. While there is overlap between the areas with greatest transit commute share and low-income population areas in the Downtown core, the patterns do not overlap to a significant degree in other areas, indicating that access to transit likely plays a role in commute mode choice.

Figure 33: Proportion of People Commuting to Work by Public Transit by Dissemination Area (DA), overlaid with the bus network

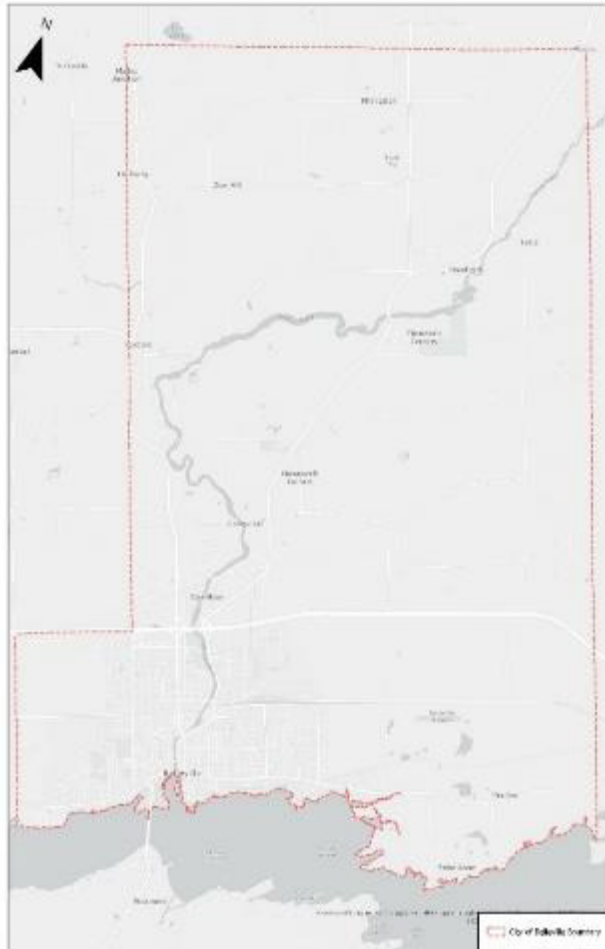


Belleville Transit

Service Coverage Area

Belleville Transit's service coverage areas is 247 km² and the service area population is 50,716, which are the same as the municipal population and land area of the City. Figure 34 shows the boundary of the City, or the service coverage area.

Figure 34: Belleville Service Coverage Area



Service Network

The Belleville Transit bus network is made up of ten fixed routes, two on-demand routes, and the Mobility Bus paratransit service. There are two major transit terminals located downtown at Pinnacle Street and Market Street, and at Quinte Mall on Bell Boulevard west of North Front Street. Eight out of the ten fixed routes operate mostly as a one-way loop, providing most corridors with service in only one direction, unless there are overlapping routes serving different directions. Routes 3 and 10 are the only two routes that mostly serve the same corridor in both directions.

Figure 35: Belleville Transit System Map



Service Characteristics

Most of Belleville Transit’s regular fixed routes (Routes 1 to 10) operate at a 30- to 60-minute headway from about 6:00 am to 10:00 pm on weekdays and until about 7:00 pm on weekends. Routes 31 and 101 offer on-demand service in the evenings after the hours of the conventional routes. Table 12 shows the details of the service levels and operating hours of each route.

Table 12: Headway and Span of Belleville Bus Routes on Weekdays, Saturdays, and Sundays

Route	Weekday			Saturday			Sunday		
	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip	Headway (min)	First Trip	Last Trip
1	30	6:30	18:00	60	8:00	18:00	60	9:30	17:30
2	30/60	5:00	22:00	30	7:30	19:00	60	9:00	18:00
3	30	5:30	21:00	30/60	6:00	18:00	60	8:30	17:30
4	30/45	6:15	21:15	45	7:15	18:30	45	8:45	17:45
5	30	5:00	21:30	60	5:30	18:30	60	9:00	18:00
6	30/45	6:30	18:00	60	8:00	18:00	60	9:00	18:00
7	30/60	6:30	22:00	60	7:00	19:00	60	9:30	17:30
8	30-60	6:30	21:30	30	7:30	18:30	60	9:30	17:30
9	45	6:30	20:45	45	7:30	17:45	45	9:00	18:00
10	60	7:30	21:30	60	8:30	18:30	60	9:30	17:30
31	30	22:00	24:00	30	19:30	24:00	60	19:00	24:00
101	30	22:15	24:15	30	19:45	24:15	30	19:15	24:15

Service Types

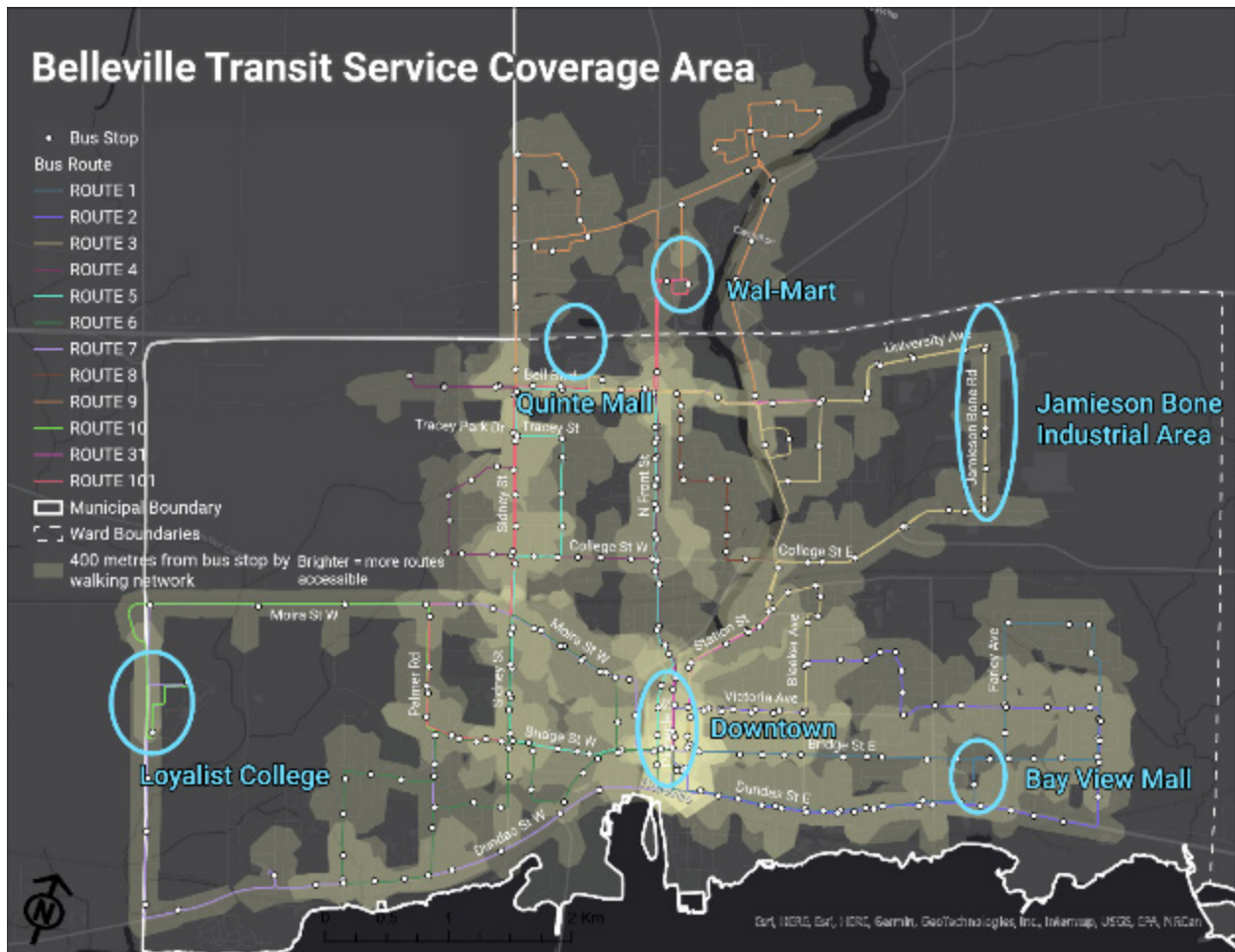
Belleville Transit offers three types of services by bus: regular fixed route, on-demand, and paratransit. Regular fixed routes (Routes 1 to 10) operate throughout most of the day on set schedules, where passengers may show up at a bus stop and board the bus when it arrives. On-demand routes (Routes 31 and 101) operate in the evening after fixed-route service has ended and allow passengers to book a trip using an app between two set points along an on-demand route. The paratransit service, called the Mobility Bus, offers a door-to-door service for people facing barriers to using the fixed-route services.

Transit Coverage Analysis

Population Coverage

Current distribution of bus routes and stops cover most of the populated areas south of Highway 401. Approximately 93% of the population of Ward 1 lives within 400 metres of a bus stop (see Figure 36). There are currently no bus routes that operate more frequently than a 30-minute headway. However, having access to multiple bus routes increases transit accessibility by offering a one-seat ride to more places, or increased frequency along the same corridor due to overlapping service. Because eight out of ten fixed routes operate mostly as one-way loops, it is difficult to analyze service levels of a particular corridor, since the route(s) serving the corridor in one direction may be different from the opposite direction. Thus, in order to analyze the level of service that is accessible from any given location, we look at the number of bus routes accessible within 400 metres.

Figure 36: Existing bus network coverage area assuming a 400-metre walk along the road network to access a bus stop, where brighter red indicates more bus services available.



Areas along major corridors such as Pinnacle Street, Front Street North, and Sidney Street tend to have higher levels of service since multiple bus routes operate along these corridors. These areas also tend to have some of the areas with highest transit commute mode share. The Downtown Terminal and the Quinte Mall Terminal have higher level of service since a number of routes serve these terminals.

Other major trip attractors such as Loyalist College, Walmart, Bay View Mall, and the industrial area have lower levels of service as only one or two routes serve these locations. Preliminary ridership analysis however shows that these locations account for about 20% of all boardings.

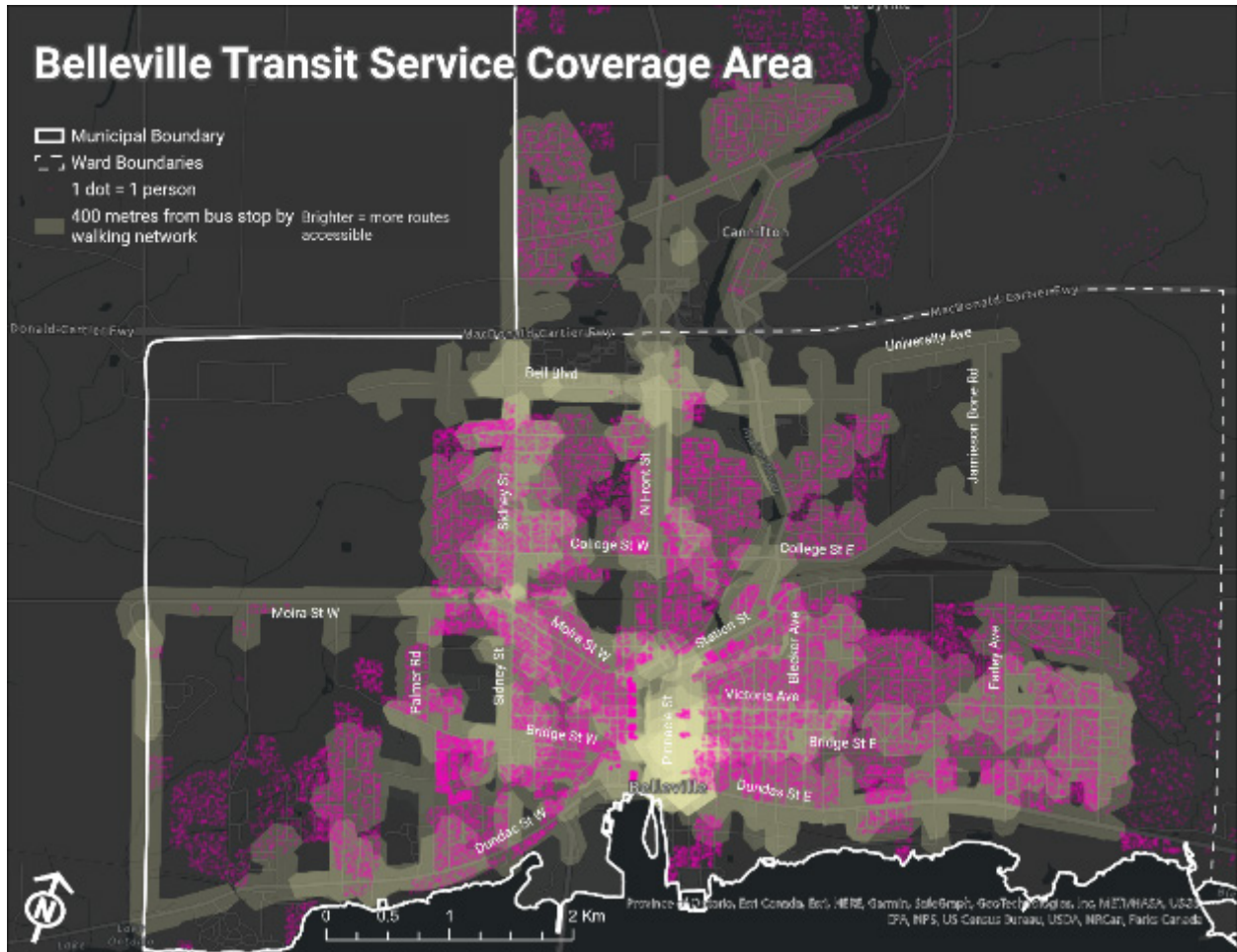
About 93% of the population of Ward 1 lives within a 400-metre walk of a bus stop. This includes all the mid- to high-density locations in Ward 1. There are a few notable locations where there are people who live in Ward 1 without accessible bus service, (shown in Figure 37) by areas with pink dots (representing population) that are outside of the yellow service coverage area. These areas include:

- Dundas Street East east of Haig Road
- The neighbourhoods on Sienna Avenue and Avonlough Road north of Dundas Street West
- Several areas in Ward 2 that are not served by Route 9

There are also several neighbourhoods with a bus stop nearby but not within 400 metres due to poor road connectivity. These include:

- Parts of the neighbourhood northwest of North Front Street and College Street
- The neighbourhood west of the Jamieson Bone industrial area
- The neighbourhood west of Pinnacle Street and south of Dundas Street
- Tracey Park Drive west of Sidney Street

Figure 37: Existing bus network coverage area assuming a 400-metre walk along the road network to access a bus stop, where brighter yellow indicates more bus services available. Approximate distribution of the population shown by the pink dots based on areas that are zoned as residential, where more dots close together indicate a greater population density. (Dot locations are approximate and do not indicate the exact location of a person’s residence.)



Having more than one bus route within 400 metres offers more flexibility for someone to make a trip by transit and increases the accessibility of more destinations. 55% of the people in Ward 1 have access to at least two bus routes. The following table shows the approximate percentage of the Ward 1 population with access to different levels of bus service (number of bus routes within 400 metres).

Table 13: Count of the Number of People in Belleville Ward 1 and How Many Bus Routes They Have Access To

Number of Routes Accessible	Approx. Population	Pct. of Ward 1 Population
0	3,084	7%
1	15,966	38%
2	15,756	37%
3	6,515	15%
4	444	1%
5	63	0%
6	271	1%
7	181	0%
8	80	0%
Ward 1 Total	42,360	100%

Employment Area Coverage

Assuming that most jobs are located in downtown, a commercial area, or an industrial area, we can evaluate how well the transit network serves these locations based on official plan land uses.

The five key commercial areas are served by the current bus network:

- The area near Quinte Mall along Bell Boulevard (Routes 3, 4, 5, 10, 31, 101)
- The North Front Street corridor north of the railroad tracks (Routes 4, 5, 8, 31)
- The Dundas Street East corridor (Routes 1 and 2)
- The intersection of Sidney Street and Bridge Street West (Routes 5, 6, 10, 31, 101)
- The Walmart north of Highway 401 (Routes 9, 10, 31, 101)

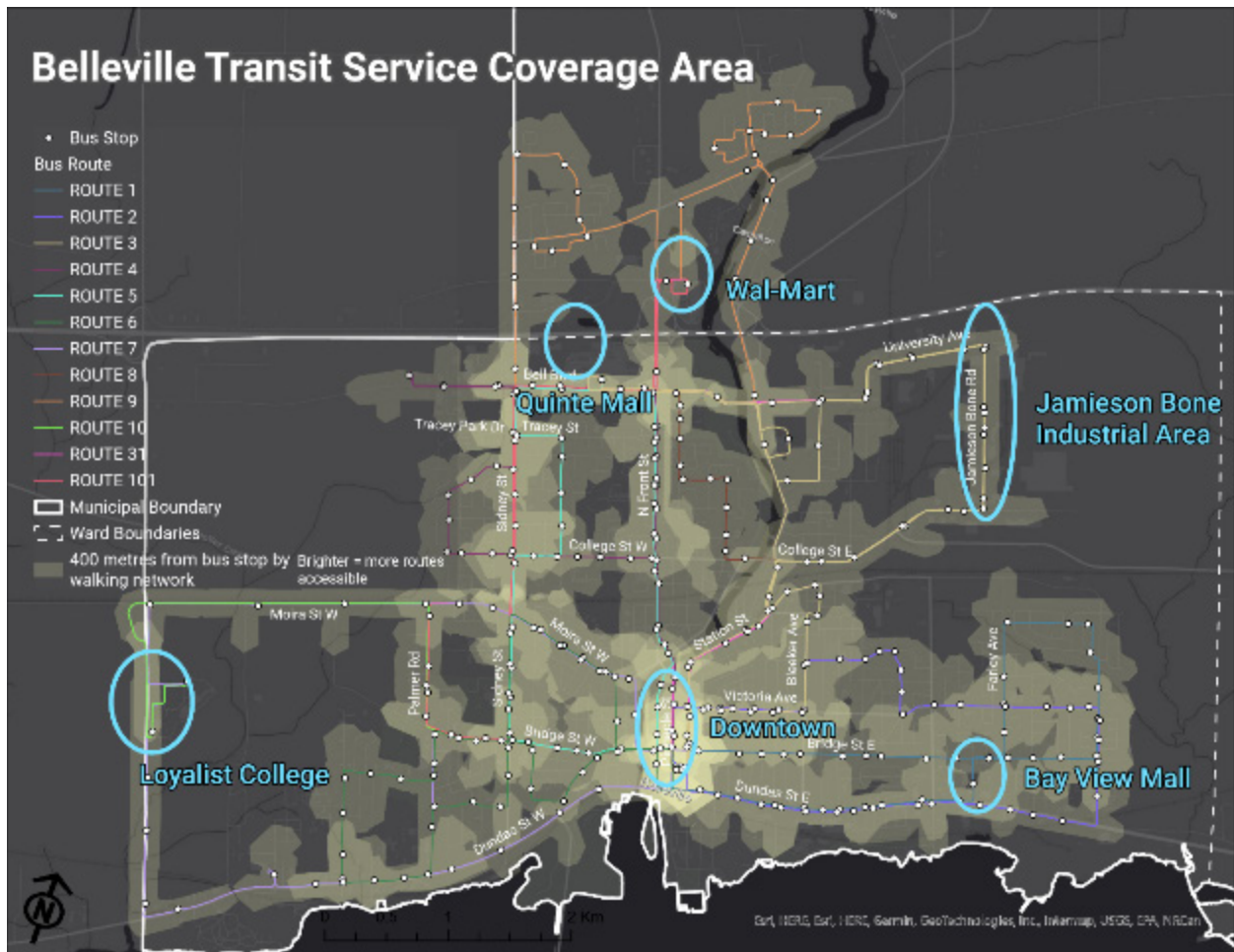
Four of the six industrial areas identified above are served by the current bus network:

- The industrial area along University Avenue, Jamieson Bone Road, and College Street East (Routes 3 and 31)
- Industrial areas along Sidney Street between Moira Street and Bridge Street West (Routes 5, 6, 10, 101)
- The industrial area north of Moira Street West and east of Sidney Street (Routes 6 and 7)
- The industrial area at Bell Boulevard west of Sidney Street Hanna Court (Route 4)

Two of the six industrial areas identified above are not served by the current bus network:

- The area along Station Street near Herchimer Avenue
- The area along Mineral Road and Parks Drive in Ward 2, north of the Walmart

Figure 38: Major Trip Attractors and Service Level Access



Other Trip Attractors

Loyalist College is the main trip attractor that is not captured by commercial or industrial land uses. The campus is currently served by fixed Routes 7 and 10 and on-demand Route 101. Belleville Transit has indicated, and ridership data has also shown, that demand for bus service to Loyalist College has outpaced service growth due to a large increase of students living farther away from the campus due to affordability.

Belleville General Hospital is currently served by Routes 1 and 2. A major hospital would typically be expected to be an important trip attractor; however, ridership data does not show this to be at the same level as other destinations.

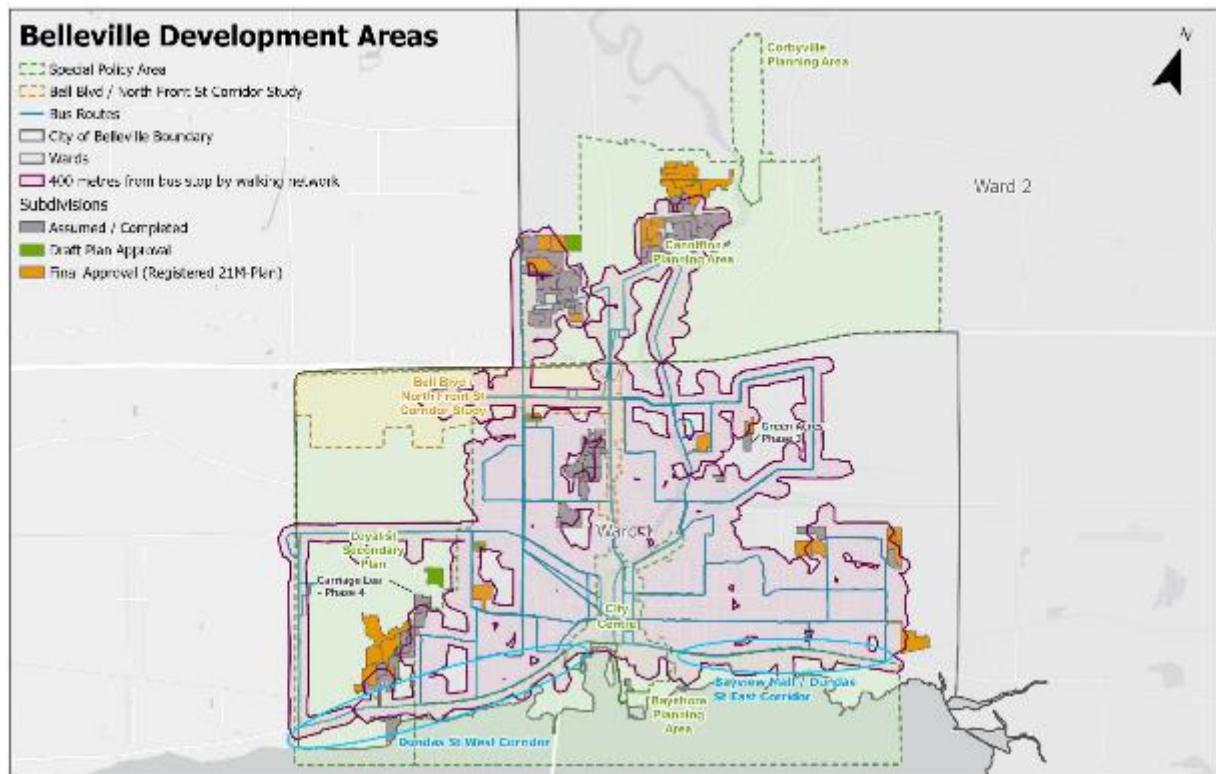
Minor trip attractors are located around the City and are served by various routes, including schools and community centres. There are also schools that are not served by the current bus network, including Susanna Moodie Elementary School and Quinte Christian High School, however it is likely that school bus service is available for students attending these schools.

Future Development Areas

In addition, gaps in transit service are expected when considering future development and planned growth. The Review of Medium-Term Population Growth Patterns and Transit-Oriented Communities goes into further details about future development considerations.

Most of the residential growth in Belleville is expected to take place in Special Policy Areas. Figure 39 lists the Special Policy Areas in Belleville, the expected residential growth based on registered and draft approved plans of subdivisions and the City Centre Intensification Plan, and subdivisions that do not have access to the current transit network and may require new transit service. The growth of these Special Policy Areas will impact the future expansion of the transit network to ensure that people living in these communities have access to public transit.

Figure 39: Special Policy Areas in Belleville, their expected residential size, and subdivisions that are outside the current transit network



Special Policy Area	Expected new dwelling units	Subdivisions outside of current transit service area
City Centre	1,280	
Loyalist Planning Area	987	Potter's Creek – Phases 6, 8, 9A
Bayshore Planning Area	Unknown	
Cannifton Planning Area	892	
Corbyville Village Planning Area	Unknown	

Outside of these Special Policy Areas, there are two recently assumed / completed subdivisions in Belleville that are not within 400 metres of an existing transit stop:



- Carriage Lea – Phase 4
- Green Acres – Phase 1

Green Acres – Phase 1 and Carriage Lea – Phase 4 combined have 70 single detached dwellings.

Belleville's Official Plan identifies four commercial areas that will continue to be developed, and will therefore be expected to have a growing level of transit demand:

- Bell Boulevard Corridor
- North Front/Highway 62 Corridor
- Bayview Mall/Dundas Street East Corridor
- Dundas Street West Corridor

Belleville's Official Plan and Transportation Master Plan (TMP) include policies and guidelines that encourage transit-supportive communities. These policies recommend that the City of Belleville identify corridors for promoting transit-supportive development. These corridors have not yet been identified but will play an important role in guiding the future transit network.



F

Appendix F: Route Network Analysis

Appendix F: Route Network Analysis

Background

To prepare recommendations for a redesign of Belleville Transit, it is important to understand the current route and service structure. This memo will review the route structure, service levels, passenger activity, and operational performance of the current system. These findings will be used, along with other background study components and customer feedback, to develop future transit route and service recommendations.

Service Area Characteristics

The City of Belleville has a population of approximately 55,000 (2021), area of about 25,000 square kilometres, and is 19 kilometres north-south and 15 kilometres east-west.

The Bay of Quinte defines the southern boundary of Belleville. The City is bisected east-west by Highway 401, Highway 2 and the CN Rail line and yard, north-south by the Moira River and Front Street / Pinnacle Street (Highway 62), and Highway 1 along the west edge.

The City is divided into two Wards: Ward 1 consists of the built-up urban parts of the City and is where most of the transit services are located, while Ward 2 consists of rural lands with some built-up areas along the southern edge. Highway 401 is the east-west boundary between the Wards. Ward 1 is about 5 kilometres north-south and about 9 kilometres east-west.

A network of arterial roads connects the City. The major north-south four-lane arterials are North Front Street and Pinnacle Street in the centre, Highway 1 and Sidney Street in the west, and Cannifton Road in the northeast. The major east-west four-lane arterials are Dundas Street (Highway 2) along the southern shore and Bell Boulevard to the north, and there are several two-lane arterials including Moira Street, Bridge Street, College Street, and Victoria Avenue.

The transit route network covers most of the built-up areas in Ward 1. Routes 8 and 10 connect to the Walmart site in the south of Ward 2, and Route 9 serves the Cannifton area of Ward 2. There is discussion regarding terminating Route 9 in the Spring of 2023.

The network is designed around serving several major trip destinations: Loyalist College, Walmart, Quinte Mall and Downtown. Secondary transit destinations include the Jamieson Bone industrial area, the Front and College area, the Sydney and Bridge area, and Bayview Mall.

Existing Transit Service

Current Network

The current Belleville Transit bus network is made up of ten fixed routes and two evening on-demand routes. Eight of the ten fixed routes operate as a one-way loop, providing most corridors with service in only one direction. In some cases, there are overlapping

routes that serve the opposite direction. Routes 3 and 10 are the only routes that mostly service the same corridor in both directions.

North Front Street, the main central north-south corridor, is served by Route 4 northbound and Routes 5 and 8 southbound. Sidney Street, the north-south corridor on the west side of the City, is serviced only by Route 5 northbound. Route 7 connects Loyalist College with the Downtown Terminal, and Route 10 connects Loyalist College with Quinte Mall. Route 3 connects the Jamieson Bone industrial area with both the Downtown Terminal and Quinte Mall.

An on-demand service operates in the evening when fixed route service does not operate. Three vehicles operate on weekdays between 9:30 pm to 12:00 am and Saturdays between 7:00 pm and 12:00 am. Two vehicles operate on Sunday evenings from 6:30 pm to 12:00 am. An on-demand trip can be booked at any time at www.btletsgo.ca or through the “On Demand Transit – Rider App” or by email or phone Monday to Friday from 8:30 am to 4:00 pm. A trip can be booked between any two of the regular bus stops.

Belleville transit also offers a door-to-door paratransit service called the Mobility Bus. Passengers must apply to be eligible to use the Mobility Bus Service. The paratransit service is not within the scope of this review.

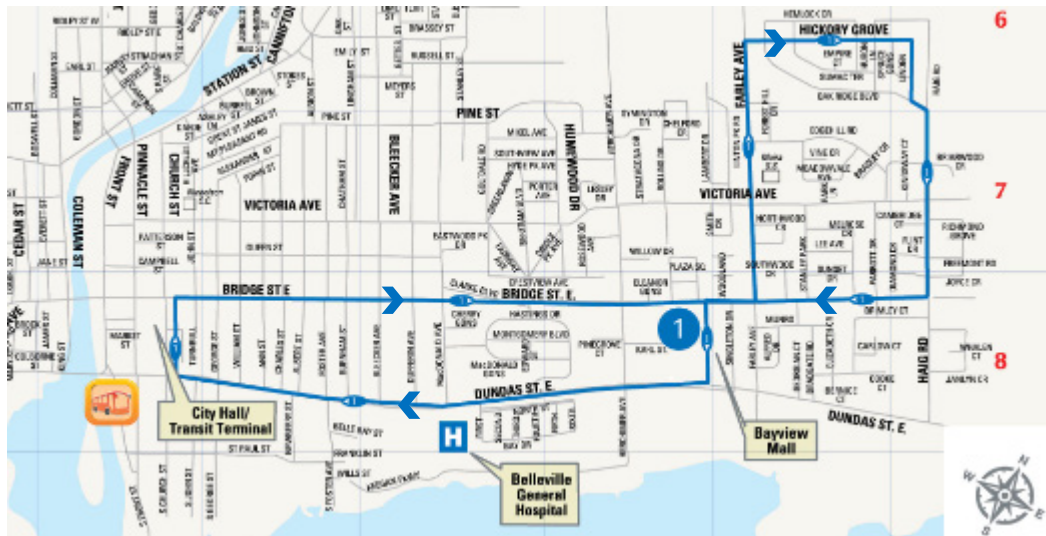
Network Map

Figure 40: Belleville Transit Network Map



Route Maps

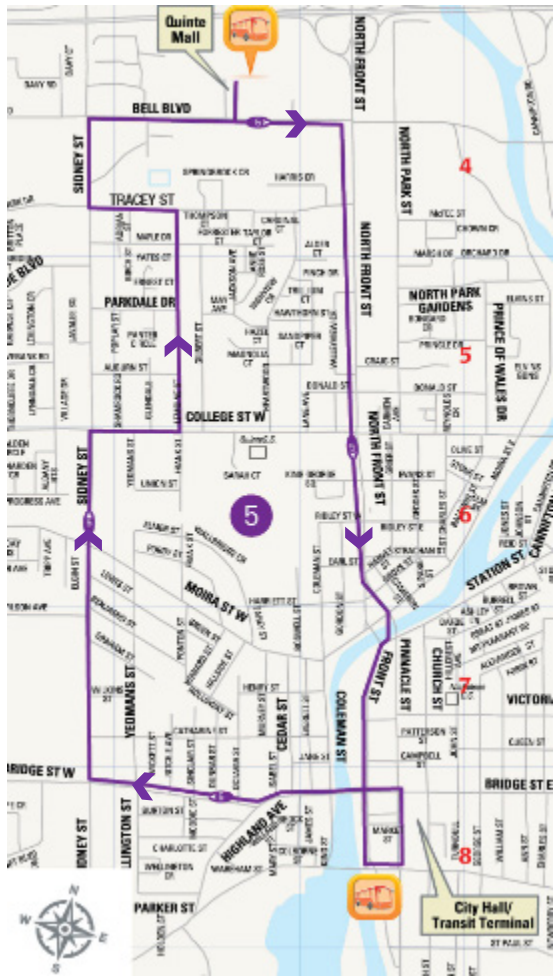
Route 1



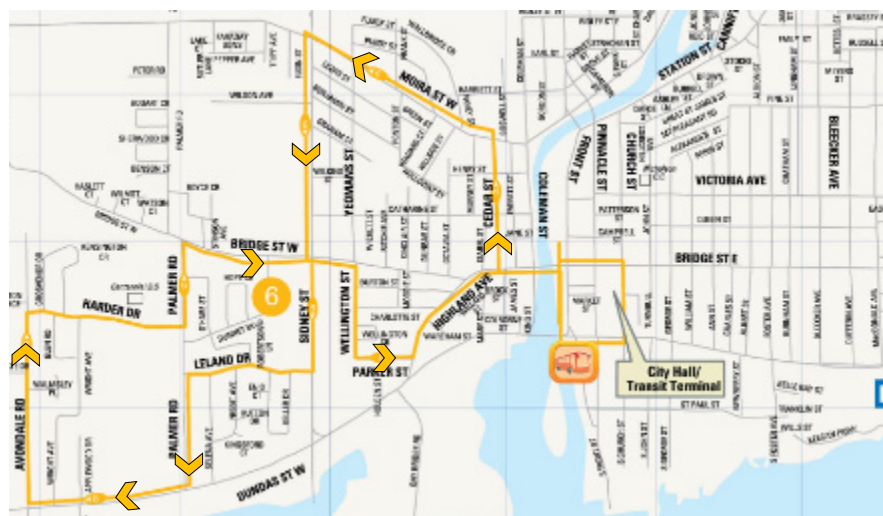
Route 2



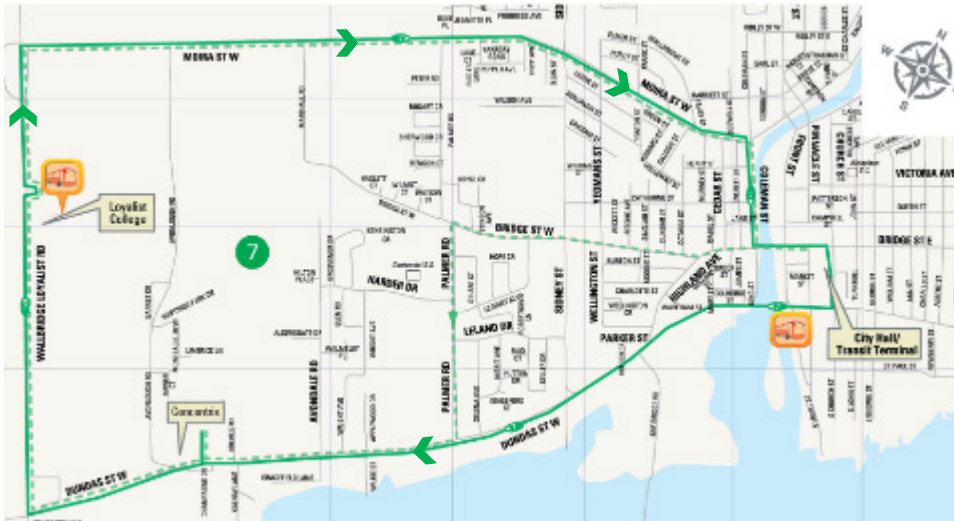
Route 5



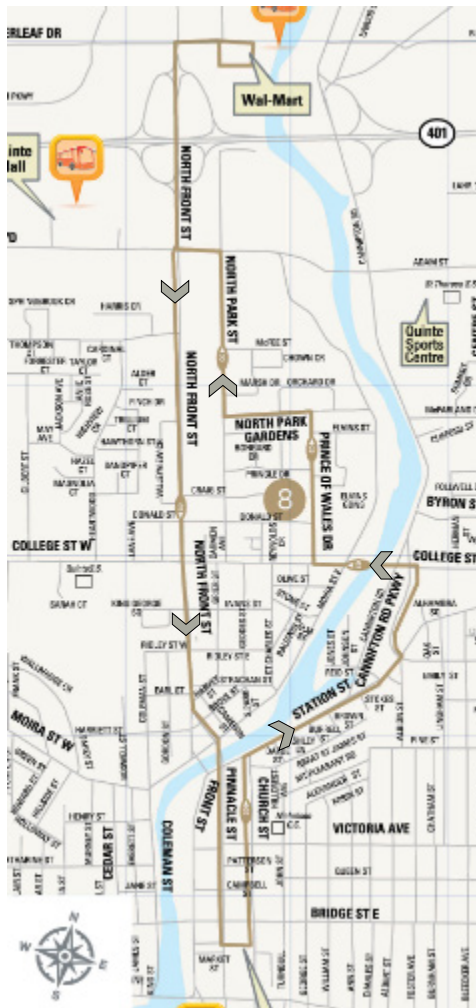
Route 6



Route 7



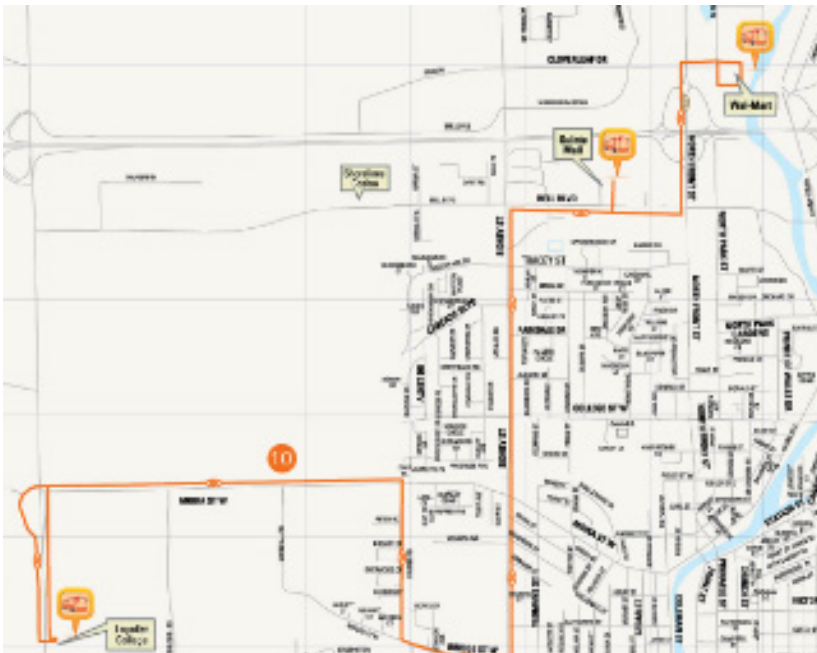
Route 8



Route 9



Route 10



Current Service

Service Hours and Headways

All ten fixed routes operate seven days of the week. On weekdays, most routes start operation between 5:00 and 7:00 and end operation between 18:00 and 22:00. Route

headways are either 30, 45, or 60 minutes depending on the day of the week and the time of day.

Table 14: Route Headways (minutes)

Route	Weekday Headway	Saturday Headway	Sunday Headway
1	30	60	60
2	30/60	30	60
3	30	30/60	60
4	30/45	45	45
5	30	60	60
6	30/45	60	60
7a 7b	30/60	60	60
8	30-60	30	60
9	45	45	45
10	60	60	60

Figure 41: Weekday Span and Headway

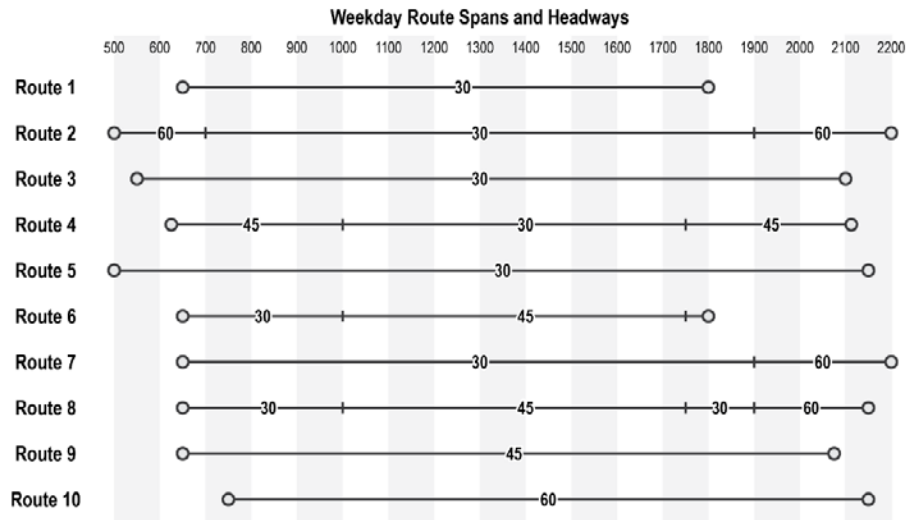


Figure 42: Saturday Span and Headway

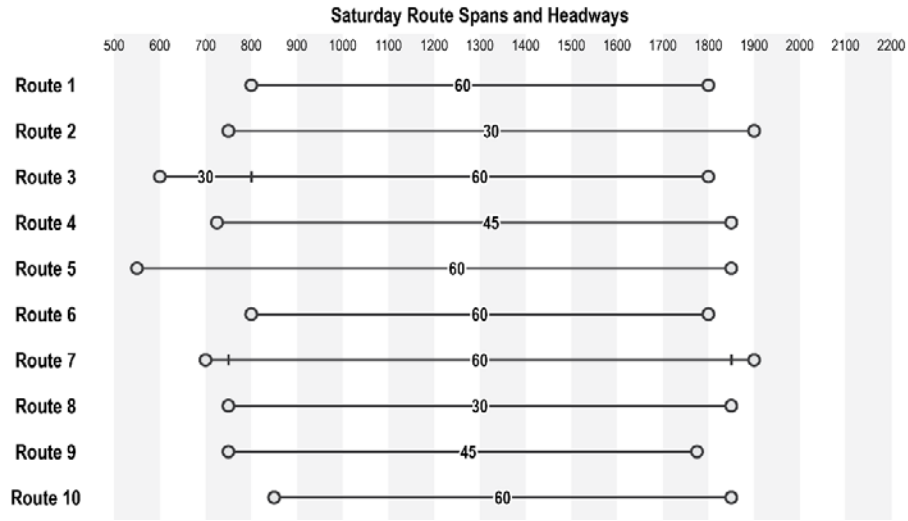
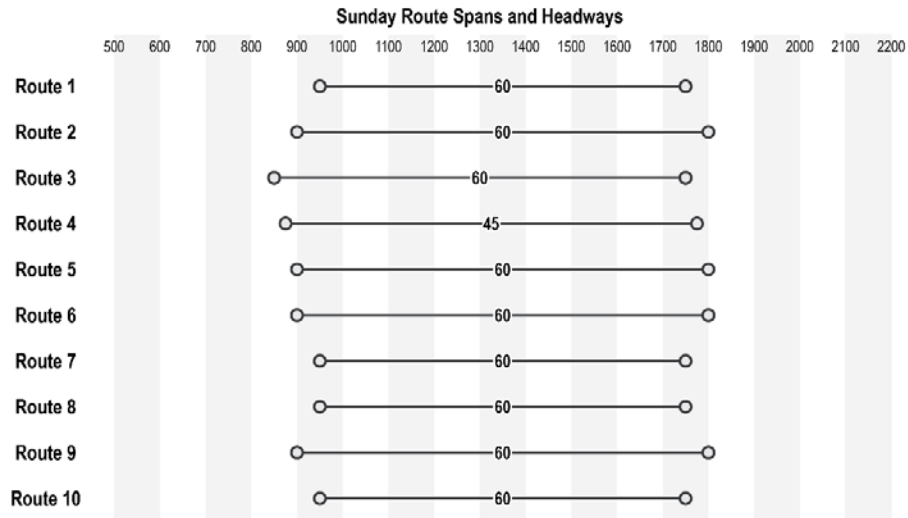


Figure 43: Sunday Span and Headway

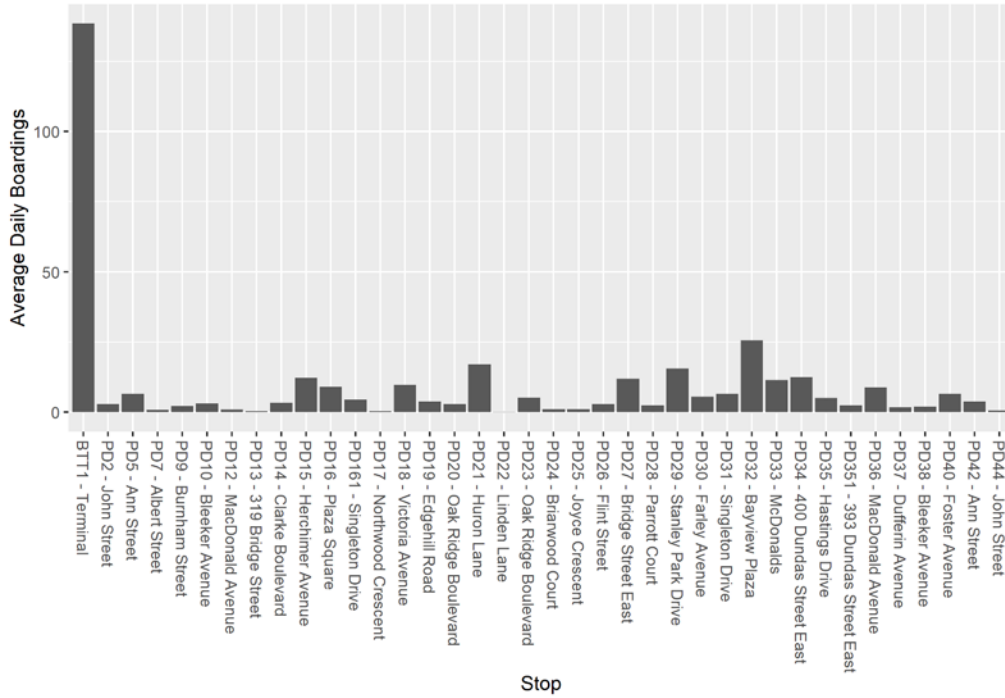


Current Ridership Patterns

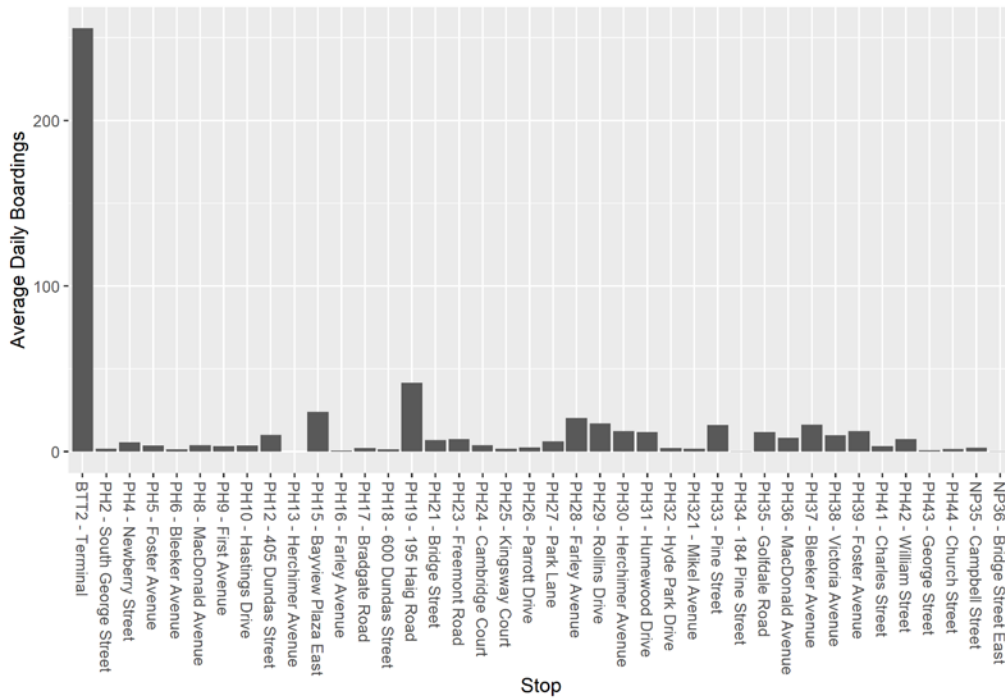
Stop Activity

The following charts show the average number of weekday boardings at each stop by route.

Route 1 Average Daily Boardings
 Weekday Average - September to October 2022

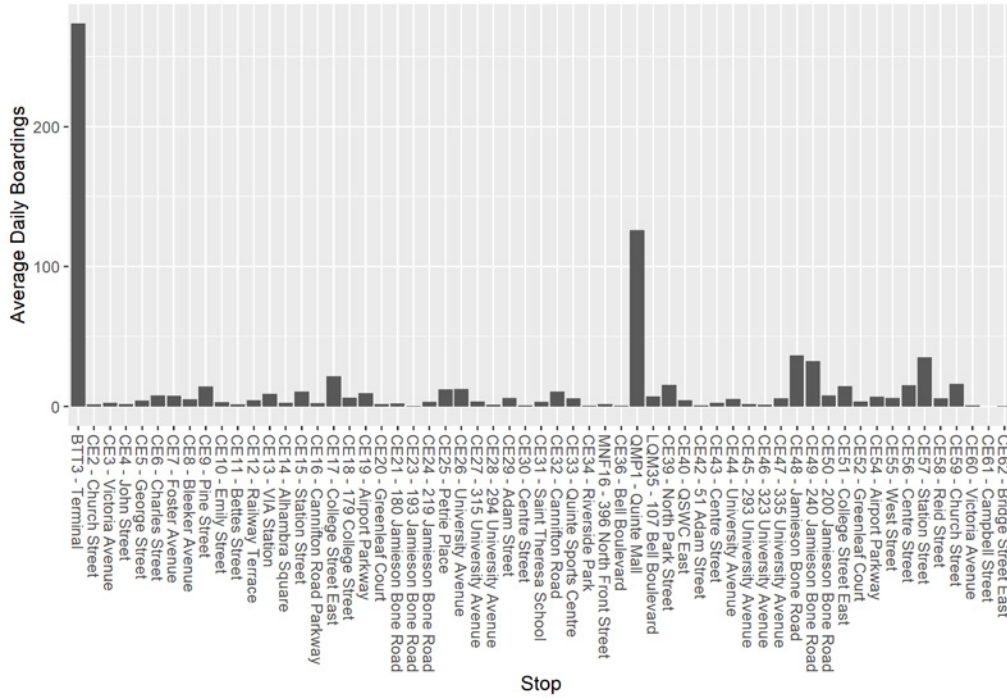


Route 2 Average Daily Boardings
 Weekday Average - September to October 2022

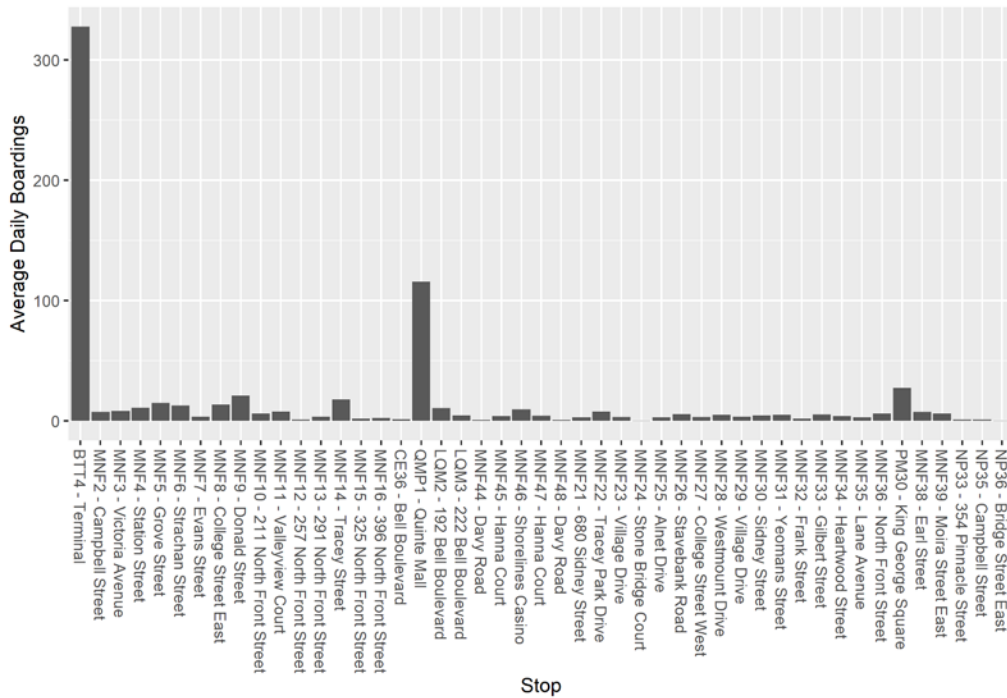




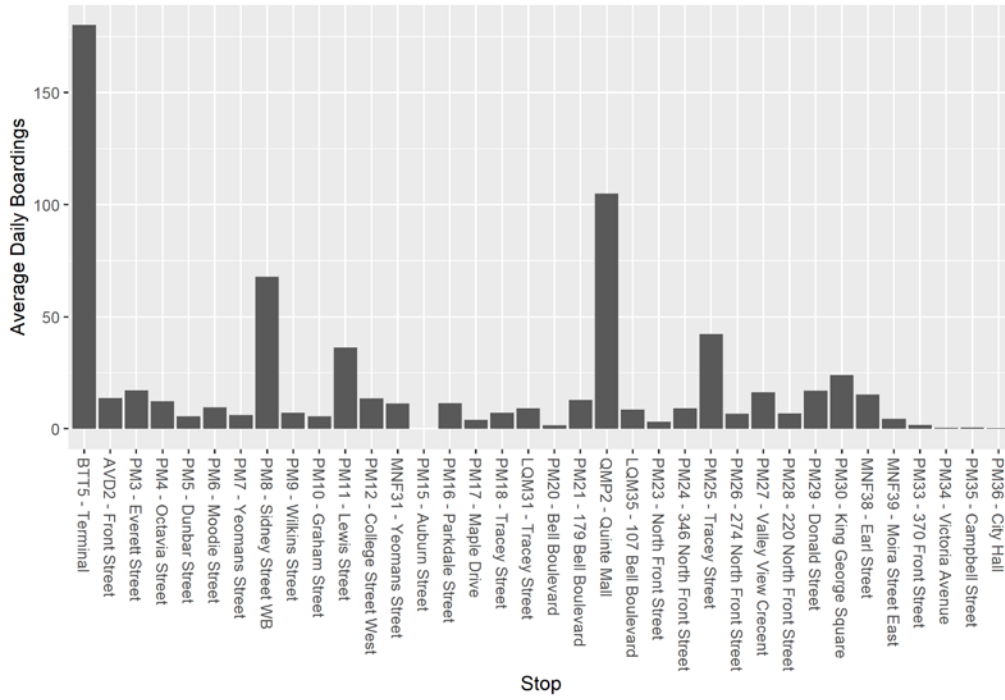
Route 3 Average Daily Boardings
Weekday Average - September to October 2022



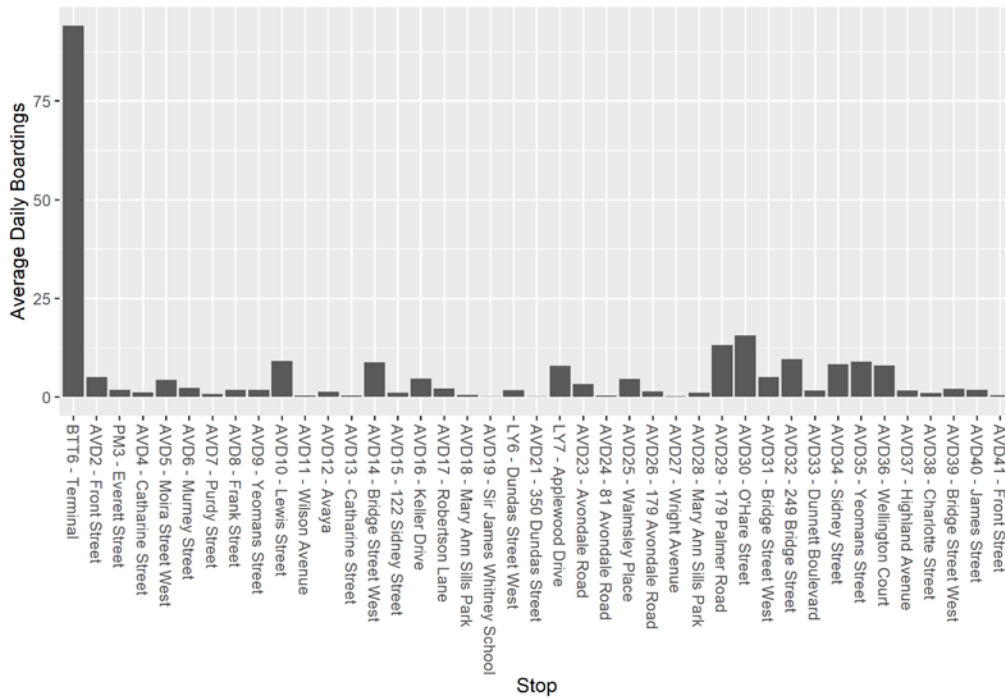
Route 4 Average Daily Boardings
Weekday Average - September to October 2022



Route 5 Average Daily Boardings
 Weekday Average - September to October 2022

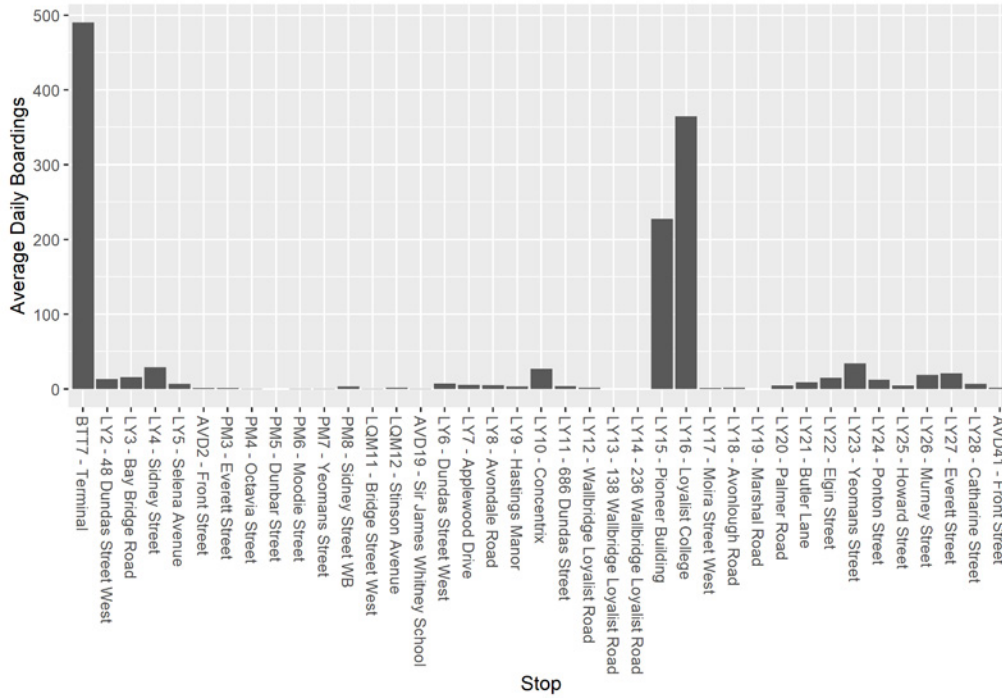


Route 6 Average Daily Boardings
 Weekday Average - September to October 2022

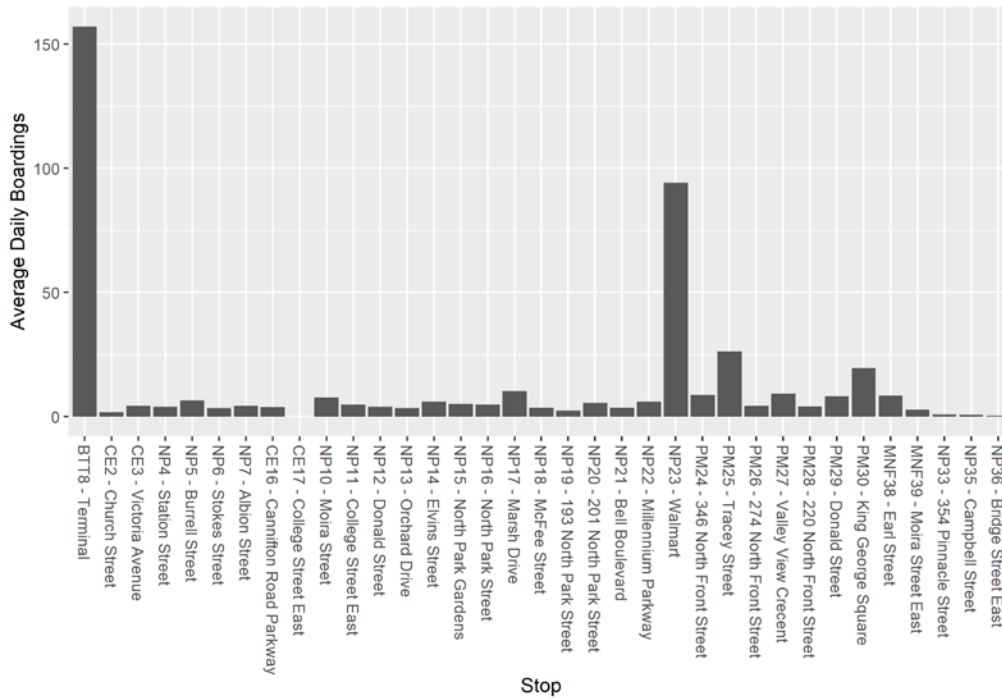




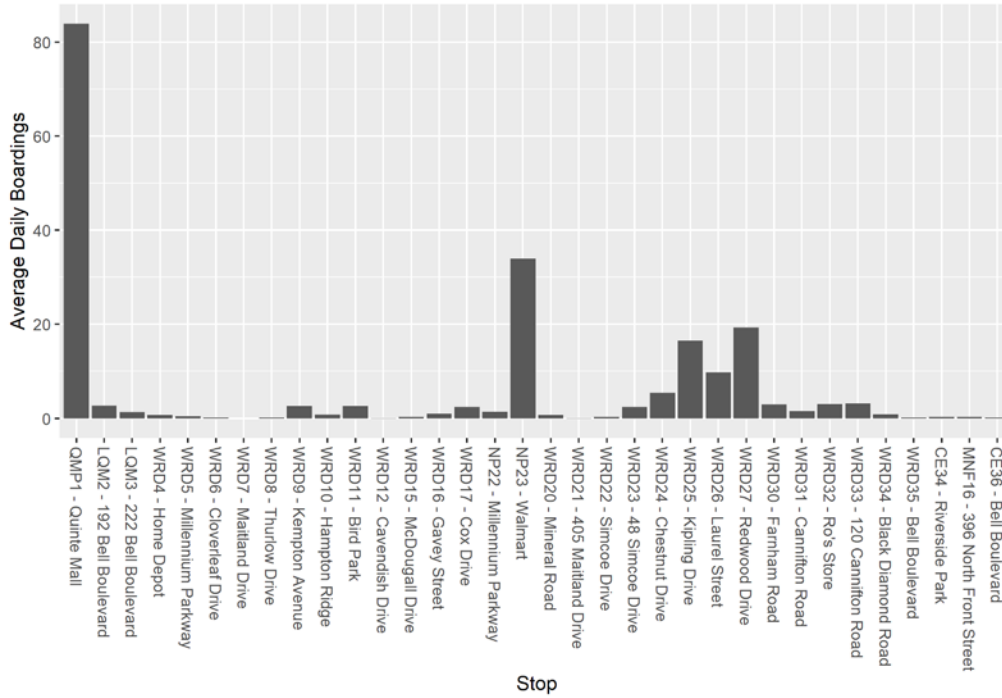
Route 7 Average Daily Boardings
Weekday Average - September to October 2022



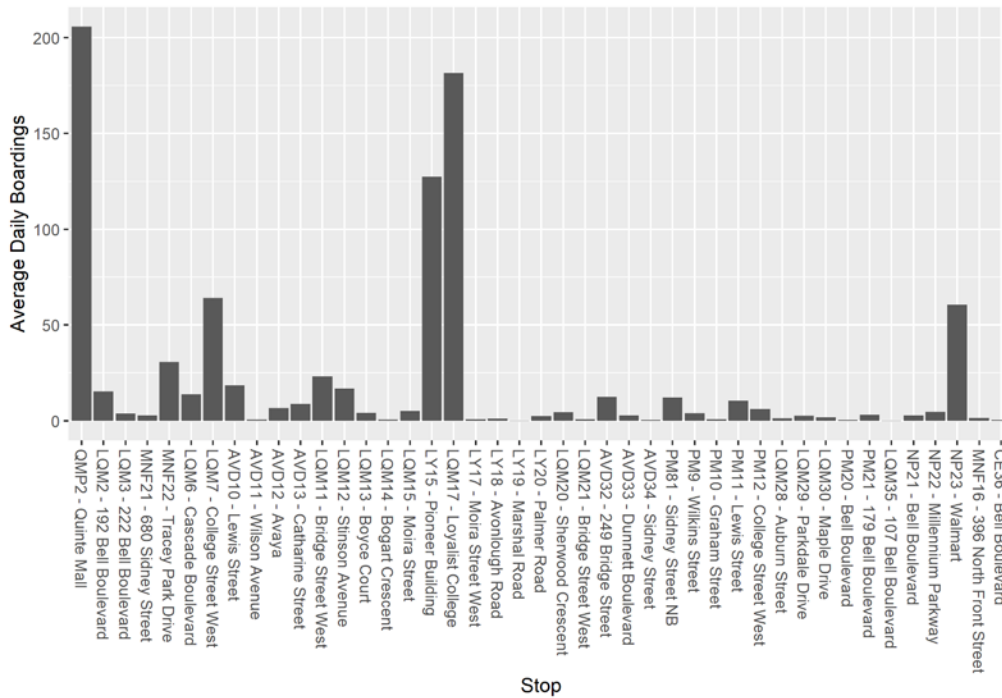
Route 8 Average Daily Boardings
Weekday Average - September to October 2022



Route 9 Average Daily Boardings
 Weekday Average - September to October 2022



Route 10 Average Daily Boardings
 Weekday Average - September to October 2022



Route Statistics

Table 15 provides basic route statistics for all routes including route length, travel time, speed, and boardings by time periods.

Table 15: Route Statistics

Route	Length (km)	Peak Trip Time (min)	Peak Speed (km/h)	Boardings per Operating Hour Weekdays All day	Boardings per Operating Hour 7:00 to 8:00 Weekdays	Boardings per Operating Hour 15:00 to 16:00 Weekdays
1	9.7	25	23.3	29.3	30.3	32.5
2	9.3	25	22.3	35.2	44.2	42.7
3	23.2	55	25.3	24.9	33.3	47.1
4	12.4	40	18.6	36.5	21.1	71.5
5	10.4	40	15.6	33.5	46.6	56.2
6	11.1	40	16.7	20.0	30.6	14.2
7a	14.0	25	33.6	67.0	83.9	124.0
7b	15.4		37.0			
8	10.1	40	15.2	31.4	33.8	27.1
9	14.4	40	21.6	14.1	10.6	18.2
10	21.6	55	23.6	61.8	120.0 *	89.4

* Service starts at 7:30 on weekdays

The distinction between Boarding Passengers and Passengers or Revenue trips is noted below.

The Boardings Per Operating Hour (unlinked trips) in Table 14 include the initial boarding and subsequent transfers.

The Passengers Per Operating Hour noted in the CUTA Statistics are revenue trips per hour or “total linked trips / regular service hours”.

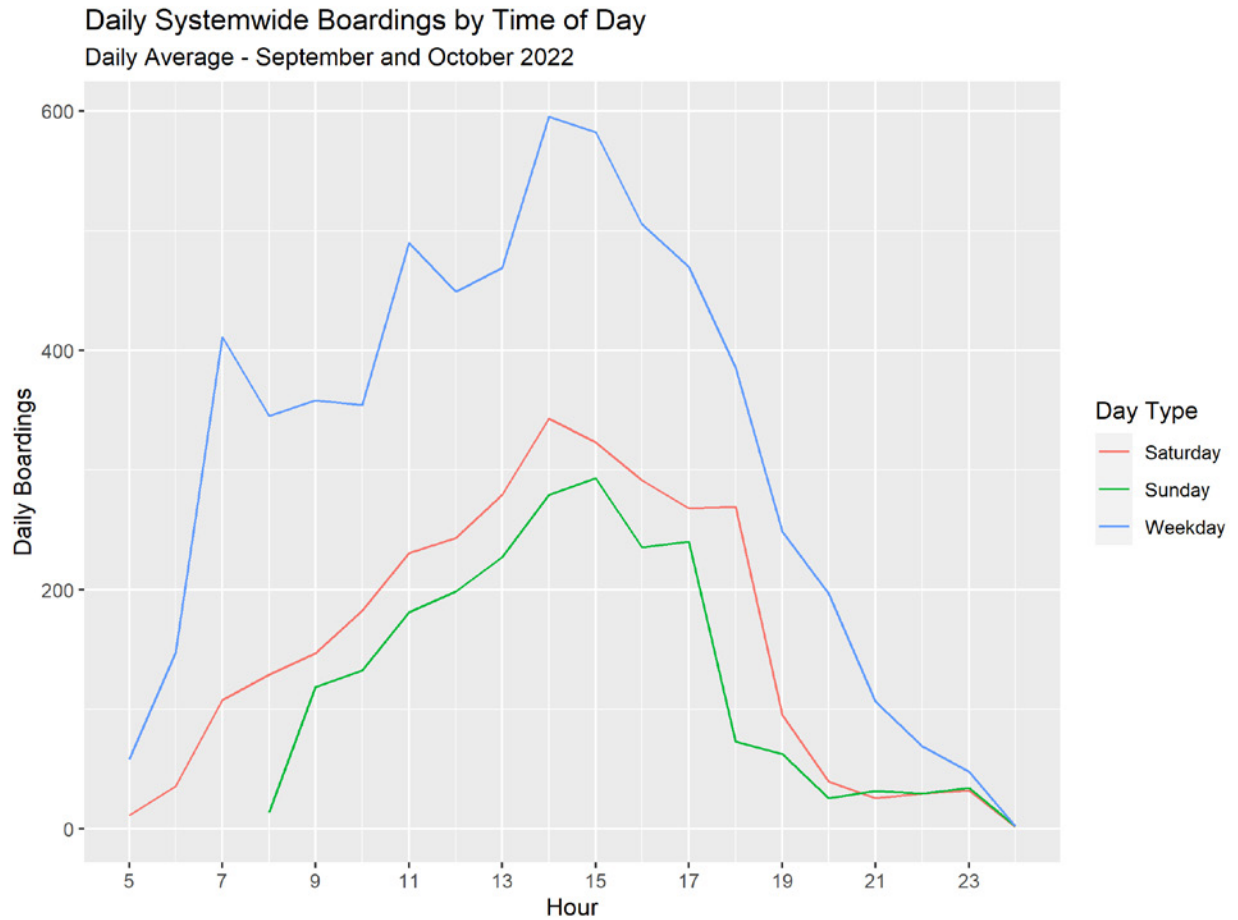
In 2019 Belleville Transit had 21.2 passengers per operating hour (total linked trips / regular service hours). This decreased to 8.0 passengers per operating hour in 2021. However, this number is expected to be greater in 2022.

The significant difference between the passengers per operating hour (linked trips) and boardings per operating hour (unlinked trips) implies there is a significant number of transfers in the system.

Trips by Time of Day

Figure 43 illustrates the daily passenger boarding distributions for weekdays, Saturdays, and Sundays.

Figure 44: Average Daily Systemwide Boardings



Travel Times to Major Destinations

The following isochronal maps show the 30-minute service area of major destinations during weekdays from 7:00 to 9:00. These travel times include average waiting time and transfer time.

Figure 45: 30 Minute AM Peak Travel Time to Downtown Belleville

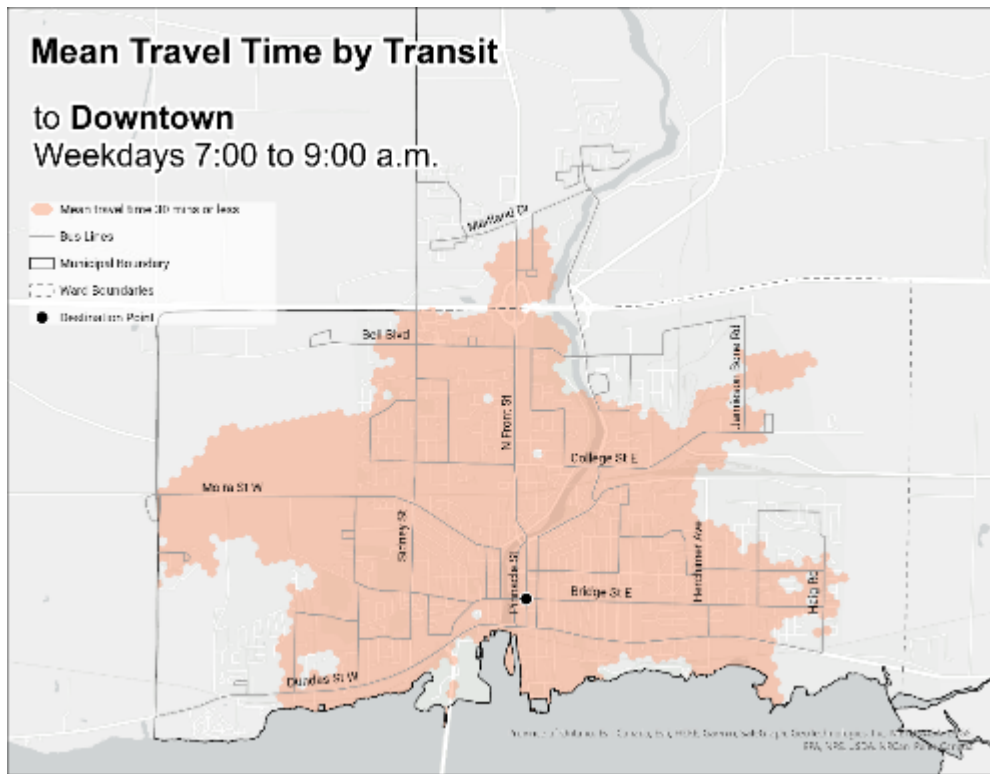


Figure 46: 30 Minute AM Peak Travel Time to Quinte Mall

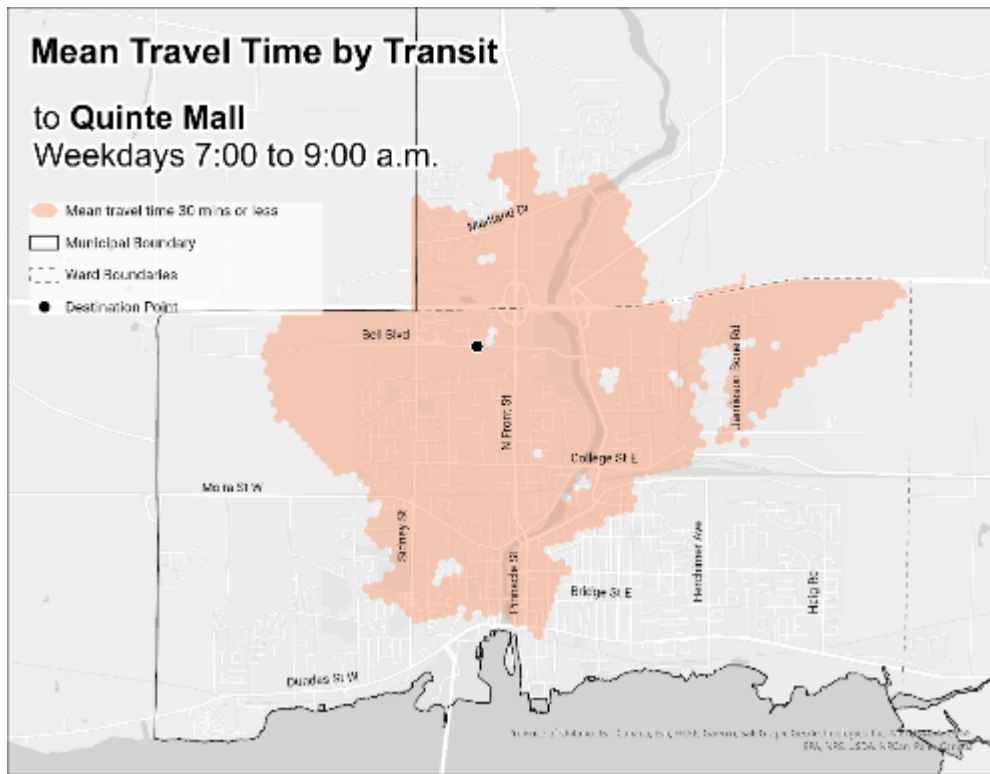


Figure 47: 30 Minute AM Peak Travel Time to Loyalist College

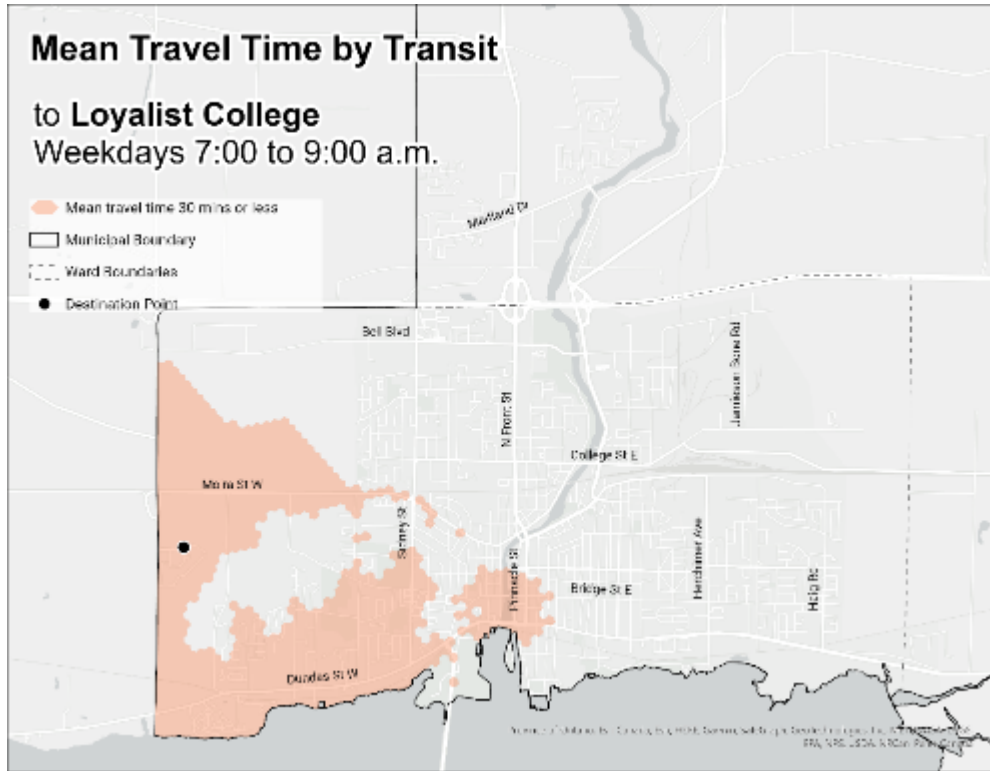


Figure 48: 30 Minute AM Peak Travel Time to Jamieson Bone Industrial Area

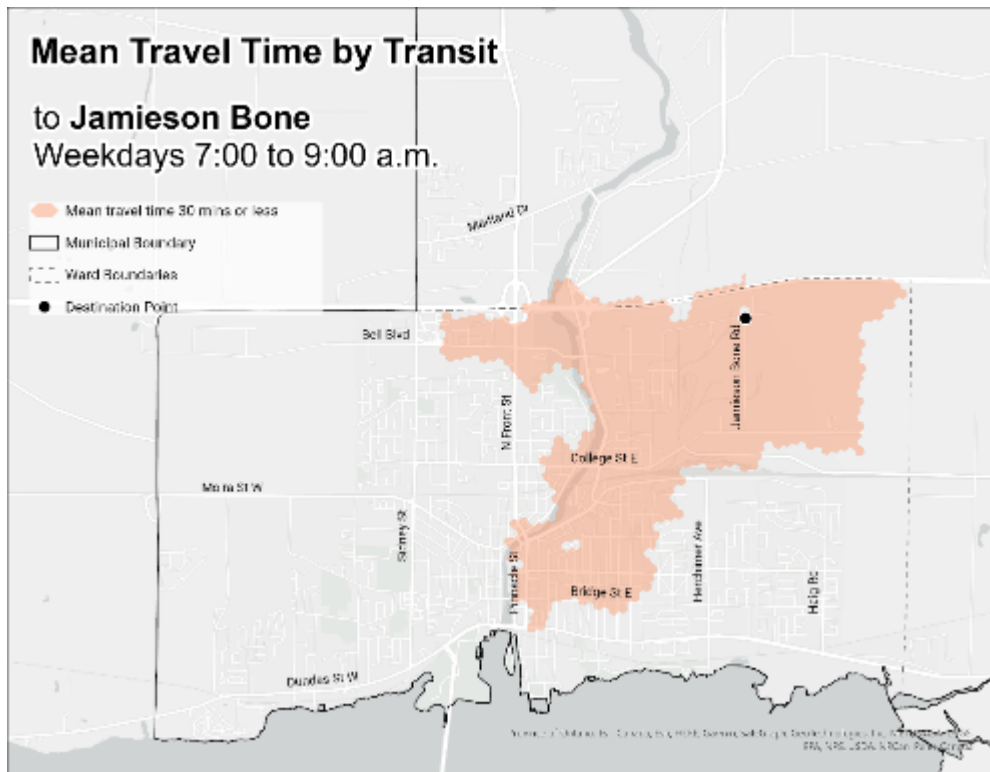


Figure 49: 30 Minute AM Peak Travel Time to Bay View Mall

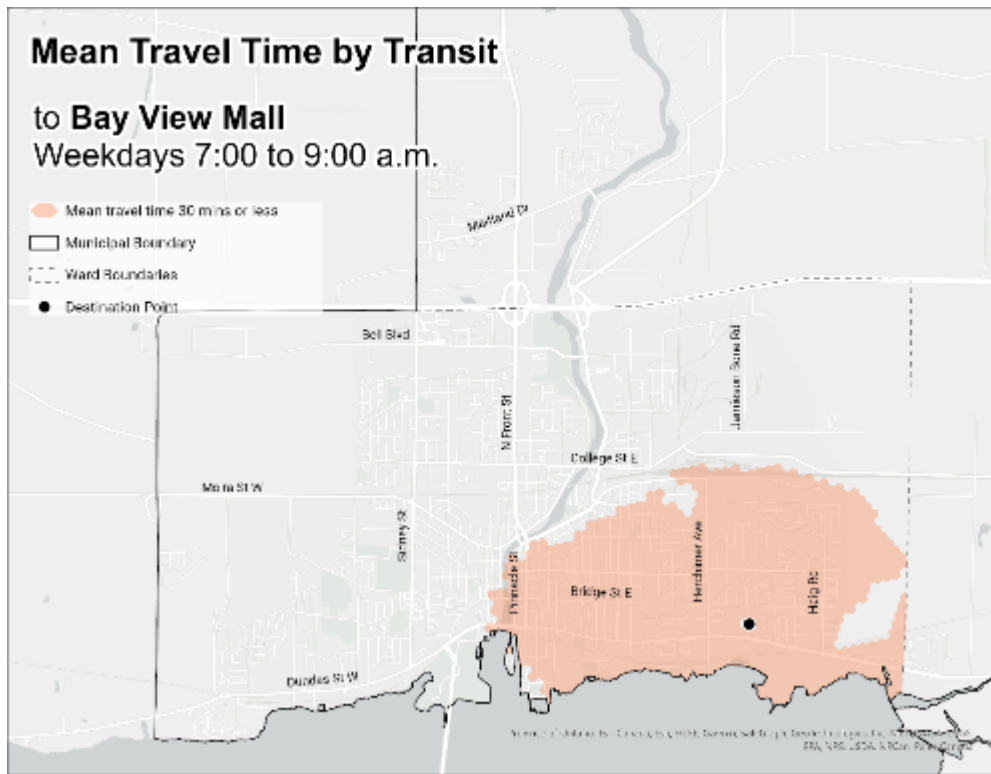


Figure 50: 30 Minute AM Peak Travel Time to Walmart

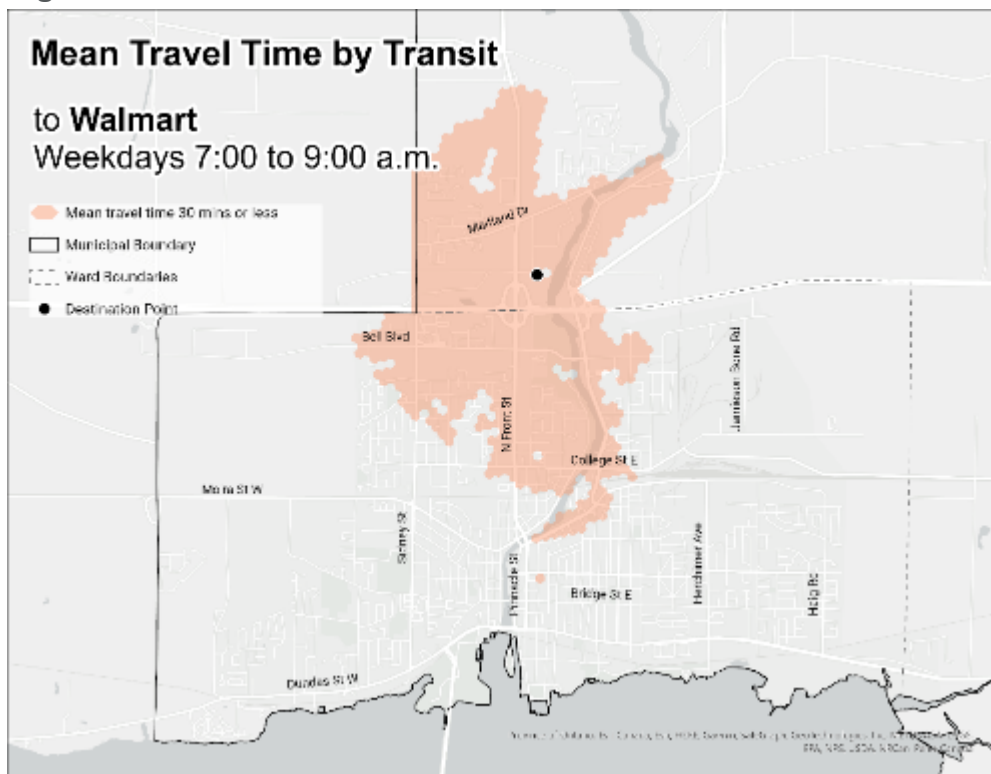


Figure 51: 30 Minute AM Peak Travel Time to North Front St and College St

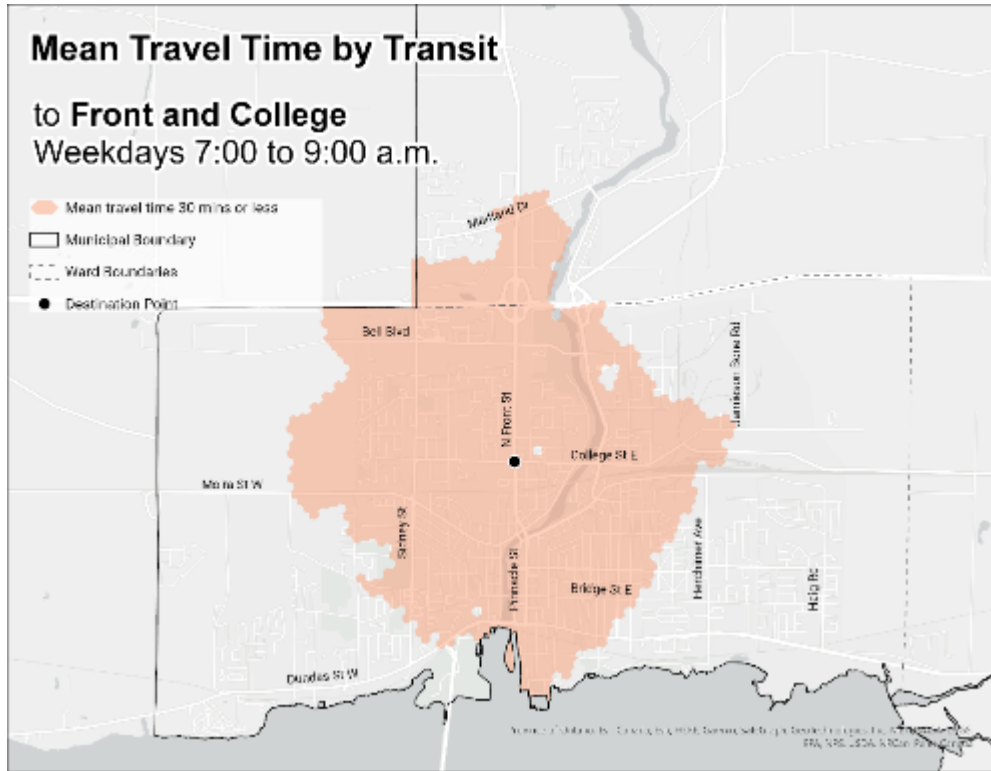
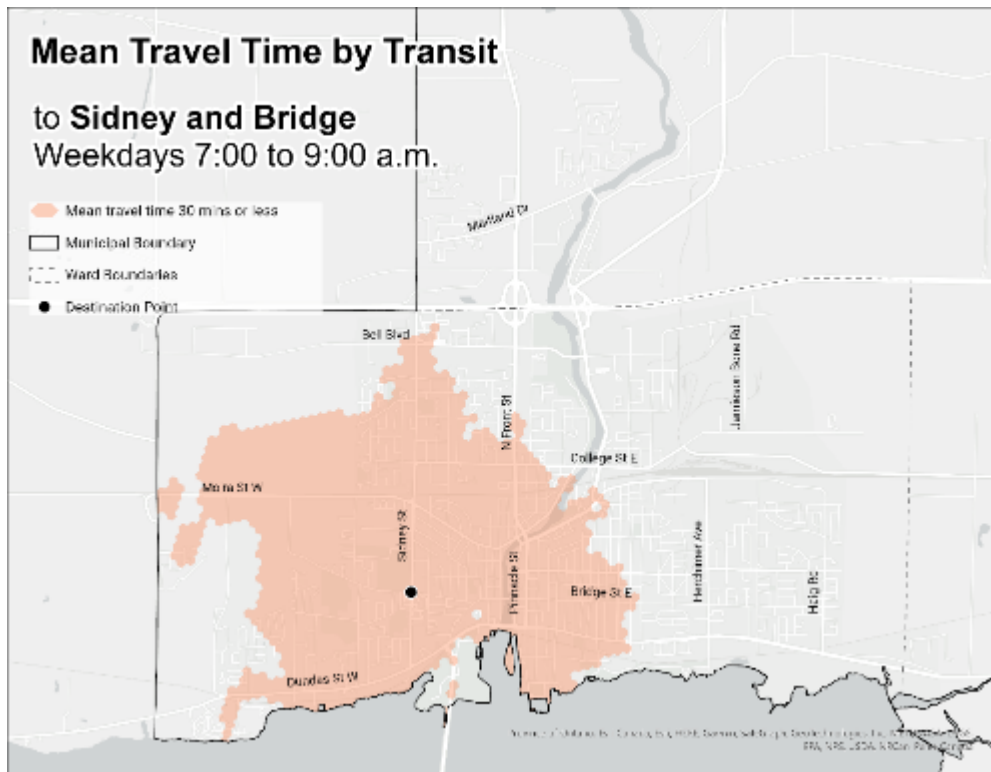


Figure 52: 30 Minute AM Peak Travel Time to Sidney St and Bridge St



Schedule Adherence

Schedule adherence is calculated as the difference between the scheduled departure time and actual departure time at each stop. The percentage values in Tables 16, 17, and 18 represent the number of total stop departures that fall into each category.

Table 16: Weekday Schedule Adherence

Route	Early (Before scheduled departure)	On-Time (0 to 3 minutes after scheduled departure)	Late (> 3 minutes after scheduled departure)
1	8%	78%	14%
2	59%	37%	5%
3	29%	55%	16%
4	54%	40%	6%
5	41%	45%	14%
6	53%	41%	5%
7	31%	51%	18%
8	56%	37%	8%
9	59%	37%	4%
10	59%	27%	14%

Table 17: Saturday Schedule Adherence

Route	Early (Before scheduled departure)	On-Time (0 to 3 minutes after scheduled departure)	Late (> 3 minutes after scheduled departure)
1	9%	40%	51%
2	60%	35%	5%
3	31%	54%	14%
4	45%	50%	6%
5	21%	46%	32%
6	46%	26%	14%
7	13%	48%	40%
8	27%	49%	24%
9	67%	29%	4%
10	67%	27%	6%

Table 18: Sunday Schedule Adherence

Route	Early (Before scheduled departure)	On-Time (0 to 3 minutes after scheduled departure)	Late (> 3 minutes after scheduled departure)
1	33%	57%	11%
2	64%	34%	2%
3	32%	57%	10%
4	53%	44%	4%
5	42%	42%	16%
6	44%	48%	8%
7	20%	53%	27%
8	37%	48%	16%
9	66%	30%	4%
10	78%	16%	6%

The schedule adherence envelope is 0 to -3 mins from the scheduled departure time, and no bus is to leave a stop before the scheduled time.

Overall, slightly less than 50% of all trips depart early; approximately 10% of trips depart late, and slightly less than 50% of trips depart on time. Weekday on time performance varies from 27% to 78%; Saturday on time performance varies from 27% to 54%; and Sunday on time performance varies from 16% to 57%.

Route Network Assessment

The current Belleville Transit's major shortcomings are route directness, low service levels, and poor schedule adherence.

Belleville Transit has a series of well-defined, major, and secondary destinations (nodes), and a network of circuitous, one-way, open loop routes that provide a fragmented, illegible network that increases travel time and requires route transfers to access many destinations.

The major and secondary destinations and several corridors (route segments) that generate reasonable ridership are noted in Figure 53. These elements form the backbone of the current system.

The major destinations and corridors are the locations where much of the system's ridership is generated. Destinations are specific locations that attract significant ridership, such as employment centres, shopping centres, or schools. Major corridors are stretches of bus corridors where there is significant stop activity, typically where there are several trip generators and attractors along the corridor. Primary destinations generate a large portion of the system ridership, while secondary destinations and corridors have a reasonable level of stop activity.

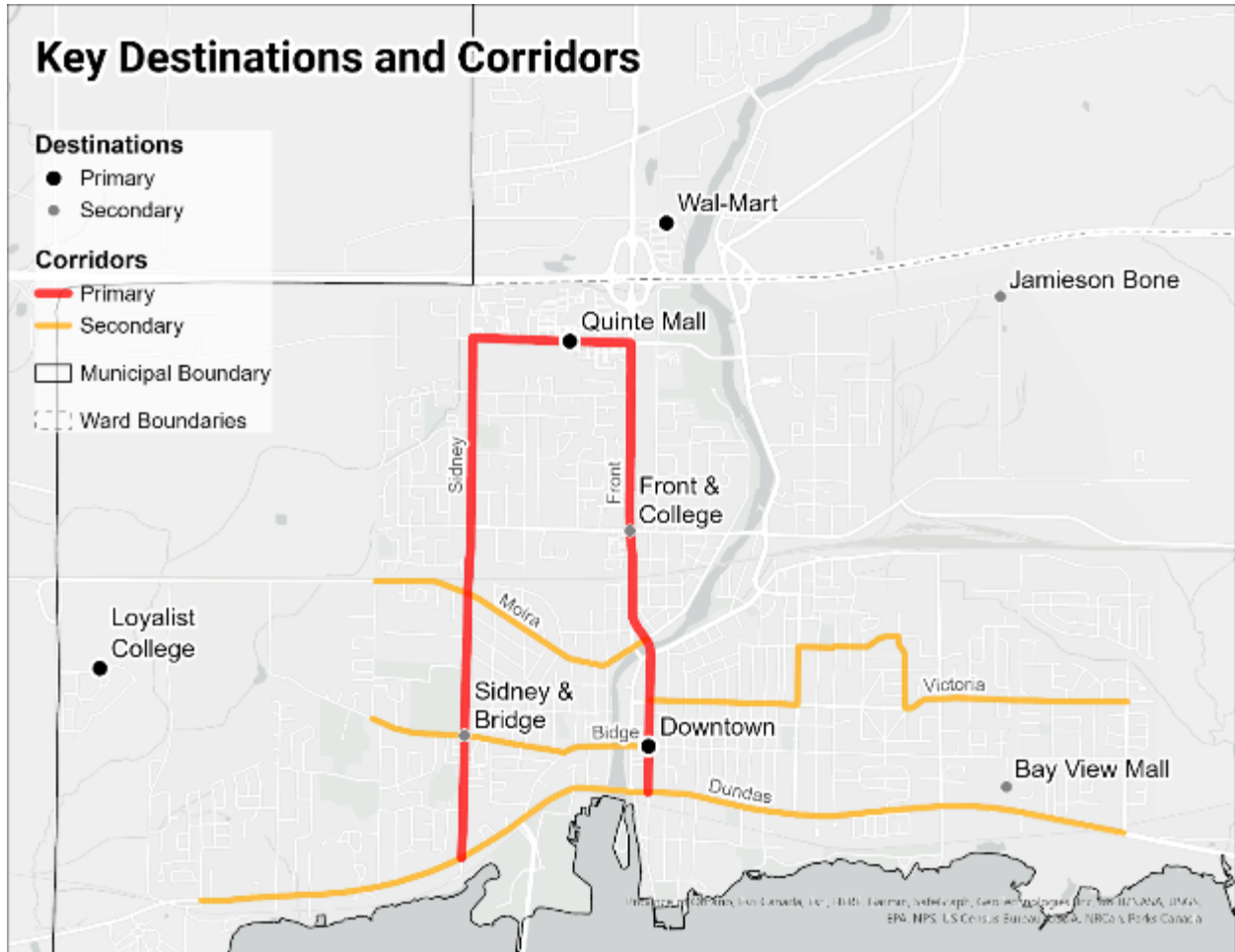
There is no clear distinction between more active primary bus routes and less active secondary or neighbourhood routes, and many of the routes attempt to serve multiple purposes.

Belleville Transit provides infrequent service with six routes providing a 30-minute peak headway, three routes providing a 45-minute peak headway and one route providing a 60-minute peak headway. The span of service is less of a concern.

The current schedule adherence performance increases the difficulty of making route-to-route transfer connections. The significant number of early departures is a serious concern.

The combination of poor route directness and infrequent service increases transfers and travel times. There is also a capacity issue with Routes 7 and 10 connecting with Loyalist College.

Figure 53: Key Destinations and Corridors



Ridership Patterns

As a hub-and-loop style bus network, many trips require the passenger to travel through the Downtown Terminal or Quinte Mall to transfer to another route. These two locations see significant passenger boardings due to transfers and being major destinations. Most routes have only a few stops or route segments with a reasonable level of stop activity with very little stop activity for the rest of the route.

Ridership peaks during the 15:00 hour on weekdays, Saturdays, and Sundays. Ridership picks up sooner in the morning on weekdays than on weekends. Unlike ridership distributions on many other transit systems, Belleville’s ridership is not bimodal with a peak in the morning and a peak in the afternoon, and the larger ridership peak is in the afternoon rather than in the morning. Ridership is low in the evenings as bus service decreases into the evening, with headways dropping below 30 minutes at 19:00 on most routes and most routes ending service by 22:00 on weekdays and by 19:00 on weekends.



G

Appendix G: Bus Stop Analysis

Appendix G: Bus Stop Analysis

Background

As part of HDR's Operational Review of Belleville Transit, this memo will review current bus stop locations and configurations, bus stop planning best practice, and make recommendations on improvements to bus stop placement and infrastructure. These findings will be used along with other background study components and customer feedback to develop the future transit route and service recommendations.

Context

Belleville Transit has ten fixed bus routes, eight of which operate mostly in one direction and the other two offering mostly two-way service. Many of the routes operate largely on residential streets, while some routes operate partially or mostly on arterial or rural roads. Bus stops are distributed throughout the urban parts of the service area and are generally spaced out 200 to 400 metres along routes.

The Ward 1 of the City of Belleville, which is the more built-up portion of the City located south of Highway 401, has three main north-south arterial roads that are four or more lanes wide: North Front Street, Sidney Street, and Cannifton Road; and three main east-west arterials that are four or more lanes wide: Bell Boulevard, College Street, and Dundas Street. The rest of the roads, both major and minor, are no more than two lanes wide.

Bus Stop Planning Best Practice

Understanding that the transit journey begins and ends at the bus stop, the design and functionality of the stop should be developed to inspire a sense of safety, pride, system ownership, encourage ridership, and influence the overall success of the transit system.

Best practice in bus planning indicates that stops should be designed and placed:

- Adjacent to major trip generators/destinations or 400-500 meters apart along the route; however, this is highly dependent on the community urban form.
- Generally located in pairs along two-way routes to accommodate both the outbound and homebound trip ends.
- With high quality walkable access.
- Generally located far-side of an intersection.
- Provide a safe, comfortable waiting environment.
- Bus bays or bus laybys should only be used on streets with a posted speed limit of 65 km/h or greater; at end of route timepoints; or a major boarding / alighting bus zones where buses are consistently dwelling for greater than 45 seconds.

- Public parking or stopping within bus zones should be controlled with an addition to a traffic bylaw which designates bus only use of a bus zone.
- The following bylaw language provides an example of bus stop zone parking control:

“bus stop” or “bus zone” means a portion of a street adjacent to the curb reserved for loading and unloading of buses lying either between two traffic control devices designating the bus stop or bus zone or, where there is only a single traffic control device designating the bus stop or bus zone, between the device and the nearest preceding intersection to the direction of traffic

The passenger waiting pads are typically located immediately at the back of the road curb within the zone between the roadway and the right-of-way property line. This zone may also accommodate boulevard greenery, trees, sidewalks, cycle paths, streetlighting, signage and driveway accesses. The width of the zone may vary. The adjacent land uses are typically a mix of residential, commercial, and institutional.

The width of the bus stop zone, the relationship to the adjacent built environment, and the need for pedestrian access have a significant influence on the scale of the stop and its fit within the local community.

As the bus stops are the initial point where transit customers interact with transit, it is critical that the stop design accommodate both an efficient pedestrian flow to and through the stop area to board and alight from buses and accommodate waiting passengers in a safe and comfortable manner.

As well, the bus stops are the permanent street element that announces the transit presence in the community and assures transit customers that they have arrived at the portal to transit service.

Design Criteria

Recognition of the available space, the relationship to the surrounding built environment, and the required functionality have guided the development of the following bus stop elements and design criteria:

- Stop identification signpost
- Pad length – Standard 9.0 metres
- Pad width – Desirable 1.8 metre clear width, additional width required for shelter
- Front door passenger loading zone – Desirable 1.5 metre width and 2.4 metre depth
- Pad height – flat faced curb with 150-to-200-millimetre height
- Pad cross slope – 2%
- Pad running slope – Same as adjacent road or max 4%
- Pad connection to adjacent sidewalk or path
- Shelter for environmental protection is optional
- Area lighting

- Bench optional
- Waste receptacle
- Information panel optional
- Advertising panel optional

Stop Placement

Generally, bus stops should be placed on the far-side of an intersection; however, near-side, and mid-block stops may be required to accommodate local road configurations.

Far-side bus stops are preferred as left turning vehicles will not pass in front of a near-side stopped bus and customers crossing the street will be behind the parked bus.

Figure 54, Figure 55, and Figure 56 illustrate examples of typical far-side, near-side, and mid-block stop layouts. Figure 57 provides an example of a bus layby stop layout. Note that all stop layouts are designed for a 12-metre bus.

Figure 54: Diagram of a Far-Side Bus Stop

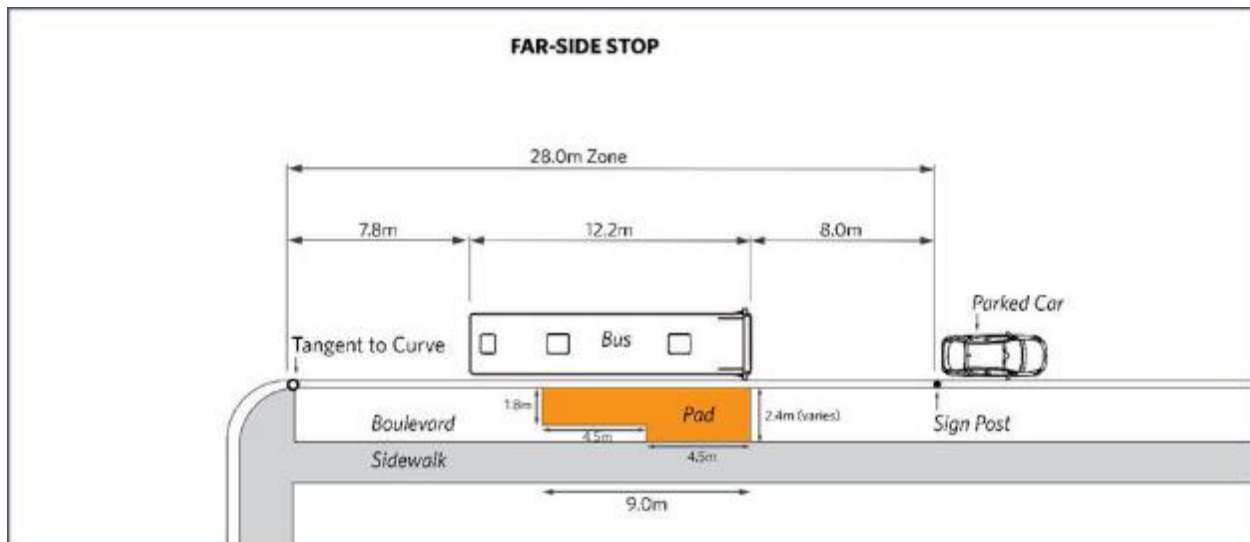


Figure 55: Diagram of a Near-Side Bus Stop

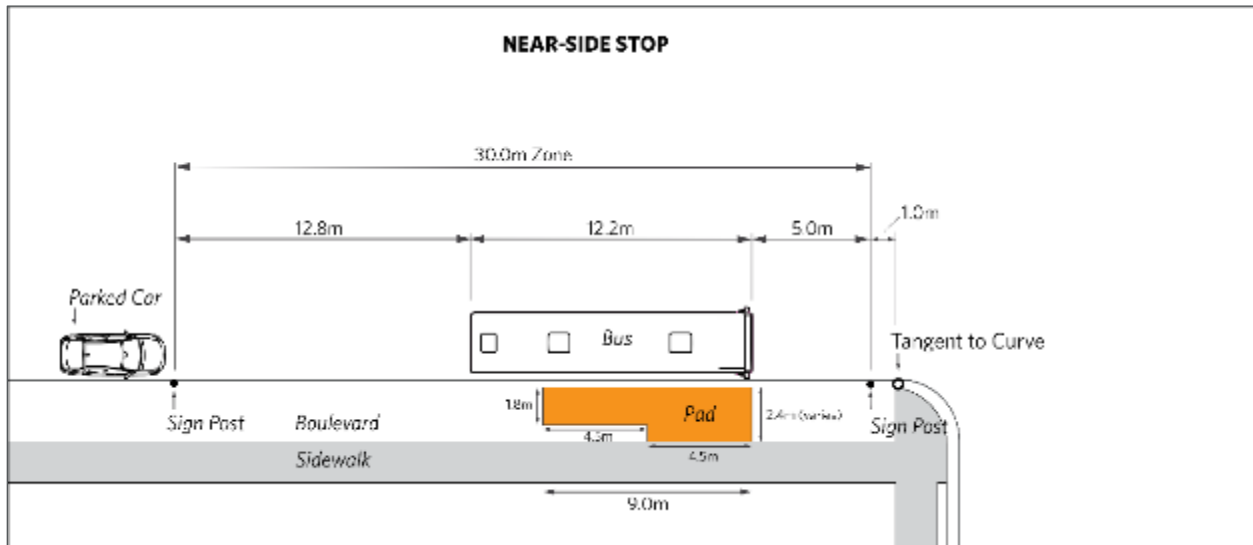


Figure 56: Diagram of a Mid-Block Bus Stop

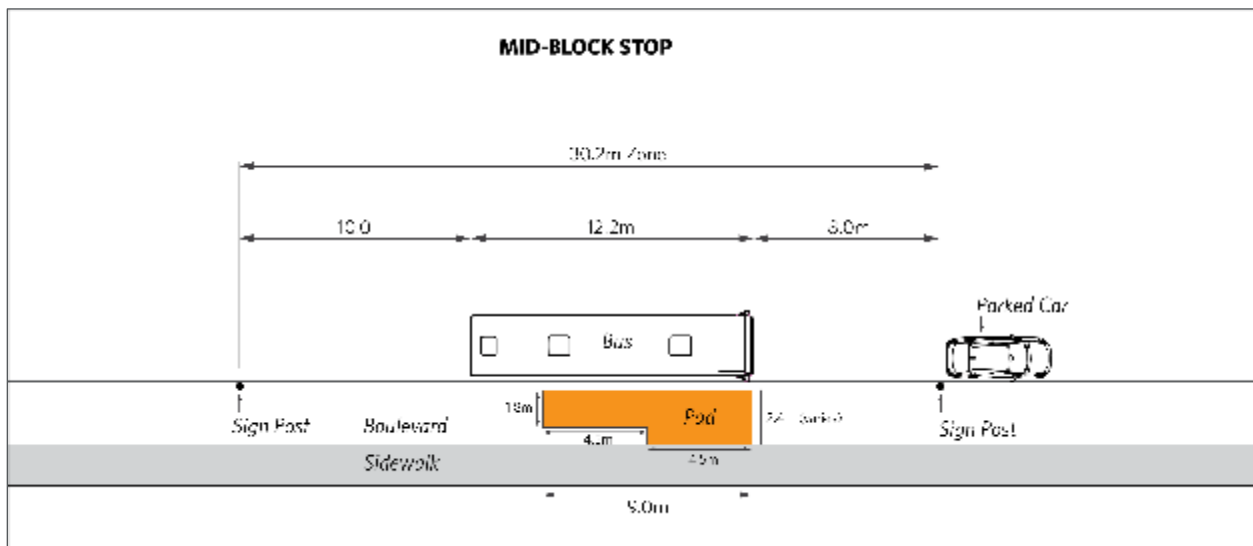
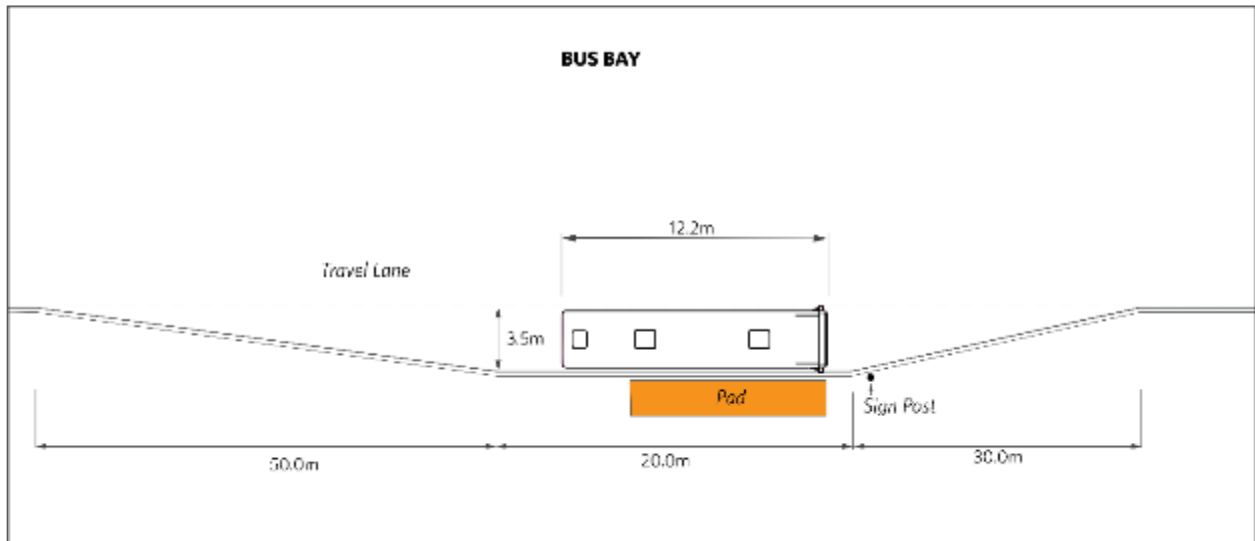


Figure 57: Diagram of a Bus Bay



Analysis of Belleville Transit Bus Stops

Stop Distribution

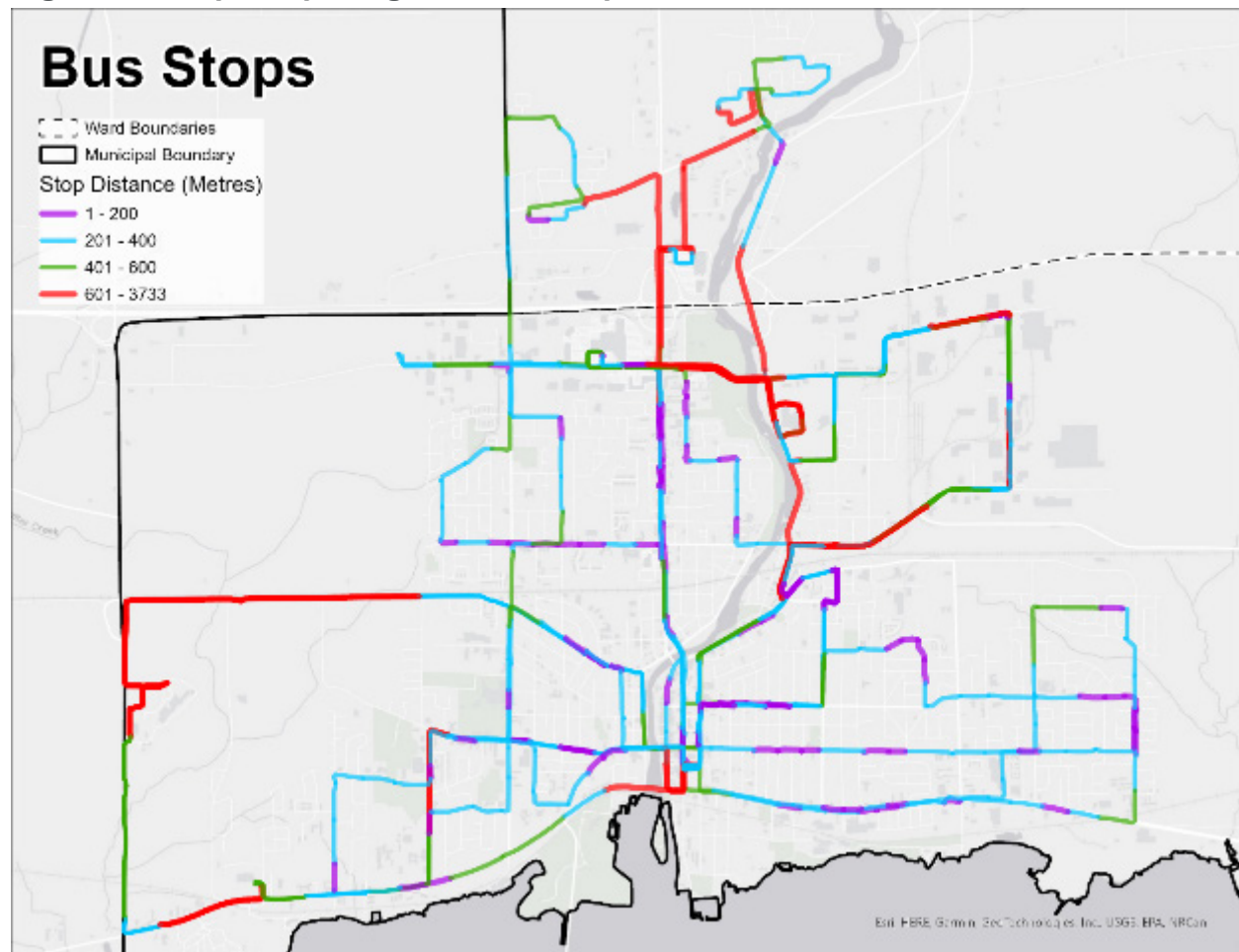
A review of the current Belleville Transit bus stop placements, based on the latitude/longitude coordinates from the bus stop data received from Belleville Transit, reveals that there is a mix of near-side, far-side, and mid-block stops throughout the City, with a high percentage of near-side stops. Figure 58 shows the locations of all Belleville Transit bus stops.

Table 19: Bus stop spacing by route

Route	Average Spacing (m)	Total Stops	0 to 200 m	200 to 400 m	400 to 500 m	> 500 m
1	251	41	13	25	3	0
2	236	40	19	18	1	2
3	354	61	13	27	9	12
4	235	49	22	22	5	0
5	282	37	9	23	3	2
6	262	42	11	28	2	1
7	459	36	4	16	4	12
8	266	38	15	18	3	2
9	409	35	4	18	4	9
10	476	46	6	20	7	13

Figure 59 shows the geographic distribution of bus stop spacing. Locations where stops are spaced further apart are within less built-up areas of the City, for example on Moira Street coming from Loyalist College, in industrial areas, and crossing barriers such as rivers and Highway 401. Locations where stop spacing is shorter tend to be in neighbourhood areas.

Figure 59: Map of Spacing Between Stops



Bus Stop Infrastructure

The standard bus stop infrastructure elements are noted in the Design Criteria section. The exhibits below note examples of bus stops that meet and do not meet typical bus stop infrastructure requirements. An inventory of passenger shelters is noted in Figure 60.

Figure 60: Belleville Transit Bus Stop Shelter Availability

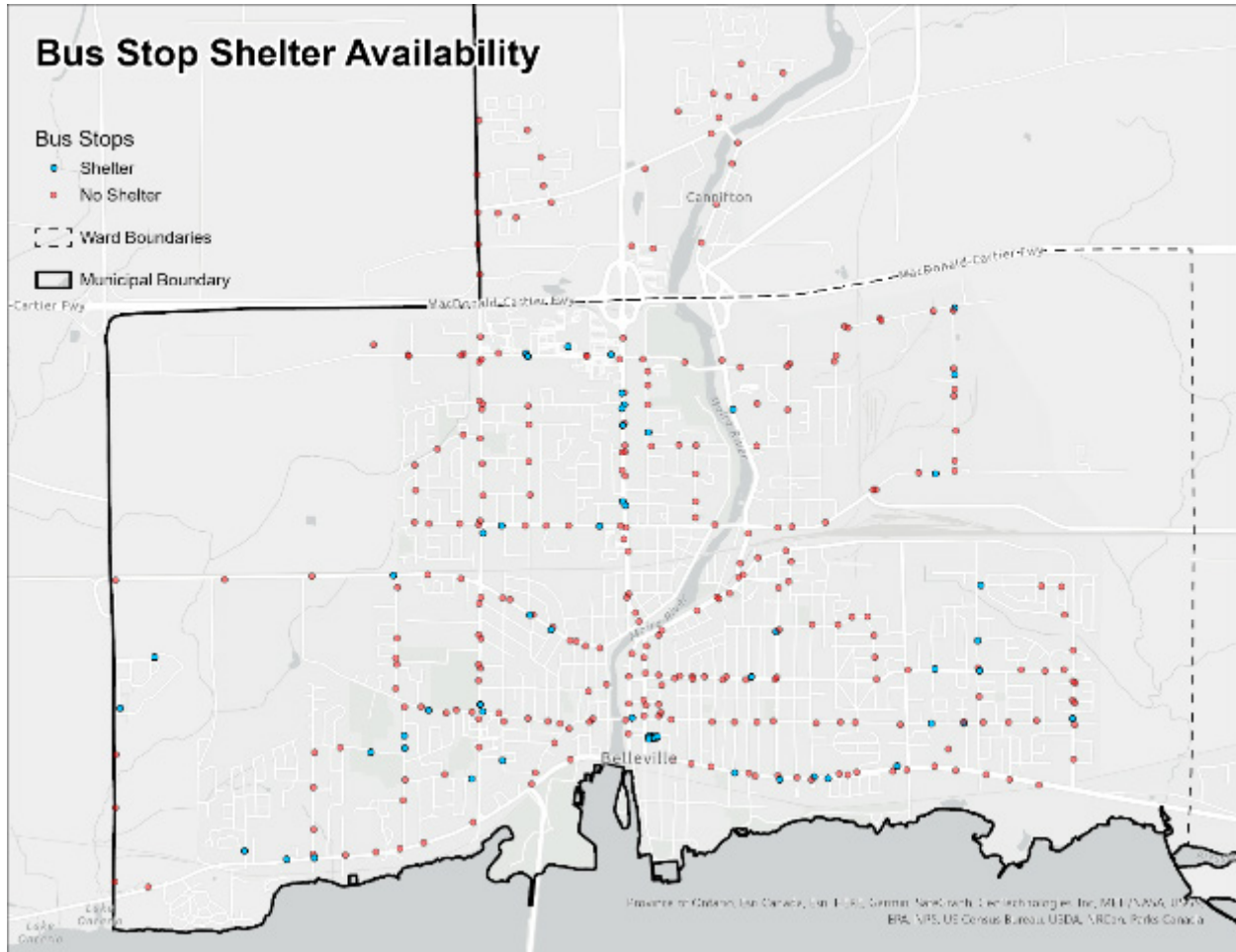


Figure 61: Belleville Transit Bus Stop on Cedar Street at Catherine Street. This is a near-side stop on a neighbourhood street with no pad or shelter. Insufficient space between stop sign and intersection.



Figure 62: Belleville Transit Bus Stop on Sidney Street at Graham Street. This is a near-side stop on an arterial road with no pad or shelter.



Figure 63: Belleville Transit Bus Stop on Moira Street West near Avonlough Road. This is a far-side stop on a rural road with no sidewalk, pad built on the shoulder of the road.



Figure 64: Belleville Transit Bus Stop on Jamieson Bone Road. This is a mid-block stop with a shelter but no pad or sidewalk.



Figure 65: Belleville Transit Bus Stop on Victoria Avenue at Parrott Drive. This is a far-side stop on a neighbourhood road with an appropriately sized pad



Figure 66: Belleville Transit Bus Stop on Bell Boulevard at Riverside Park. This is a far-side stop with a pad connected with a multi-use trail.



Figure 67: Belleville Transit Bus Stop on North Front Street northbound at Donald Street. This is a near-side stop with a shelter and an appropriately sized pad.



Figure 68: Belleville Transit Bus Stop at Quinte Mall. The stop is located on the mall access road and does not have any notable stop infrastructure.



Figure 69: Belleville Transit Bus Stop at Loyalist College




Figure 70: Belleville Transit Downtown Bus Terminal



Conclusions

A review of Belleville Transit's bus stops has shown that the location and infrastructure at many bus stops do not meet transit industry best practice. There is an inconsistent assignment of stop locations (far-side, near-side, mid-block), provision of customer waiting pads and stop signage locations. After a redesign of the bus route network recommendations on new stops, relocation of existing stops and the upgrading of existing stops could be an input into a future bus stop refurbishment program.



H

Appendix H: Fare Strategy

Appendix H: Fare Strategy

Passenger fares are an important component of a transit system's revenue stream. Across Canada, pre-pandemic, approximately 50% of transit operating expenses were funded by farebox revenues, with additional funding support provided through municipal, provincial, and other contributions, and non-passenger revenues. The average farebox revenue support is generally higher in larger transit agencies and lower in small agencies.

Fare policies should seek a balance between recovering current operational costs and developing service improvements, while also ensuring a reasonable and equitable price for transit. Several factors influence the decisions and development of a fare policy, including fare recovery requirements, system goals, inflation and operating costs, equity between population segments, and technology limitations.

In 2018 and 2019, pre-pandemic, Belleville Transit had a revenue to cost ratio of 43% and 39%, respectively. The recovery ratio fell to 16% in 2020 and 14% in 2021. As ridership recovered post-pandemic the recovery ratio reached approximately 30% in 2022.

Belleville Fare and Revenue

The 2021 fares for Belleville Transit and several peer agencies, including data for all Canadian transit agencies under 150,000 population are noted in Table 20 below.



Table 20: Peer Comparison of Fares, CUTA 2021 Operating Data

	Adult				Child				Student				Senior			
	Cash	Mobile Pay	Ticket	Pass	Cash	Mobile Pay	Ticket	Pass	Cash	Mobile Pay	Ticket	Pass	Cash	Mobile Pay	Ticket	Pass
Belleville	\$3.00	\$2.75	\$2.50	\$65.00	\$3.00	\$2.50	\$1.54	\$65.00	\$3.00	\$2.25	\$2.25	\$65.00	\$2.25	\$2.25	\$2.25	\$65.00
Timmins	\$3.25		\$3.25	\$82.00	\$3.00				\$3.00			\$65.00	\$3.00			\$65.00
Charlottetown	\$2.25	\$2.25	\$2.00	\$65.00	\$1.00	\$1.00	\$1.00		\$2.25	\$2.25	\$2.00	\$45.00	\$2.25	\$2.25	\$2.00	\$45.00
North Bay	\$3.00			\$86.00	\$3.00			\$61.00	\$3.00			\$71.00	\$3.00			\$61.00
Sault Ste Marie	\$3.00			\$69.00					\$3.00			\$30.00	\$3.00			\$59.00
Sarnia	\$3.00		\$2.40	\$76.50					\$3.00		\$2.40	\$76.50	\$3.00		\$2.40	\$60.00
Ontario (without GO)	\$3.19		\$2.78	\$91.64	\$2.66		\$2.00	\$53.88	\$3.08		\$2.43	\$72.86	\$2.91		\$2.30	\$60.46
Group < 50K	\$2.88		\$2.40	\$71.34	\$1.88		\$1.57	\$54.20	\$2.31		\$1.93	\$54.20	\$2.48		\$2.14	\$46.21
Group 50K - 150K	\$2.82		\$2.54	\$73.73	\$2.50		\$1.96	\$48.43	\$2.81		\$2.28	\$56.78	\$2.82		\$2.23	\$50.87

It is noted that the Belleville cash fare for adult, child and students is similar to the peer agencies; however, the Belleville pass fare is significantly below the peer average.

Summary of Fare Policy Best Practices

Based on the review of best practices of relevant fare policies, a summary of key findings is as follows:

- Transit should be priced appropriately at the “value of the service,” relative to the cost of competitive and alternative transportation options.
- Based on empirical studies of fare increase and service expansion elasticities, transit customers value the provision and quality of service higher than the cost of service (deep discounts should not be provided at the expense of reduced service).
- Fare discounts should consider reflecting the transaction costs associated with various fare payment media to provide benefit to the transit agency. Cash transactions impose the greatest cost, and tickets / tokens require material, sales, and distribution costs. Smartcards, often topped up online through credit cards, could be encouraged for fewer transactions and with higher upload values per transaction. In addition, smartcard technology allows fares to be rounded to a smaller denominator (i.e., \$0.05 rather than \$0.25).
- Social issues regarding discounts for child, student, and seniors pricing are a concern across a large number of transit agencies. Although fare discounts should be equitable, they should not erode fare revenues and the ability to provide service.
- Fare increases should be equitable in terms of horizontal equity, such that those who pay also benefit from the additional services. However, increases are generally inequitable across income groups as lower income groups bear the burden of the fare increases.
- Fare subsidy programs should focus on user-side subsidies to target individuals, rather than system wide supply-side subsidies. For example, pass programs for low-income individuals should be considered, rather than deep discounts for all seniors.
- Although discounts for prepayment of multi-ride tickets provide up-front revenue, the discount should be minimized as they also provide customers the benefit of convenience.
- Review fare revenue annually and make annual fare adjustments to ensure that large fare adjustments do not result on customer price “shock”.

Fare Structure Scenarios

There are three fare scenarios offered for consideration: existing fare categories, flat fare, and discounted concession fare. In each of the scenarios the cash fare increase is maintained at a relatively modest 17% increase over the next five years; however, the pass price is increased more aggressively at 38% increase over the next five years. The



more rapid increase in the pass price is to redress the current low pass price relative to the transit market.

The tables below show each fare scenario, and the fare changes for each of the next five years.

Table 21 shows the Existing Fare Category Model and the fare increases per category over the next five years.

Table 21: Existing Fare Categories

	Adult				Child				Student				Senior			
	Cash	Mobile Pay	Ticket 10 Pack	Pass	Cash	Mobile Pay	Ticket 10 Pack	Pass	Cash	Mobile Pay	Ticket 10 Pack	Pass	Cash	Mobile Pay	Ticket 10 Pack	Pass
2023 (Current)	\$3.00	\$2.75	\$25.00	\$65.00	\$3.00	\$ 2.50	\$15.40	\$65.00	\$3.00	\$2.25	\$22.50	\$65.00	\$3.00	\$2.25	\$22.50	\$65.00
2024	\$3.00	\$2.75	\$27.50	\$70.00	\$3.00	\$ 2.75	\$20.00	\$70.00	\$3.00	\$2.75	\$27.50	\$70.00	\$3.00	\$2.75	\$27.50	\$70.00
2025	\$3.25	\$3.00	\$30.00	\$75.00	\$3.25	\$ 3.00	\$25.00	\$75.00	\$3.25	\$3.00	\$30.00	\$75.00	\$3.25	\$3.00	\$30.00	\$75.00
2026	\$3.25	\$3.00	\$30.00	\$80.00	\$3.25	\$ 3.00	\$30.00	\$80.00	\$3.25	\$3.00	\$30.00	\$80.00	\$3.25	\$3.00	\$30.00	\$80.00
2027	\$3.50	\$3.25	\$32.50	\$85.00	\$3.50	\$ 3.25	\$32.50	\$85.00	\$3.50	\$3.25	\$32.50	\$85.00	\$3.50	\$3.25	\$32.50	\$85.00
2028	\$3.50	\$3.25	\$32.50	\$90.00	\$3.50	\$ 3.25	\$32.50	\$90.00	\$3.50	\$3.25	\$32.50	\$90.00	\$3.50	\$3.25	\$32.50	\$90.00

Year when fare category changes

The Flat Fare Model in Table 22 is a simplified scenario that has one price point for everyone. The table includes price increases over the next five years.

Table 22: Flat Fare (All Categories)

	Cash	Mobile Ticket	Pass
2023 (Current)	\$3.00	\$2.75	\$65.00
2024	\$3.00	\$3.00	\$70.00
2025	\$3.25	\$3.25	\$75.00
2026	\$3.25	\$3.25	\$80.00
2027	\$3.50	\$3.50	\$85.00
2028	\$3.50	\$3.50	\$90.00

The Adult / Concession Model includes a concession fare, or a discounted fare for mobile tickets and passes offered to children, students, and seniors. Table 23 shows the fares for Adult and Concession fares over the next five years.

Table 23: Adult / Concession Model (Concession Fare* - Child, Student and Senior)

	Adult			Concession Fare*		
	Cash	Mobile Ticket	Pass	Cash	Mobile Ticket	Pass
2023 (Current)	\$3.00	\$2.75	\$65.00	\$3.00	\$2.25 / \$2.50	\$65.00
2024	\$3.00	\$3.00	\$70.00	\$3.00	\$2.75	\$65.00
2025	\$3.25	\$3.25	\$75.00	\$3.25	\$3.00	\$70.00
2026	\$3.25	\$3.25	\$80.00	\$3.25	\$3.00	\$75.00
2027	\$3.50	\$3.50	\$85.00	\$3.50	\$3.25	\$80.00
2028	\$3.50	\$3.50	\$90.00	\$3.50	\$3.25	\$85.00

Fare Strategy Recommendations

It is recommended that Belleville Transit adopt the Adult/Concession Fare Model.

As well, although there has been differing opinions on the implementation of a U-Pass program for Loyalist College, the program would be of significant benefit to both Belleville Transit and Loyalists students. It is recommended that Belleville Transit continue to pursue the initiation of a U-Pass Program with Loyalist College that would be both fair to Belleville Transit and Loyalist students and meet the requirements of the Ontario Ministry of Colleges and Universities Policy.