



Town of Arnprior Transit Feasibility Study Final Report

Paradigm Transportation Solutions Limited

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Executive Summary

Arnprior does not currently have local transit services for use by the general public. The Town of Arnprior's Strategic Plan identifies transportation options and transit planning as a "Key Priority" for 2020 to 2023. Transit also has the potential to advance other Key Priorities for community well-being, access to affordable housing, and economic development. As well, transit could support multiple elements of the Town Strategic Plan's *Vision for 2023*.

The Town commissioned a Transit Needs/Feasibility Study to investigate how transit can best meet Arnprior's needs and goals. This report presents the findings from the study.

Target Travel Markets for Transit

- ▶ **A wide variety of trip types are made within the Town's boundaries:** Arnprior is a compact town. The commercial areas on the west side of town and industrial/employment areas on the east side of town are separated by the Madawaska River. As the local area's economic centre, Arnprior has amenities that serve the wider region, not just its residents.
- ▶ **Multiple groups need or would benefit from transit service.** The demographics and travel patterns of Arnprior's residents indicate there are multiple groups who have a particular need for transit, or would benefit from being able to use transit services.
- ▶ **A transit service within Arnprior would be able to serve a broad range of markets.** Students, seniors, and people without easy car access would have a strong tendency to use transit. However, people commuting to work or traveling to/from amenities should also be considered key target markets.

Existing Supply

- ▶ **Existing transportation options are limited:** without a car, people have to use taxis or rely on specialist services not available to all. Further, household car ownership does not mean all household members can use a car for travel. However, Arnprior's compact size supports active transportation use.
- ▶ **Transit service to/from Ottawa should connect with the nearest LRT station.** Currently, that is Tunney's Pasture station, approximately 63km or 45 minutes from downtown Arnprior. Current construction will see Moodie station opening in



2025 approximately 50km or 35 minutes from downtown Arnprior

Recommended Transit Solution for Arnprior

- ▶ **A wide range of potential transit solutions was analysed for their ability to serve Arnprior's needs.** The analysis took into consideration Arnprior's patterns of land use, density, street network, pedestrian facilities, and likely demand levels. The best options are summarised in Table E.1

TABLE E.1: RECOMMENDED TRANSIT SOLUTIONS

Market	Service model	Vehicle type(s)	Operator
Within Arnprior (conventional)	Point-to-point demand responsive	Passenger van	Private contractor
Within Arnprior (specialized)	Door-to-door demand-responsive <i>or</i> Taxis / rideshare vouchers	Minivan Sedan	
To/from Ottawa (conventional and specialized)	Fixed-route <i>or</i> Scheduled demand-responsive connector	Standard bus	Private contractor <i>or</i> other government agency

Partnership Opportunities

- ▶ **Partnership opportunities exist with multiple organizations in and around Arnprior.** These include other municipalities, Willis College, and seniors' housing providers.
 - Partnering with **other municipalities** would be vital in enabling Arnprior's residents, workers and visitors to travel to/from places outside the Town by transit. However, such services (other than Arnprior-Ottawa) were beyond the scope of this study. A partnership with OC Transpo would help in delivering an Arnprior-Ottawa service.
 - A partnership with **Willis College** could see a large proportion (or all) students having transit included with their tuition. This would provide a steady source of both revenue and ridership.
 - Partnering with **seniors' residences** could enable staff to book trips on behalf of residences, or for facilities to pay for



residents' transit through a corporate account (with costs potentially passed on to residents).

- Partnering with **major employers and trip attractors** could aid by helping target marketing efforts, and by encouraging or enabling employees, customers or clients to use transit.

Public Engagement

- ▶ **An online survey was conducted** asking participants to share information on their travel habits, how a proposed transit service could align with their needs, their opinions on whether transit would benefit the community, and their support for a potential modest property tax increase to fund the service.
- ▶ **Over two-thirds of residents who responded to a public survey supported a property tax increase to fund transit.** The survey collected over 475 responses from a broad range of people, including nearly 412 Arnprior residents.

Next Steps

- ▶ **Additional planning is needed for regarding potential transit services.** This would include developing a service plan, estimate ridership, determining vehicle requirements, establishing a fare framework, engaging with OC Transpo and other potential partners, and determining the financial impacts.
- ▶ **The Town should engage with Renfrew County using the results of this study,** regardless of whether the Town wishes to advance its investigations into transit. The County's upcoming Transportation Master Plan is set to assess its potential future transit needs. These could include the needs and solutions identified in this report.



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Responses to Question 1: Which of the following apply to you? .50
Responses to Question 2: Which of the following apply to other members of your household?50
Responses to Question 3: How many vehicles are owned by members of your household?50
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1 Introduction

Arnprior does not currently have local transit services for use by the general public, and its inter-municipal transit connections are limited to a daily Ontario Northland service. Options for travel within the Town are limited to private vehicles, taxis, and active transportation. As a result, the Town of Arnprior commissioned this study to:

- ▶ determine the conditions, financial and otherwise, under which it may be feasible to initiate any transit service for the Town of Arnprior;
- ▶ identify potential connectivity between local transit and OC Transpo; *and*
- ▶ recommend the optimal transit solution based on research conducted and insights gained.

Transit offers several potential benefits to Arnprior and its people. The wider **economic benefits** of transit include connecting people with more jobs, employers with more potential employees, and businesses with more customers. The **social benefits** comprise connecting people with friends, family, recreation opportunities, and education institutions, particularly the Willis College campus. The **environmental benefits** derived from transit compared to auto use include lower emissions of greenhouse gases and other airborne pollutants. Higher transit use can also reduce both municipal spending on roads and household spending on private vehicles.

This study investigated how transit can best meet Arnprior's needs and goals. The options for transit serving travel within the Town and travel to/from Ottawa will be examined throughout the study. It was open to the possibility that the recommended solutions would be different for these two markets.

For this study, the term "transit" was not limited to traditional fixed-route service, but included any form of non-private motorized transportation that can be used for travel within the service area. This report provides robust, evidence-based recommendations tailored to Arnprior's current and future needs that will inform and support decision-makers.



2 Travel Demand Market Analysis

Like any mode of transport, transit works best if it aligns with people's travel needs. The size of market will also have financial implications for the Town – both the cost of supplying transit service, and the potential farebox revenue.

This chapter presents an analysis of the travel patterns within Arnprior. Each of the following sections answers one of the six fundamental questions:

- ▶ **Where** are people travelling?
- ▶ **What** are they traveling to?
- ▶ **Why** are people travelling?
- ▶ **Who** are the people travelling?
- ▶ **When** are people travelling?
- ▶ **How** are people travelling?

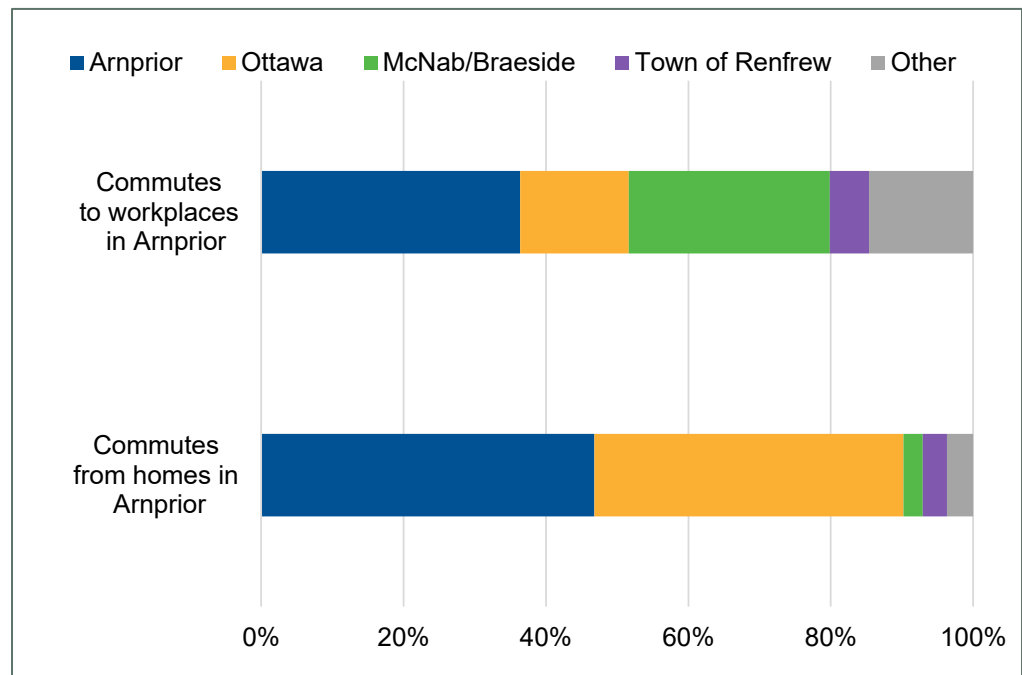
The answers to these questions will together inform the type of transit service Arnprior needs, along with the times and places it should serve.



2.1 Where

The 2016 Canadian Census includes information relating to people's commutes to work¹. This is the only quantitative data available that provides information specific to Arnprior on where people travel. The Census asks people where they live and work, as well as other aspects of their commute trips (covered in later sections). **Figure 2.1** illustrates the distribution of commute flows into and out of Arnprior.²

Figure 2.1: Commuting Flows to and from Arnprior



The chart shows that nearly half of commutes to Arnprior jobs are by Arnprior residents. The remaining half of Arnprior jobs are filled by non-Arnprior residents. The adjacent municipalities of Ottawa and McNab/Braeside both generate significant numbers of commutes to and from Arnprior. This suggests that there is potential for future partnership with other municipalities to support cross-boundary transit service.

The chart also shows that majority of Arnprior residents commute to jobs within the Town. This implies that an initial transit service focused on trips within Arnprior would be useful to the Town's residents.

¹ At the time of writing, detailed 2021 Census Data was not yet available.

² Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016325.



2.2 What

Arnprior is the economic centre for the local area. It has a wide range of amenities to serve its residents, visitors, and people from the communities in the surrounding area. **Figure 2.2** shows key destinations in the town.

Non-residential uses can be found in multiple parts of the town. Commercial areas are concentrated along John Street North, including restaurants, bars, a theatre, various services, and banks. Other employment and industrial uses can be found on the outskirts of town. Elementary and high schools can be found across town.

Two significant destinations are Arnprior Regional Health (in the northern part of Town) and Arnprior Shopping Centre and Willis College (in the southern part of Town).

Much of the remaining area within Arnprior is taken by residential uses, with new subdivisions and apartment buildings being planned or already under construction. Information from Town staff suggests that small-scale intensification (construction of multi-unit building) has been common in recent years. The Town also has multiple seniors' residences.

The wide variety of destination types within Arnprior implies there is a wide range of travel markets that transit could serve. The distribution of the destinations across Arnprior means that it would be unnecessarily limiting for transit to focus on a small number of travel markets associated with particular types of destinations.



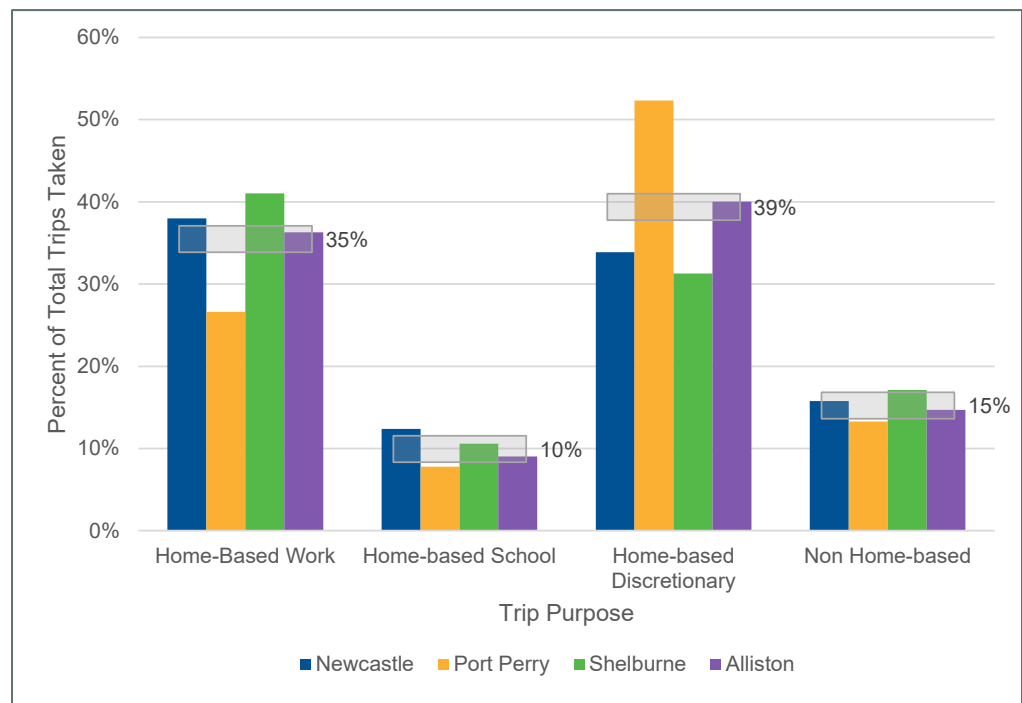


2.3 Why

Specific quantitative data for why people travel is not available for Arnprior. However, the *Transportation Tomorrow Survey* (TTS) provides detailed travel data for municipalities across the Greater Golden Horseshoe area. It includes communities that are like Arnprior in terms of size, population density, land use, and proximity to a metropolitan area. These include the community of Newcastle, the community of Port Perry, the town of Shelburne, and the settlement of Alliston. Data for these places can serve as surrogate for Arnprior.

Figure 2.3 illustrates the distribution of trip purposes within these communities, as well as the average value³.

Figure 2.3: Trip Purpose for Similar Communities



The chart shows that most trips (39%) in places like Arnprior are classed as “Home-based Discretionary”. These are trips between homes and places other than work or school. These trips could include trips to visit friends and family, recreational activities, and shopping. The data shows that transit service should be planned to serve a wider variety of trips, not just commutes to/from work.

³ University of Toronto Data Management Group - 2016 Transportation Tomorrow Survey.



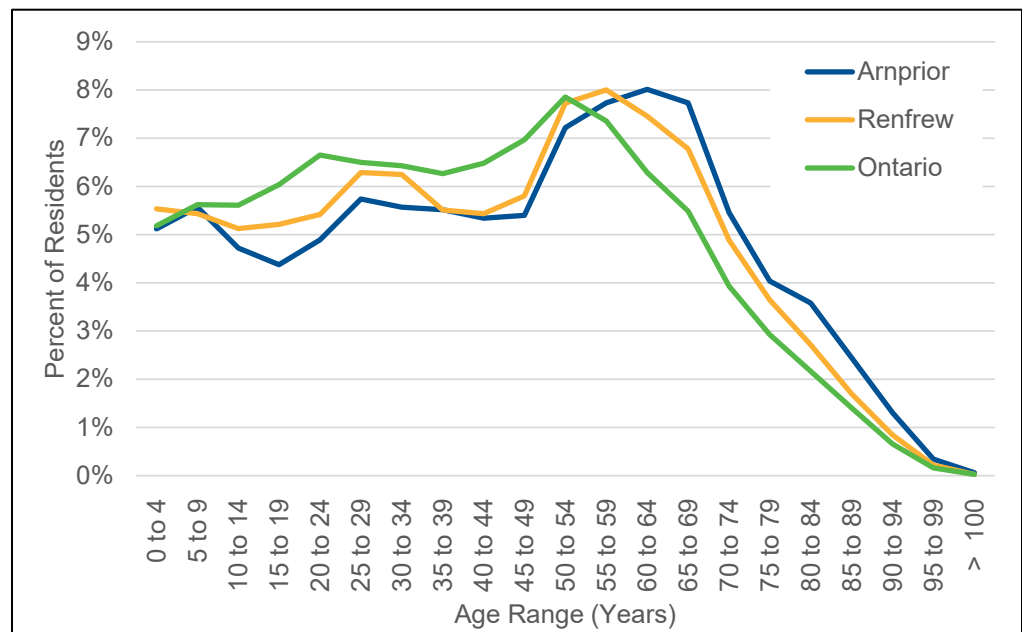
2.4 Who

Demographic data for the Town of Arnprior has been taken from 2016 Census. To provide context, the census data for the Renfrew Census Division⁴ and the province of Ontario are also used. The comparison helps to highlight the unique characteristics Arnprior and aids in determining its key travel markets for transit.

2.4.1 Age distribution

Figure 2.4 shows the age composition of Arnprior residents, along with to Renfrew Census Division and Ontario. When compared to the rest of the province, the residents of Arnprior are generally older. Arnprior has a higher proportion of seniors (aged 65+) and a lower proportion of working aged people (aged 18-65) and children (aged under 18) than both Ontario and Renfrew.

Figure 2.4: Age of Population



Seniors are more likely to use transit than the general population. This is because they are more likely to have medical issues that prevent them using a car. They are also more likely to not own a car for financial reasons. The higher proportion of seniors in Arnprior suggests that this could be a good market to target for transit.

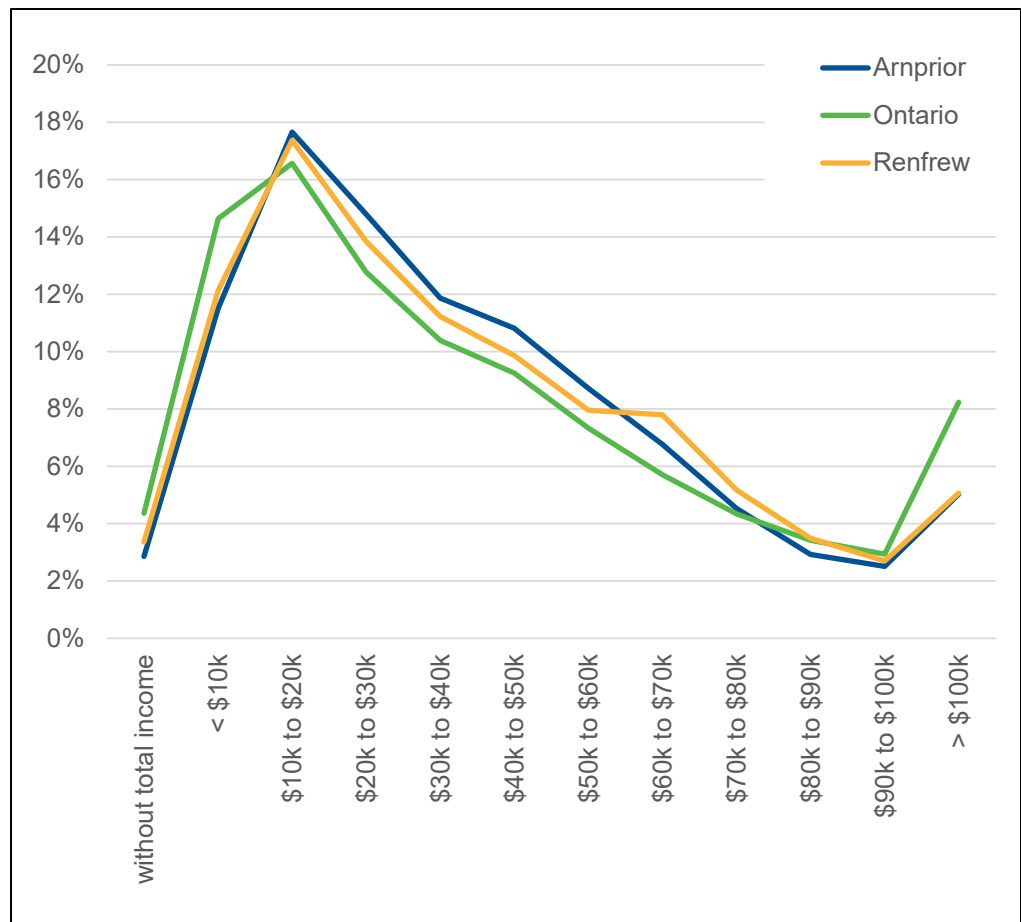
⁴ Renfrew Census Division is comprised of Renfrew County and the City of Pembroke.



2.4.2 Personal income

The median total income of residents in Arnprior is \$33,579, very similar to the provincial median of \$33,539⁵. **Figure 2.5** shows the distribution of personal annual income (before tax) of residents in the Town of Arnprior relative to the Renfrew Census division and the province of Ontario.

Figure 2.5: Total Pre-Tax 2015 Income in 2015



The chart shows that personal incomes in Arnprior are similar to the Renfrew Census division, but skew lower than the Ontario average. Approximately 59% of Arnprior residents earn under \$40,000 per year and therefore could be considered low-income.

In communities with transit service, lower personal (and household) income levels are correlated with higher transit use. This is primarily

⁵ Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.



because of lower car ownership rates. This extends to households that *own* a car, but not everyone in the household has *access* to it for all trips. In addition, people who are unable to drive for medical reasons also tend to have lower incomes.

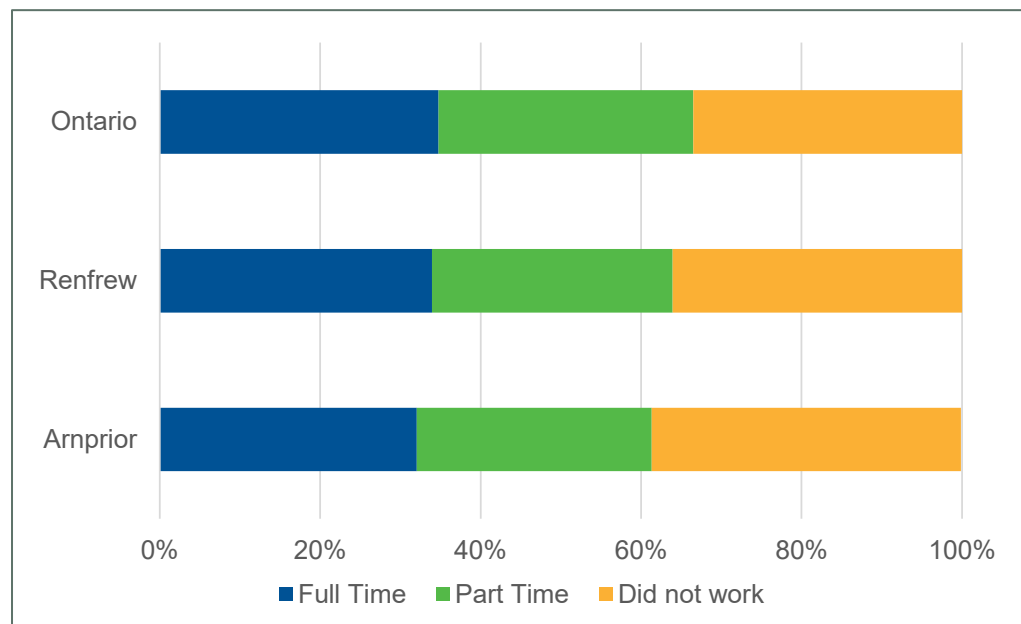
The higher proportion of low-income people reinforces the need for and benefits of transit service in Arnprior.

2.4.3 Labour force

Employed people are a useful market for transit, as most travel to and from the same destination each day. Switching to transit for this one particular journey will result in a person making many transit trips each year.

Figure 2.6 Error! Reference source not found. shows the employment status of the residents of Arnprior in relation to the Renfrew census division and the province of Ontario.⁶

Figure 2.6: Employment Status



The chart shows that (in 2016), Arnprior residents are less likely to be employed when compared with the Renfrew census division and the province of Ontario. This could be explained by Arnprior's relatively

⁶ Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.



older population when compared to the county Renfrew and the province of Ontario, Arnprior has more residents of retirement age.

Employment status fluctuates significantly with time, depending on local and wider economic circumstances. The COVID pandemic produced large changes to the economy; some types of jobs simply ceased to exist as a result of lockdowns or other restrictions. Further, the loss of revenue has caused some businesses to cease operating or permanently lay off staff. Even as the pandemic ends, the effects on employment will continue.

As a result, any efforts to target employees to use transit for their commutes must incorporate up-to-date information on employment in the Town, and hence people's travel patterns to and from work.

2.4.4 Language ability

Most Arnprior residents speak English as their mother tongue (91.9%). Further, 99.8% of residents have knowledge of English. This implies that communications about transit in English would be understood by virtually all the population.

2.4.5 Mobility status

The number of people living in Arnprior has remained relatively stable over the last 30 years. However, this does not mean the same people have lived there for that period. The 2016 Census showed that 6.4% of residents did not live in Arnprior one year previously and 22.4% of residents did not live in Arnprior five years previously.⁷

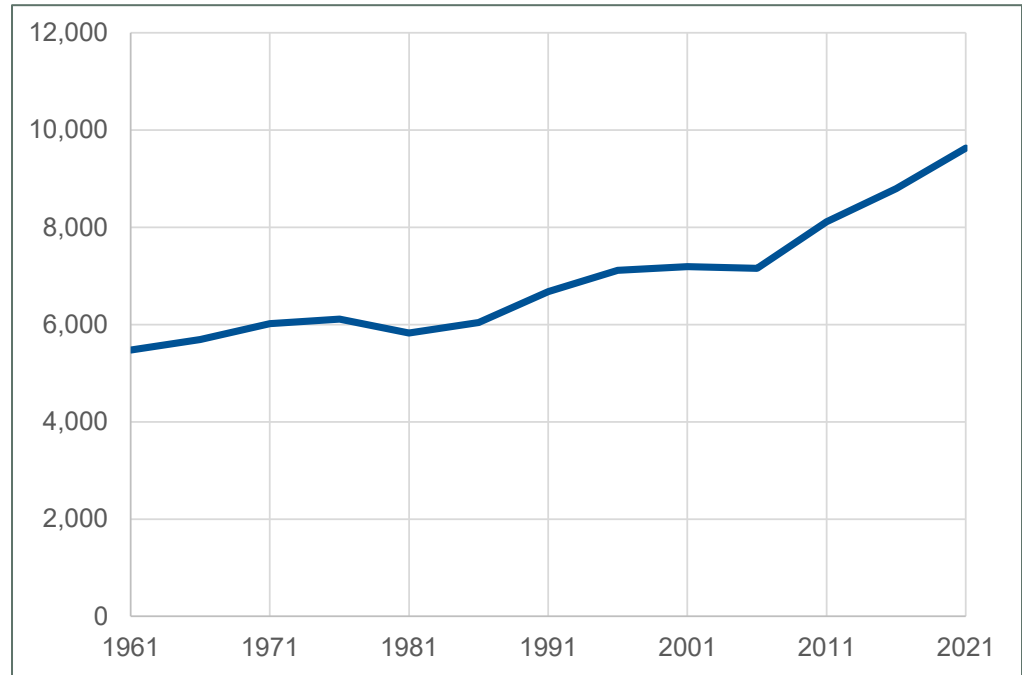
This turnover provides an opportunity for the Town to change travel habits in Arnprior. People are highly likely to (re)consider their mode of travel when they move to a new place. Consequently, promoting transit to new residents can be an effective way to build long-term transit ridership.

2.4.6 Population Trends

Figure 2.7 Error! Reference source not found. illustrates the population trends of Arnprior between 1986 to 2021. This shows the general upward population trend experienced in Arnprior. The population of Arnprior grew 35% from 2006 to 2021, an average growth of 2.00% per annum.

⁷ Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.



Figure 2.7: Population of Arnprior

Provincial population projections from 2020 show that the Renfrew area (including Arnprior) is expected to grow 8.5% between 2015 and 2045 from 106,000 to 115,000 people.⁸ This indicates that population growth will likely occur in Arnprior, along with growth in the travel demand to, from, and within the municipality.

As a regional centre, employment in the Town would also be expected to grow. Even growth outside Arnprior will result in more trips into the Town, further expanding the benefits of shifting travel to transit and other modes.

⁸ Ontario Ministry of Finance, *Ontario Population Projections Update, 2019–2046*, Summer 2020.



2.5 When

Figure 2.8 illustrates the time at which residents of Arnprior leave for work.⁹ Around two-thirds of Arnprior residents (64%) leave for work during typical morning peak hours (between 6 AM and 9 AM). This indicates there is a strong morning travel market available for transit, and the hours of operation for any service should reflect that. It also shows there is significant commute market available for travel outside the morning peak period – likely to be retail, service sector, or industrial jobs.

Figure 2.9 shows the distribution of commuting durations for Arnprior residents. Of these commutes to work, the majority of residents of Arnprior (59%) spend less than 30 minutes commuting. Given that most Arnprior residents have short commutes, any transit service needs to offer short access times, wait times and in-vehicle times to be a competitive alternative.

Figure 2.8: Time of Commute to Work

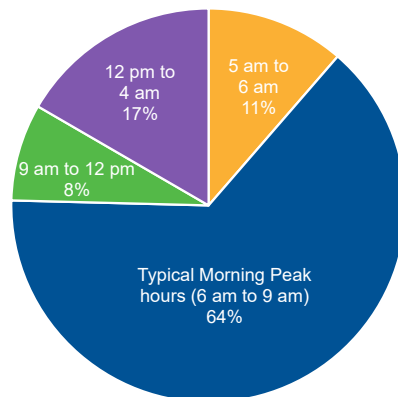
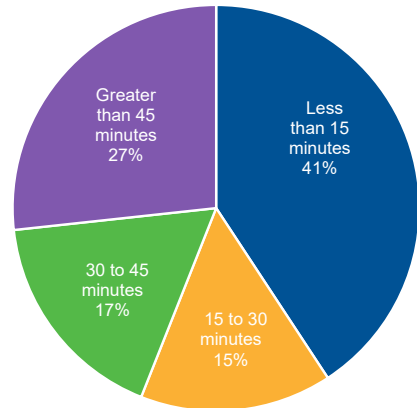


Figure 2.9: Commuting Duration



⁹ Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

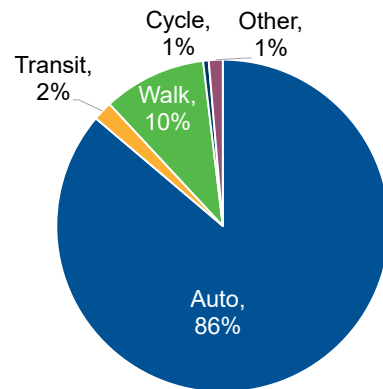


2.6 How

Arnprior does not currently have local transit services. Travel options in the Town are limited to private vehicles, taxis, and active transportation.

Figure 2.10 illustrates the commute mode choice in Arnprior in 2016. It shows that commute trips are dominated by private vehicle use, with 86% of commutes using car-based modes or motorcycles. The dominance of car-related travel for commuting is to be expected given the choices currently available to residents. A similar situation is expected for other types of trips within Arnprior

Figure 2.10: Commute Mode Choice in Arnprior



11% of commute trips were by active modes (walking and cycling). This is a relatively large proportion and indicates that Arnprior generally has good walkability. A high-level review of the pedestrian network in the town showed that the urban area typically has small block sizes and good sidewalk provision. Major roads also have plenty of potential crossing points. The Ottawa Valley Rail Trail provides a connection from the west end of Town to the urban area along John Street North and Daniel Street North. This walkability will help any transit service, as transit trips generally begin and end with a walk to/from a bus stop.

Transit was used for 2% of commute trips. This included the commuter bus service to and from Ottawa that existed at the time of the Census (but does not exist now). It also included people who drove to an OC Transpo park-and-ride facility and used transit for the rest of their trip.

2.7 Summary

Arnprior is a compact town. The commercial areas on the west side of town and industrial/employment areas on the east side of town are separated by the Madawaska River. The two sides are connected by Madawaska Boulevard (for all modes) and by the Ottawa Valley Rail Trail (for pedestrians and cyclists). Employment and other amenities are spread over multiple locations, rather than being concentrated around one spot. As the local area's economic centre, Arnprior has amenities that serve the wider region, not just its residents. This in turn



means a wide variety of trip types are made within the Town's boundaries. The demographics and travel patterns of Arnprior's residents indicate there are multiple groups who have a particular need for transit or would benefit from being able to use transit services.

As a result, a transit service within Arnprior would be able to serve a broad range of markets. Students, seniors, and people without easy car access would have a strong tendency to use transit. However, people commuting to work or traveling to/from amenities should also be considered key target markets.

Census data reveals that Ottawa is a major employment destination for Arnprior residents. Ottawa is also a service hub for the wider region, and hence will attract a variety of non-employment trips to amenities that are not present in Arnprior. Consequently, an Arnprior-Ottawa transit service would probably be used primarily by commuters, but would also benefit all residents of Arnprior.



3 Existing Supply

Currently, Arnprior is not served by a public transit system, interregional transit, such as Ontario Northland, provides Arnprior with connection to the rest of the Ottawa Valley and Northern Ontario. Due to COVID-19, the commuter bus service from Arnprior to Ottawa is no longer in operation. Other services are available to accommodate transportation within the Town that do not depend on private vehicle ownership. These include specialized transit, carpool and rideshare services, and taxi services.

3.1 Inter-municipal transit

Ontario Northland provides daily service between Ottawa and Sudbury via Arnprior. The Ontario Northland bus stop is in Arnprior at 39 Winners Circle Drive. Buses depart this stop at 11:30 AM (to Sudbury) and 10:15 PM (to Ottawa).

Classic Alliance provided commuter bus service between Arnprior Ottawa-Gatineau. This was a regional partner route with OC Transpo and provided residents with bus service to and from downtown Ottawa. As of March 30th, 2020, this route (ROUTE 500) has been suspended due to COVID-19. When this route was in service, it served various locations in Arnprior between 05:57 and 06:18 and in Ottawa-Gatineau between 06:47 and 07:12. In the evening, stops in Ottawa-Gatineau were served between 15:45 and 16:20, and in Arnprior between 17:05 and 17:23. The one-way cash fare between Arnprior and Ottawa was \$22.00.

3.2 Specialized transit

Carefor is a local charitable non-profit organization that provides a wide range of in-home care and community support services. These are designed to meet the needs of the Arnprior and Renfrew County community. They offer a non-urgent transportation program to help individuals unable to access other means of transportation to local and out-of-town appointments.

Arnprior-Braeside-McNab Seniors at Home Program Inc. (“Seniors at Home”) is a non-profit charitable organization assisting and cooperating with other agencies to provide community support services to seniors and individuals with special needs. Seniors at Home provide a wide variety of programs and services including home support, social, medical assistive devices loans, and transportation. Seniors at Home also provides transportation services for those attending out-of-



town medical appointments, assistance with getting around in-town (for medical appointments, social events, hair appointments, etc.), and bringing residents from outside of Arnprior into town for their personal needs.

The Town should continue its existing relationship with these organizations as providers of specialized transit within Arnprior.

3.3 Carpool and Rideshare

Rideshare and carpooling are gaining popularity in the Town of Arnprior. The County of Renfrew is collaborating with the RideShark Corporation to develop a “Winterized On-Demand Community Transit Network”. The development and deployment of this rideshare system is planned to serve commuters, employers, residents, students, youth, and visitors to the county.

This rideshare system is intended to make it easier for people in rural and smaller communities to travel to their destinations, especially during the winter. As of February 2021, the technology development was slated to begin in early 2021, with fair weather tests in fall of 2021, and on-road winter condition testing in early 2022.

In addition to this rideshare system, Renfrew County is developing a ride share platform, SharetheRide.ca, in cooperation with local employers, schools, seniors, and community organizations. This website helps users find other nearby commuters to form carpools.

Information from with Town staff indicates that Lyft was planning on expanding into Arnprior, prior to the COVID-19 pandemic.

3.4 Taxi services

There are four taxi companies in Arnprior. These include A-1 Taxi, Clay Valley Taxi, Grab-A-Taxi, and Murry’s Taxi. These taxi companies provide door-to-door service and delivery services for customers.



3.5 OC Transpo services

OC Transpo does not serve the Town of Arnprior. However, any service between Arnprior and Ottawa would need to connect with OC Transpo's services.

OC Transpo classifies its routes by the level of service they offer. The routes that come closest to Arnprior in each class are as follows:

- ▶ **LRT:** the current western terminus of the Confederation Line (Line 1) is at Tunney's Pasture station, approximately 63km or 45 minutes from downtown Arnprior. Work is currently underway to extend Line 1 westwards to Moodie transitway station, approximately 50km or 35 minutes from downtown Arnprior.
 - The City of Ottawa has plans to further extend the line to Kanata. The closest station would then be approximately 45km or 30 minutes from downtown Arnprior.
- ▶ **Rapid** (*high-frequency express service*): the route that comes closest to Arnprior is 62 TERRY FOX. This serves Terry Fox bus station, approximately 45km or 30 minutes from downtown Arnprior.
- ▶ **Frequent** (*high-frequency service*): the route that comes closest to Arnprior is 88 HURDMAN. This route also serves Terry Fox bus station, approximately 45km or 30 minutes from downtown Arnprior.
- ▶ **Local:** No local route serves a location significantly closer than those served by Rapid or Frequent routes.
- ▶ **Connexion** (*weekday peak-period O-Train connections*): The closest route is 262 West Ridge-Tunney's Pasture. This route serves the Carp Road park-and-facility, approximately 40km or 25 minutes from downtown Arnprior.

Given the various distance/time from Arnprior and service level offered by each option, it is recommended that any service to/from Arnprior connect with the nearest LRT station. This would provide the highest level of service for onward travel towards central Ottawa. LRT stations are also hubs for bus routes serving the surrounding area. This would allow easy connections for trips to nearby destinations.



4 Transit Supply Options Analysis

The provision of transit services can be broken into four components:

- ▶ **Service Delivery Model:** *What* the service looks like to the user, such as fixed-route or demand-responsive;
- ▶ **Operator Model:** *Who* runs the service, such as a municipality or private contractor;
- ▶ **Vehicle Type:** *How* the service is operated (such as electric vs. diesel, or vehicle size); and
- ▶ **Individual Service Options:** *Where* and *when* service is provided, such as whether a route serves a particular community.

This study's scope covers the first three components, which are addressed in the following three sections. This chapter concludes with a review of communities similar to Arnprior that have transit services.

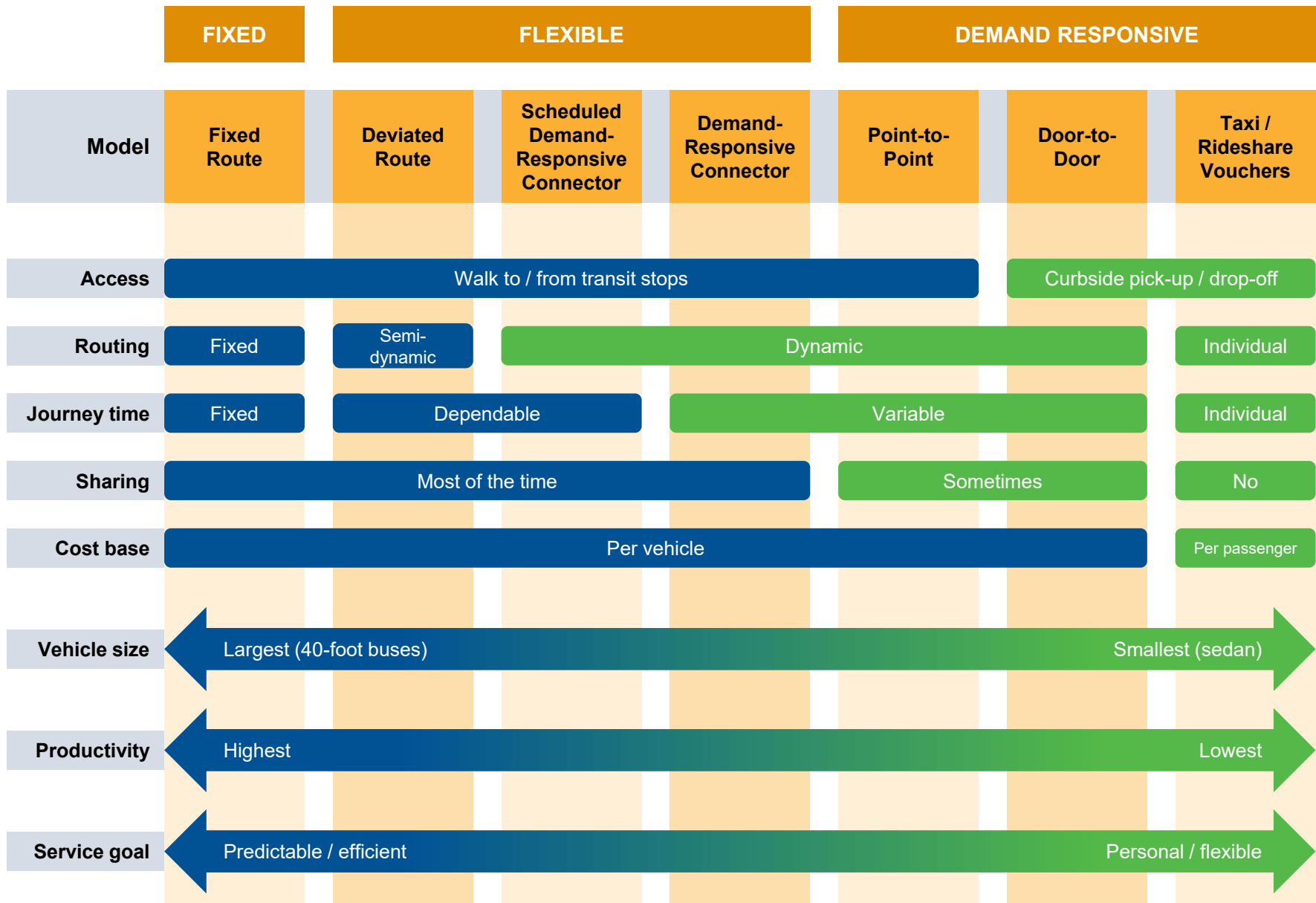
4.1 Service Delivery Model

This section describes the range of service delivery models, based on those in use elsewhere in North America. Some of the key differences between the different models are as follows:

- ▶ **Access:** how do passengers access transit services?
- ▶ **Routing:** how is the transit vehicle's route decided?
- ▶ **Journey time:** how much certainty does the model provide?
- ▶ **Sharing:** how often do passengers share the vehicle with other passengers?
- ▶ **Cost basis:** what drives the operating costs?
- ▶ **Vehicle size:** how large are the typical vehicles?
- ▶ **Productivity:** how many boardings per hour can the model expect to accommodate?
- ▶ **Goals:** what overarching goals does the model best serve?

The answers to these questions will depend on each community's unique needs. **Figure 4.1** (next page) shows the various models of transit and their attributes. The rest of this section provides detailed descriptions of each model, their strengths and weaknesses, where they are most suitable, and a real-world example of each.





Transit Supply Models

4.1.1 Fixed-route model

A **fixed-route service** operates along a pre-set route, following a schedule of when to serve each stop. This model is the most common approach for long-distance inter-city or inter-community services, and for transit within medium and large urban areas.

A fixed-route service will directly serve the people within walking distance of the bus stops. “Walking distance” is typically defined to be 400m. Calculations of this distance should take into consideration the pedestrian routes and crossing points available.

This model is the most efficient way to provide transit in areas of high demand. It can accommodate the highest demand of the models discussed here. For all models, picking up a passenger adds to the journey time of people already on the transit vehicle. This effect is smallest under the fixed-route model.

The fixed-route model is easiest to apply in areas where the street network allows routing to be mostly in straight lines. Areas with a grid of major roads are the ideal situation. Where multiple routes are required to cover an urban area, coverage will be most efficient if the area is roughly rectangular. This allows routes to be parallel, minimizing the overlap in their service areas.

Fixed-route services are easy for potential customers to understand. They provide predictable trip start times and durations. The administrative overhead of running a fixed-route service is low. However, small communities may not generate sufficient demand to justify running buses often enough to be convenient.

Example: Ontario Northland services, including the Ottawa-North Bay service via Arnprior. This model is also used in most Ontario municipalities with significant urban populations, including Ottawa.

4.1.2 Demand-responsive models

Under a demand-responsive model, the route of the transit vehicle will depend on the needs of the passengers using it – that is, it *responds* to travel *demand*. A demand-responsive service will be limited to a specified geographic area or set of origin and destinations. The term **microtransit** typically refers to any form of demand-responsive transit that uses small vehicles such minibuses, vans or cars.



The simplest form of demand-responsive service is the **door-to-door** model. A transit vehicle picks up passengers from outside their origin point and then drops them off at their destination point. (This is typically at the curb, rather than literally at someone's front door.) This replicates the convenience of a private car or taxi. There are two main differences between this model and a taxi. Firstly, the vehicle is generally shared with other passengers. Secondly, the vehicle will often pick-up and drop-off other passengers along the way.

The convenience of door-to-door service limits its efficiency. Using minor residential roads can result in relatively long detours to pick-up or drop-off one passenger. Consequently, it is highly unusual for a door-to-door service to average less than five minutes between successive pick-ups/drop-offs. This means it can't average more than six boardings per hour, which increases the costs per passenger.

Example: Specialised transit services are almost always door-to-door, because of the mobility constraints of potential customers.

The efficiency of the demand-responsive service can be improved using the **point-to-point** model. Under this model, passengers are picked up or dropped off at pre-set points (that is, transit stops). Customers generally need to walk a short distance between the transit stop and their origin or destination. Transit stops can be placed to facilitate the easy movement of transit vehicles, by placing them on major roads or continuous minor roads. In urban areas, this results in a significantly greater efficiency.

The greater efficiency allows for more boardings per hour, which in turn reduces the number of required vehicles (and hence operating costs). However, it requires a supportive pedestrian environment, with strong sidewalk provision and plenty of road crossing points. Arnprior has these conditions in most of its urban area.

Example: Belleville Transit late night service. Belleville is a self-contained city of about 50,000 people. The transit agency uses fixed-routes during the day, and point-to-point demand-responsive service at night. The same vehicles and bus stops are used for both service models. Customers can book rides on the on-demand service via an app or a website.

The two models can co-exist within one agency or service area, potentially even using the same vehicles. For example, customers needing specialized transit are offered door-to-door service, while



other customers are offered point-to-point service. Another example would be door-to-door service in rural areas, and point-to-point service in urban areas.

4.1.3 Flexible transit models

The term “flexible transit service” covers a range of models that include elements of both the fixed-route model and demand-responsive models.

One type of flexible transit service is **route deviation**. Under this model, a service operates as a fixed-route service by default, but will detour to an alternative route in response to customer needs. The alternative route could have just one stop, or multiple stops. This model is useful when a location or area needs transit service, but doesn’t generate enough to demand to justify running every transit vehicle trip there.

This service model is also appropriate for services running through rural areas, as it will increase the number of people who can use the service beyond those within walking distance of the route.

Example: San Joaquin RTD’s “County Hopper”. The agency serves a rural area in northern California, east of San Francisco. The five County Hopper routes run primarily along major roads. Customers in rural areas living away from those roads can request the service deviate by up to one mile to a point where they can be picked up or dropped off.

Another type of flexible transit service is the **demand-responsive connector** model. Under this model, a service will provide demand-responsive service between a transit hub and people’s origins / destinations in a prescribed area. Passengers travelling within that area could either get direct service or be required to travel via the hub.

This model is useful for connecting low-density areas with a focal point for travel. The focal point could be a mall, medical facility, post-secondary institution, or transit hub with fixed-route service to other places.

Example: Oakville Transit’s “Home to Hub”. Oakville is a growing suburban community west of Toronto. The Home-to-Hub service operates in areas of the town that are not yet fully built out, and hence do not generate sufficient trips to justify fixed-route service. The service transports people between their homes (or other



destination in the service area) and a transit hub. The hub is served by fixed-route service, providing connections to the rest of the town.

A variant on this is the **scheduled demand-responsive connector**. Under this model, a service will have scheduled arrival or departure times at one or more points, but otherwise operate as a demand-responsive service. The focal point could be an inter-Town transit hub or other location where a timed arrival or departure is particularly valued.

Example: Durham Region Transit late night service (pre-COVID). DRT's service area includes several GO Transit commuter rail services. At Ajax rail station, late-night local transit service was provided by a service that left shortly after trains from Toronto arrived. The route was then based on destinations of passengers.

4.1.4 Taxis / rideshare voucher model

Under this model, customers use conventional taxis or rideshare providers (such as Lyft), with the municipality paying some form of subsidy for each trip. This could be structured as a percentage of the normal fare, or by passengers being charged a pre-set fare with the municipality paying the operator the difference.

This arrangement results in a significant financial difference between the voucher model and other transit delivery models, assuming fares do not cover costs.

Under other transit delivery models, vehicles operate (and incur costs) throughout the day. This means their annual costs are fixed. Each additional passenger pays a fare but does not increase the cost of operation. This means the greater the number of passengers, the *lower* the subsidy requirement. (Assuming no additional capacity is needed.)

By contrast, the voucher model means vehicles only incur costs to the municipality when they are transporting passengers. Each additional passenger both pays a fare *and* increases the cost of operation. This means the greater the number of passengers, the *higher* the subsidy requirement.

Example: Innisfil Transit. The town is a largely rural municipality in central Ontario. The Town contracted rideshare operator Uber to operate the service. Passengers can book via Uber's app or a third-



party phone service. Fares are \$4-\$6 for certain common destinations, or \$4 off Uber's standard charge for other destinations. Customers could make a maximum of 30 subsidised trips per month, meaning that people travelling every weekday pay the full Uber fare for some of their trips.

Service started in 2017 and proved successful at attracting riders. However, that success resulted in municipal subsidy requirements being substantially higher than expected. In 2018, subsidies for trips to/from Innisfil were removed (except for one key destination). In 2019 the number of subsidized trips per customer was capped.

Unusually, teenagers require a parental consent form before they can use the service.

Wheelchair-accessible service is provided by a taxi company, as Uber was unable to ensure its fleet of driver-owned vehicles would include wheelchair-accessible vehicles when needed.

4.1.5 Vanpool models

A vanpool service brings people to common destination, such as a workplace, business/industrial park, seniors centre or shopping mall. Service is typically provided by a passenger van (hence the name) with a capacity of 10-15 seats. Use of the service is restricted to those who have signed up to use the program in advance. Vanpools operate with fixed routes and pick-up/drop-off times, although this may be adjusted as customers join or leave the program.

The vehicle will typically be owned and operated by an organization associated with the common destination (for example, the employer if the destination is a workplace). The vehicle could be driven by one of the users, or by a person hired by the organisation responsible for the service. The most common ways of organizing the vanpool are as follows:

- ▶ **Employer-sponsored** vanpools are limited to the company's employees, with the employer organizing the operations and underwriting any costs not covered by users. They typically serve one destination.
- ▶ **Third-party** vanpools are organized and operated by for-profit or not-for-profit operators (such as transit agencies). They may serve any number of destinations, but are still limited to a particular group of people in some way.



- ▶ **Privately owned vanpools** are organized and operated by individuals. They typically serve one destination.

The vanpool model has a lot in common with school bus services, with the obvious differences being type of users. However, the planning and delivery of the service is similar. Vanpools require a suitable mass of (potential) customers who travel on a routine basis between an origin and the common destination.

Vanpools occupy a grey area between private transportation and public transit. By their nature, they are open to a select group of people only, unlike other public transit model. However, they do involve people sharing a means of transport provided by a third party, unlike private transportation.

4.1.6 Assessment – travel within Arnprior

A key task for this study is to determine an optimal transit solution for Arnprior. Given Arnprior's size and land use patterns, it is possible to narrow down the various options into suitable and unsuitable models as follows.

- ▶ **Fixed-route:** Arnprior is separated into the east side and west side by the Madawaska River with only one bridge crossing. Possibilities for fixed-route service include:
 - A one-way “figure 8” route with loops around the industrial area east of the river and residential areas west of the river. This would be about 14km, and take 45 minutes for a bus to complete one loop.
 - A pair of routes, one running north-south (between Arnprior Regional Health, Arnprior District High School, the town centre along John Street North, and Arnprior Shopping Centre); the other running east-west (connecting the residential areas on the west side of town to the employment and service areas on the east side of town). These would have (two-way) lengths of about 10km and 7km, respectively.

Both these options would result in relatively long average wait times and in-vehicle travel times. Consequently, this model is not suitable for transit service within Arnprior.

- ▶ **Deviated route:** The urban area of Arnprior is separated by the Madawaska River into a west side and an east side with one bridge crossing to connect them. Services and employment are concentrated along the north-south and east-west corridors of



the town and thus doesn't have distinct areas to deviate a route to. Consequently, this model is not suitable for transit service within Arnprior.

- ▶ **Demand-responsive connector:** Arnprior's commercial areas are distributed along a corridor running across the Town and are separate from the industrial and employment areas. Consequently, it lacks a single focal point for transit, making this model unsuitable for transit service within Arnprior.
- ▶ **Scheduled demand-responsive connector:** Arnprior's only scheduled transit service is the (daily) Ontario Northland service between North Bay and Ottawa. The low capacity implies a relatively low number of passengers travelling from Arnprior. These factors make it an unsuitable focus for a scheduled demand-responsive connector, and hence this model is not suitable for Arnprior.
- ▶ **Point-to-point demand responsive:** Arnprior is an urban community with several points of interests and generally good pedestrian connectivity and infrastructure. These factors both mean **point-to-point demand-responsive is a suitable model for Arnprior.**
- ▶ **Door-to-door demand responsive:** The population density in Arnprior is not low enough to justify a door-to-door model for most trips. In general, this model is not suitable for transit service within Arnprior. However, **this model is suitable for specialized transit customers in Arnprior.**
- ▶ **Taxis / rideshare vouchers:** Arnprior's compact size and urban nature means that shared models will offer significantly better productivity (and hence lower costs per passenger) than a voucher model. Consequently, this model is not suitable for conventional transit service within Arnprior. However, Arnprior's population would result in low specialized transit demand. Consequently, **this model is suitable for specialized transit customers in Arnprior.**
- ▶ **Vanpools:** For this study, the Town of Arnprior is examining options to facilitate the movement of all people throughout the municipality. Vanpools, by their nature, are for specific groups of people only. Consequently, this model is not suitable for transit service within Arnprior.

To summarise, point-to-point demand-responsive is the only suitable service delivery model for conventional (that is, non-specialized) transit in Arnprior; door-to-door demand-responsive service and taxis /



rideshare vouchers are both suitable model for specialized transit in Arnprior.

4.1.7 Assessment – travel to/from Ottawa

For purposes of this assessment, it is assumed that an Arnprior-Ottawa service would connect with OC Transpo services at an LRT station or at a bus terminal.

- ▶ **Fixed-route:** Plausible options for fixed-route service include:
 - A route between a suitable interchange location in Ottawa (a bus station or LRT station) via Hwy 417 and an interchange point with any local transit service near the Hwy 417 Daniel St interchange. This would be about 45-50km long, and would take a bus about 60-75 minutes to complete the entire route.
 - A route that does the same thing, but then circulates around Arnprior. This would be about 50-55km long, and would take a bus about 105-120 minutes to complete the entire route.
 - Funding for Ontario Northland to provide additional trips between Arnprior and/or lower fares.

Consequently, **fixed-route is a suitable model for Arnprior-Ottawa service.**

- ▶ **Deviated route:** There are no significant communities between Arnprior and Ottawa's main urban area, and thus no locations to sensibly deviate a route to. Consequently, this model is not suitable for Arnprior-Ottawa services.
- ▶ **Demand-responsive connector:** Under this model, demand-responsive service would be provided between OC Transpo services in Ottawa and Arnprior. However, the long journey time between the two would likely result in long and unpredictable wait periods. Consequently, this model is not suitable for Arnprior-Ottawa services.
- ▶ **Scheduled demand-responsive connector:**
 - Arnprior's only scheduled transit service is the (daily) Ontario Northland service between North Bay and Ottawa. The low capacity implies a relatively low number of passengers travelling to/from Arnprior. These factors make it an unsuitable focus for a scheduled demand-responsive connector.
 - Alternatively, the service could connect with OC Transpo services in Ottawa (at a bus station or LRT station) and then



provide demand-responsive service with Arnprior. The “scheduled” aspect would mean trips to/from Ottawa would have a dependable arrival/departure time.

Consequently, **scheduled demand-responsive connector is a suitable model for Arnprior-Ottawa service.**

- ▶ **Point-to-point demand responsive:** The long journey time between the Arnprior and Ottawa’s urban area would likely result in long and unpredictable wait periods. Consequently, this model is not suitable for Arnprior-Ottawa services.
- ▶ **Door-to-door demand responsive:** The population density in Arnprior is not low enough to justify a door-to-door model for most trips.. Consequently, this model is not suitable for Arnprior-Ottawa services.
- ▶ **Taxis / rideshare voucher model:** The long journey time between the Arnprior and Ottawa’s urban area means that shared models will offer significantly better productivity (and hence lower costs per passenger) than a voucher model. Consequently, this model is not suitable for Arnprior-Ottawa services.
- ▶ **Vanpools:** For this study, the Town of Arnprior is examining options to facilitate the movement of all people. Vanpools, by their nature, are for specific groups of people only. Consequently, this model is not suitable for Arnprior-Ottawa services.

To summarise, fixed-route service and scheduled demand-responsive connector are both suitable models for Arnprior-Ottawa services.

4.1.8 Recommend service delivery models

Given the market size and area served, the recommended service delivery models are as follows:

- ▶ **Within Arnprior (conventional):** Point-to-point demand responsive
- ▶ **Within Arnprior (specialized):** Door-to-door demand-responsive *and/or* taxi / rideshare vouchers.
- ▶ **To/from Ottawa (conventional and specialized):** fixed-route service *or* scheduled demand-responsive connector.



4.2 Operator Model

The operator is responsible for providing the day-to-day aspects of a transit service – providing vehicles, conducting maintenance, employing drivers, addressing disruptions, and collecting fares. A municipality can either directly employ the people do these things through in-house operations, or contract with a third party to provide them. This chapter describes the three main types of operator model, then assesses each for their suitability in Arnprior.

4.2.1 In-house operation

Under this model, the municipality employs all the people to manage, operate and maintain the transit vehicles. The municipality will also procure and own the vehicles and associated facilities. This arrangement is common for larger Canadian transit systems (30+ vehicles).

Modern demand-response systems are typically centred around a software platform that handles bookings and vehicle routing. This platform is normally provided by a specialist vendor, even if all other aspects of operations are done in-house. (This approach is used by Belleville Transit).

Advantages	Disadvantages
<ul style="list-style-type: none"> ▶ Full control of customer experience and transit assets ▶ No contract oversight required 	<ul style="list-style-type: none"> ▶ Full capital cost required to start services ▶ Requires internal management experience

4.2.2 Private contractor

Under this model, the municipality pays a private contractor, who in turn employs all the people to manage, operate and maintain the transit vehicles.

The exact responsibilities will depend (in part) on the service delivery model. Under a fixed-route or deviated fixed-route model, service planning and scheduling is typically done by the municipality, along with the creation of associated customer information.



With demand-responsive models, the contractor will be responsible for the (dynamic) routing and scheduling, as well as the associated customer information and booking system.

The contractual arrangements will specify the quantity and quality of service. There is typically a base fee for a certain service level, plus some adjustment for if service needs to be increased or decreased. This arrangement is common for smaller Canadian transit systems (fewer than 10 vehicles) and newer systems.

Advantages	Disadvantages
<ul style="list-style-type: none"> ▶ Quick start-up with low up-front costs ▶ Retain control over service levels ▶ Can draw on external management expertise 	<ul style="list-style-type: none"> ▶ Contract oversight required ▶ Customer experience is indirectly controlled ▶ Can only adjust service within parameters of contract

4.2.3 Inter-government collaboration

Under this model, a municipality contracts with a government agency that operates transit (which may be another municipality) to provide services. The advantages and disadvantages are similar to private contractors, with the added disadvantage that the service model is outside the contracting municipality’s control. The same is typically true of service levels and operating hours.

However, contracting with a neighbouring municipality allows for seamless integration of services, resulting in cross-boundary trips easier to make by transit. Further, the contractual arrangements between municipalities can be simpler than when a private company is involved.

Advantages	Disadvantages
<ul style="list-style-type: none"> ▶ Quick start-up with low up-front costs ▶ Can draw on external management expertise 	<ul style="list-style-type: none"> ▶ Service levels controlled by third party ▶ Contract oversight required ▶ Customer experience is indirectly controlled



4.2.4 Non-operational management

The choice of operator model can be done independently of **vehicle ownership**. A municipality may elect to own the transit vehicles but contract out operations. For example, Simcoe County decided to purchase and own their transit vehicles, with operations and maintenance contracted out. This arrangement took advantage of federal government grants for municipalities to purchase buses. Otherwise, the County would have to pay extra to the contractor to cover the annualised capital cost of the vehicle. This arrangement also gave the County full control over the type of vehicle and on-board amenities.

The same is also true for **other capital assets**, including vehicle maintenance / storage facilities and transit stops. These can be the responsibility of the municipality or the operator. Arnprior would probably save money by allowing a private contractor to use Town facilities for storing and maintain transit vehicles. The alternative would involve transit vehicle being driven to/from an out-of-town facility each day at the start and end of service.

Successful transit requires effective **promotion and marketing**. The Town has the strongest incentive to increase transit use, so this role would default to them. However, if using transit requires use of an app or website, then there is potential for the app creator to provide training on its use to potential users, or those who help potential transit users (such as staff at seniors' centres, shops, bars/restaurants, municipal amenities etc.)

4.2.5 Assessment and recommended operator model

The size of Arnprior (9,000) people suggests that any transit system will have a relatively low number of vehicles. As the Town would be starting a new service, it does not have in-house expertise to draw upon. These factors indicate that in-house operation is not a suitable option.

The only adjacent municipality that operates transit services is the City of Ottawa (with services provided by OC Transpo). Preliminary discussions with OC Transpo indicate that it would be possible for them to provide service between Arnprior and Ottawa under a suitable financial arrangement, subject to vehicle availability. (Ongoing LRT construction means that vehicles are not currently available, but could be available when construction concludes.)



All these factors mean **that service within Arnprior** would be best provided by a private contractor, and **service to/from Ottawa** could be provided by either a private contractor or other government agency.

At a minimum, the contractor should be responsible for maintaining and operating the transit vehicles and managing the service. This includes recruitment and training of the employees performing those roles. It also includes customer service elements involving their employees or services (such as any software platform).

Subject to suitable funding being available from the Town or from third-party grants, the Town should aim to own the transit vehicles. This will give it more control over the quality of customer experience. Ideally, the Town should also consider providing space at any Town-owned vehicle maintenance facility for use in maintaining transit vehicles.

Promotion and marketing activities should be done jointly by the Town and the operator in a way that aligns with their respective expertise and interests.







4.3 Vehicle Type

There are a wide variety of vehicles that can be used for transit services. This section identifies the broad types of vehicles used for transit, the service delivery models they are suitable for, and the required fleet size. It then recommends the vehicle type for each market, and discusses the potential for using electric vehicles for transit service.

4.3.1 Vehicle size

Table 4.1 provides an overview of the range of sizes available, including information on capacity, lifespan, and capital cost. Within each type, there is some variation. For example, a standard bus can vary from 9m to 15m in length, with a commensurate change in cost and capacity.

TABLE 4.1: VEHICLE TYPES USED FOR TRANSIT SERVICES

Type	Standard bus	Passenger van	Minivan	Sedan
Image				
Example model	Nova Bus LFS	Ford Transit Passenger Van	Honda Odyssey	Toyota Corolla
Capacity	30 to 60	12 to 18	4 to 7	1 to 4
Lifespan	10 to 12 years	10 to 12 years	6 to 8 years	6 to 8 years
Capital cost	\$500-600k (ICE*) \$1,000,000 (EV)	\$75-100k (ICE) \$200-300k (EV)	\$35-75k	\$20-75k
Suitable for...				
<i>Fixed-route</i>	Yes	Yes	No	No
<i>Demand-responsive</i>	Yes	Yes	Yes	No
<i>Specialized</i>	No	Yes	Yes	Yes
Available fuel / energy options	Diesel Hybrid Electric	Gasoline Diesel Electric	Gasoline Diesel Hybrid	Gasoline Diesel Hybrid Electric

* ICE = internal combustion engine (diesel or gasoline)



As the table shows, standard buses and passenger vans are both generally suitable for both fixed-route service and demand-responsive service. Minivans are also suitable for demand-responsive service. Specialized service requires smaller vehicles – either minivans or sedans. Discussion in the rest of this section will be limited to those vehicle sizes that are suitable for each service type.

Service within Arnprior: A point-to-point demand-responsive service generally requires more frequent turns than a fixed-route service. Within the context of Arnprior's typical roadway widths and street layout, a standard bus would have to turn more slowly and carefully than other vehicles. Depending on the choice of stop locations, this may make standard buses unsuitable for a point-to-point demand-responsive service in Arnprior. For specialized services, the low demand levels means that minivans and sedans would both be suitable.

Service to/from Ottawa: the service would be likely to use major roads (including Hwy 417). A standard bus or passenger van would be suitable, with the choice depending on the required capacity. For low volumes, passenger vans would be cheaper to purchase and operate.

4.3.2 Fleet size

The fleet size required depends on the number of trips made by transit in the peak hour. To estimate this, the first step was to apply a trip rate (trips per person) to Arnprior's adult population. This took into account the age profile of Arnprior, the different purposes for people's travel, and the time of day people typically travel. This produced the number of trips made by Arnprior residents in the peak hour. A range of transit mode shares were then tested to see how many vehicles would be required.

For **conventional transit within Arnprior using point-to-point demand-responsive service**, the capacity of the service is determined by the number of boardings per hour the system can allocate each vehicle, as well as the vehicle capacity. With standard buses or passenger vans, 15 boardings/hour is a reasonable upper limit. Using this, it was found a transit mode share for travel of up to 0.9% required 1 vehicle; up to 1.8% required 2 vehicles. With minivans, the smaller vehicle sizes means that 5 boardings/hour is a reasonable upper limit. Consequently, three times as many minivans as passenger vans or standard buses would be needed for a given mode share.



For **specialized transit demand within Arnprior**, the likely demand can be estimated using the typical percentage of conventional transit demand observed in other municipalities. Boardings tend to take longer for specialized transit. Consequently, specialized transit vehicles rarely average more than 4 boardings/hour. For Arnprior, this suggests one vehicle would be needed for specialized transit vehicle if a dedicated fleet was used. This could be any vehicle physically suitable for carrying specialized transit customers.

For **transit to/from Ottawa** using either fixed-route service or a scheduled demand-responsive connector, the capacity is limited by the size of the vehicle. A useful comparison is Russell Township's (pre-COVID) transit services, which provided peak-only service to downtown Ottawa. This service required four standard buses. 2016 Census data shows that 4,845 Russell residents worked in Ottawa, compared with 1,350 Arnprior residents. This implies that with a similar mode share, one standard bus would be sufficient. (Unlike Russell's service, the one vehicle would provide all day service and do more than one trip in the peak period). If passenger vans were used, more vehicles would be needed. This would result in higher operating costs.

4.3.3 Electric transit vehicles

This section assesses the viability of electric buses for each service delivery method under consideration.

Availability

The availability and capabilities of electric vehicles (EVs) have improved significantly in recent years. Electric passenger vans are a newer addition to the market, typically coming from manufacturers that are new to the transit market. However, there are multiple options for vehicles in the 7.5-9.0m size, with seating capacities of 15 to 25, depending on the configuration.

Electric buses have no issues with the climate in most Canadian cities. Edmonton Transit System (ETS) is rolling out an electric bus fleet; ETS has found that electric buses can provide sufficient A/C in summer and heating in winter. The city of Edmonton has both hotter summers and colder winters than Ottawa.¹⁰

The City of Sarnia recently studied the feasibility of electrifying their bus fleet.¹¹ Their study showed that battery capacity should allow 1.0

¹⁰ Edmonton's lower humidity levels do not significantly affect the energy consumption of A/C or heating on buses.

¹¹ IBI Group / City of Sarnia: *Sarnia Electric Bus Feasibility Study* (July 16, 2021)



to 1.4 kWh/km, plus up to 12kW for heating. (A/C consumes less power than heating.) This means a standard bus operating for 12 hours/day at an average of speed 24km/hr would need a capacity of at least 550kWh; a bus operating at an average speed of 18km/hr would need a capacity of at least 216kWh.

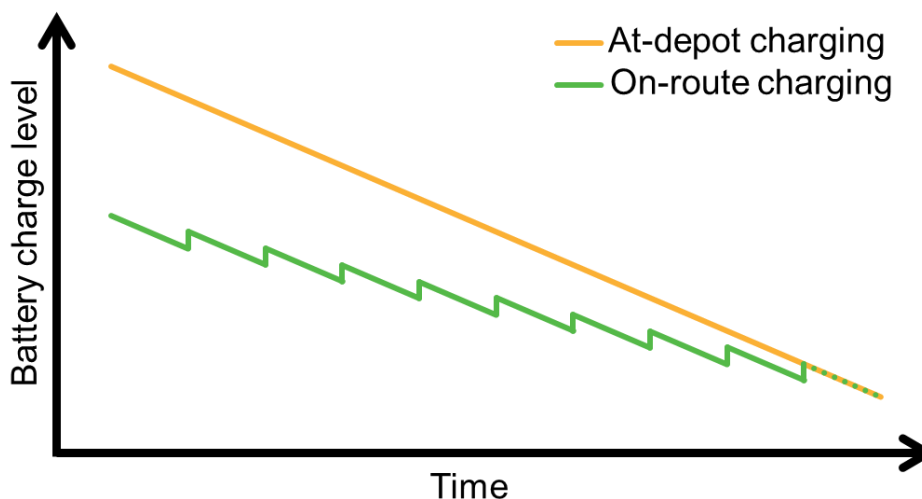
Charging

Electric buses can be charged through at-depot charging or on-route charging. With **at-depot charging**, buses are charged each night between the end and start of service. They must have enough charge to get them through the entire day. Alternatively, buses can return to the depot during the day to top-up their charge. This decreases capital costs (smaller batteries) but increases operating costs (because of travel to/from the depot).

For **on-route charging**, buses are charged both overnight and at select places on their route during normal daytime operations. These daytime top-ups are not intended to fully charge the battery, but provide enough charge in conjunction with the overnight charge.

Figure 4.2 conceptually illustrates how the battery charging level varies through the day under the two approaches, and hence how smaller batteries are needed with on-route charging.

Figure 4.2: Battery charging patterns



At-depot charging minimizes the number of charging facilities needed, which reduces capital costs. However, buses must have larger capacity batteries than if on-route charging is used. This increases



vehicle capital costs. Consequently, on-route charging is more suitable where service levels are high, and multiple vehicles operate on each route. This means the cost of the on-route charging facility is offset by the cost reduction of the multiple vehicles that use it.

For a **point-to-point demand-responsive service**, on-route charging is not a feasible option. Consequently, such a service would have to use at-depot charging.

Costs

Electric buses have a substantially higher purchase bus than diesel-powered equivalents. As shown in **Table 4.1**, the cost is substantially higher. However, electric buses offer savings: the cost of electricity to charge an electric bus is much lower the cost of fuel for a diesel bus. Further, electric buses do not need as much maintenance as bus with a diesel engine.

Several transit agencies in Canada are in the process of rolling out or trialing electric vehicle fleets. At the current time, it appears the lifecycle costs of diesel and electric buses are roughly equal, with the higher capital costs being offset by years of lower operating costs. The relative life cycle costs of electric and diesel passenger vans are not yet known.

If the Town can obtain a third-party grant to cover part of the cost of purchasing transit vehicles, then the lower operating costs (which will be incurred by the Town) mean electric vehicles would be the cheaper option. Otherwise, the financial consideration depends on the Town's desired cashflow profile over the lifespan of the transit vehicles, and political considerations of environmental benefits compared with the higher capital costs.

Implementation

Starting a transit service using electric buses would take significantly longer than starting one with diesel buses. The Town of Sarnia's electric bus feasibility study indicated that designing, building and commissioning the necessary infrastructure would take one to two years.

By contrast, the Town of Arnprior already has the infrastructure in place to support diesel buses. This means the implementation time would be much shorter, being primarily by the procurement process.



Example: Edmonton Transit Service (ETS) is currently transitioning to an all-electric bus fleet. It is using standard (12m) buses manufactured by Proterra with 660kWh of battery capacity. This provides them with 350km of range, sufficient to last all day on any of ETS's routes.

The buses are charged at the depot using overhead (pantograph) connectors. Charging the battery takes up to three hours.

ETS has a fleet of around 950 buses. Existing diesel buses will be replaced with electric buses at the end of their normal working lives, subject to suitable depot facilities being available.

Summary

If the Town decides it wishes to pursue use of electric vehicles for transit services, then:

- ▶ **Electric transit vehicles are a viable option** in terms of operations and range.
- ▶ The **initial capital costs** would be higher than non-electric buses, but the **lifecycle costs** would be similar but standard buses. The financial assessment should consider the availability of third-party funding for capital costs, the Town's desired cashflow profile, and political considerations of the environmental benefits.
- ▶ The **implementation** of the infrastructure for electric buses would take significantly longer than for diesel buses. If the Town wanted to start service quickly (in less than a year), then it would have to start with diesel buses (owned or leased). This would not preclude switching to electric buses at a later date

4.3.4 Recommend vehicle types

Given the required capacity and other vehicle attributes, the recommended vehicle types are as follows:

- ▶ **Within Arnprior (conventional):** Passenger van
- ▶ **Within Arnprior (specialized):** Minivan and/or sedan
- ▶ **To/from Ottawa (conventional and specialized):** Standard bus

Electric vehicles are viable option for all three services, with no significant operational reason to not choose them. However, their higher capital cost means the choice is a policy / financial decision that should be made by Council.



4.4 Transit Solutions Peer Review

The experience of municipalities that both operate transit and are similar to Arnprior offers potential lessons for the Town. A set of peer municipalities was chosen to fit the following requirements:

- ▶ Lower-tier or single-tier Ontario municipality
- ▶ Transit service provided by the municipality (as opposed to another level of government)
- ▶ Low population (under 20,000)
- ▶ Population concentrated in a single distinct urban area
- ▶ Not part of a larger metropolitan area

The municipalities selected that fit these criteria were Cobourg, Port Hope, Tillsonburg and Kenora. **Table 4.2** provides details on the municipalities and their transit systems. For comparison, Arnprior is a lower-tier municipality has a population of 9,600, an area of 15km², a population density of 640 people/km².

TABLE 4.2: PEER MUNICIPALITY TRANSIT SYSTEM INFORMATION

Municipality	Cobourg	Port Hope	Tillsonburg	Kenora
Population	19,400	16,200	15,800	15,100
Area (km ²)	22	278	22	211
Density (/km ²)	869	60	710	71
Administration	Lower-tier	Lower-tier	Lower-tier	Single-tier
Service delivery model	PTPDR *	Fixed-route (2 local routes; 1 inter-municipal)	Fixed-route (2 local routes; 4 inter-municipal)	Fixed-route (3 routes)
Operator model	Private contractor (Century Transportation)	In-house	Private contractor (Voyago)	Private contractor (FSC)
Vehicle type and capacity	Standard bus (28-30 seats)	Passenger van (12 passengers)	Small bus (20 passengers)	Standard bus (28-30 seats)
Fleet size	2	1 (for local)	1 (for local)	3
Service hours	Mon-Fri: 6am-10pm Sat: 8am-7pm Sun: 9am-4pm (96 hours/week)	Mon-Fri: 7am-8pm Sat: 9am-4pm Sun: N/A (72 hours/week)	Mon-Fri: 6am-6pm Sat: N/A Sun: N/A (60 hours/week)	Mon-Fri: 7am-6pm Sat: 11am-5pm Sun: N/A (61 hours/week)



Municipality	Cobourg	Port Hope	Tillsonburg	Kenora
Operating cost ¹²	\$680,000	\$552,402	\$225,700	\$386,149
<i>Per capita</i>	\$35.05	\$33.08	\$14.28	\$25.57
Ridership ¹³	189,000	58,025	~12,500	34,600
<i>Per capita</i>	9.74	3.58	~0.79	2.28
Farebox recovery ratio ¹³	17%	14%	11%	24%

* PTPDR = point-to-point demand-responsive

The peer municipalities' **populations** are between 15,100 and 19,400, which are all higher than Arnprior. Further analysis shows that Arnprior would be the least populous municipality in Ontario to provide transit.¹⁴ Lower population suggests a small tax base from which to fund transit – both capital and operating costs.

The **areas** of the peer municipalities are all higher than Arnprior. However, transit service in Kenora and Port Hope is not provided outside the single urban area. The urban area of both is around 12km². Consequently, Arnprior's urban area is similar in size to all four peers. The data shows that Arnprior's **population density** is similar to its peers. This relatively high density is good for transit provision, as it means a larger potential market for a given amount of service.

The **service delivery model** for three peer municipalities is fixed-route. Cobourg Transit switched from fixed-route (two routes) to demand-responsive in June 2021; financial and ridership figures therefore date from the time of fixed-route operation. This reflects that transit services in these communities pre-dates the availability of app-based demand-responsive service provision.

The most common **operator model** is a private contractor. Port Hope transitioned from a private contractor to in-house operations in 2018, drawing on management expertise built up over a lengthy period. The prevalence of private contractors (that serve multiple customers) allows small municipalities to draw on external management expertise at a potentially lower cost.

¹² 2020 budget or 2019 actual operating costs for conventional and specialized transit services. Farebox revenues are not included.

¹³ Ridership and farebox recovery ratio are for 2019.

¹⁴ Brighton and Penetanguishene have lower populations and local transit. However, their transit services are provided jointly with Quinte West and Midland, respectively. Other less-populous municipalities with transit have it provided by their upper-tier government.



The **vehicle types and capacity** show more variation. This reflects how vehicles are chosen to meet the service model and demand levels of their individual system. All peer municipalities have a small **fleet size** (no more than three vehicles). This implies that transit service in Arnprior would probably need a similarly-sized fleet.

The **hours of service** also show consideration variation. Only one (Cobourg) operates Sunday service; three out of four provide Saturday service. Weekday start times are all 6am or 7am, but service end times range from 6pm to 10pm. Consequently, total weekly service hours range from 60 hours per week to 96 hours per week (over 50% higher). If Arnprior had one vehicle costing \$70/hour, this range of service hours corresponds to \$200,000 to \$350,000 in annual operating costs.

The gross annual **operating cost** (that is, excluding farebox revenues) ranges from \$225,700 to \$680,000. This reflects the considerable variation in service levels each municipality is willing to support. Service costs are primarily proportional to length of service span and the number of vehicles in operation.

The annual **ridership** varies by more than a factor of ten between the lowest and highest figures, despite the relatively similar populations. This is a much broader range than for operating costs. Applying the range of ridership per capita to Arnprior's population (9,600) implies a transit service within Arnprior would have a ridership of 8,000 to 95,000 per year. This is a very wide range, and demonstrates that transit ridership does not just depend on the number of people served. This implies the Town has ample opportunity to take actions that result in higher ridership.

The **farebox recovery ratio** is the percentage of operating costs covered by fares. The farebox recovery ratio in peer municipalities varies between 11% and 24%. Costs not covered by fares must be covered from other sources. These sources can include municipal support and other funding sources. A farebox recovery ratio of 24% and annual operating costs of \$200,000 would require \$152,000/year in subsidy; farebox recovery ratio of 11% and annual operating costs of \$350,000 would require \$311,000/year in subsidy.



5 Partnership Opportunities

Partnering with organizations in and around Arnprior would provide the Town with the means to encourage and increase transit use in a way that also benefits those organizations. This section details key potential partners and how the partnerships could work.

5.1 Municipalities

Arnprior is a service and employment hub for the surrounding area. Services in the Town are accessed by people from outside Arnprior. Further, as discussed in Chapter 2, nearly half of jobs in Arnprior are filled by non-Arnprior residents. The industrial and employment areas in the Town also extends beyond the municipal boundaries. These conditions create an environment for plenty of cross-boundary trips.

As a result, partnering with other municipalities so that transit can be extended to serve their residents could result in greater ridership (and farebox revenue) and lower costs for the Town. It would also advance the Town's wider aims regarding supporting sustainable travel and decreasing the number of cars on its roads.

Travel by modes other than transit (car, bike, foot) faces no obstacles in crossing a municipal boundary, and the aim should be for transit users to have a similarly seamless experience. The amount of travel between Arnprior and other municipalities indicates that any form of partnership that supports any form of cross-boundary transit service would mutually beneficial.

Given the current municipal boundaries, the neighbouring **City of Ottawa** and **Township of McNab/Braeside** would be natural partners. Of the people who work in Arnprior, 23% and 15% live in McNab/Braeside and Ottawa, respectively. Conversely, 43% of Arnprior's employed residents work in Ottawa and 3% work in McNab/Braeside. More generally, it would be expected that most trips to/from Arnprior to access its jobs and services would come from McNab/Braeside and Ottawa.

5.1.1 City of Ottawa / OC Transpo

The City of Ottawa's transit services are provided by OC Transpo. Engagement with OC Transpo for this study indicated they would be happy to help facilitate a transit connection between the town and an LRT station.



The bus loops at LRT stations are “fare paid” areas, only accessible to passengers who have paid an OC Transpo fare. A bus service from Arnprior could use the bus loop if there was an integrated fare agreement between the Town and the City of Ottawa. Under such an arrangement, passengers using the Arnprior-Ottawa service would be able to transfer for free onto OC Transpo services. The Town would pay OC Transpo a portion of the fare revenue collected for Arnprior-Ottawa services.

Absent such an agreement, an Arnprior-Ottawa service would have to use an on-street stop beside the LRT station.

5.1.2 McNab/Braeside

Census data shows that McNab/Braeside is a significant source of labour for Arnprior workplaces. This suggests a transit service between Arnprior and McNab/Braeside would offer benefits to both communities. Although outside the scope of this study, such a service should be considered as a longer-term option.

5.1.3 Renfrew County

The information available at the time of writing suggests Renfrew County’s upcoming Transportation Master Plan will assess the County’s potential future transit needs. This could include service within its local municipalities (such as service within Arnprior), between those municipalities (such as service between Arnprior and McNab/Braeside), or between Renfrew and adjacent areas (such as service between Arnprior and Ottawa).

The County would former a natural partner in coordinating transit services, particularly those between municipalities.

5.2 Willis College

Willis College is a private career college offering post-secondary diploma programs and industry-recognized certifications across a range of programs. Courses are offered online and at their campuses in Arnprior, Ottawa, and Winnipeg.

Many post-secondary institutions in Ontario offer a “U-Pass” system, where students pay a mandatory fee to receive a transit pass for the year or semester. Such a system would be attractive to the student body if most of them live in Arnprior, or can access the campus via any Arnprior-Ottawa service. The Town should consider engaging with the



college and student body to determine the level of support for a U-Pass system.

5.3 Seniors' housing providers

As discussed in Chapter 2, seniors would be a good market for transit in Arnprior. This is particularly true for seniors living in dedicated housing, and this creates a partnership opportunity between the Town and seniors' housing providers.

The Town could offer basic training to on-site staff on how to book transit trips for residents, or how to help residents use transit. This would provide an efficient way for Town staff to enable transit use and provide relevant information to a large number of seniors.

The Town can also ensure that stops are located to minimize walking distance for seniors. If the housing provider allows, stops could even be located within their property (subject to agreement about whether non-residents would be allowed to use that stop).

5.4 Major employers and trip attractors

Partnering with major employers in Arnprior could provide the Town with an effective way to encourage commuters to use transit. Such employers include ServiceOntario, Arnprior Regional Health, Quality Inn, manufacturers, and the Town itself. Employers could help by targeting communications at workers who live in Arnprior, encouraging employees to use transit, helping distribute monthly transit passes (if available), or even contributing to the cost of using transit.

There is also potential to partner with significant trip attractors such as the Arnprior Shopping Centre, supermarkets, healthcare facilities, and Town amenities. Those trip attractors could provide information about transit services to their customers/users, a phone line or computer that allows their customers/users to book a transit trip, or training so that staff can book a transit trip on behalf of a customer/user.



6 Public Survey

An online public survey was conducted using Microsoft Forms from 11th to 27th February 2022. The survey's questions for respondents included:

- ▶ Relationship to Arnprior
- ▶ Support for a property tax increase of \$25/year
- ▶ Travel habits and vehicle ownership
- ▶ Demographic information

A total of 475 people filled out the survey online, with an additional two completing paper surveys. This included 412 people who lived in Arnprior, approximately 4.3% of its population. This is a high response rate for an open survey.

Like any open online survey, the results should be treated as a true random sample. Respondents with stronger feelings on a survey topic (positive or negative) are more likely to respond. Further, the distribution of respondents' ages indicated they skewed significantly older than the general population (as shown in Census data). Despite these limitations, the survey results provide a robust assessment of the views of a significant portion of Arnprior's population.

The questions in the survey are listed in **Appendix A**, along with the number and percentage of respondents choosing each option. The following sections provide more detailed analysis of specific topics.

6.1 Support for property tax increase

Overall, 70% of respondents who stated they live in Arnprior supported a property tax increase to support a transit service within Arnprior. Support was not uniform, with the following variations being observed:

- ▶ Respondents' **relationship to Arnprior** revealed broadly similar support across people who work, shop, or attend high school in Arnprior.
- ▶ Support decreased slightly among Arnprior residents with higher **vehicle ownership**, ranging from 76% for households with one vehicles to 65% to households with three vehicles¹⁵. The **travel mode(s)** people normally use slightly affected support. Support

¹⁵ Too few respondents reported zero or 4 or more vehicles to draw a robust conclusion about the level of support among such households.



was strongest among residents who normally use taxis (74%), cycle (74%) or rideshare (75%), and lowest among those who normally drive a car (69%). This suggests that people in households with less car access are more aware of the potential benefits of transit

- ▶ Support generally increased among Arnprior residents with **household size**, particularly with the number of children. Support ranged from 63% in Arnprior households with no children to 88% in Arnprior households with four children.¹⁶ This implies that respondents are aware of the need for people aged under 18 to be able to travel independently.
- ▶ Support generally decreased steadily with **age**, ranging from 77% for respondents aged 18 to 25, to 73% among respondents aged 75 to 84.

Despite the variations, the support for a property tax increase was strong (over 65%) across almost all subgroups with significant number of respondents. The only exception was the small proportion (26%) of resident respondents who would neither expect to use transit, nor know anyone they would expect to use it.

6.2 Expected transit usage

Overall, 42% of respondents said they would expect they would use a transit service and 69% said they knew someone inside or outside their household who would they expect to use transit.

- ▶ Respondents' **relationship to Arnprior** revealed that the expectation of using transit was highest among high school students (78%). In other subgroups, 40-43% of respondents said they would use transit. This implies that students will form a key market for transit, supporting the analysis elsewhere in this report.
- ▶ Respondents' expectation of using transit decreased slightly with higher **vehicle ownership**, ranging from 76% for respondents in households with no vehicles to 65% to households with three vehicles. Similarly, the **travel mode(s)** people normally use somewhat affected usage expectations. 74% of respondents who normally use taxis said they expect to use transit, compared with only 64% of respondents who normally drive and 67% of respondents who are normally passengers in a car.

¹⁶ Too few respondents reported they were residents and had 5 or more children to draw a robust conclusion about the level of support among such households.



This supports the idea that people in households with less car access are more likely to use transit.

- ▶ The **household size** (number of children or adults) and **age** did not seem to have a significant effect on whether respondents were expecting to use transit.

Overall, there were smaller variations in the proportions of each subgroup who said they would use transit compared to the support for a property tax increase.

6.3 Comments

The final question in the survey allowed people to provide any comments they wished. Although each comment was unique, various repeated themes and ideas were present.

Those opposed to the idea of providing transit typically cited unhappiness with existing or higher property taxes, and the need to address other transportation issues within the Town across a variety of modes.

Those that supported the idea of local transit identified numerous groups who would benefit. These groups included seniors, teenagers, students, people with disabilities, and people to whom cars would be or are a financial burden.

Respondents also brought up a range of potential benefits of a transit service. These benefits included providing people with access to jobs, shops, and healthcare. The environmental benefits of transit were also mentioned.

The survey asked whether respondents would use transit for trips within Arnprior. However, around a quarter of comments (22%) mentioned the need and benefits of transit services to/from Ottawa (including Kanata).

Overall, respondents saw transit as an important service for a growing Town, and as a way to make Arnprior a more attractive place to live.



7 Recommendations and Next Steps

7.1 Recommended Transit Solution

The potential transit solutions were analysed for their ability to serve the travel markets within Arnprior. The analysis took into consideration Arnprior's patterns of land use, density, street network, pedestrian facilities, and likely demand levels. The best options are summarised in **Table 7.1**.

TABLE 7.1: RECOMMENDED TRANSIT SOLUTIONS

Market	Service model	Vehicle type(s)	Operator
Within Arnprior (conventional)	Point-to-point demand responsive	Passenger van	Private contractor
Within Arnprior (specialized)	Door-to-door demand-responsive <i>or</i> Taxis / rideshare vouchers	Minivan Sedan	
To/from Ottawa (conventional and specialized)	Fixed-route <i>or</i> Scheduled demand-responsive connector	Standard bus	Private contractor <i>or</i> other government agency

For conventional transit within Arnprior, **point-to-point demand-responsive service** offers lower walk distances, more flexibility in stop spacing, and lower end-to-end journey times than the other reasonable options for service delivery model for travel within Arnprior.

For specialized transit within Arnprior, **door-to-door demand-responsive** and **taxis / rideshare vouchers** both provide the access to transit necessary for people who need to use specialized services.

For travel to/from Ottawa, **fixed-route** and **scheduled demand-responsive connector** both provide the operational predictability necessary for long-distance services.

For all markets, a **private contractor** would bring transit management expertise (which the Town currently lacks). This would follow typical practice at similarly-sized municipalities. Service to/from Ottawa could also be provided by **another government agency** (OC Transpo), subject to fleet availability and a suitable agreement being in place. The



Town should conduct promotion and marketing jointly with the operator.

The recommended **vehicle types** provide sufficient capacity and appropriate service at the lowest lifetime cost for each market. For all markets, **vehicles should be owned the Town**. This would allow them to take advantage of third grants for vehicle purchases, and to control the exact specification of the vehicles used.

The choice between **electric and non-electric vehicles** is a policy and financial decision that should be made by Council.

7.2 Next Steps

Should the Town wish to advance its investigations into transit within Arnprior or to/from Ottawa, the following next steps are recommended:

- ▶ **Develop a service plan**, including routing (where applicable), service area, typical stop locations, and service span/days.
- ▶ **Estimate ridership**, based on service levels, access arrangements, and total travel demand.
- ▶ **Determine vehicle requirements**, based on ridership, service delivery model, levels of service, and spares allowance.
- ▶ **Establish a fare framework**, covering fare discounts for each user group; monthly passes and multi-ride tickets; fare integration with other transit providers; ticket purchasing options; and prices.
- ▶ **Engage with OC Transpo and other potential partners**, to determine how they could assist with transit service provision and encourage use, and what benefits they would gain from the partnership.
- ▶ **Determine financial impacts**, covering the capital and operating costs of establishing and operating a transit service, as well as revenue from fares and third-party grants.

Regardless of whether the Town wishes to advance its investigations into transit, it should **engage with Renfrew County**. The County's upcoming Transportation Master Plan is set to assess its potential future transit needs. These could include the needs and solutions identified in this report. The Town should use the results of this study to inform its input into the County's Transportation Master Plan process.



Appendix A: Public Survey Questions

The following tables provide the number of responses and percentage of respondents choosing the various options for each question.

RESPONSES TO QUESTION 1: WHICH OF THE FOLLOWING APPLY TO YOU?

Option (select all that apply)	Responses	Percentage
I live in Arnprior	412	87%
I work in Arnprior	141	30%
I attend Willis College	1	0%
I attend high school in Arnprior	9	2%
I shop in Arnprior	317	67%
I visit Arnprior for other reasons	72	15%
None of the above apply to me	0	0%

RESPONSES TO QUESTION 2: WHICH OF THE FOLLOWING APPLY TO OTHER MEMBERS OF YOUR HOUSEHOLD?

Option (select all that apply)	Responses	Percentage
They work in Arnprior	157	33%
They attend Willis College	1	0%
They attend high school in Arnprior	68	14%
They shop in Arnprior	335	71%
They visit Arnprior for other reasons	99	21%
None of the above apply to me	16	3%

RESPONSES TO QUESTION 3: HOW MANY VEHICLES ARE OWNED BY MEMBERS OF YOUR HOUSEHOLD?

Option (select one)	Responses	Percentage
I do not own a vehicle	4	1%
1	154	32%
2	242	51%
3	52	11%
4	13	3%
5	1	0%
6 or more	1	0%



**RESPONSES TO QUESTION 4:
WHICH OF THE FOLLOWING APPLY TO
HOW YOUR NORMALLY TRAVEL WITHIN ARNPRIOR?**

Option (select all that apply)	Responses	Percentage
I drive a car	426	90%
I am a passenger in a (privately-owned) car	113	24%
I take a taxi	32	7%
I use the “Seniors At Home” transportation service	0	0%
I bicycle	90	19%

**RESPONSES TO QUESTION 5:
IF A TRANSIT SERVICE WAS PROVIDED FOR TRIPS WITHIN
ARNPRIOR AT A REASONABLE PRICE, WHICH OF THE
FOLLOWING APPLIES TO YOU?**

Option (select all that apply)	Responses	Percentage
I expect I would use transit	199	42%
I expect other people in my household would use transit	187	39%
I expect other people that I know (outside my household) would use transit	281	59%
None of the above	108	23%

**RESPONSES TO QUESTION 7:
WOULD YOU SUPPORT AN AVERAGE PROPERTY TAX
INCREASE OF \$25/YEAR FOR EACH HOUSEHOLD TO FUND A
LOCAL TRANSIT SERVICE?**

Option (select one)	Responses	Percentage
Yes	332	70%
No	136	29%
<i>[Did not respond]</i>	7	1%



**RESPONSES TO QUESTION 8:
HOW MANY ADULTS (AGE 18+) LIVE IN YOUR HOUSEHOLD?**

Option (select one)	Responses	Percentage
1	69	15%
2	306	64%
3	72	15%
4	21	4%
5	4	1%
6 or more	1	0%

**RESPONSES TO QUESTION 9:
HOW MANY CHILDREN (AGE 0-17) LIVE IN YOUR HOUSEHOLD?**

Option (select one)	Responses	Percentage
0	53	11%
1	99	21%
2	58	12%
3	25	5%
4	8	2%
5	4	1%
6 or more	2	0%

**RESPONSES TO QUESTION 10:
WHAT IS YOUR AGE?**

Option (select one)	Responses	Survey percentage	Census percentage
Under 18	4	1%	17%
18 - 25	13	3%	9%
26 - 35	84	18%	12%
36 - 45	93	20%	10%
46 - 55	81	17%	13%
56 - 65	83	17%	14%
66 - 75	88	19%	11%
76 or older	22	5%	13%

OPEN COMMENT FIELD

The survey ended with an open comment field, with the prompt “Do you have any other comments about transit in Arnprior?”. About 570 respondents (roughly half) left a comment (other than “No”, “N/A”, or similar).

