Appendix 1

Final Report

Micromobility Project Phase 1

Mississauga Micromobility Program Development Phase 1

Prepared for the City of Mississauga
by IBI Group
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1 Introduction

The City of Mississauga is exploring the potential to expand residents' transportation options by introducing a shared micromobility program. This report provides an initial assessment of options towards implementing such a system, including describing and evaluating different vehicle types, system models and governance models to understand what is most appropriate for Mississauga's unique context. It also analyzes the high-level financial implications and risk of implementing micromobility services in Mississauga, and outlines the overall impact of micromobility on other mobility services.

1.1 Background

Support for investigating a shared micromobility program for the City of Mississauga comes from several key City policy documents, including:

- **Cycling Master Plan (2018)**, which recommended that the feasibility of a bike sharing system for Mississauga be examined.
- **Transportation Master Plan (2019)**, which recommended that a micromobility policy framework be developed to address not only bicycles, but electric bikes and e-scooters as well.
- **Smart Cities Master Plan (2019)**, which has a goal to focus on mobility (including bikes, scooters, and car share) that provides freedom of movement, active transportation, and future oriented multimodal options with integrated technologies improving access and choice.
- **Climate Change Action Plan (2019)**, which includes an action for Mississauga to encourage and enable micromobility systems and establish a policy framework for shared micromobility systems to help the city achieve GHG emission reduction targets.
- **Economic Development Strategy (2020-2025)**, which includes a priority action to set a regulatory framework for electric bikes and scooters and secure private sector investment to support.

In 2019, Council adopted City staff recommendations, initiating the development of a regulatory framework to enable a phased introduction of micromobility systems in Mississauga (GC-0577-2019). Shortly after, the Province of Ontario announced the five-year pilot program to allow electric kick-style scooters (one type of micromobility vehicle) on municipal roads through amendments to municipal by-laws. In 2020, Council adopted City staff recommendations to enact all necessary by-laws to permit and regulate the use of personal e-

scooters in Mississauga (GC-0358-2020), leading to approved amendments to the City Traffic, Transit and Parks by-laws. The corporate report included eight strategic pillars identified through a cross-departmental visioning exercise for micromobility in Mississauga including:

- Accessibility and ease of use
- Addressing climate change
- Building a sense of community
- Education
- Leverage and partner with business
- Mobility as a service
- Safety
- Supporting infrastructure and policies.

The by-law amendments to date do not grant authority to shared micromobility companies to provide services in Mississauga.

1.2 Purpose

The purpose of this report is to assess and screen high-level shared micromobility options for Mississauga. This report:

- Describes and evaluates the different shared micromobility program alternatives including vehicle types, and system and governance models;
- Completes a multimodal and regional integration analysis, providing recommendations to integrate micromobility with local and regional transit, the Region of Peel, and neighbouring municipalities; and
- Analyzes the financial and modal split impacts of a shared micromobility program in Mississauga.

1.3 Document Structure

This report is structured around the following chapters:

- **Chapter 2 – What is Shared Micromobility?** outlines the vehicle types, system models and governance models typically utilized for shared micromobility programs and investigated as part of this study.
- **Chapter 3 – Peer Review of Operational Considerations** describes key statistics from peer cities as well as considerations for operating a shared micromobility program covering topics such as municipal oversight, operator retention and enforcement activities.
- **Chapter 4 – Initial Financial Analysis** provides high-level costs and potential revenue and funding sources.
- **Chapter 5 – Micromobility Vehicle and Model Screening** describes the evaluation frameworks used to assess micromobility vehicles, system models and governance models for Mississauga and the results of the evaluations including recommendations.
- **Chapter 6 – Initial Implementation Considerations** describes key considerations when moving into implementation planning in a future phase of this project.
- **Chapter 7 – Stakeholder and Community Consultation Summary** describes the engagement activities and key takeaways. Additional detail can be found in Appendix A.
- **Chapter 8 – Key Findings and Recommendations** concludes the report by describing the vehicle type, system model and governance model recommendations for the City of Mississauga along with other key findings from the report.

This report is supported by two appendices providing additional details on the assessment:

- **Appendix A** – Additional Details on Community and Stakeholder Consultation

2 What Is Shared Micromobility?

The term “micromobility” generally refers to small, lightweight human-powered or electric bicycles and kick-style scooters operating at speeds below 25 km/h that are ideal for trips up to 10 km. Micromobility vehicles are useful for the first- and last-mile of transit trips connecting people from the nearest transit stop to their origin and/or destination. These vehicles also provide a viable option to satisfy many shorter-distance trips (under 5 km), which make up approximately 40% of total trips in Mississauga,[1] and can be used for both functional and recreational trips. This can help to reduce the number of automobile trips taken by both residents and visitors.

Shared micromobility is when a service is provided for users to rent a micromobility vehicle for a short period of time – instead of personally owning the vehicle, they are “sharing” it with other users who also choose to rent the vehicle. There are three foundational components of a shared micromobility system:

1. **Vehicle types** – What micromobility vehicles are offered in the shared system?
2. **System models** – Where can vehicles be picked up and dropped off?
3. **Governance models** – Who owns and operates the system?

This chapter describes the various options for each of these three foundational components that are being considered for Mississauga. The evaluation of the options is included in Chapter 5.

2.1 Vehicle Types

There are three vehicle types that are commonly in use in shared micromobility systems described in this section:

- Conventional bicycles (bicycles);
- Electric pedal-assist bicycles (e-bikes); and
- Electric kick-style scooters (e-scooters).

[1] According to 2016 Transportation Tomorrow Survey data

Conventional Bicycle

An example of a shared conventional bicycle from Hamilton is shown in Exhibit 2.1. A detailed description is provided below:

- **Structural frame** – The structural frame of conventional bicycles resembles a traditional bicycle but is typically more heavy duty to accommodate substantial use by several users. While skills for balancing are inevitably required, the frames are generally designed with stability and comfort in mind, being suitable for riders of any skill level. Adjustable seats enable users to move the seat post to the height appropriate for them.
- **Wheels** – Conventional bicycle wheels are typically hub and spoke style with inflatable tires. The large diameter of bicycle wheels makes them able to navigate over most uneven pavement surfaces, however deep or abrupt potholes can cause damage to the tires and potentially cause safety concerns.
- **Location tracking equipment** – Conventional bicycles can be equipped with location tracking equipment that provides information on the start and end location (typically for dock-based models as described in section 2.2), or the full route (typically for dockless models as described in section 2.2).
- **Trip type** – Information released by NACTO in 2019 indicates that bike share using the docked system model (described in section 2.2) is most heavily used during traditional rush hours, suggesting they are commonly used for commuting/functional purposes.[2]
- **Charging infrastructure** – Conventional bicycles do not require charging infrastructure.
- **Cost** – The general cost of a shared conventional bike is approximately $1,200.
- **Seasonality** – With appropriate cycling facilities and winter maintenance practices, conventional bicycles can be used in any season. Some bike share systems reduce the fleet size in winter months due to reduced demand.
- **Regulation** – Conventional bicycles are regulated within the Ontario Highway Traffic Act and City of Mississauga by-laws including the Traffic By-law 0555-200.
- **Typical Vehicle Features**

[2] 84 Million Trips Taken on Shared Bikes and Scooters Across the U.S. in 2018, NACTO.

- Lights and reflectors
- Brakes
- Pedals
- Locking mechanism on vehicle (depending on system model as described in section 2.2)
- Baskets and cargo carriers
- Kickstand
- Information or placards
- Handlebars
- Bell or horn
- Acoustic signaling device (depending on system model as described in section 2.2).

Exhibit 2.1: Example of conventional bike, Hamilton

Electric pedal-assist bicycle

An example of a shared electric pedal-assist bicycle in Toronto is shown in Exhibit 2.2. A detailed description is provided below:

- **Structural frame, wheels, trip type, seasonality, and location tracking equipment –** All features of the conventional bicycle structural frame, wheel, and location tracking equipment, as well as trip types and seasonality are shared by the e-bike with some key additions. The frame of an e-bike also contains the battery and motor which helps to propel users of these vehicles while they are pedaling. The battery is often located in the down tube and the motor is typically located around the bottom bracket as shown in Exhibit 2.2.
- **Charging infrastructure –** The most common method for charging e-bikes is replacing the batteries and charging them off-site. E-bikes with solar panels are also available, but uncommon. Charging infrastructure can also be built into docking stations (as described in section 2.2). Charging is conducted by or coordinated by the operator.
- **Cost –** The general cost of a shared pedal-assist bike is approximately $2,200.
- **Regulation** – Electric pedal-assist bicycles are currently regulated by the Ontario Highway Traffic Act and City of Mississauga by-laws including the Traffic By-law 0555-200. However, the provincial government announced their intention to redefine e-bikes into three classes (bicycle-style, moped, and motorcycle-style) in the 2021 Moving Ontarians More Safety Act. Technical and regulatory elements of the redefinition are currently under review.
- **Typical Vehicle Features –** In addition to all the vehicle features included on conventional bicycles, e-bikes also have batteries.

Exhibit 2.2: Example of a shared electric pedal-assist bicycle, Toronto

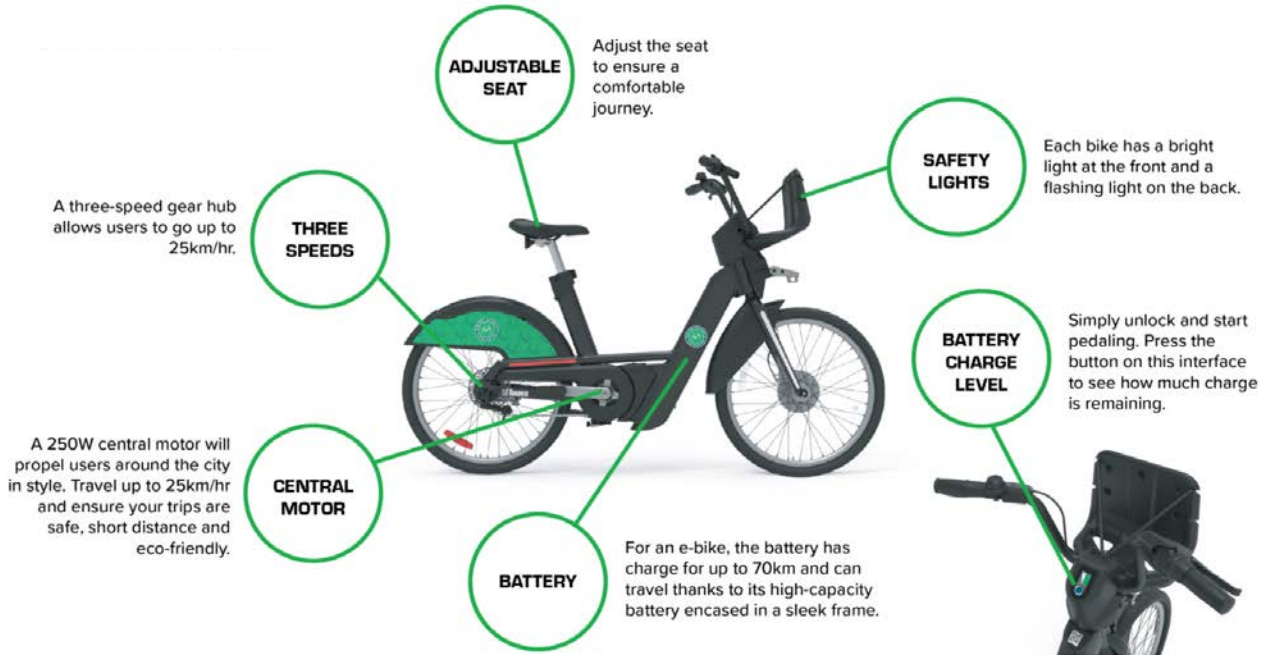


Photo: Bike Share Toronto

Electric kick-style scooter

An example of a shared electric kick-style scooter in Waterloo is shown in Exhibit 2.3. A detailed description is provided below:

- **Structural frame –** The structural frame of an e-scooter is much smaller than that of conventional and e-bikes. It contains a deck typically large enough to stand comfortably with one foot in front of the other. The stem is adjustable, so users can raise and lower the handlebars to a comfortable level. The batteries are typically located on the underside of the deck or on the handlebar stem, and the motor which helps to propel the user is in the back wheel.
- **Wheels –** The wheels on e-scooters are generally about 20 centimeters in diameter; due to the small wheel size, e-scooters can be less stable on uneven surfaces, making them more susceptible to damage and safety concerns from potholes. However, as the e-scooter industry matures, vehicle designs that are more stable are being released with features such as pneumatic tires which have an increased ability to absorb the unevenness of terrain, as well as longer decks and heavier bases.
- **Location tracking equipment –** E-scooters are typically equipped to track the vehicle's location at all times during and between trips.

- **Trip Types –** Information released by NACTO in 2019 indicates that e-scooter use is more distributed throughout the day than shared bicycles, with the highest ridership on Fridays and weekends. This suggests that e-scooters are more likely to be used for recreational trips.[3]
- **Charging infrastructure –** To date, e-scooter charging is via either swappable batteries or having staff collect the whole vehicle to be charged, both done off-site. As battery technology advances, companies are increasingly extending the life of batteries to reduce charging requirements. One company, Bird, has stated that the battery on their most recent vehicle can last from 25,000 to 32,000 km before requiring major servicing.[4] Additional software that runs a series of diagnostics is now common in e-scooters which can communicate battery levels, other servicing needs and even safety features such as reducing the vehicle speed if it senses the vehicle is overheated.
- **Cost -** The general cost of a shared e-scooter is approximately $500. However, with more robust and technologically advanced vehicles being released recently, it is possible the cost per vehicle will increase in exchange for reduced operations and maintenance costs and longer vehicle life.
- **Seasonality** – While e-scooters may be able to be used in winter months where adequate facilities are provided and winter maintenance conducted, the majority of shared-e-scooter companies in North American cities that have snowy winters remove the e-scooters from the system during the winter months.
- **Regulation** – In 2019, the Province of Ontario announced it would begin a five-year pilot program to allow electric kick-style scooters on municipal roads in Ontario, beginning on January 1, 2020. The pilot will be the Province's primary tool in informing the feasibility of a permanent e-scooter framework. It is stipulated that local municipalities must amend their existing by-laws to opt-in to the pilot. The City of Mississauga has opted into the program by amending by-laws to formally allow electric kick-style scooters in Mississauga.

[3] 84 Million Trips Taken on Shared Bikes and Scooters Across the U.S. in 2018, NACTO.
[4] Next-gen Bird Three scooter comes with bigger battery and better software, TechCrunch.

- **Typical Vehicle Features**
  - Lights and reflectors
  - Brakes
  - Locking mechanism on vehicle
  - Kickstand
  - Information or placards
  - Handlebars
  - Bell or horn
  - Speed limitations
  - Acoustic signaling device[5] (depending on system model as described in section 2.2).

[5] An acoustic signaling device makes a noise to indicate to the user that something is not right, such as the vehicle being parked in an incorrect location or not being locked securely.

Exhibit 2.3: Example of a shared electric kick-style scooter, Waterloo

2.2 System Models

System models impact where micromobility vehicles can be picked up and dropped off. Most micromobility programs utilize one of three system models, described in this section:

- Dock-based model;
- Dockless model; and
- Hybrid Model (docked and dockless).

Dock-Based Model

This system model involves physical docking stations. Micromobility vehicles must be picked up and returned to these designated docking stations. These are technology-enabled “smart” docks which house all of the technology needed to facilitate the bike rental process – in this case, the vehicles themselves do no need to be technology-enabled. An example of a city using this system model is Toronto’s bike share system (Exhibit 2.4). Users access and pay for the service

at the station, through a mobile app, or using a member card/fob/code purchased online.

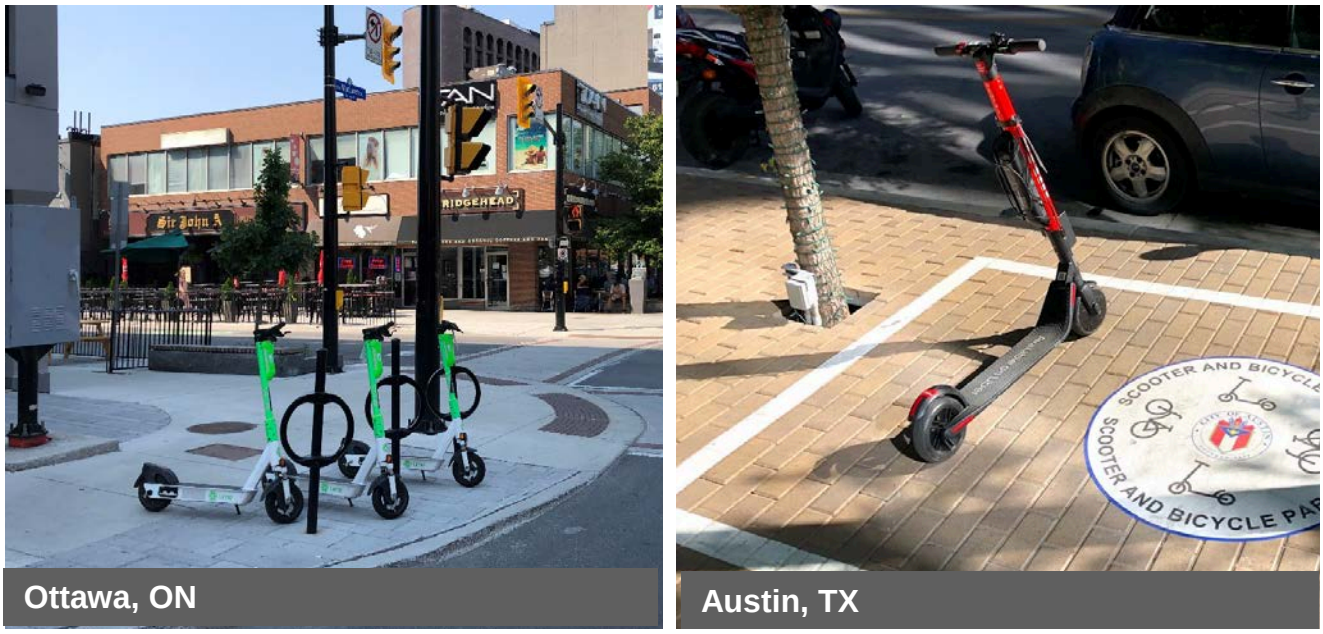
The dock-based model is most common for conventional bicycles with several examples for electric pedal-assist as well. Docks for e-scooters are not yet commonly offered by e-scooter providers likely due to the added cost to private owners and operators. However, third-party docks for electric kick-style scooters do exist and are being piloted in some cities in Europe and the United States (i.e. the docks are provided by a different company than the e-scooters).

Exhibit 2.4: Dock-based bike share program, Toronto, ON

Dockless Model

With this system model, micromobility vehicles can be dropped off and picked up anywhere within an established service area. Most systems, however, restrict the location where vehicles can be parked to ensure a clear passage for pedestrians along the sidewalk. These restrictions can include, for example, limiting parking to the furniture zone (as in Ottawa—see Exhibit 2.5) or in designated areas indicated by paint or signage (as in Austin TX—see Exhibit 2.5). Often, users need to take and upload a photo of the properly parked vehicle to the app which can help with compliance. Users access and pay for the service through a mobile app – to provide equitable access, other methods can be made available such as by phone.

Exhibit 2.5: Dockless e-scooter parking in furniture zone (L) and in designated area (R)



Hybrid Model

This system model combines both docked and dockless models to meet micromobility needs. This model is applicable to all vehicle types. In this model, within the service area, some areas will have docking stations and some areas will not. Vehicles can be parked at a docking station (Exhibit 2.6) or outside of the docking station, often for an added fee (Exhibit 2.7). Cities using this model include Hamilton and Portland, Oregon. Users access and pay for the service at the station, through a mobile app, or using a member card/fob/code purchased online.

Often, the docks used in a hybrid system model can be “dumb” docks that are not technology-enabled (like the docks required for a full dock-based model) and resemble traditional bike corrals. These docks are less expensive, but – since they are not technology-enabled – the vehicles must then contain the technology to facilitate the renting process.

In the hybrid system model, typically all vehicles (including conventional bikes, electric pedal-assist bicycles and electric kick-style scooters) are equipped with a locking mechanism that is used to lock the vehicle to a docking station (Exhibit 2.6) or a standard bike rack (Exhibit 2.7). A “lock-to” requirement can be added so that even in the dockless form, the vehicle still has to be locked to a suitable rack.

Exhibit 2.6: Hybrid system model in Hamilton, ON

Exhibit 2.7: E-scooter locked to public bike rack in San Francisco, CA

Summary of Typical Vehicle and System Features

Exhibit 2.8 provides a summary of the typical features available on each micromobility vehicle type.

Exhibit 2.8: Features typically available on each vehicle type

Vehicle Feature	Conventional Bicycle		Electric Pedal-assist Bicycle		Electric Kick-style Scooter
	Dock-Based	Dockless	Dock-Based	Dockless	
Lights and reflectors	Yes	Yes	Yes	Yes	Yes
Brakes	Yes	Yes	Yes	Yes	Yes
Pedals	Yes	Yes	Yes	Yes	No
Locking mechanism on vehicle	No	Yes	No	Yes	Yes
Battery	No	No	Yes	Yes	Yes
Baskets and cargo carriers	Yes	Yes	Yes	Yes	No
Kickstand	Yes	Yes	Yes	Yes	Yes
Information or placards	Yes	Yes	Yes	Yes	Yes
Handlebars	Yes	Yes	Yes	Yes	Yes
Bell or horn	Yes	Yes	Yes	Yes	Yes
Speed limitations	No	No	No	No	Yes
Acoustic signaling device	No	Yes	No	Yes	Yes

2.3 Governance Models

Governance of a shared micromobility program impacts the nature of a city's involvement, including factors such as ownership of the vehicles. There are three governance models that are generally in use in the micromobility field:

- Publicly owned and publicly operated;
- Privately owned and privately operated; and
- Publicly owned and privately operated.

Descriptions of these three governance models are outlined below, including additional details relating to permits.

Publicly Owned and Publicly Operated

Under this governance model, the micromobility program would be both owned and operated by the City of Mississauga. This model is extremely rare in practice. In this model, the City would own all the assets, carry all financial risk, and be responsible for service expansion. The benefit of this model is having one entity responsible for the planning, design, operation, and future expansion of the system; however, it is often the case that private companies can operate more efficiently.

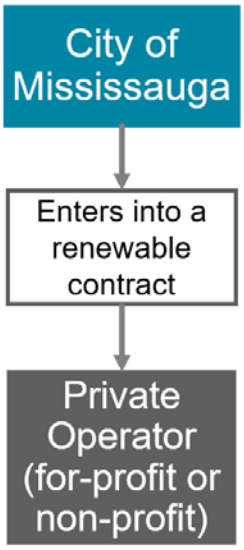
Publicly Owned and Privately Operated

There are two types of publicly owned and privately operated service models to consider:

- Exclusive contracted operator; and
- Contracted operator and permit-based operators.

Exclusive Contracted Operator

Example Cities: Philadelphia, Toronto, Pittsburgh



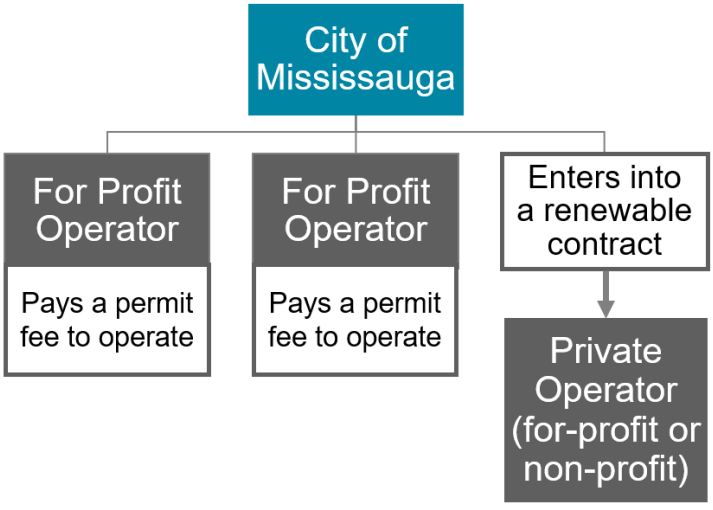
Under this model, the system would be owned by the City of Mississauga, and a private company (either for-profit or non-profit) would enter into an exclusive agreement with the City to operate a micromobility service. The City would purchase and own the micromobility vehicles and operating equipment. It would be the City's responsibility to fund any upgrades such as an increase to the fleet size or additional stations.

Procurement would follow a competitive RFP process and the City would pay the operator to provide the service (e.g. Toronto, Philadelphia, and Washington DC pay CAD$89, USD$125, and USD$99 monthly per dock respectively). Service expansion would be planned by the City and terms for operating the expanded service would be part of the contract with the operator. The City would be responsible for acquiring any new assets needed to serve an expanded service area, though some operators have invested their own funds into expansion and upgrades (e.g. Lyft in Chicago, Portland, and Philadelphia).

Contracted Operator and Permit-Based Operators

Example Cities: Minneapolis, Memphis, Washington DC, Portland

This model combines the contracted operator model with the privately owned and operated permit-based model outlined below. This is common in US cities that had successful contracted operator bike share systems in place before venture-capital-funded micromobility companies arrived, but where authorities also see benefits in having alternative technologies and business models available. Washington DC's City-run Capital Bikeshare, for example, operates alongside up to 10,000 e-scooters run by four permit-based operators. This model is an option for Mississauga, even though no existing micromobility program is in place.



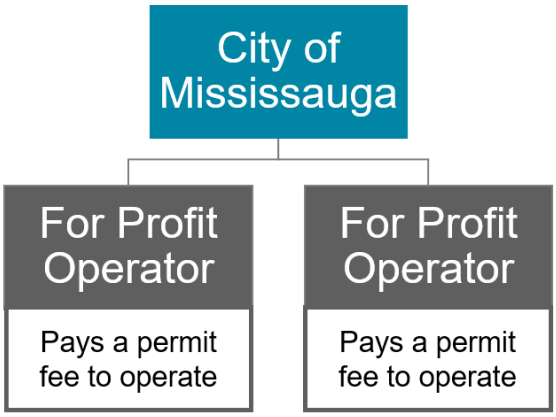
For Mississauga, an effective arrangement could involve an experienced contracted operator (for profit or not-for-profit), potentially with some measure of exclusivity (e.g. only the contracted operator can use bikes), alongside a permit system that allows multiple for-profit companies to operate as described below.

Mississauga would own the equipment associated with the contracted operations and would provide capital and operating funding to the contracted operator. The permit-based operators would receive no funding from the City but would need to pay applicable permit fees to operate.

Privately Owned and Privately Operated – Permit-based system

Example Cities: Kelowna, Calgary, Edmonton

When privately owned and operated service providers are involved in a micromobility program, permits can be introduced to provide structure to the relationship, especially where there are multiple interested operators.



Under this model, a permit process would allow multiple companies (e.g. Spin, Lime) to operate non-exclusive micromobility services in Mississauga. This approach would require City of Mississauga staff resources to administer and enforce the permits. Typically, no competitive RFP would be pursued in this case, which could simplify the process.[6]

While it is possible to have a contracted privately owned and privately operated system that is exclusive to one operator (and therefore not a permit-based system), this is very uncommon.

Under the privately owned and operated permit-based model, operators would use their own proprietary vehicle and app designs, as is common in competitive environments.

Funding and service expansion would be the responsibility of the operators, and the City would relinquish most direct control over how services are delivered. The terms of the permits would set some service parameters like acceptable fleet sizes and incentives to expand (e.g. the right to expand fleet or discounted

[6] Interviews conducted by IBI Group in 2020 with Toronto and Philadelphia city staff who recently completed RFPs for their bike share systems highlighted that there is very little market interest in bidding on non-exclusive operating contracts.

permit fee once targets are met). Funding to oversee the program would come from permit fees paid by the operators. Permit fees typically come from a combination of flat fees, per-device fees, or per-trip fees. Per-vehicle performance bonds and fees to relocate improperly parked vehicles are also common.

Permits

Permits are a regulatory tool that allow municipalities to introduce regulations for services provided to the public by a private entity. Permits offer a way to articulate operating standards based on policy goals such as equitable geographic distribution, fleet size limits, proper parking and limits on the number of operators to prevent market saturation.

Permitted operators typically pay the municipality for the right to operate on public property with fees usually set just high enough to cover expenses to the City in overseeing the program. Permits may also set aside funds to remove vehicles from public property if an operator leaves.

A nearby example a permit system for a New Mobility system is Toronto's Free-Floating Car-Share Permit Pilot that allows operators to run car-share services subject to specific rules tied to policy goals.

There is a risk that the permit-based operators require high levels of enforcement to maintain order on public rights of way. Calgary, Edmonton, and Ottawa have already launched permit-based programs, which could provide lessons learned to Mississauga on how best to structure a permit program to minimize these risks. Additionally, permits can be revoked for non-compliance with terms and conditions. Most North American cities that have micromobility services provided by many companies (i.e. non-exclusive) use permits.

3 Peer Review of Operational Considerations

This chapter describes various operational considerations related to the vehicle types, system models and governance models, based on a review of micromobility systems in peer cities in North America. This information illustrates some of the key implications of different types of shared micromobility and informs the vehicle, system, and governance screening outlined in Chapter 5.

Ten cities were identified for the review: Toronto, Vancouver, Hamilton, Kelowna, Calgary, Seattle, Washington (DC), Portland, Minneapolis, and Philadelphia. The peer review was undertaken through desktop research and conference calls with representatives from Philadelphia, Washington, Toronto, and Kelowna conducted through other IBI Group engagements.

These systems were selected to cover a range of vehicle types, governance models and system models currently in use in a variety of urban contexts, providing a breadth of examples to help inform the evaluation in Mississauga. A summary of all systems in Canada are also provided.

3.1 Characteristics of Peer Systems

This section describes the operations and practices of the shared micromobility programs in peer cities. A summary of many established systems in North America are outlined below, followed by a table of key operating statistics in Exhibit 3.1. The section concludes with a high-level summary of all shared systems currently in Canada.

- **Toronto:** Bike Share Toronto is Canada's second largest bicycle sharing program (following Montreal's BIXI system). The service is a dock-based bike share that provides access to 6,850 bikes at 625 stations (including more than 11,000 docking points) across 200 km^2. Electric pedal-assist bicycles are also available with at least 300 included in the system.

  The system was originally operated by PBSC solutions starting in 2011 under the BIXI Toronto brand. It was renamed to Bike Share Toronto in 2014 following PBSC's bankruptcy and subsequent system takeover by the Toronto Parking Authority. Program management is now awarded via a competitive RFP process. The most recent award was a 5-year term to a single for-profit operator.

- **Vancouver:** Mobi by Shaw Go is a dock-based bike share system in Vancouver. It is differentiated from other dock-based systems by allowing riders to lock the bikes anywhere to make a stopover and holds the distinction of being the only bike share in Canada requiring and providing helmets for all riders. Operations are contracted out to a for-profit operator in 5-year terms.
- **Hamilton:** Hamilton Bike Share is a hybrid docked and dockless bike share system. A series of docking stations are available to users across the city. However, the bikes can also be parked to any regular bike rack within the service areas for an added fee ($1 at the time of this report). While the City of Hamilton owns the bicycles and stations, operations have always been contracted out. The system was originally operated by Social Bicycles Inc., which was eventually acquired by Uber. In 2020, citing financial pressures due to the COVID-19 pandemic, Uber prematurely terminated their operating contract with the City, leaving the system in a state of uncertainty. A crowd-funding campaign and additional funding from the City was required to keep the system alive. The system is now operated by the not-for-profit Hamilton Bike Share Inc. The bike share system was one of the first free-floating, or “smart bike”, systems in Canada. Currently Hamilton Bike Share has 825 bikes spread across 35 km^2. It is the only public bike share in the Greater Toronto and Hamilton Area outside of Toronto.
- **Kelowna:** Micromobility in Kelowna is based on a permit system that allows multiple private sector firms to apply to deploy their own vehicles subject to the terms of the permit. The system began as a bike share pilot in 2018 and, as of August 2020, also includes e-scooters, e-bicycles, and e-mopeds. E-scooters are the most abundant type of shared micromobility and are allowed under the same rules as bicycles and e-bicycles under a provincial pilot program. The program is partly funded by Kelowna’s broader sustainable mobility program, which aims to promote active transportation and other non-driving modes.
- **Calgary:** Calgary has initiated pilot programs for dockless bicycles and e-scooters through a permit system. In March 2020, however, bikes were pulled from the streets by the private operator, leaving e-scooters as the only shared mobility available. Up to 2,500 e-scooters have been permitted between three companies.
- **Seattle:** Shared micromobility in Seattle is a permit-based system with bicycles, e-bicycles, and e-scooters available, provided by

multiple operators. Seattle was the first city in the United States to pilot a dockless bike share program.

- **Washington, DC:** Capital Bikeshare expands across the Metro DC area, providing a hybrid bike share service in Washington and neighbouring municipalities in Virginia and Maryland. Bikes can be locked outside of docks for a fee. This program is administered by the District Department of Transportation and operations are contracted to a single private operator through an RFP process. The DC area also has several private companies that provide dockless bicycles and e-scooters, which operate independently of Capital Bikeshare through a permit program also administered by the District Department of Transportation.
- **Portland:** BIKETOWN is a hybrid system that offers only e-bikes. The original launch in 2016 used conventional bikes and was funded with a $2M grant from the federal government and a $10M title sponsorship. The title sponsorship was renewed in 2020 for 5 more years at $8M, along with the upgrade to 100% e-bikes. No general City of Portland funds are used to operate the system. There is also an ongoing pilot e-scooter program in which five private operators are participating through a permit program run by the Portland Bureau of Transportation.
- **Minneapolis:** The Nice Ride program includes bicycles, e-bicycles, and e-scooters, integrated under a single non-profit administrator that outsources operations to the for-profit firm Motivate. Services are available in both Minneapolis and neighbouring Saint Paul. The system began with a docked bicycle system but is transitioning to a dockless system. Of the programs reviewed, this system was the only one that had e-scooters integrated into the typical public bike share structure (owing to Lyft's ownership of Motivate). Despite the cross-branding, e-scooters and bicycles have different fee structures. Lime and Spin e-scooters are also allowed, but not integrated into the Nice Ride system. Funding largely comes from user fees and title sponsorship.
- **Philadelphia:** Indego is a docked bike share system administered by Philadelphia's Office of Transportation, Infrastructure, and Sustainability, with operations outsourced to a single private operator via RFP. Non-profit groups are heavily involved in system planning, outreach, marketing, and equity programming alongside city staff. The program is largely funded by user fees and a title sponsor (Independence Blue Cross).

Exhibit 3.1: Key statistics for peer systems

Municipality	Pop. Density	Type of Micromobility			Micromobility Statistics	User Fees	Farebox Recovery	Operating Expenses
		Vehicle Types	System Models	Governance Models				
Toronto (Population: 2,731,571)	4,334.4 /km^2	Bicycles	Dock	Publicly owned, privately operated	6,850 bikes, 625 docking stations (by end of 2020)	Annual, 3-day, day, single trip passes	50% (2017)	$2.58 per trip[1]
Vancouver (Population: 631,486)	5,492.6 /km^2	Bicycles	Dock	Publicly owned, privately operated	~2,000 bikes, ~200 docking stations	Day, monthly, annual passes	Unknown	Unknown
Hamilton (Population: 536,917)	480.6 /km^2	Bicycles	Hybrid	Publicly owned, privately operated	825 bikes, 130+ hubs	Pay as you go, monthly and 6-month plans	29% (2020 estimate)	$52 per dock per month, $88 per bike per month
Calgary (Population: 1,239,220)	1,501.1 /km^2	E-scooters	Dockless	Privately owned and operated	~2,500 e-scooters	Varies by operator	n/a	None
Kelowna (Population: 142,146)	601.3 /km^2	E-scooters, e-bikes, e-mopeds,	Dockless	Privately owned and operated	~700 scooters, 50 e-bikes, 25 e-mopeds (permitted)	Varies by operator	n/a	None

Municipality	Pop. Density	Type of Micromobility			Micromobility Statistics	User Fees	Farebox Recovery	Operating Expenses
		Vehicle Types	System Models	Governance Models				
Philadelphia (Population: 1,584,064)	4,554.8 /km^2	Bicycles, e-bicycles	Dock	Publicly owned, privately operated	~1000 bikes, ~136 docking stations	Day, monthly, annual passes	~41% (2017 forecasted)	$284/bike per month[2], $155 per dock per month
Minneapolis (Population: 429,606)	3,071.7 /km^2	Bicycles, e-bicycles, e-scooters	Dock	Publicly owned, privately operated	~1,550 bikes, ~170 docking stations – system is transitioning to dockless or hybrid system, 2,500 e-scooters	Single ride, day, 30-day, annual passes, e-bicycle and e-scooter are pay as you go	Unknown	$50 per dock per month, $98 per bike per month
Washington (Metro Area) (Population: 6,216,589)	418.7 /km^2	Capital Bikeshare: Bicycles, e-bicycles Private: Bicycles, e-bicycles, e-scooters	Capital Bikeshare: Dock Private: Dockless	Capital Bikeshare: Publicly owned, privately operated Private: Privately owned and operated	Capital Bikeshare: ~5,000 bikes, ~900 e-bikes, ~600 docking stations, Private: ~1,900 e-scooters, ~90 dockless bikes.	Single trip, day, 3-day, 30-day and annual passes; $1 extra to unlock an e-bike	~90% in DC, ~52% in Arlington	$2.55 per trip[1], $101 per dock per month, $207 per bike per month

Municipality	Pop. Density	Type of Micromobility			Micromobility Statistics	User Fees	Farebox Recovery	Operating Expenses
		Vehicle Types	System Models	Governance Models				
Portland (Population: 654,741)	1,894.7 /km^2	Biketown: Bicycles, e-bicycles Private: e-scooters	Biketown: Hybrid Private: Dockless	Biketown: Publicly owned, privately operated Private: Privately owned and operated	1,500 e-bicycles (in process of relaunching, will remove 1,000 standard bicycles), up to 1,250 e-scooters allowed per permit issued, 5 permit holders	Pay as you go, monthly and annual passes; prices vary by operator for e-scooters	Unknown	Unknown. No operating costs paid by City.
Seattle (Population: 753,675)	3,464.6 /km^2	Bicycles, e-bicycles, e-scooters	Dockless	Privately owned and operated	7,000 bicycles (as of May 2019) with plans to expand to 10,000. 1,500 e-scooters.	Varies by operator	n/a	None

[1] ITDP Bike Share Planning Guide

[2] Indego 2018 Business Plan Update

Current Shared Micromobility Systems in Canada

There are currently 18 shared micromobility systems in Canada. Many have recently begun or are beginning soon, often utilizing a pilot model for initial deployment. A summary of the cities, the vehicle types offered, and the system and governance models utilized is shown in Exhibit 3.2.

Exhibit 3.2: Current shared micromobility systems in Canada

Municipality	Vehicle Types			System Models			Governance Models		
	Bikes	E-Bikes	E-Scooters	Docked	Dockless	Hybrid	Public/ Public	Private/ Private	Public/ Private
Hamilton, ON	✓					✓			✓
Ottawa, ON			✓		✓			✓	
Toronto, ON	✓	✓		✓					✓
Waterloo, ON	✓		✓			✓		✓	
Windsor, ON		✓	✓		✓			✓	
Calgary, AB			✓		✓			✓	
Edmonton, AB			✓		✓			✓	
Leduc, AB			✓		✓			✓	
Lethbridge, AB		✓	✓		✓			✓	
Okotoks, AB			✓		✓			✓	
Red Deer, AB			✓		✓			✓	
St. Albert, AB			✓		✓			✓	
Kelowna, BC		✓	✓		✓			✓	
Vancouver, BC	✓			✓					✓
Vernon, BC		✓	✓		✓			✓	
Halifax, NS			✓		✓			✓	
Montreal, QC	✓	✓		✓					✓
Quebec City, QC		✓		✓					✓

3.2 Operator Retention

Peer cities that own micromobility assets tend to have private operator contracts with clear clauses covering data sharing, penalties for early termination, fixed periodic payments by the City, and allowances for service area expansion during the term of the contract. No unusual or unexpected operator retention techniques were found to be used in peer municipalities. One irregularity was

found in Hamilton where their contract with Uber did not include early termination penalties, data sharing, etc. and led to Uber's abrupt withdrawal. This illustrates the importance of including these provisions in contracts.

Cities with privately owned and operated service providers tend not to have any operator retention rules or penalties for an operator leaving unexpectedly. Many cities require operators to set aside a fund to cover the costs of removing vehicles from the street if the operator ceases operations, but this is not structured to penalize early departure. It is simply meant to ensure that the City is not left to cover unexpected clean-up costs.

One unique situation was in Toronto, where the Toronto Bike Share's founding operator, PBSC Solutions, filed for bankruptcy three years into their term as operator, leaving the City with several docking stations and bicycles around the City. Toronto Parking Authority took over the system following the bankruptcy with funds diverted from other City capital programs. While the industry has matured since Toronto's experience, financial risks for privately owned and operated bike share systems exist, particularly in a dock-based model.

If the City chooses a private operator, regardless of vehicle ownership, retention strategies are important to include when structuring operating contracts as there is a risk of private operators leaving if financial objectives are not met. Privately owned systems are typically not obliged to stay for any fixed period and are free to leave if profits are not made. For publicly owned systems, longer operating contracts with penalties for premature termination are common.

3.3 Enforcement Activities

Within each of the governance models, enforcement mechanisms vary to ensure operations are meeting the requirements set out in the agreement. Typically, enforcement is the responsibility of the City. However, it is the responsibility of the operator to maintain the agreed upon service standards or face penalties that can include fines or termination of the contract. Other communities have struggled to ensure for-profit operators meet the operating requirements without proactive monitoring of micromobility operations.

Typical enforcement activities include:

- Ensuring operators maintain operating standards of a clear right-of-way and ensuring no obstruction of pedestrian areas;
- Vehicle safety compliance (i.e. do vehicles have all required safety features?);
- Ensuring the operator contains vehicles in the proper operating and parking areas;

- Ensuring the operator removes vehicles from any paths or parks where they are not permitted; and
- Requiring operators to detect and fine users for improper riding behaviour.

Operators can fine riders for improper use or improper parking. Calgary's program allows users and non-users to submit photos of improperly parked scooters to operators who, in turn, can fine users. In Ottawa, residents can report mis-parked e-scooters to operators, who must respond to the concern within one hour.

There is a risk that privately owned and operated services will require high levels of enforcement to maintain order on public rights of way, particularly if there are multiple operators. To properly enforce local regulations (or terms in a sole-source agreement), the City will need to invest resources in oversight and enforcement. The additional enforcement responsibilities could be funded through a portion of the permit application fee, as well as from fines collected for each enforcement action (fees would be determined by the licensing department on a cost recovery basis).

3.4 Expansion Approaches

Service expansion could involve increasing the service area, adding vehicles, adding vehicle types, or permitting additional operators.

Peer cities with contracted operations tend to focus on providing good coverage of micromobility vehicles throughout the city to ensure equitable access, rather than focusing only on profitable neighbourhoods. However, typically some level of cycling propensity analysis or similar technique is used to identify whether residents of a neighbourhood are likely to use micromobility if it were deployed there. Looking at a propensity analysis combined with broad distribution helps to balance equitable distribution through higher use and potentially lower use areas combined.

In Toronto's publicly owned and privately operated system, City staff identify opportunities to expand the system. Toronto's most recent expansion, for example, extends further north outside the dense downtown core. In lower density suburban neighbourhoods in North York and Scarborough, Toronto is piloting smaller deployments of bikes to gauge response before investing heavily in suburban expansion.

Privately owned and operated systems like Kelowna and Calgary are much more reliant on the operator's initiative to expand. Some US cities like Los Angeles incentivize private operators to expand the system through reduced

permit fees, while others allow fleet size increases if the operators reach certain vehicle distribution targets.

As Mississauga would be deploying a new system, the initial service area is likely to be relatively small. As such, preparations for expanding the service area if the program is successful are important to consider in the planning stage of the program.

3.5 Level of Municipal Oversight Required

Regardless of the system or governance model, all micromobility programs require some level of oversight at either the municipal level or through a designated non-profit (e.g. Minneapolis and to some extent Philadelphia). Generally, the higher the level of private sector involvement, the lower the level of City staff time is required to oversee and administer the program.

Consideration of the desired level of municipal involvement required for shared micromobility system deployment is important – particularly in a new operating environment such as Mississauga. This will impact the amount of City staff time required to administer and/or operate the system as well as how much control the City has over the planning and operation of the system. The governance model employed (described in section 2.3) heavily informs the level of municipal oversight required.

3.6 Equitable Access to Services

Most of the cities reviewed had some form of equity consideration built into the shared micromobility program aimed at supporting equitable access to the program. This aligns with one of the City's five Strategic Pillars for Change in the Strategic Plan, "Belong", which describes the need to ensure access to a range of affordable and accessible housing, transit, and service options in Mississauga.

Equity programs among peers took the shape of one or more of the following:

- **Discounts/special passes for low income individuals**, e.g. Vancouver, Philadelphia, Washington, Minneapolis, Portland, Seattle. Qualifying criteria and size of the discount varied among cities;
- **Alternative payment arrangements** intended to improve accessibility for those without a credit card and/or a smartphone, e.g. Vancouver, Portland, Minneapolis;
- **Service requirements to increase access within lower income or priority neighbourhoods**, typically implemented through a provision

that a certain number or percentage of devices be located within identified areas, e.g. Minneapolis, Portland, Seattle; and

- **Targeted expansion** to lower income or equity areas for docked/publicly-administered shared mobility systems, e.g. Washington.

Calgary's bike and e-scooter permit application asks applicants to submit low income pricing scheme proposals and alternatives to credit cards and/or smartphone access proposals. Toronto's bike share does not offer any sort of discounted pass or have stated equity considerations. Kelowna's permit-based system does not include any equity considerations, but it was noted that devices were most likely to be deployed in lower income areas due to the built form and other geographic considerations. Seattle's bike and e-scooter share programs include "Equity Focus Areas," where private operators must make at least 10% of their devices available.

The responsibility of offering an equity program is typically shared among all operators for their respective services. If an operator does not have an equity program in place, paying an equity fee to the City could be an option. The equity fee would go towards building an equity program and ensure a broad range of residents from different incomes and backgrounds have access to affordable and healthy modes of transportation.

Equity programs can be implemented regardless of the system's vehicle type or system and governance model. However, there are specific considerations for each model in implementing equity-specific measures. Implementing equity measures in publicly owned systems is easier as the City has direct control over deployment. Improving equity in privately owned and operated systems requires involvement from the City in mandating vehicle availability and affordability, which has the potential to increase costs to operate the system.

Equity program case study – Hamilton, Ontario

The City of Hamilton is home to Canada's first and one of North America's best bike share equity programs, which has been removing barriers to cycling in Hamilton since 2015. Hamilton's Everyone Rides Initiative (ERI) is a part of Hamilton's strong commitment to providing equitable access to a range of sustainable transportation options across the city. ERI is run by Hamilton Bike Share Inc. (HBSI), a local non-profit which also currently operates Hamilton's bike share services.

The program provides cycling education, outreach, discounted access to the bike share system, advice and support to Hamilton on system expansion, and promotes a range of initiatives that remove barriers to cycling across Hamilton. As a non-profit, HBSI has opportunities to apply for funding from the government and other third-parties that for-profit operators would not have access to.

To date, the ERI has only had to consider equity issues related to Hamilton's publicly-owned bike share system. If Hamilton's micromobility services expand to include permitted operators, the program will need to determine how to integrate additional service providers.

3.7 Key Findings – Peer Review of Operational Considerations

There are several operational considerations that can help shape Mississauga's micromobility program. Key findings include:

- There are many examples of North American cities with similar characteristics to Mississauga that operate shared micromobility systems.
- Hybrid systems that use both docked and dockless vehicles are the most common among peers. This reflects the emergence of technologies that enable more computing and location-tracking ability of micromobility vehicles, while also providing dedicated and predictable locations for vehicle pick-up and drop-off.
- Conventional bicycles, electric pedal-assist bicycles and electric kick-style scooters are all common in peer micromobility programs.
- Some level of municipal oversight is required for every governance model with the highest effort needed for publicly owned and operated and the lowest needed for privately owned and operated. Less staff

time may be desirable in a new system to limit the required upfront investment in a program.

- Privately owned and operated systems in three peer cities started as pilot programs and have since evolved to permanent fixtures in their respective transportation networks. Pilots allow cities to rapidly deploy and adjust programs at a comparatively low cost.
- Making expansion plans and incentives clear during the procurement process lets potential operators know what to expect and to plan for it. It is essential for operator contracts to include penalties for early contract termination to discourage operators from leaving unexpectedly and putting service provision at risk, like the City of Hamilton’s experience in 2020.
- Proactive monitoring of operators and enforcement of requirements is necessary to support operators providing services according to agreed upon standards.
- Supporting equitable access to micromobility services is a common theme among peer systems, who recognize the importance of providing equitable access to all residents and visitors.

4 Initial Financial Analysis

This chapter presents the findings of an initial financial analysis. The purpose of this initial analysis is to compare and contrast different vehicles and system and governance models on the basis of their financial performance. This feeds into the evaluation presented in Chapter 5 which ties together the financial considerations of various alternatives with several other factors.

It is emphasized that this analysis should not be interpreted as a precise representation of the cost to deploy and operate a given system. Subsequent studies by the City will define the specific service area, forecast ridership, and obtain other information that will enable more accurate financial forecasting.

4.1 Assumptions for Analysis Purposes

Assumptions on the service area and potential demand are presented below.

Conceptual Service Area and Fleet Assumptions

A conceptual service area of 9 km^2 is assumed for analysis purposes, approximately bounded by Highway 403, Central Parkway, Dundas Street, and Confederation Parkway, as shown in Exhibit 4.1.

This area was selected for the analysis purposes, in part, because it incorporates the highest concentration of land uses that are commonly associated with trips made by active transportation, such as high-density housing, office and institutional buildings, major retail, and a post-secondary school campus. Further, local travel behaviour data show that this conceptual service area has among the highest shares of pedestrian trips, transit trips, and zero-car households in the city.[7] The size of the service area is also consistent with initial service deployments in other Canadian cities. For example, Ottawa's pilot deployment of e-scooters was over a 10 km^2 area centred on the city's downtown, while Calgary's pilot program was conducted over a 12 km^2 area. **It is important to note however, that this conceptual service area was identified for analysis purposes and should be further refined in subsequent phases of the study.**

[7] *Transportation Tomorrow Survey 2016*

Exhibit 4.1: Conceptual service area for analysis purposes

Potential Demand

For system planning, potential demand is presented as an annual figure. This annual figure represents an average number of daily trips, taking into consideration varying trip rates throughout the year (typically higher in summer and lower in winter). The following assumptions are made for estimating demand:

- **2.0 daily trips per vehicle** for both bikes and e-scooters, informed by average trip rates in peer Canadian cities.
- **450 vehicles in the service area**, calculated as 50 vehicles per km^2 in an assumed 9 km^2 service area, consistent with best practices in shared micromobility programs.

- **45 docks in the service area,** calculated as 5 docks per km^2 and 10 vehicles per dock, consistent with best practices in shared micromobility programs.
- **2 km average trip length** based on the size of the assumed service area.

The resulting demand is estimated at approximately **300,000-350,000 trips per year** depending on local conditions**.**

4.2 Overview of Initial Cost Estimates

These initial cost estimates are based on readily available information from peer cities and other sources applied to system assumptions outlined in section 4.1.

Initial high-level estimates for fixed costs and recurring costs are presented below in Exhibit 4.2, followed by a discussion on methods for determining each figure in section 4.3 to 4.5. All values have been rounded to the nearest $50,000. Recurring costs and revenues are indicated as low ($150,000 or less), medium ($150,000 - $350,000), high ($350,000 - $700,000) in the overview table (Exhibit 4.2) with the purpose of indicating relative differences between models during this initial analysis.

More detailed financial analysis should be conducted in later stages of the planning for a shared micromobility service as more implementation details are confirmed.

Vehicle, System, and Governance Models

The financial implications of four shared micromobility models are analyzed in this section. The three models that involve some level of private sector involvement cover the most common combinations of vehicles and governance models currently in use in peer cities – the publicly owned and publicly operated model was added for comparison despite being very uncommon. Other combinations of vehicles and governance models can be extrapolated from this information if needed.

The four shared micromobility models analyzed in this section are:

- Conventional Bicycles – Publicly owned and publicly operated;
- Conventional Bicycle – Publicly owned and privately operated;
- E-Bicycle – Publicly owned and privately operated; and
- Convention Bicycle / E-Bicycle / E-Scooter – Privately Owned and Privately Operated.

Exhibit 4.2: Summary of initial financial analysis – costs to the City of Mississauga

Vehicle Type and Governance Model	Conventional Bicycle — Publicly Owned & Publicly Operated	Conventional Bicycle — Publicly Owned & Privately Operated	E-Bicycle — Publicly Owned & Privately Operated	Conventional Bicycles / E-Bicycle / E-Scooters — Privately Owned & Privately Operated
Fixed Costs				
Vehicle Procurement	$550,000-$900,000	$550,000-$900,000	$1,000,000-$1,350,000	N/A
Dock Procurement	$150,000-$2,250,000	$150,000-$2,250,000	$150,000-$2,250,000	N/A
Disposal	$50,000	$50,000	$50,000	N/A
TOTAL	**$750,000-$3,200,000**	**$750,000-$3,200,000**	**$1,200,000-$3,650,000**	**$0**
Magnitude of Annual Recurring Costs and City Funding/Revenues [a]				
Magnitude of Annual Recurring Costs				
Operations	High	High	High	Low
Contract/Permit Administration	N/A	Low	Low	Low
TOTAL	**High**	**High**	**High**	**Low**
Magnitude of Annual City Revenues				
User Fees	Medium	Medium	Medium	Low
Permit Fee	N/A	N/A	N/A	Low
Sponsorship	Low	Low	Low	N/A
TOTAL	**High**	**High**	**High**	**Low**
Magnitude of Required Annual Subsidy				
Required Subsidy	**Medium**	**Medium**	**Medium**	**Low**

[a] Recurring costs and revenues are presented in categories of high, medium, and low to indicate the relative difference between the operating models. Estimated values fall in the following ranges: Low ($150,000 or less), Medium ($150,000 - $350,000), and High ($350,000 - $700,000).

4.3 Fixed Costs

Fixed costs include procuring vehicles and docking stations during program start-up, and expenses associated with end-of-life disposal of the same assets. These costs only apply to publicly-owned bike systems as the City would not be responsible for procurement and disposal of assets for privately-owned systems. These initial estimates have been rounded to the nearest $50,000.

Vehicle Procurement and Disposal

The City would be responsible for procuring vehicles for a publicly owned system. Procuring conventional bicycles would cost approximately $550,000 (dock-based) to $900,000 (hybrid/dockless) due to the level of technology required on the vehicle based on the system model. This figure is estimated based on a $1,200 per dock-based bike or $2,000 per dockless/hybrid bike, and an assumed initial fleet size of 450 vehicles. Electric pedal-assist bicycle procurement would cost approximately $1,000,000 (dock-based) to $1,350,000 (dockless/hybrid), calculated based on an estimated $2,200 per dock-based vehicle and $3,000 per dockless/hybrid vehicle, for the same fleet of 450 vehicles.

Based on experience analyzing implementation costs of other micromobility programs in North America, end-of-life disposal is estimated to be $50,000 for the fleet of 450 publicly owned bikes.

Docking Stations

Docking stations make up the most significant start-up cost for a publicly owned system. Docking stations can range from tech-enabled stations designed specifically for bike share (Exhibit 2.4) common for docked system models, or sets of more conventional, non-tech-enabled parking corrals (Exhibit 2.6) common for hybrid system models. Details of the two common docking station types are provided below:

- **Tech-enabled docking stations** (common for docked system models) – Each dock is estimated to cost $50,000 to procure and install, and 45 docks would be required to service the fleet of 450 bikes for a total of approximately $2.25 million.
- **Conventional non-tech-enabled bike corrals** (common for publicly and privately owned hybrid system models) – Each dock does not require the technology and supporting infrastructure required for a fully dock-based system. These could be off-the-shelf bike racks or customized corrals for shared micromobility, estimated to cost $3,000 each to procure and install, totaling approximately $150,000.

Additional costs would be associated with dock installation. Privately owned and operated fleets could operate using a dockless model, or the operator would be responsible for financing docks.

4.4 Recurring Costs

Recurring costs are those associated with running the system. Recurring costs include day-to-day operations, fee subsidies, and administering contracts for privately operated systems. Estimates of recurring costs per governance model are outlined below to provide an indication of variation across governance models. More refined estimates should be developed as more details of the program are determined in future phases of work.

Publicly Owned and Operated

The cost of publicly operating a bike share system of 450 vehicles is estimated to be approximately $600,000 to $700,000 annually. Operating cost is calculated assuming an approximate cost of $2 per trip, based on the experience of other bike share systems. This includes vehicle maintenance, rebalancing, charging for e-bikes, customer service, and insurance. In this model, the City would not have to dedicate resources to managing a relationship with a private operator.

Publicly Owned and Privately Operated

Contracting to a private operator is estimated to save about 10% of direct operating costs, due to the contractor's assumed cost efficiency based on experience in the industry,[8] resulting in an estimated annual operating cost of approximately $550,000 to $650,000. Based on the experience of peer cities, approximately 0.5 full time equivalent staff will be required to administer the relationship with the private operator.

Privately Owned and Operated

Privately owned and operated shared micromobility systems have no direct operating cost for the City but would require staff time to administer operator contracts. Based on the experience of peer cities, approximately 0.5 full time equivalent staff will be required to administer the relationship with the private owner/operator.

[8] Based on *The Bike Share Planning Guide*, Institute for Transportation & Development Policy

Subsidies

Publicly owned systems typically require a subsidy, as their fares are designed to decrease barriers to access shared micromobility rather than generating revenue for the operator. This required subsidy is estimated to be approximately $300,000 per year for a publicly operated system and slightly lower for a privately-operated system.

4.5 Revenues and Funding Sources

City revenues vary based on the governance model employed and have varying implications on the potential overall cost to the City. The City can expect revenues from a publicly-owned system to originate primarily from user fees, sponsorship, and government sources. In a privately-owned system, the City can expect to charge operators a permit fee to offset the cost of staff time to administer the system.

Common funding sources for micromobility include:

- Government sources;
- Sponsorship and advertising;
- Capital Grant Programs;
- User fees; and
- Permit fees.

The remainder of this section describes each of these sources and the potential implications on overall costs to the City.

Government Funding Sources

These funding sources could be used under any governance model.

Funding from the City of Mississauga operating budget, general levy, parking revenue, fines collected from red light cameras, and Ontario's Gas Tax Fund for Public Transit are potential stable government funding sources that could support micromobility. However, securing funding through these sources can be challenging and often take several years. Potential government funding sources include:

- **City of Mississauga Operating Budget:** The cost of staff time for system operation would likely be covered by the City's operating budget.
- **Capital Funding from the City of Mississauga or Peel Region:** The City of Mississauga and Peel Region utilize taxes to fund transportation initiatives and infrastructure projects. Capital funding can be requested from the general levy to fund the purchase of micromobility vehicles and infrastructure.
- **Municipal Parking Revenue**: The City of Mississauga collects revenue from parking lots, street parking, parking permits, and tickets. Any revenue above that which covers the direct operating costs of the parking program, could be allocated to fund micromobility services

including operating or capital costs. Marginal increases in parking fees (e.g. $0.15/hour) and fines (e.g. $1 - $5) could potentially generate more revenue to directly fund micromobility. An advantage of this funding source is that it provides a consistent, predictable funding source that the City has direct control over.

- **Red Light Camera Revenue**: The Region of Peel collects $325 for each red-light camera ticket issued. A small portion of these funds could be allocated to the City of Mississauga for shared micromobility including operating or capital costs. This is an existing source of funding that will likely grow as more red-light cameras are added.
- **Provincial Gas Tax Funding**: In the 2020-2021 year, Mississauga received $19M in Gas Tax funding from the Province.[9] This provincial funding is dedicated to transit but can be spent on either capital or operating expenses of the transit system, including capital works that increase transit ridership. To utilize this funding source, the City would need to shape the future shared micromobility program so that it directly contributes to transit ridership. There are no existing examples of the use of Provincial Gas Tax Funding for shared micromobility programs, however further investigation is warranted.
- **Canada Community-Building Fund (Federal Gas Tax Funding)**: In the 2020-2021 year, Mississauga received about $22M from the Canada Community-Building Fund from the Federal Government.[10] This funding can be used for investments in community public infrastructure including public transit and local roads and bridges. To utilize this funding source for capital costs associated with micromobility, the City would need to integrate the micromobility program's infrastructure needs with transit, road, or bridge projects.
- **National Active Transportation Fund:** Administered by Infrastructure Canada, this new fund announced in 2021 aims to expand and enhance active transportation networks in communities across Canada. Capital costs for non-removable infrastructure related to micromobility sharing programs such as docking stations or bike racks may be eligible. Non-fixed assets such as bicycles are not eligible.

[9] 2020-21 Gas Tax Funding by Municipality, Province of Ontario.
[10] https://www.canada.ca/en/office-infrastructure/news/2020/06/backgrounder-ontarios-202021-federal-gas-tax-fund-allocations.html

Sponsorship and Advertising

These revenue sources could be used under publicly owned governance models.

- **Sponsorship**: Shared micromobility sponsorship is an arrangement with a private company for a fixed amount of money that can be used for operations or capital purchases. There are different levels of sponsorship such as a title sponsor (highest investment covering entire system) or a station sponsor (limited to single or small subset of stations). A title sponsor typically reserves naming rights for the bikeshare system. Title sponsors are very difficult to secure. Sponsorship is not guaranteed and can be unpredictable, as exemplified by Toronto Bike Share's lack of title sponsor since 2016.

  In Mississauga, a sponsorship revenue of up to $50,000 per year is estimated based on experiences in peer cities. A high-profile title sponsor would be difficult to obtain, so sponsorship at the bike and station level would be more realistic.

- **Advertising**: Advertising enables companies offering products or services to display ads on the micromobility equipment (e.g. on bike baskets, on station infrastructure, etc.). Advertising requires an arrangement with a private company for a fixed amount of money that can be used for operations or capital purchases. Revenue can be earned by selling advertising at stations or on bicycles under different terms than a sponsorship agreement.

  Advertising agreements are typically a shorter duration than sponsorship agreements. In addition, advertising tends to generate relatively low amounts of funding and it is unclear how much funding could be collected this way. The most efficient approach may be to lease advertising space on equipment to the same organization that currently manages other advertising on public property like benches and bus shelters.

Capital Grant Programs

These revenue sources may be available for publicly owned governance models. Many peer systems in Canada have been successful in securing capital funds from a range of sources. Potential grant programs include but are not limited to:

- Canada Healthy Communities Initiative, Government of Canada;
- Public Transit Infrastructure Fund, Government of Canada;
- Grow Grants, Ontario Trillium Foundation; and
- Green Municipal Fund, Federation of Canadian Municipalities.

User Fees

User fee revenues are a combination of membership sales and per-ride fares.

In a publicly owned system, user fees are an important revenue stream for operating costs and typically include a fee per trip. For example, a single-use pass in Toronto costs $3.25 for trips under 30 minutes, plus $4 for each 30 minutes exceeding the initial rental period.

In addition to individual trips, publicly owned systems typically offer memberships like transit passes to incentivize use and ensure regular revenue. Members tend to use the system more than casual riders, so the City can expect the average revenue per trip to be less than the fare for a single ride. For Mississauga, assuming an annual average of 2.0 trips per vehicle per day, and an expected revenue per trip of $1 results in an estimated revenue from all trips of $300,000 to $350,000.

In a privately owned system, user fees go to the private operator; however, the City may charge the operator a fee per trip. Typically, in a privately owned system, the user fee includes a flat fee per trip plus fees based on the amount of time you use the vehicle. In Ottawa in 2021, the cost to unlock a shared e-scooter was $1.15, plus $0.35 per minute to use.

Permit Fees

Permit fees may only be charged under the privately owned and operated governance model, or where privately owned and operated services are provided alongside publicly owned services.

Exhibit 4.3 shows example permit fees in some North American cities. Fees tend to reflect both direct and indirect program costs as well as programming to support safe, equitable use of micromobility, and can lead to a cost-recovery model. In a cost-recover model, cities typically collect a combination of fees

shown in Exhibit 4.3 to offset the cost of administering their relationship with operators.

In cities where both contracted (publicly owned and privately operated) and permitted (privately owned and privately operated) operators provide services, it is not common for permit fees to be used to subsidize contracted operations. Washington DC, Portland, and Minneapolis are some examples of cities with mixed contracted and permitted operators and the programs are funded separately. From a business perspective, it would be challenging for Mississauga to justify charging a permitted operator a fee to subsidize a contracted operator, who is in effect a competitor. The City risks not attracting and retaining any permitted operators if they agree to cross-subsidize.

Exhibit 4.3: Example permit fees for permitted operators

Fee Type	Fee Amount
Application fee	• $1,000 (Calgary) • $5,000 (Ottawa) • $150 (Denver) • $2,500 (Oakland) • $20,000 (Los Angeles, Santa Monica)
Per device fee	• $20 (Calgary) • $50 (Ottawa) • $130, reduced to $39 in disadvantaged communities (Los Angeles) • $130 + $1/day (Santa Monica)
Per trip fee	• $0.10 when parked (Oakland)
Performance bond	• $25 per electric scooter to a maximum of $15,000 per permit holder (Calgary) • $15 per device to a maximum of $5,000 per permit holder (Kelowna) • $20/bike & $30/e-scooter (Denver) • $80/vehicle (Los Angeles) • $10,000 (Seattle)

Fee Type	Fee Amount
Electric scooter engagement, education, and encouragement	• $10 per electric scooter (Calgary) • $10 per electric scooter (Ottawa)

4.6 Key Findings – Initial Financial Analysis

The key findings of the financial analysis include:

- Electric pedal-assist bicycles are the most expensive vehicle type (approximately $2,200) followed by conventional bicycles (approximately $1,200), and then electric kick-style scooters as the least expensive (approximately $500).
- “Smart” docks that are technology-enabled or “dumb” docks like conventional bike corrals (both described in Section 2.2) can be used for different costs – each option has benefits and drawbacks.
- Privately owned and operated programs are the least expensive upfront and on-going for the City.
- Publicly owned systems, whether publicly or privately operated, require high upfront investment from the City and high annual operating subsidies – private operation of a publicly owned system is expected to achieve some efficiencies.
- Securing government funding for the required subsidy can be challenging and is often a multi-year process. Waiting for this type of funding can be an impediment to the rapid deployment of a new service.
- Sponsorship, advertising, and capital grant programs typically make up a small amount of revenue and are not guaranteed.
- Under the privately owned and operated model, permit fees can offset City expenses, potentially leading to a cost-recovery model.

5 Micromobility Vehicle and Model Screening

This chapter presents an initial screening of the vehicle types, and system and governance models for applicability to Mississauga. To conduct the screening, there is one evaluation framework for vehicle types and a second for system and governance models.

5.1 Phasing Considerations

A key consideration for screening the alternatives is implementation phasing. What is necessary in the early stages of a program is likely to differ from what is ideal in later stages of a program. Since Mississauga is considering implementation of a new program, this evaluation specifically reviewed early-stage program implementation considerations including suitability for a potential pilot program in Mississauga.

Pilots are an effective tool commonly used by peer cities for shared micromobility programs to gauge level of interest, gather data, test deployments, and determine the extent to which shared micromobility contributes to transportation and broader city-building goals. Findings from a pilot program can help determine if a continual program is suitable and if so, can help shape what the program looks like.

Key features that are ideal for a pilot program include:

- Low upfront financial investment;
- Flexibility to adjust deployments based on feedback; and
- Easy removal if necessary, at the end of the pilot.

Effective monitoring is essential during a pilot to determine whether moving into a more continuous program is desirable. If a pilot is successful, higher levels of investment and infrastructure may be justifiable.

5.2 Vehicle Evaluation Framework and Results

This section describes the evaluation of the three micromobility vehicle types described in section 2.1. The vehicle types were evaluated against seven factors:

- **Ease of Use – Stability** – How well does the design of the vehicle lead to a stable experience for users?
- **Ease of Use – Level of effort required by users** – How much physical effort is required by a user to operate the vehicle? While physical exertion is beneficial for good health and well-being, this can make vehicles less accessible for people of varying physical abilities.
- **Accessibility – Potential impacts on vulnerable road users** – Is this vehicle type associated with impacts on vulnerable users of the right-of-way, specifically related to sidewalk riding?
- **Maintenance required** – How much maintenance is required?
- **Cost** – How much does the vehicle typically cost?
- **Suitability for a potential pilot program** – Based on the vehicle characteristics, how suitable is the vehicle for a potential pilot program in Mississauga?

These seven factors cover key differentiators across the vehicles and address top concerns identified through stakeholder consultation. An evaluation of the different vehicle types in the context of different system models is shown in Exhibit 5.1. Notably, the dock-based system is not included in the evaluation for e-scooters as dock-based e-scooters are not a common vehicle type and are not currently readily available.

The evaluation of each factor is based on knowledge of peer systems and is categorized by a symbol as indicated below:

▼ = High risk or negative impact
▬ = Medium risk or neutral impact
▲ = Low risk or positive impact

Exhibit 5.1: Evaluation of vehicle types

Factor	Conventional Bicycle			Electric Pedal-assist Bicycle			Electric Kick-style Scooter [a]	
	Dock-Based	Dockless	Hybrid	Dock-Based	Dockless	Hybrid	Dockless	Hybrid
Ease of Use – Stability	▲ Conventional bicycles are designed for stability and comfort, suitable for riders of any skill level, therefore increasing accessibility.			▲ Electric pedal-assist bicycles are designed for stability and comfort, suitable for riders of any skill level, therefore increasing accessibility.			▬ Vehicles are designed for stability with a wide heavy base that is easy to stand on with both feet; however users typically report a less stable experience than with bicycles, generally due to the small overall size and smaller wheel diameter which can be less stable over uneven terrain. This can reduce the accessibility of the vehicle.	
Ease of Use – Level of Effort Required by User	▬ Reasonable level of physical effort required by the user, especially due to the weight of the bicycle. While this can benefit good health for many, it can also make the vehicle less accessible to people of varying physical abilities.			▲ Designed to enable longer riding, the electric motor reduces the physical effort required and can therefore increase accessibility.			▲ Low level of effort required due to electric motor, therefore increasing accessibility.	
Accessibility – Potential Impacts on Vulnerable Road Users	▲ Low – similar to current situation with privately owned bicycles.			▲ Low – similar to current situation with privately owned bicycles.			▬ Medium – some peer cities report challenges with sidewalk riding while others do not.	
Maintenance Required	▲ Low maintenance required.	▬ Medium level of maintenance required due to electronic components on the bike.		▼ High maintenance required due to battery swapping or charging requirements and other electronic components.			▼ High maintenance required due to battery swapping or charging requirements and other electronic components.	
Cost	▬ Medium cost of vehicle (e.g. $1,200)	▼ High cost of vehicle (e.g. $2,000) due to additional technology required for dockless/hybrid		▼ High cost of vehicle (e.g. $2,200)	▼ High cost of vehicle (e.g. $3,000) due to additional technology required for dockless/hybrid		▲ Low cost of vehicle (e.g. $500)	

Factor	Conventional Bicycle			Electric Pedal-assist Bicycle			Electric Kick-style Scooter [a]	
	Dock-Based	Dockless	Hybrid	Dock-Based	Dockless	Hybrid	Dockless	Hybrid
Suitability for a potential pilot program	▼ Typically provided through publicly owned system which requires significant upfront investment for vehicles regardless of system model. Broad market interest does not appear to exist for providing shared conventional bicycles in North America.			▼ Market interest does not exist for providing shared e-bikes in a docked model meaning upfront investment from the City would need to be high.	▲ Market interest exists for providing shared e-bikes in a dockless or hybrid system model meaning upfront investment from the City would be low.		▲ Market interest exists for providing shared e-scooters in a dockless or hybrid system model meaning upfront investment from the City would be low.	

Recommended Vehicle Type

The top performing vehicle type per evaluation factor is summarized in Exhibit 5.2 followed by a description of the recommended vehicle type for early stage implementation.

Exhibit 5.2: Top performing vehicle type per evaluation factor

Evaluation Factor	Top Performing Vehicle Type(s)
Ease of Use – Stability	Conventional Bicycle & E-Bike
Ease of Use – Level of Effort	E-Bike & E-Scooter
Accessibility – Potential impacts on vulnerable road users	Conventional Bicycle & E-Bike
Maintenance Required	Conventional Bicycle
Enforcement Required	Similar level of effort, depending on system model
Cost	E-Scooter
Suitability for a potential pilot program	E-bikes & E-Scooters

In the early stages of a shared micromobility program in Mississauga, a combination of the **electric pedal-assist bicycle** and **electric kick-style scooters** are recommended. Providing two vehicle types is becoming more common in peer municipalities across North America. For example, the City of Hamilton will soon launch a privately owned and operated shared e-scooter system, alongside the existing publicly owned and privately operated bike share system.

Providing two vehicle types can make the shared micromobility program appealing to a larger number of users who can select a vehicle based on their preference and/or the characteristics of each trip (e.g. distance, purpose, time of day etc.). With snowy conditions in Mississauga during winter, it is also advantageous to provide two vehicle types.

If a private operator is engaged in the program, operating requirements outlining the need to provide both vehicle types can support this delivery.

Electric pedal-assist bicycles are recommended because:

- Due to the electric motor assistance, they enable longer distance trips more easily and are accessible to a wider range of users than other micromobility vehicle types. Providing micromobility vehicles suitable for longer distances is important for Mississauga as a lower-density city with more suburban land uses.
- They are currently allowed to operate on all cycling facilities and multi-use trails under the jurisdiction of the City of Mississauga and Region of Peel.
- Several deployments in peer cities indicate there would likely be market interest in providing this vehicle type.

Electric kick-style scooters are recommended because:

- They are the most common vehicle type provided by private operators due to the low cost, and numerous deployments in peer cities indicate there would likely be market interest in providing this vehicle type.
- By-law number 0036-2021 passed in Mississauga in February 2021 outlines all necessary regulation for e-scooter operation in the city, including where they can operate and who can use them.
- They are quickest to deploy and remove if necessary, making them suitable for a potential pilot program.

Every vehicle type has associated benefits and drawbacks. While some challenges exist for e-bikes and e-scooters relating to increased maintenance requirements, and reduced stability and potential impacts on vulnerable road users for e-scooters, strategies exist to mitigate these challenges. These strategies should be implemented during the planning, procurement, and implementation phase by outlining requirements in the operating agreement. Some options are discussed in Chapter 6, however a more in-depth analysis should be conducted in later stages of this project.

5.3 System and Governance Evaluation Framework

An evaluation framework was developed to assess potential system models and governance models. Five themes were outlined in consultation with City staff to form the foundation of the evaluation framework. These themes are:

- **Operational Risks:** Such as risk of not finding operators willing to adopt the business model, the risk of the service failing if an operator leaves, liability risk, financial risks, etc;
- **Ability to Meet Performance Objectives:** This covers metrics typically associated with measuring program success including membership uptake and growth, vehicle usage, operating costs and revenues, flexibility of service area, vehicle trip types;
- **Level of Administrative Overhead:** Such as City staff involvement required to manage program or enforce operating requirements; and
- **Accessibility and Quality of Service:** Refers to accessibility impacts to the broader community including improper parking/sidewalk riding, as well as access/accessibility for users of the program.
- **Suitability for a potential pilot program:** Based on characteristics ideal for a pilot program outlined in section 5.1, how suitable are the governance and system models for a pilot project?

Within these five evaluation themes, 13 factors related to system models and 13 factors related to governance models were developed and are described in sections 5.4 and 5.5. By outlining factors under the same themes, the evaluations of both system and governance models are comparable yet tailored to the unique considerations of each component.

5.4 System Model Evaluation Results

The system model evaluation factors are presented in Exhibit 5.3. The evaluation of the different system models against each factor is presented in Exhibit 5.4.

Exhibit 5.3: System model evaluation factors

Themes	System Model Factors
Operational Risks	• Level of infrastructure required to support the system model (physical and IT infrastructure) • Potential for damage and/or vandalism to vehicles • Operating requirements (re-balancing distribution across service area, maintenance)
Ability to Meet Performance Objectives	• Station typology (cost, potential breadth, number of vehicles, parking capacity, and speed of implementation) • Flexibility of the system model (ability to meet changing needs) • Equity considerations (ability to launch in areas with unmet transportation needs) • Data characteristics and information technology (ability to collect detailed trip information to inform future transportation initiatives)
Level of Administrative Overhead	• Level of enforcement required by City staff • Ease of integration with other modes of transportation to support a potential future Mobility as a Service platform (i.e. multi-modal integration)
Accessibility and Quality of Service	• Right-of-way encroachment including improper parking (addressing accessibility concerns, maintaining road and sidewalk clear zones) • Ease of renting the vehicle • Convenience of parking for users • Hierarchy of road users (e.g. prioritizing pedestrians and cyclists)
Suitability for a potential pilot program	• Low upfront financial investment, flexibility to adjust deployments based on feedback, and easy removal if necessary at the end of the pilot.

Exhibit 5.4: System model evaluation – operational risks

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Level of infrastructure required to support the system model (physical and IT infrastructure)	▼ High risk. Dock based systems require a significant amount of physical infrastructure and space within the right-of-way. IT infrastructure requirements are like other models.	▲ Low risk. Dockless systems require the least amount of physical infrastructure. IT infrastructure requirements are like other models.	— Medium risk. Hybrid systems require some physical infrastructure at designated locations. IT infrastructure requirements are like other models.
Potential for damage and/or vandalism to vehicles	— Medium risk. Damage and vandalism are easy to report at the docking stations. Hard to trace theft of a vehicle.	— Medium risk. Damage and vandalism are easy to report on the vehicle or through the app. Able to trace theft of a vehicle through GPS.	— Medium risk. Damage and vandalism are easy to report on the vehicle or through the app. Able to trace theft of a vehicle through GPS.
Operating requirements (re-balancing distribution across service area, maintenance)	▼ High risk. Rebalancing effort is high as docks have a limited number of spaces. Station maintenance is high, whereas vehicle maintenance is lower due to less technology on the vehicles.	— Medium risk. Rebalancing effort is lower since the number of spaces to park the vehicle is not limited by physical infrastructure. Little to no station maintenance (unless there are designated parking areas), and vehicle maintenance is high due to technology on the vehicles.	— Medium risk. Rebalancing effort is lower since the number of spaces to park the vehicle is not limited by physical infrastructure (e.g. user can park nearby if station is full). Limited station maintenance is required, and vehicle maintenance is high due to technology on the vehicles.

Exhibit 5.5: System model evaluation – ability to meet performance objectives

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Station typology (cost, potential breadth, number of vehicles, parking capacity, and speed of implementation)	▼ Highest cost system to implement, largely due to capital infrastructure costs. Parking capacity is limited to the station size. Slowest system to implement.	▲ Lowest cost system to implement due to limited physical infrastructure required for designated parking areas, if any. Parking capacity is more flexible. Fastest system to implement.	— Cost varies depending on the amount of physical infrastructure required for designated parking areas. Parking capacity is more flexible. Time to implement varies, depending on the physical infrastructure chosen.
Flexibility of the system model (ability to meet changing needs)	▼ Least amount of flexibility. Once infrastructure is installed, it is difficult and costly to adjust if needed (e.g. nearby construction).	▲ Greatest amount of flexibility. Adjustments to the service area or designated parking areas via geofencing are quick to implement depending on needs.	— Good amount of flexibility. Adjustments to the service area or designated parking areas are easy but require operators to physically move stations in some cases.
Equity (ability to launch in areas with unmet transportation needs)	▼ Due to the high capital cost, it may be difficult to launch in areas where ridership may be lower compared to other areas of the city.	▲ Dockless systems typically have a lower capital cost, leaving more funding for purchasing vehicles to be launched in areas with unmet transportation needs.	— Capital costs are typically lower than dock-based systems providing some opportunity to launch in areas with unmet transportation needs.
Data characteristics and IT (ability to collect detailed trip information to inform future transportation initiatives)	— Dock-based systems typically have origin-destination trip data, but no GPS data informing the City of the route chosen, limiting the ability to collect detailed trip information.	▲ Ability to collect detailed GPS trip information, including origin, destination, and route which can inform other transportation initiatives.	

Exhibit 5.6: System model evaluation – level of administrative overhead

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Level of enforcement required by City staff	▲ Parking is only allowed at designated stations, limiting the amount of enforcement required.	▼ Parking is typically allowed anywhere in the service area or at designated locations (no physical stations) which can lead to high levels of required enforcement.	▬ Parking is allowed at designated locations with physical stations or anywhere in the service area. A parking convenience fee typically deters people from parking improperly, limiting the amount of enforcement required.
Ease of integration with other modes of transportation to support a potential future Mobility as a Service platform	▲ Able to integrate into third-party travel planning apps (e.g. Transit, Google Maps) through the General Bikeshare Feed Specification (GBFS) or Mobility Data Specification (MDS).		

Exhibit 5.7: System model evaluation – accessibility and quality of service

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Right-of-way encroachment (addressing accessibility concerns, maintaining road and sidewalk clear zones)	▲ Parking is only allowed at designated stations, limiting right-of-way encroachment.	▼ Parking is typically allowed anywhere in the service area or at designated locations (no physical stations) which can lead to right-of-way encroachment. Can be mitigated through enforcement or virtual designated parking areas (i.e. parking areas designated by geofencing and enforced through artificial intelligence).	— Parking is allowed at designated locations with physical stations or anywhere in the service area (typically for an added fee). The added fee typically deters people from parking improperly, limiting the right-of-way encroachment.
Ease of renting the vehicle	▲ Users access and pay for the service at the station, through a mobile app, or using a member card/fob/code purchased online. Available without a smartphone.	— Users access and pay for the service through a mobile app, which can be easy for some users and difficult for others. Typically a smartphone is required. To provide equitable access, other options can be made available, but there are few examples.	▲ Users access and pay for the service at the station, through a mobile app, or using a member card/fob/code purchased online. Available without a smartphone.
Convenience of parking for users	▼ Parking is only allowed at designated stations which are easy to find and are in predictable locations. However, if a station is full then the user must travel to another station with an empty dock.	▲ Parking is typically allowed anywhere in the service area or at designated locations (no physical stations) which provides the most amount of convenience for users.	▲ Parking is allowed at designated locations with physical stations or anywhere in the service area (typically for an added fee) which provides the most amount of convenience for users.

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Hierarchy of road users (e.g. prioritizing pedestrians and cyclists)	▲ Stations are located outside of the pedestrian pathway (the clear zone) and cycling facilities, limiting any pedestrian or cyclist conflicts. Provides the most amount of predictability for those with accessibility needs.	▼ Risk of vehicles being left in restricted areas (e.g. pedestrian clear zone). Provides the least amount of predictability for those with accessibility needs.	— Stations are located outside of the pedestrian clear zone and cycling facilities, limiting any pedestrian or cyclist conflicts. However, option to park vehicles outside of stations leaves the risk of vehicles being left in restricted areas. Provides some amount of predictability for those with accessibility needs.

Exhibit 5.8: System model evaluation – suitability for a potential pilot program

Factors	System Models		
	Dock-based	Dockless	Hybrid (Docked & Dockless)
Suitability for a potential pilot program	▼ Significant level of infrastructure required to provide docks – high upfront investment for a pilot program and low flexibility to accommodate changes or potential program discontinuation.	▲ No new infrastructure is required making this the quickest, least expensive and most flexible option for a pilot program. Inexpensive materials such as paint can be used to indicate designated parking areas if that approach is taken.	— Some infrastructure required which may require upfront investment. Existing bike parking infrastructure can be utilized – added bike corrals can increase capacity and be repurposed for regular bike parking if the shared system discontinues.

Recommended System Model

The top performing system model per evaluation factor is summarized in Exhibit 5.9 followed by a description of the recommended system model for early stage implementation.

Exhibit 5.9: Top performing system model per evaluation factor

Evaluation Factor	Top Performing System Model
Operational Risks	Hybrid
Ability to Meet Performance Objectives	Dockless
Level of Administrative Overhead	Docked
Accessibility and Quality of Service	Hybrid
Suitability for a Potential Pilot Program	Dockless

In the early stages of a shared micromobility program in Mississauga, the **Hybrid System Model** is recommended. The hybrid system model enables a broader service area with less infrastructure and offers flexibility to users, while also minimizing operational risks relating to improper parking and high enforcement requirements.

The hybrid model provides designated parking locations, limiting right-of-way encroachment, while allowing users to park outside of that docking station when necessary, typically for a small fee. This provides the most benefits to the user, pedestrians, and cyclists by offering both the structure of a docked system that leads to more organization and less encroachment concerns, and the flexibility of a dockless system that can be more convenient for users. The hybrid system model requires some vehicle parking infrastructure (e.g. bike racks or e-scooter racks), and all micromobility vehicles to be equipped with a locking mechanism.

Every system model has associated benefits and drawbacks. For the hybrid system model, some challenges relating to improper parking may persist leading to increased enforcement requirements compared to a dock-based system. Strategies exist to mitigate challenges associated with a hybrid system model and should be implemented during the planning, procurement, and implementation phase by outlining requirements in the operating agreement. Some options are discussed in Chapter 6, however a more in-depth analysis should be conducted in later stages of this project.

5.5 Governance Model Evaluation Results

The governance model evaluation factors are presented in Exhibit 5.10. The evaluation of the different governance models against each factor is presented in Exhibit 5.11.

Exhibit 5.10: Governance model evaluation factors

Themes	Governance Model Factors
Operational Risks	• Inability to secure an operator • Failure due to loss of operator • Liability risk of the program (e.g. injury) • Information technology risk (i.e. ability to acquire data)
Ability to Meet Performance Objectives	• Level of ongoing financial commitment required from the City • Allows City influence on decision-making on operations and service expansion
Level of Administrative Overhead	• Level of City staff involvement required to manage program (FTEs) • Ease of integration with other modes of transportation to support a potential Mobility as a Service platform • Funding sources (e.g. government funding sources, sponsorship, permit fees, capital grants) • Enforcement of operating requirements and preventing right-of-way encroachment
Accessibility and Quality of Service	• Supports a consistent user experience throughout the city • Encourages regular technology and process improvements that increase efficiency and/or quality of service • Supports City's Strategic Plan Driver of Change "An Engaged and Energized Population"
Suitability for a potential pilot program	• Low upfront financial investment, flexibility to adjust deployments based on feedback and easy removal if necessary, at the end of the pilot.

Exhibit 5.11: Governance model evaluation – operational risk

Factors	Governance Models		
	Publicly Owned and Publicly Operated	**Publicly Owned and Privately Operated**	**Privately Owned and Privately Operated**
Inability to secure an operator	▲ Low risk. The City would be responsible for operations.	— Medium risk. There are few private operators available. Depending on the funding agreement, there is a risk of funding shortfalls for the private operator if operational costs are not covered by the City.	▲ Low risk. Ottawa is the only example in Ontario to officially pilot this model. However, other municipalities are exploring this model (e.g. Brampton) or a modified version of this model (e.g. Hamilton). There is industry interest to launch a program in Mississauga.
Failure due to loss of operator	▲ Low risk. The City would be responsible for operations.	— Medium risk. Service-provider contract typically includes penalties for early termination.	▼ High risk. The operator can abandon the program and take vehicles with them, even if there are penalties for early termination.
Liability risk of the program (e.g. injury)	— Medium risk. The City may assume more risk as the operator.	▲ Lower risk. Upon registering for the program, users sign an agreement that typically includes a liability waiver. The private operator may assume more of the risk.	
Information technology risk (i.e. ability to acquire data)	▲ Low risk. The City would be responsible for operations and have full access to data.	▲ Low risk. The City can require access to the data within the operating contract.	— Medium risk. The City can require access to the data within an agreement, however not all data may be shared (e.g. only aggregated data may be available).

Exhibit 5.12: Governance model evaluation – ability to meet performance objectives

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Level of ongoing financial commitment required from City	▼ City is responsible for the high capital costs to purchase vehicles and equipment to support operations.	— City is responsible for the high capital costs to purchase the vehicles and related equipment. However, operational costs could be partially or fully subsidized by the operator.	▲ The City would not be responsible for any capital or operating costs. Often, municipalities can charge fees for private organizations to operate their program.
Allows City influence on decision-making on operations and service expansion	▲City has high influence as the owner and operator of the program.	▲ City has high influence as the client in a service-provider relationship with operator.	— The City influences the operation of the program through permit terms but has less direct control.

Exhibit 5.13: Governance model evaluation – level of administrative overhead

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Level of City staff involvement required to manage program (FTEs)	▼ Would require the highest level of staff involvement to own and operate the program.	▲ Experience in other cities suggests less than 1 FTE to manage the contract.	▲ Experience in other cities suggests less than 1 FTE to manage the contract.

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Ease of integration with other modes of transportation to support a potential Mobility as a Service platform	▲ Lowest barrier to integration as the City is the operator.	— Only one operator is involved but can be required to share data with a future platform via an agreement. Not-for-profit may be less able to invest in technology upgrades to integrate.	— Operators can be required to share data with a future platform via an agreement, however it can be more difficult to coordinate with multiple companies.
Funding sources	▼City can arrange funding from tax or non-tax based sources and sponsorship.	— City can arrange funding from tax or non-tax based sources and sponsorship. A not-for-profit operator may also be eligible for grants. Funding required is high.	▲ The program would be privately funded, requiring minimal funding from the City that can be off-set with permit fees.
Enforcement of operating requirements and preventing right-of-way encroachment	▼ Enforcement is the responsibility of the City. Updates to associated enforcement regulations would be required.	— Enforcement is typically the responsibility of the operator. Operating agreement typically outlines enforcement terms with penalties.	— Enforcement is typically the responsibility of the operator with an agreement outlining enforcement terms with penalties.

Exhibit 5.14: Governance model evaluation – accessibility and quality of service

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Supports a consistent user experience throughout the city	▲ Most consistent since a single operator (the City) works toward specific performance metrics.	▲ Most consistent since a single operator works toward specific contract terms.	— Inconsistency is expected with multiple operators using different apps/ processes. However, overall regulations/allowances (e.g. where the vehicles can ride) would be consistent.

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Encourages improvements that increase efficiency and/or quality of service	— May be less able to invest in improvements that have high up-front costs unless additional funding is identified.	— Large for-profits could bring cost savings from other cities but fixed contract may impact incentives. Not-for-profits may not be able to invest in improvements.	▲ Competitive environment could drive improvement.
Supports Strategic Plan Driver of Change "Engaged and Energized Population"	▲ High engagement and participation possible since the City is responsible for operating the service.	— Some engagement as City could require community participation in planning/running the service through contract.	— Low engagement and participation as operators generally only accountable to own interests. Can be mitigated by involving the community in the system planning process.

Exhibit 5.15: Governance model evaluation – suitability for a potential pilot program

Factors	Governance Models		
	Publicly Owned and Publicly Operated	Publicly Owned and Privately Operated	Privately Owned and Privately Operated
Suitability for a potential pilot program	▼ Significant upfront investment in vehicles, staff and potentially infrastructure would be necessary from the City.	▼ Significant upfront investment in vehicles and potentially infrastructure would be necessary from the City.	▲ No upfront investment is required from the City for a privately owned and operated model. Easy to remove program if it is discontinued.

Recommended Governance Model

The top performing system model per evaluation factor is summarized in Exhibit 5.16 followed by a description of the recommended system model for early stage implementation.

Exhibit 5.16: Top performing governance model per evaluation factor

Evaluation Factor	Top Performing Governance Model
Operational Risks	Publicly Owned & Publicly Operated
Ability to Meet Performance Objectives	Publicly Owned & Privately Operated
Level of Administrative Overhead	Privately Owned & Privately Operated
Accessibility and Quality of Service	Publicly Owned & Publicly Operated
Suitability for a Potential Pilot Project	Privately Owned & Privately Operated

In the early stages of a shared micromobility program in Mississauga the **Privately Owned and Privately Operated** governance model is recommended. This governance model significantly reduces start up costs to the City which is especially beneficial if a pilot program approach is used. Using this model, the shared system could potentially operate on a cost-recovery model if fees are charged to the operator.

Every governance model has associated benefits and drawbacks. For privately owned and operated systems, there is potential for challenges relating to securing and retaining an operator, and presenting a consistent user experience across multiple operators. However, strategies exist to mitigate challenges associated with a privately owned and operated micromobility program and should be implemented during the planning, procurement, and implementation phase by outlining requirements in the operating agreement. One approach is to use a permit system that enables the City to outline the requirements of a desired micromobility program, retaining some control over how the program would operate. This and other options are discussed in Chapter 6, however a more in-depth analysis should be conducted in later stages of this project.

6 Initial Implementation Considerations

Moving into implementation planning presents the opportunity to further refine program requirements in collaboration with the public and stakeholders, and identify strategies that optimize benefits and mitigate challenges.

While implementation planning will be covered in a future phase of the City of Mississauga Micromobility Project, this chapter discusses some initial options and considerations that should be investigated in more detail.

6.1 Early-stage Implementation

Pilots are an effective approach to implementing new city-building initiatives that involve uncertainty. Micromobility is a new service that makes use of technologies that are rapidly changing. To mitigate the risks associated with these new technologies, many peer municipalities are deploying micromobility systems on a pilot basis in a controlled manner.

A shared micromobility pilot would help the City gauge level of interest, gather data, test deployments, and determine the extent to which shared micromobility contributes to transportation and broader city-building goals. Should this strategy be pursued, there are numerous considerations that can help lead to a successful pilot program. These include:

- **Service area:** An initial service area should balance the need to cover a sufficiently large area to be beneficial to users, while simultaneously operating at a scale that permits effective management of local operational considerations for a brand new system. As noted in section 4.1, a typical initial service area for pilot programs in Canada is approximately 10 km^2.
- **Number of vendors and fleet size:** Careful consideration should be placed in determining the maximum number of vendors that are able to participate in the pilot program and the number of vehicles they are permitted to supply. Placing a limit on the number of vendors and vehicles can help prevent overwhelming an area with micromobility vehicles and reduce the chance of financial failure of an operator. Most Canadian pilots to date have been run with either two (Calgary) or three (Ottawa) vendors.
- **Duration:** Micromobility pilots in Canada are commonly conducted on a one-year cycle, enabling evaluation and improvements from one year to the next. For example, the City of Kelowna has released four

versions of their Micromobility Permit Program[11] guidelines, each time sharing the evolution of the program with the public by highlighting additions/adjustments using coloured borders. This process clearly illustrates that the pilot model has enabled Kelowna to improve the shared micromobility program over time in response to feedback.

- **Performance monitoring:** Effective monitoring is essential during a pilot as it can help the City make improvements and test different options. Monitoring can also help determine whether moving into a more continuous program is desirable. A monitoring program should collect benchmarking data before the pilot and then collect information on the uptake of the service in different areas, impacts on the transportation system as a whole and the travel behaviour of shared micromobility users.
- **Consultation and Feedback:** In addition to monitoring the performance of the micromobility system, ongoing consultation with the system's users, the general public, and key stakeholders (including city operations staff) will help ensure that the implementation of the pilot is effectively serving the community with minimal negative impact. In particular, ongoing consultation with persons with disabilities and/or the City's Accessibility Advisory Committee should be pursued to ensure that the shared micromobility system does not impede the use of the road right of way.

6.2 Permit and Contractual Considerations

If the City chooses to engage companies who would privately own and operate shared micromobility services, one of the most important implementation considerations will be determining the details of the permit system or contract governing the operation of the services.

A permit system can be employed to provide clear guidelines within which the service providers must operate. Permits are also an important tool available to address challenges associated with vehicle types, system models, and governance models. Guidelines for operating can be included in a contractual model in order to shape the service in a manner that supports the City's objectives and interests.

These considerations can include:

[11] Kelowna's Micromobility Permit Program guidelines can be accessed here: https://www.kelowna.ca/sites/files/1/docs/micromobility_permit_program_-_version_1.4.pdf

- **Rebalancing requirements:** Rebalancing vehicles ensures an adequate number of vehicles are available across the system. For example, Capital Bikeshare sets a service standard that no station may remain full or empty for more than 3 hours between 6 a.m. and midnight. Staff may fill or empty stations late at night in anticipation of rush hour demand. The rebalancing standards have a direct relationship to the cost of operations.
- **Fleet Deployment:** At any given time, a percentage of the system's fleet will be out of service due to maintenance. Deployment standards determine what proportion of the fleet must be active at any one time. Requirements may be reduced in the winter due to lower demand and fleet management strategies.
- **Inspection and Maintenance:** Agreements can stipulate how often vehicles and stations are inspected. Capital Bikeshare requires that vehicles are inspected and maintained at least every 30 days. Maintenance schedules may vary depending on the intensity of use in the program.
- **Customer Service Standards:** Contracts can stipulate quality of service standards, including call centre wait times and customer service satisfaction ratings. Standards may stipulate that telephone operators are available in more than one language if required by City standards.
- **Enforcement Roles and Responsibilities:** It is vital for the permit or contract to outline the roles and responsibilities of the operator and of the City in relation to enforcement. Many peer cities allocated much of the enforcement to the operator through the agreements. For example, in Ottawa, operators must have a reporting hotline by phone, email and through the app where users and members of the public can report improperly parked vehicles. The operator must respond to the mis-parked vehicle within one hour. Every vehicle has a printed number on it to identify the vehicle and the company's contact information.
- **Sidewalk Riding Detection and Disincentives:** Permitted operators for motorized micromobility vehicles can be required to have sidewalk riding detection on the vehicles, and issue automated warnings or fines to riders when a significant amount of a trip is spent on a sidewalk. This is done in Kelowna. Data sharing requirements can also be stipulated, including the locations where sidewalk riding is taking place.

- **Support for Equity Programs:** Permitted operators can be required to offer a discounted option to support low income residents. If another equity program is in place, being run by a contracted operator, permitted operators can be required to:
  - Accept payment media that the other equity program may provide directly to users;
  - Support a defined number of the equity program's outreach initiatives per year; and
  - Pay a direct equity fee to the equity program to support the longevity of the program.
- **New Rider Safety Program:** Permitted operators can be required to put limitations on riders' first trips such as speed reductions on motorized vehicles and thorough descriptions of rules to get new riders used to using micromobility vehicles.
- **Education Programs:** Permitted operators can be required to provide educational content on micromobility rules to users through available avenues, such as the app, public education campaigns, and through safety education events.
- **Insurance and Indemnification Requirements:** Permitted operators can be required to obtain and maintain liability insurance that meets City requirements for the term of the permit. The permitted operator may also be required to indemnify the City.

Penalties up to and including revoking an operator's ability to deploy in Mississauga should be included for if permit or contractual requirements are not met. Methods of enforcement vary depending on a city's tolerance, and approaches are evolving as the industry matures. For example, Montreal took a strict enforcement approach to parking and safety during their 2019 e-scooter program, resulting in the program being discontinued after a single year. Montreal does, however, have a publicly owned bike share system as an alternative. Ottawa faced similar parking issues in the first year of e-scooter operations. In the second year of operations, the City introduced a single-step enforcement mechanism where improperly parked scooters from all operators could be reported, and operators would have to clear the scooter within an hour, or risk a fine. Ottawa's system has been continued and expanded into a third year.

6.3 Regional and Multimodal Integration

Supporting proper integration with the Region of Peel, bordering municipalities, and the transit services available in Mississauga (e.g., MiWay, GO Transit) will be essential when planning implementation of a shared micromobility program.

While implementing a shared micromobility program in Mississauga is within the City's jurisdiction, the system's users will interact with Region of Peel infrastructure and may travel to other jurisdictions. Considerations for interacting with regional infrastructure and neighbouring jurisdictions are discussed in this section.

Micromobility also provides an opportunity to enhance local and regional transportation by providing a convenient first and last mile connection to transit services. Considerations for interfacing with MiWay and GO Transit based on industry best practices are key in implementation planning. Initial considerations are presented in this section.

Use of Region of Peel Facilities

Peel Region roads are an important part of Mississauga's road network; however, travellers use Mississauga's road network without considering which entity has jurisdiction over a particular road. For micromobility users, having access to all allowable facilities in the system's service area leads to a consistent and understandable user experience.

Crossrides are dedicated spaces on Peel region roads for cyclists to safely cross without having to dismount. They are currently the only active transportation facility in Mississauga under Region of Peel's jurisdiction that has implications for a shared micromobility program. The Region of Peel has confirmed that the micromobility vehicles will be allowed on cross-rides with an impending update to the relevant by-laws.

There are no implications for multi-use trails or regional roads. Currently, all multi-use trails located along regional roads are owned by the City and are therefore regulated under City by-laws. E-scooters are not allowed to operate on roadways with a speed limit over 50 km per hour, resulting in the disallowance of e-scooters to be used on regional roadways unless specific facilities are provided.

Use in Bordering Municipalities

The City of Brampton recently announced an e-scooter pilot program which, at the time of writing, is in the procurement phase. Once the operators of the pilot program are selected, the City of Mississauga should work with the City of

Brampton to determine if the pilot will be operating near the Mississauga and Brampton border and identify if there are opportunities for collaboration.

E-scooters have not been prohibited in the City of Toronto. In the Town of Oakville, Town of Milton, and Halton Region, there have been no by-laws passed allowing or preventing shared or personal e-scooters on active transportation facilities in these jurisdictions. The operators of any City program could utilize geofencing technology to prevent shared e-scooters from traveling to surrounding municipalities, and limit the operation of the vehicles to the service area.

Should the City allow users to travel outside of the service area (or there is no geofencing technology available to prevent users from doing so), it is recommended that the operating and user agreement include a clause that would require the user to return the vehicle to the service area, or they would have to pay an “out-of-system fee.”

Integration with Transit

Integrating shared micromobility with transit is an opportunity to maximize the benefits of both services. Micromobility is an ideal first and last mile solution for longer distance transit trips, particularly those that use higher order transit like the Mississauga Transitway and GO Rail.

Interfacing with transit brings challenges related to service and fare integration. For a hybrid system, the City would ideally coordinate with MiWay and Metrolinx to authorize the parking of vehicles at docks or on the sidewalk at the transit agencies’ facilities to make transfers between the systems convenient. The City could alternatively identify municipally controlled locations around transit stops for parking stations.

Bike Share Toronto intentionally deploys new stations around TTC subway stations as it expands its service area beyond the downtown core. This strategy allows for seamless transfers to Bike Share in areas outside of the downtown core, where origins or destinations may be further away from subway stations. An example of this integration is presented in Exhibit 6.1.

Exhibit 6.1: Bike Share Toronto dock located at TTC's St. Clair subway station

Source: Google Maps Streetview

To integrate with the regional transit system, micromobility stations in Hamilton and Toronto are located at GO Stations within the micromobility service area. Stations are located close to the entrance of the transit station, in the parking lot, or within a designated area in an open space, like a short-term bicycle parking rack (Exhibit 6.2 and Exhibit 6.3).

The operation of micromobility vehicles on MiWay and Metrolinx property should follow the same regulations as the City of Mississauga and the Region of Peel, creating a consistent user experience. Users would not be able to operate micromobility vehicles on sidewalks or any passenger waiting areas (e.g. terminal platforms and pedestrian landing pads), and operators can use detection and geofencing technology to mitigate the use of micromobility vehicles in prohibited areas. Further collaboration with both MiWay and Metrolinx during the implementation planning phase will be critical to ensure a successful deployment.

Exhibit 6.2: Toronto Bike Share station at Long Branch GO Station

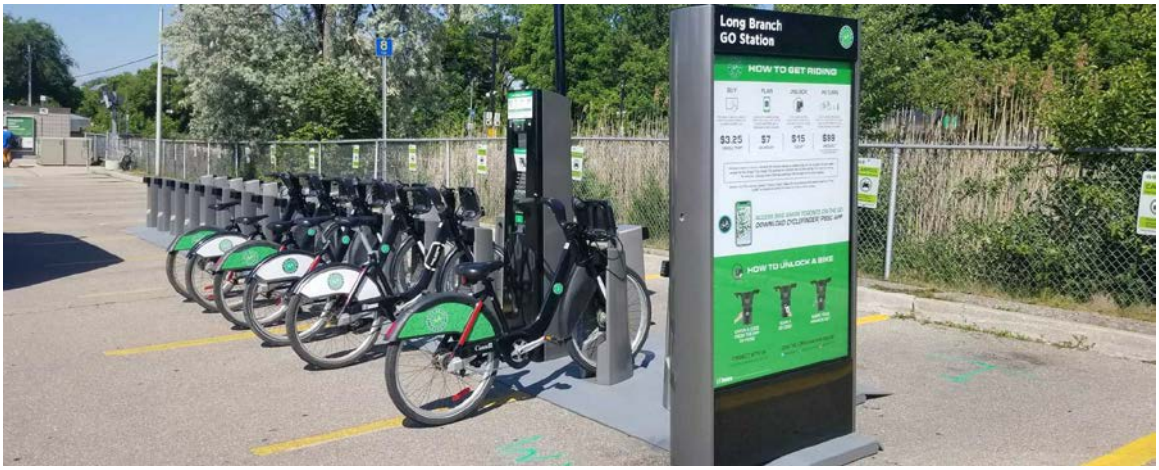


Photo: Metrolinx

Exhibit 6.3: Hamilton Bike Share station at West Harbour GO Station

Integrating fares between micromobility and transit service is a barrier to system integration. Transit and micromobility programs are typically governed and financed separately, resulting in legislative and administrative barriers to integrating user fares.

Locally, fare integration has started in Toronto. Bike Share Toronto members that use PRESTO are eligible for a 30% discount on an annual membership, incentivizing users to transfer between the services. This is one benefit of a publicly-owned system. Similarly, in Los Angeles County, the LA Metro owns the county's bike share system and offers discounts for users of the agency's smart card.

6.4 Modal Split Forecast and Impact Analysis

If implemented, micromobility will be a part of Mississauga's broader transportation system. As such, as part of implementation planning, it is important to consider the impact that micromobility may have on other modes of transportation. The same assumptions for analysis purposes (as described in 4.1) were used for the modal split forecast and impact analysis.

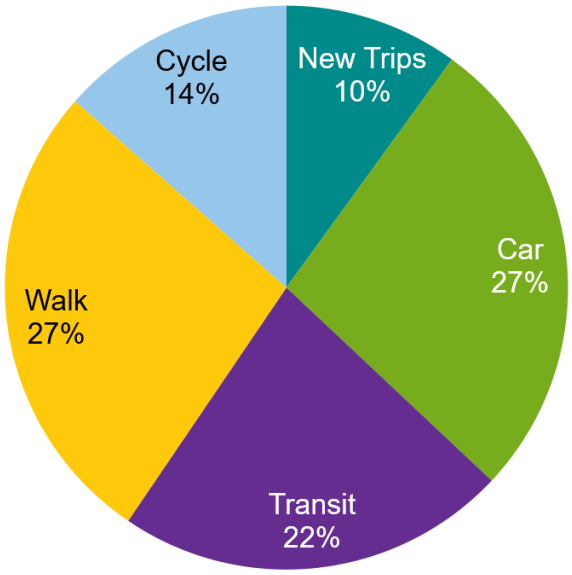
A shared micromobility program will impact travel demand and behaviour by both replacing trips that currently use other modes and by generating some new trips that would have otherwise not been made. Based on analysis of peer systems, 10% of shared micromobility trips are estimated to be new trips, with the remaining 90% diverted from other modes in the following ratios[12]:

- **27% of diverted trips from auto modes**, including driver, passenger, taxi, and ride-hailing;
- **27% of diverted trips from walking**, though micromobility trips will have a walk component to access the vehicle and final destination;
- **22% of diverted trips from transit,** though micromobility users may connect with MiWay and GO Transit for longer distance trips; and
- **14% of diverted trips from cycling**, using a privately-owned bike.

The breakdown of where shared micromobility trips will come from is shown in Exhibit 6.4.

[12] Expected trip generation and diversion rates are informed by the experiences of the Cities of Calgary, Ottawa, and Montreal after implementing shared micromobility programs.

Exhibit 6.4: Breakdown of previously used modes for predicted micromobility trips



With an initial service area of 9 km^2, the total number of trips made by micromobility would be less than 0.1% of total annual trips originating in Mississauga by all modes.[13] While some trips are diverted from other sustainable modes, the number of trips diverted is negligible at the city-scale. Further, with proper integration of shared micromobility and transit services, there is a potential for transit use to increase as a result of the program.

If the service area is expanded, a similar analysis should be conducted to understand potential impacts and ensure the City's policy objectives are being advanced.

[13] Transportation Tomorrow Survey, 2016

7 Community and Stakeholder Consultation Summary

Engagement for this study focused on gathering information from the community and stakeholders on their needs, wants and concerns relating to shared micromobility. This input has informed the recommendations on vehicle types, and the system and governance models.

This chapter describes the community and stakeholder engagement activities and key findings related to each. More details are presented in Appendix A.

7.1 Community Consultation

There were three main opportunities for community members to engage in Phase 1 of the Mississauga Micromobility Project:

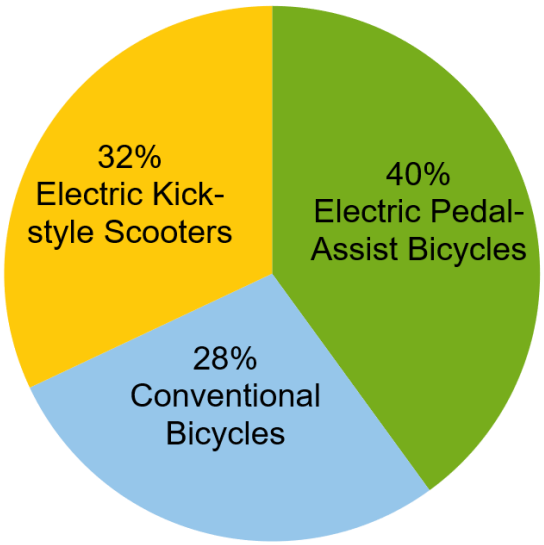
- **YourSay Mississauga** – This webpage on Mississauga's consultation website introduces shared micromobility systems to the public. In addition to describing opportunities to get involved, it provides information on the project, background, timelines, answers to frequently asked questions and additional resources for more information. The YourSay Mississauga page was launched February 28, 2022 and received approximately 2,400 views.
- **Online Community Meeting** – This event, hosted virtually on March 8, 2022, invited the community to engage directly with the project team, ask questions, and share feedback. A presentation provided an overview of the study scope, vehicle types, and system and governance models, and was followed by a question and answer period and breakout rooms with smaller groups. Participants provided feedback verbally and through the chat function during the meeting. The event attracted 35-40 attendees.
- **Online Survey** – The online survey was open from March 1 to March 25, 2022 and included 10 questions on travel behaviours, micromobility preferences, and key focus areas/considerations for the project team. The online survey received 602 responses.

Key Findings – Community Consultation

Key takeaways across all community consultation include:

- There is broad support for the introduction of a shared micromobility system in Mississauga, including 75% of survey respondents indicating they would use the service.
- The biggest concerns relate to sidewalk riding and improper parking negatively impacting vulnerable road users, including members of the disability community.
- Support for all vehicle types is prevalent, however survey responses indicate the highest interest in e-bikes followed by e-scooters and conventional bicycles, as shown in Exhibit 7.1.

Exhibit 7.1: Vehicle type preferences from survey respondents



7.2 Stakeholder Consultation

Internal Stakeholders

Internal consultation consisted of two groups: the Core Project Team and Steering Committee. Stakeholders from these two groups provided critical input to the study and ultimately helped shape the recommendations. Further details of these meetings are provided in Appendix A.

- The **Core Project Team** consisted of City staff representing various interests within Transportation and Works and other departments, including Active Transportation, Information Technology, Traffic, Finance, Risk Management, Transportation Infrastructure Management, and MiWay. This group was engaged three times over the course of the study and were invited to provide feedback at project kick-off, after the completion of draft alternatives screening, and following the development of draft recommendations.
- The **Steering Committee** consisted of senior leadership including the Director of Infrastructure Planning and Engineering Services, Director of MiWay, Director of Enforcement, the City Solicitor, and the Senior IT Manager of Enterprise Business Solutions. This group was engaged for strategic direction towards the conclusion of the study.

External Stakeholders

Consultation with external stakeholders occurred through two main channels: the Technical Advisory Committee and deputations to six advisory committees to Council.

- The **Technical Advisory Committee** (TAC) consisted of representatives from the City of Mississauga project team, other representatives from the City of Mississauga, and staff representing Metrolinx, Peel Region, City of Toronto, Town of Oakville, City of Brampton, Town of Caledon, University of Toronto Mississauga, and Sheridan College. The TAC was engaged in a virtual meeting on January 19, 2022 during which the project team presented information about the study scope, fundamental background information about micromobility, and an overview of the study's evaluation framework. Following the presentation, TAC members were invited to participate in a break-out discussion.
- The project team made deputations to five **Advisory Committees of Council**, providing background information about shared micromobility, the scope of the Phase 1 study, and the draft screening framework. Following each presentation, committee members were

given the opportunity to ask questions and give feedback about shared micromobility and the Phase 1 study. Deputations were made to the following advisory committees:

- Cycling Advisory Committee (Micromobility Subcommittee) – November 30, 2021
- Road Safety Committee – December 7, 2021
- Accessibility Advisory Committee– January 5, 2022
    - Accessibility Advisory Committee (Accessible Transportation Subcommittee) – January 17, 2022
- Traffic Safety Council – January 26, 2022
- Environmental Action Committee – March 1, 2022

Key Findings – Stakeholder Consultation

Key takeaways across all stakeholder consultation include:

- The safety of all road users—and particularly vulnerable road users—is paramount. Operation of a shared micromobility program should ensure that pedestrians are safe and that penalties are in place for unsafe behaviour. Education programs can help improve safety outcomes and compliance with regulations.
- The design and implementation of any future micromobility system must not create any additional barriers to persons with disabilities or the broader community.
- Identification of a service area should consider the variety of travel markets that could potentially use the service. Post-secondary students, members of low-income households, new Canadians, and tourists were all specifically highlighted by stakeholders as potential users.
- The City should ensure that the operators are working in the best interest of the city through operating requirements and agreements. This could include the use of technologies, vehicles, operating regulations, and other means to ensure the system does not negatively affect travel in Mississauga. Micromobility vehicle “cluttering” was specifically articulated as a concern to be mitigated.
- Ongoing internal and external coordination will be crucial to ensure a successful roll-out of a shared micromobility system.

8 Key Findings and Recommendations

A shared micromobility program in Mississauga presents an opportunity to address policy objectives in several City plans by increasing travel options, improving connections to public transit, and promoting active transportation. This report identifies and screens different alternatives for a shared micromobility program with the aim of advancing such a program in Mississauga.

8.1 Key Findings

- City of Mississauga policies are supportive of shared micromobility.
- There are many examples of North American cities with similar characteristics to Mississauga that operate shared micromobility systems.
- Micromobility is a new service that makes use of technologies that are rapidly changing. To mitigate the risks associated with these new technologies, many local governments that are deploying micromobility systems are doing so on a pilot basis.
- Different types of micromobility vehicles have different benefits and drawbacks. Conventional bicycles are common and can be comfortably ridden by a large segment of the population. Electric pedal-assist bicycles are similar with added propulsion assistance requiring less effort from the user, but are expensive to procure and operate. Electric kick-style scooters are the most easily deployed, but as a new vehicle type, they are less familiar to users and have been associated with public realm challenges in peer cities.
- Privately owned and operated programs are the least expensive upfront and on-going. Publicly owned systems, whether publicly or privately operated, require high upfront investment from the City and high annual operating subsidies. Private operation of a publicly owned system is expected to achieve some efficiencies.
- Under the privately owned and operated model, permit fees can be set to offset City expenses, potentially leading to full cost recovery.
- Based on the experience of peer Canadian cities, approximately 90% of shared micromobility trips would have been made by other modes of travel, with the remaining 10% being newly generated trips. However, at a scale typical of an initial service area, the number of micromobility trips is small relative to total trips and would have a

negligible impact on other modes such as transit ridership. Key benefits instead relate to increased choice for short-distance trips.

- The public and stakeholders are generally supportive of shared micromobility, with 75% of survey respondents indicating they would use a shared micromobility service.
- Any future deployment of a micromobility service will need to address the needs of vulnerable road users and people with disabilities. Measures to address these needs could include technology to limit sidewalk riding, parking enforcement, and education and incentive programs delivered by service providers.

8.2 Recommendations

- **Begin with a pilot program:** Pilots are commonly used by cities deploying shared micromobility to monitor and adjust their programs to maximize benefits and minimize risks. These adjustments could include, for example, new vehicle types, alternative service areas, different enforcement measures, or alternative system and governance models. A monitoring program should include a series of indicators based around the evaluation factors presented in this report. The vehicles, system model and governance model recommendations outlined in this report are specifically intended for early-stage pilot implementation and could be revisited after the pilot period has concluded.
- **Pursue a privately owned and operated governance model in the near term:** This model reduces upfront investment required from the City and enables easier and less expensive program closure if the pilot is unsuccessful. There is significant market interest in providing this type of service in Mississauga, and peer experience suggests it could be provided at no net cost to the City. Following the pilot, the City may elect to take on additional control in service provision through a public ownership model should the additional costs of this approach be deemed worthwhile.
- **Require pilot service providers to supply both electric kick-style scooters (e-scooters) and electric pedal-assist bicycles (e-bikes):** E-bikes and e-scooters offer different benefits to a shared micromobility program—offering two vehicle types provides users with more choice and is likely to appeal to a larger number of people. Electric pedal-assist bicycles are designed for stability and comfort, suitable for riders of any skill level, while e-scooters require the lowest

level of effort and are the lowest-cost vehicle type. Both vehicles are offered by several companies providing services in Canada.

- **Adopt a hybrid system model in the near term:** The hybrid system model—a blend of docked and dockless models—provides a structured arrangement that mitigates challenges associated with a dockless system while providing flexibility to users and lower upfront infrastructure costs. While the provision of private e-scooters has traditionally been provided via the dockless model, there is a growing trend towards the provision of locks to facilitate a hybrid model. The City can also encourage docking and parking compliance in the form of incentives and enforcement agreements with operators.
- **Continue to collaborate with the community and industry:** Ongoing feedback from members of the public will be essential to ensuring that the pilot aligns with the community's needs. Simultaneous engagement and liaising with micromobility service providers will ensure that operator interests are aligned with the City's planning and operational goals.

Appendix A – Additional Details on Community and Stakeholder Consultation

This appendix describes community and stakeholder engagement activities and results in more detail. It begins with community consultation, followed by stakeholder consultation.

Community consultation included:

- YourSay Mississauga page
- Online Community Meeting
- Online survey

Stakeholder consultation included:

- Internal stakeholders
    - Core Project Team
    - Steering Committee
- External stakeholders
    - Technical Advisory Committee
    - Advisory Committees of Council
        - Cycling Advisory Committee
        - Accessibility Advisory Committee & Accessibility Transportation Subcommittee
        - Road Safety Committee
        - Traffic Safety Council
        - Environmental Action Committee

Community Consultation Summary

YourSay Mississauga Page

This webpage on Mississauga's consultation website introduces shared micromobility systems to the public. The YourSay Mississauga page was launched February 28. The webpage included descriptions of:

- The overall project
- The background
- A description of opportunities to share feedback
- The timeline of the project
- Links to reference documents
- Answers to frequently asked questions
- Links to related projects
- Links to news releases about the project
- Contact information for the City of Mississauga project contact.

In addition to describing the opportunities to get involved, it provides information on the project, background, timelines, answers to frequently asked questions and additional resources for more information. A preview of the YourSay Mississauga webpage is shown in Exhibit 8.1.

Exhibit 8.1: YourSay Mississauga shared micromobility webpage preview

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Introduction to Shared Micro-Mobility Systems

About the project

The City is currently studying how a shared program of publicly available bicycles, electric bicycles (e-bikes) or electric scooters (e-scooters) could be used for travel in Mississauga.

Micro-mobility devices like bikes, e-bikes and e-scooters are transportation alternatives to vehicles that are lightweight, low-emission and help connect residents to their transit stop or destination. In Mississauga, a shared micro-mobility system could support the city's greater transportation system, helping residents connect to the Hurontario LRT, the Mississauga Transitway, the active transportation network and key tourism destinations like Port Credit, Streetsville and Downtown Mississauga.

The City is working to define a micro-mobility system that suits Mississauga's needs and size. This includes examining:

- the feasibility of the system based on of regional integration
- operations and governance models
- financial viability
- strategic fit
- other economic benefits and deliverability

Background

In February 2021, the City of Mississauga updated its Parks By-law, Transit By-law and Traffic By-law as part of an **interim e-scooter strategy** to regulate where personally-owned e-scooters could be operated in Mississauga.

Currently, personally-owned e-scooters can be operated on public roadways with a posted speed limit of 50 km/h or less and on cycling infrastructure, including bike lanes and multi-use trails along roadways.

The purpose of the interim e-scooter strategy was to get feedback from the community on the use of e-scooters in the city, and for staff to use this feedback to help inform whether a shared micro-mobility system should become part of Mississauga's transportation system in the future. The City's **Transportation Master Plan** recommends that a shared system of bikes, e-bikes or e-scooters be created in Mississauga.

Have your say

Get involved and share your thoughts! Your feedback will help the City determine the best way to introduce a shared micro-mobility system so that that it supports Mississauga's greater transportation system.

Opportunities to participate

- **Online community meeting: Tuesday, March 8 at 6:30 p.m.**
- **Online survey**

Key dates

Introduction to Shared Micro-Mobility Systems Online Community Meeting
08 March 2022

Timeline

Phase 1: Research and Recommendations

- Review the various micro-mobility system options and make recommendations to Council on which to pursue
- Review will include governance, ownership, device type, service area, etc. The feedback from the E-Scooter Pilot will inform recommendations from this phase

Phase 2: Implementation and Business Planning

- Develop comprehensive business and implementation plans to introduce shared micro-mobility services to Mississauga.

Documents

- Phase 1 Public Open House Presentation
- Corporate Report: Micromobility Program Update: Phase 1 - Visioning and Interim E-scooter Strategy
- Parks By-law

Online Community Meeting

This event was hosted virtually on WebEx on March 8, 2022 and attracted 35-40 attendees. It invited people to engage directly with the project team to ask questions and share feedback. A presentation was provided giving an overview of the study scope, vehicle types and system models and the evaluation framework. Attendees were then provided the opportunity to ask question during the question and answer period. A facilitated discussion took place at the end of the event in breakout rooms with smaller groups – the following questions were asked:

- What system model makes the most sense for Mississauga and why?
- Which vehicle type would you prefer to use and why?
- Is there anything missing from the evaluation framework?

Participants provided feedback verbally and through the chat function during the meeting. The event was promoted on the YourSay Mississauga webpage and on Mississauga's social media (an example is shown in Exhibit 8.2).

Key takeaways included:

- Most participants were supportive of a shared micromobility system in Mississauga whether they would use it or not
- Across all participants there was interest in all vehicle types however individuals often preferred a specific vehicle for a variety of reasons (comfort, familiarity, speed, novelty, etc.)
- Concerns were raised about sidewalk riding and improper parking impacting the public realm and particularly the disability community, as well as the role of a shared micromobility system in a lower density city like Mississauga.

Exhibit 8.2: Example social media post promoting the online community meeting

Online Survey

The online survey was conducted between March 1 and March 25, 2022. It included of 10 questions soliciting feedback on travel behaviours, micromobility preferences and key focus areas/considerations for the project team. The online survey received 602 responses. A summary of key findings from the survey is listed below followed by descriptions of responses to each question.

- 75% of respondents indicated they would use a shared micromobility program, citing leisure and fun, convenience, errands, and connecting to public transit as the most common reasons;

- Those that indicated they would not use the system primarily cited the service would not meet their travel needs or they were generally uninterested – very few respondents expressed opposition to a shared system;
- Nearly 70% of respondents used a personal vehicle as their most frequent mode of transportation;
- Personal micromobility devices (including bicycles) were owned by about half of respondents;
- Respondents would like to see accessibility and equity built into the shared micromobility program in the form of discounted passes for low-income individuals and service requirements for priority neighbourhoods;
- Downtown Mississauga was strongly preferred for early implementation;
- The enforcement of regulations was a top concern, specifically citing riding and parking of dockless devices on sidewalks; and
- Respondents supported the installation more dedicated micromobility infrastructure and maintenance of existing infrastructure in the winter.

Q1 – Overall, which mode of transportation do you use most often?

Respondents were asked to select the transportation mode they used most frequently. The top selection was personal vehicles (69%) followed by local bus service (13%), walking (7%) and biking (6%). Other modes including micromobility devices, GO transit, car share, and ride hailing were used by the remaining 5% of respondents.

Q2 – In a typical week, which modes of transportation do you use?

Respondents were asked to select all modes they typically use in a given week.

Most respondents (81%) used a car at least once per week. Other common modes of transport included:

- Walking (58%);
- Biking (31%);
- Local transit (28%); and
- GO Transit (20%).

Q3 – Do you own a personal micromobility device?

Respondents selected 'yes' or 'no' to this question. Results included:

- 52% stated that they do own a personal micromobility device, including electric kick-style scooter, pedal-assist bicycle, or conventional bicycle; and
- 48% did not own any micromobility vehicle.

Q4 – Would you use a shared micro-mobility program?

Respondents selected 'yes' or 'no' to this question. Result included:

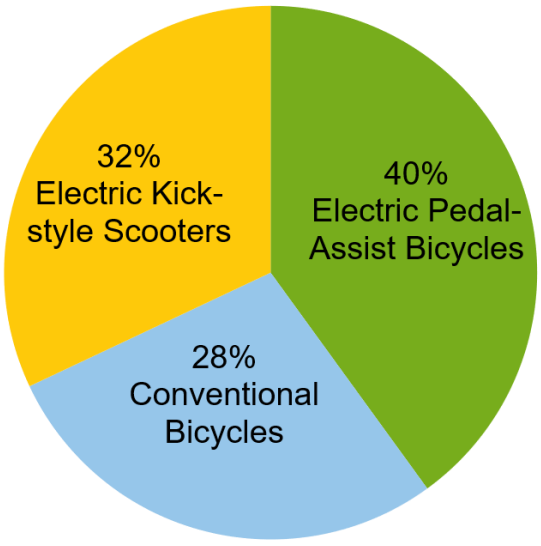
- 75% stated that they would use a shared micro-mobility program, described as bike or e-scooter share program; and
- 25% stated they would not use such a program.

Q5 – If a shared micro-mobility program were to launch, which device would you be most likely to use?

Respondents were provided three choices of micromobility devices, including conventional bicycles, pedal assist e-bicycle, and e-scooters. Results are shown in Exhibit 8.3 and listed below:

- 28%, or 162 respondents, preferred conventional bicycles;
- 40%, or 239 respondents, preferred pedal assist e-bicycles; and
- 32%, or 196 respondents, preferred e-scooters.

Exhibit 8.3: Vehicle type preferences of survey respondents



Q6 - How would you use a shared micro-mobility program?

Respondents were asked to select all of the ways they might use the proposed micromobility program from a list of common reasons.

A wide variety of uses was demonstrated with many respondents selecting more than one reason. For most to least common, the responses included:

- Leisure/fun – 70%;
- Convenience – 52%;
- Shopping/errands – 50%;
- Connecting to public transit – 49%;
- Exercise – 46%; and
- Socializing with friends or family – 45%.

Other uses respondents raised included:

- Making destinations more accessible for those that have trouble walking; and
- Not using the service due to mobility challenges or preferences.

Q7 - Shared micro-mobility programs have the potential to provide additional transportation options for under-served individuals and individuals with disabilities. What do you think are important considerations to incorporate into a shared micro-mobility program?

Respondents were asked to select all of the considerations they identified as being important to improve the accessibility and equity of the system from a list. Many respondents selected more than one consideration.

The most highly selected options include:

- Discounted passes for low income individuals – 70%;
- Ensuring there are service requirements to increase access to micromobility in priority neighbourhoods – 59%;
- Alternative micro-mobility vehicles that adapt to people's needs (e.g. tricycles that support those that cannot maintain balance) – 52%; and
- Alternative payment arrangements intended to improve accessibility for those without a credit card and/or a smartphone – 50%.

Respondents did not feel that translated program materials were as important a consideration, with 29% selecting this option.

Other options respondents suggested include:

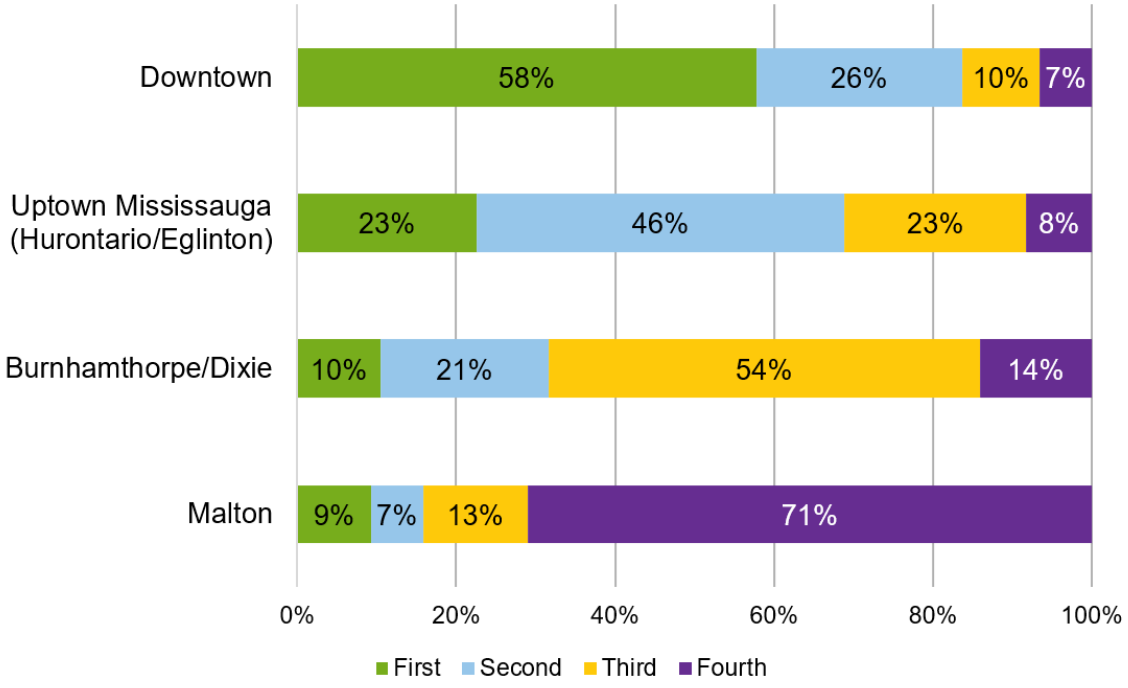
- Phone/chat assistance/support with a live person;
- Ensuring that the devices cannot be left in right of ways where they are blocking access; and
- Develop more all ages and abilities cycling infrastructure.

Q8 – Please rank the areas listed below to show where you'd like to see a shared micro-mobility program operate in Mississauga first.

Respondents were asked to rank four areas from their first to their fourth choice of areas for micromobility implementation, with one representing the top choice and four representing last choice.

Downtown Mississauga was strongly preferred for first implementation with 83% of respondents selecting it as first or second. Uptown Mississauga followed, then Burnhamthorpe/Dixie. Malton was ranked the lowest. Exhibit 8.4 shows these results.

Exhibit 8.4: Ranked preferences for a shared micromobility service location



Q9 - If there is one thing that the City needs to get right about micro-mobility, what should the City focus on?

Respondents were asked to choose one thing that the City should focus on regarding micromobility from a list.

Respondents top concerns include:

- Safety (26%);
- Coverage area (26%); and
- Cost of the program to the rider (23%).

Other concerns include cost of the program to the City (11%) and accessibility (7%). An additional 1% of respondents had no concerns and 6% selected ‘other’ including:

- Procuring a durable vehicle to ensure longevity;
- Preventing theft; and
- Ensuring winter maintenance of the vehicles and system.

Q10 - What is one thing you’d like the project team to consider as part of the shared micro-mobility study?

This was an open-ended question where respondents could type their answer. Some key themes from the responses include:

- Ensuring that signage and enforcement is present to deter usage of micromobility devices on sidewalks;
- Determining winter maintenance requirements to enable year-round operation;
- Providing access to the shared micromobility system across the whole city;
- Implementing more active transportation infrastructure to make it safe and easy to use micromobility devices whether shared or otherwise;
- Identifying financial incentives to kickstart the program;
- Identifying features to increase safety while operating on roads such as the provision of helmets with each unit; and
- Procuring units which are durable and difficult to vandalize or steal.

Stakeholder Consultation

To draw on the knowledge of stakeholders for how and incorporate on-the-ground experience and lessons learned into the micromobility study, extensive stakeholder consultation activities took place including meeting with internal staff, staff from surrounding municipalities, senior leadership, and advisory committees of council.

Core Project Team

The Core Project Team consisted of City staff representing various interests within Transportation and Works and other departments, including Active transportation, Information Technology, Traffic, Finance, Risk Management, Transportation Infrastructure Management, and MiWay. This group was engaged three times over the course of the study.

The Core Project Team provided feedback at key points throughout the study to inform the recommendations. The materials covered during each meeting include and a summary of the feedback received are described below.

Core Project Team Meeting #1: Kick-off meeting with the City introducing the study to the core project team, reviewing the proposed workplan, schedule, and confirming administrative procedures.

Core Project Team Meeting #2: Reviewed the concept of micromobility, and collected feedback about the ongoing screening activities. Also reviewed initial considerations for a propensity analysis based on demographic data and transportation infrastructure.

Feedback received included:

- The City may need to need to build more bike racks if the dockless model is selected.
- The City would like to avoid locking to trees, signs, and other street furniture.
- Consider adding how prone to injury a device is as an evaluation factor.
- The City should consider "dark" areas where there is no internet connectivity such as Erindale park, parking garages during the implementation phase.
- There are some very large/dense developments coming such as Brightwater and Lakeview that have expressed interest in micromobility. Consider adding these growth areas to the propensity analysis. Uptown Mississauga is another potential area.

- The three high propensity areas showed up in other analyses related to equity.
- There is an opportunity for Smart City concepts in terms of enforcement, data collection.
- Facilitating appeals for fines may require additional resources.
- Micromobility could provide additional rationale for improved cycling infrastructure in Councillors' minds.
- Payment integration with PRESTO is a desire.
- Focus on connecting micromobility to BRT and future LRT.

Core Project Team Meeting #3: Presented the Task 1 evaluation results and recommended system and governance model, vehicle type as well and findings related to regional integration and financial and modal split forecast and impact analysis.

All of the questions received during the presentation were for clarification on the vehicle types and system and governance models

Steering Committee

The Steering Committee consisted of senior leadership including the Director of Infrastructure Planning and Engineering Services, Director of MiWay, Director of Enforcement, the City Solicitor, and the Senior IT Manager of Enterprise Business Solutions. This group was engaged for strategic direction towards the conclusion of the study. Attendees were presented with an overview of shared micromobility, general information on vehicle types, system models and governance models, the evaluation frameworks, operational considerations and draft recommendations. The project team collected feedback to shape the recommendations

Feedback received included:

- Minimum insurance standards for the operators should be required in the permit operating contract requirements.
- In Phase 2, careful consideration for the procurement process will be necessary if a privately owned and operated model is selected (e.g. RFP, permits, licenses etc.)
- Seasonal consideration should be including in implementation planning.
- A privately owned and operated model would lessen IT requirements on the City.

Technical Advisory Committee

The Technical Advisory Committee (TAC) consisted of representatives from the City of Mississauga project team, other representatives from the City of Mississauga, and staff representing Metrolinx, Peel Region, City of Toronto, Town of Oakville, City of Brampton, Town of Caledon, the University of Toronto, and Sheridan College. The technical advisory committee was presented with the concept of micromobility. Attendees discussed the initial evaluation findings and the project team collected feedback about the ongoing screening activities, in addition to information on regional integration considerations (e.g. integration with Peel, Brampton, and neighbouring municipalities).

Feedback received included:

- A shared system at the downtown core would benefit students that go to the Sheridan College campus downtown. The campus already has a bike rental service for students, staff, and faculty as well as DIY repairs, but it would certainly support our mandate of helping students get around with active transportation.
- Brampton wants to test operators' best practices by inviting them into the city. When an RFP is ready, they can share that with Mississauga, but they want to be consistent across the region. Brampton is in the process of launching a pilot program. If the same system exists in both Brampton and Mississauga, users should be able to pick up and drop off in different cities.
- An ideal shared micromobility program would fully integrate into transit in Mississauga and Toronto and allow the user to leave vehicles in both jurisdictions but there are various regulations that would need to be updated.
- GO Stations could accommodate shared micromobility, but it would require some coordination on their location and the required infrastructure (i.e. electricity).
- For scooters, there are concerns about them being "cluttered" at the station and/or entering forbidden/dangerous areas. Geo-fencing to prevent scooters from entering bus loops or the parking lots would be ideal.
- The City's Smart City office would want to utilize anonymous data collected and circulate it to other departments to help them do better work such as supporting at vision zero projects and climate change mitigation.

- Robust education and outreach are necessary.
- The intended market is an important consideration. Small, satellite areas have not proven the be successful in other markets whereas one large catchment area that grows organically traditionally works well.
- Enforcement will be a challenge and the operator must take some responsibility. The regulations need to hold the operator accountable through the governance model.

Advisory Committees of Council

A key component of consultation with external stakeholders included deputations to five advisory committees to Council.

Cycling Advisory Committee / Micromobility Subcommittee

The Cycling Advisory Committee / Micromobility Subcommittee was presented with the concept of micromobility, a description of the system, governance, and vehicle type information, the preliminary evaluation framework and initial propensity analysis considerations. The project team collect feedback about the ongoing screening activities, in addition to collecting information on regional integration (e.g. integration with Peel, Brampton, and neighbouring municipalities).

During the Micromobility Subcommittee meeting, which is part of the Cycling Advisory Committee, the concept of micromobility was presented followed by discussion on the evaluation findings to-date. The project team collected feedback on the ongoing screening activities, reviewing the initial propensity analysis considerations based on demographic data and transportation infrastructure.

Feedback received included:

- Consider adding shared micromobility services near Erin Mills and Eglinton as a future growth area.
- Consider additional analysis to integrate the network between different areas of the City. For example, Malton is split by the airport and a lot of industrial area.
- Consider tourism in areas like Port Credit as a trip generator.
- Consider how micromobility could be used across municipal boundaries.
- Ensure that the operators are working in the best interest of the city through operating requirements and agreements.

Accessibility Advisory Committee / Accessibility Transportation Subcommittee

Accessibility Advisory Committee Meeting: Reviewed the concept of micromobility and collected feedback on the ongoing screening activities, reviewing initial propensity analysis considerations based on demographic data and transportation infrastructure.

Accessibility Transportation Subcommittee Meeting #1: Provide updated information on the ongoing screening activities and collected more detailed feedback from subcommittee members.

Feedback received included:

- Concerns with riding on the sidewalk and speeding (especially electric vehicles). Vehicles should only be allowed to operate in designated areas (e.g. bike lanes).
- Regardless of system model, the system should maintain access, be safe for all road users, and not create any additional barriers to the accessibility community.
- Docking stations are preferred due to the designated areas and predictability of where the vehicles are located. Areas outside of the pedestrian clear zone and off the sidewalk are preferred (e.g. parking lots).
- There should be a strong focus on education for users ensuring they are aware of the rules of the road.
- There should be penalties or fines associated with those not following the rules.
- There should be a small pilot area to evaluate how people are using the system and expand from there.
- Adding an accessibility lens to the evaluation framework is suggested, prioritizing vulnerable road users and considering the hierarchy of road users. Consider embedding a vision zero lens.

Road Safety Committee

This meeting reviewed the concept of micromobility and collected feedback on the ongoing screening activities, reviewing initial propensity analysis considerations based on demographic data and transportation infrastructure.

Feedback received included:

- Penalties and enforcement requirements should be considered during the evaluation process.
- Safety of pedestrians is a key priority for the committee. Proper operation of vehicles should ensure that pedestrians are safe and that penalties are in place for unsafe behaviour.
- Ensuring the vehicles have a bell or other means of emitting sound to warn other road users should be a priority.
- Learning from the implementation from other communities such as Brampton and Hamilton will be critical to the success of the program.

Traffic Safety Council

This meeting reviewed the concept of micromobility and collected feedback on the ongoing screening activities, reviewing initial propensity analysis considerations based on demographic data and transportation infrastructure.

Feedback received included:

- Traffic Safety and school zones should be carefully considered. The operating speed of the vehicles in areas that are high risk (e.g. school zones) should be evaluated as part of the next phase of the study.
- Age of the users should be consistent with the regulations established by the MTO and the City's by-laws.
- Education for riders focusing on safe operation of the vehicles is a priority. Other educational safety materials for all road users should be updated to incorporate a shared micromobility program.

Environmental Action Committee

This meeting reviewed the concept of micromobility and collected feedback on the ongoing screening activities, reviewing initial propensity analysis considerations based on demographic data and transportation infrastructure.

Feedback received included:

- Consider adding Port Credit to the pilot service area as it is a popular destination in Mississauga.
- Consider how shared micromobility could be used to increase the uptake of active transportation in areas where usage is currently low
- Ensure the vehicle technology enables users to transport basic personal items and include storage.