Corporation of the City of
NEW WESTMINSTER

Attachment #1

New Westminster Electric Bike Share

Technical Feasibility Assessment

TOOLE DESIGN

CITY OF NEW WESTMINSTER ELECTRIC BIKE SHARE TECHINCAL FEASIBILITY ASSESSMENT

April 19, 2023

CONTENTS

Information contained in this document is for planning purposes. All results, recommendations and commentary contained herein are based on limited data and information and on existing conditions that are subject to change.

PLAN AND POLICY REVIEW

The project team reviewed the following local plans, policies, and regulations to analyze existing policy impacts on a potential e-bikeshare program in New Westminster:

- **City of New Westminster Master Transportation Plan (MTP) 2015**
- **City of New Westminster All Ages and Abilities Active Transportation Network Plan (ATNP) 2022**
- **City of New Westminster Street and Traffic Bylaw 2015**
- **City of New Westminster Business License Bylaw 2020**
- **City of New Westminster Official Community Plan 2020**
- **Metro Vancouver 2050 Regional Growth Strategy 2022**
- **TransLink 2050 Regional Transportation Strategy 2022**
- **CleanBC Move Commute Connect B.C.'s Active Transportation Strategy 2019**
- **BC Ministry of Transportation & Infrastructure Motor Vehicle Act, Motor Assisted Cycle Regulation Update 2022**
- **BC Ministry of Transportation & Infrastructure Motor Vehicle Act, Electric Kick Scooter Pilot Project Regulation 2021**

KEY FINDINGS

- **E-bikeshare is a city priority:** The MTP and the ATNP identify the need for an e-bikeshare feasibility study, as well as noting the advantages for leveraging infrastructure investments and maximizing the potential for active transportation mode shift amongst the city's residents and visitors.
- **Local and provincial policies support shared micromobility:** New Westminster has developed a policy environment that strongly supports active transportation, and other Metro Vancouver and provincial policies are also supportive of including shared micromobility in initiatives and programs that encourage mode shift, increased mobility/access for underserved populations, and emissions reduction.
- **There are potential partners in the region:** TransLink's 2050 Regional Transportation Strategy identifies the potential for a regionwide shared micromobility program, including the need to develop standards for safety, data collection and management, space and curbside allocation, fleet and operational requirements, and supporting infrastructure. New Westminster should monitor the development of any potential regionwide shared micromobility system, as well as peer city programs, and identify opportunities for collaboration and interoperability across Metro Vancouver.
- **A shared micromobility program should provide equitable access:** Transportation equity is a key policy focus in local and provincial policies. An e-bikeshare program should serve all areas of the city and be inclusive to all residents, including people of all ages, abilities, identities, and backgrounds.
- **E-scooters may be a future shared micromobility option:** Current provincial regulations under the Motor Vehicle Act prohibit e-scooters in New Westminster. This limits the potential to explore an e-scootershare system or include e-scooters within a shared micromobility system, even though the MTP includes specific actions related to setting up parameters for a future program. The current pilot may be extended, or the province could permit the use of e-scooters across the province. New Westminster should continue to monitor and engage with the province to understand how the trial may further determine the use of e-scooters in New Westminster.

PLANS AND POLICIES

Detailed findings from each plan and policy reviewed are included in the following sections.

Master Transportation Plan 2015

The City has developed the Master Transportation Plan (MTP) to shape transportation infrastructure and program investments over the next 25 years in the City of New Westminster. The Plan outlines a clear vision of a multi-modal transportation system and directions that work towards achieving the City's aspirations and community goals. The MTP includes strong support for cycling use and other sustainable modes, as well as promoting a healthy and safe community and supporting the diverse social needs of the city (Figure 1).

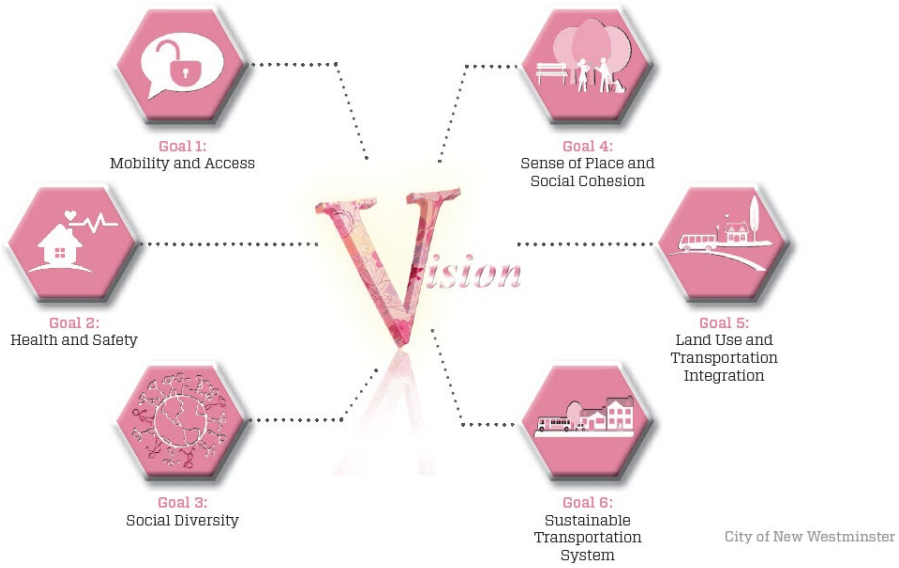

Figure 1: City of New Westminster Master Transportation Plan Vision and Goals

Making cycling safe, comfortable, and accessible is a key priority in the MTP, and the plan highlights the advantages of exploring public bicycle share and how it can help enhance the ease and convenience of cycling within the community. The MTP states that a feasibility study should consider several factors:

- Population density
- Demographics
- Mixture of land use
- Completion of the cycling route network
- Current bicycle use
- Bicycle culture
- Partnering opportunities with other agencies or the private sector
- Working with other partnering municipalities for extending PBS programs being considered by other municipalities to New Westminster
- Connections to SkyTrain Stations and between the Downtown and Uptown

Policy 9A focuses on micromobility policies and actions, and includes the following actions that would impact shared micromobility:

- Work with TransLink and other municipal partners to ensure a cohesive approach to micromobility region wide.

- Through regional partnerships, encourage the Provincial Government to regulate and provide guidance on all micromobility vehicles under the Motor Vehicle Act.
- Conduct a feasibility study for a future electric bicycle sharing program.
- Adopt a permitting framework, inclusive of operational parameters, service requirements, data sharing, and pricing controls for future shared e-scooter programs, pending regulation from the Provincial Government.
- Adopt a policy that gives direction on how equity and universal accessibility must be considered in any shared micromobility permitting program.
- Identify and prioritize new locations for publicly accessible bicycle parking. Investigate funding sources and opportunities for new micromobility parking on-street and in the furniture zones.
- Through partnership with TransLink investigate opportunities for fare integration with local shared micromobility services.

Active Transportation Network Plan

The Active Transportation Network Plan (ATNP) aims to make active transportation a safe, comfortable, and convenient mobility option for people of all ages and abilities in New Westminster. The Plan identifies an updated active transportation network, including a Core Network that connects all major destinations, including neighborhoods, commercial areas, civic facilities, schools, parks, and interregional routes (Figure 2).

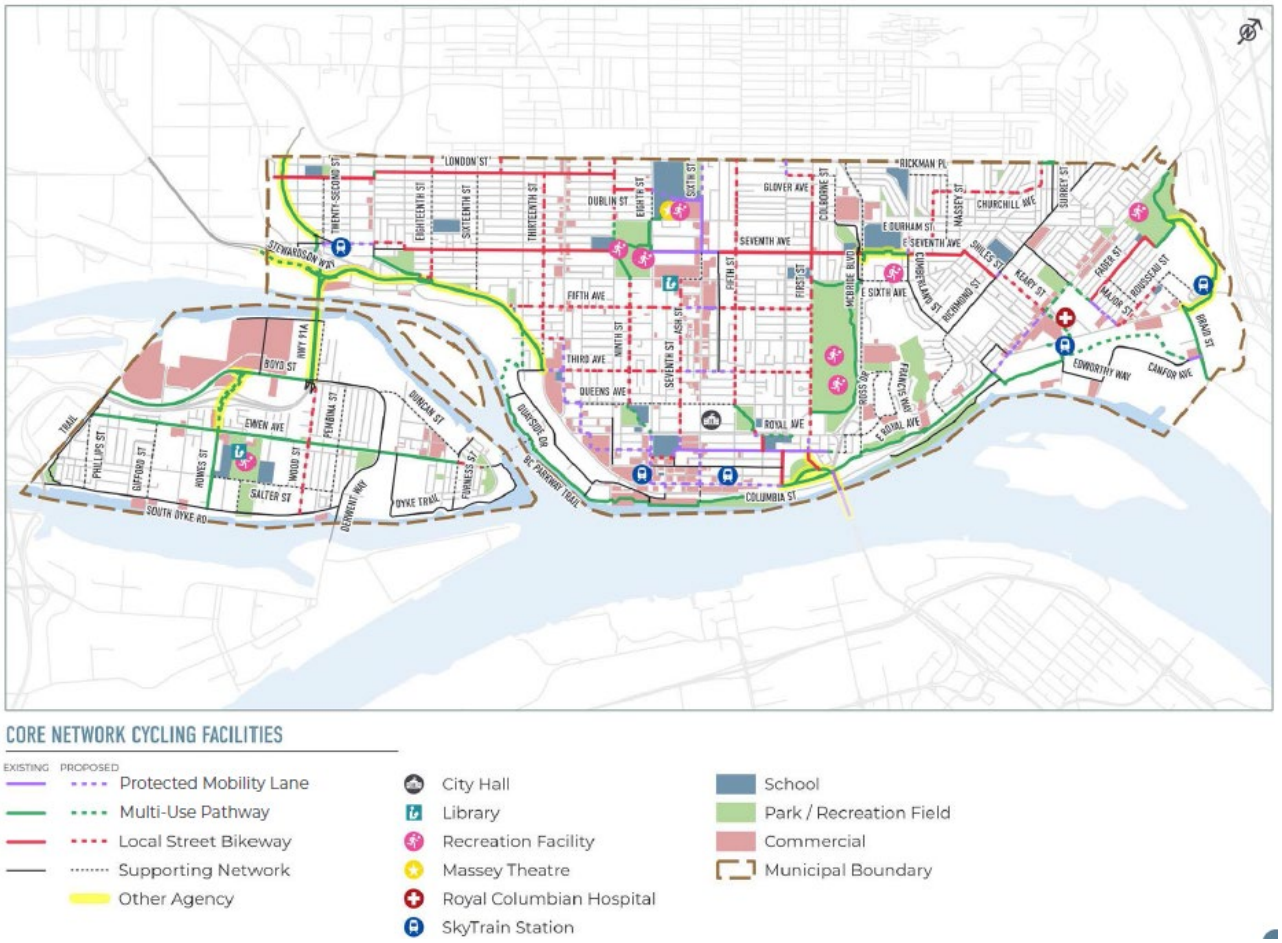

Figure 2: City of New Westminster Active Transportation Core Network

The ATNP includes a Core Network of twenty-six (26) AAA active transportation corridors which have been evaluated and prioritized into a phasing strategy. The phasing map is shown below in Figure 3. Routes prioritized for implementation in Year 1-2 are shown in green and include:

- Boyd Street
- 7th Street from Downtown to Uptown
- 7th Avenue (Rotary Crosstown Greenway) including Fader Street connection to Central Valley Greenway
- Connections to Burnaby's priority network in Edmonds Town Centre: 18th Street and 15th Street between London Street and 10th Avenue
- North – South Mainland routes:
    - 8th/9th/10th Streets
    - 4th Street / Elliot Street / Merivale Street
- East-West Mainland routes
    - 3rd Avenue
    - London Street / Dublin Street
- Queensborough
    - Wood Street

Figure 3: Core Network Phasing

The ATNP acknowledges that e-bikes have increased significantly in popularity around the world and highlights an opportunity for electrified personal mobility in New Westminster - especially in addressing issues around steep topography. The Plan further identifies a list of recommended initiatives to help leverage infrastructure investments and maximize the potential for mode shift towards active transportation: exploring an 'E-bike sharing' initiative and developing a feasibility strategy to help encourage more residents and visitors use active transportation.

Transportation equity is also a named consideration; the Plan highlights the importance of developing an active transportation network that serves all areas of the city and provides equitable access for all residents. This means an active transportation network that is inclusive of – and prioritizes –people of all ages, abilities, backgrounds, and identities.

Street and Traffic Bylaw

The City's Street and Traffic Bylaw defines a cycle as a vehicle having any number of wheels that is propelled by human power and on which a person may ride and includes a Motor Assisted Cycle. It further defines a motor assisted cycle as one which meets the criteria defined by the Motor Vehicle Act, which includes e-bikes.

The Street and Traffic Bylaw sets regulations for the allowable use of streets and pathways for various forms of active transportation, including pedestrians, cyclists (including motor assisted cycles/e-bikes), roller skaters, inline rollerbladers, skateboarders, and longboarders. These modes are permitted to use streets, multi-use pathways, sidewalks, footpaths, or walkways with due care, attention and consideration for people using the same facility. However, the Bylaw states that no person shall cycle or operate a cycle on any sidewalk, footpath, or walkway in the following locations:

- Sixth Street from Tenth Avenue to Front Street
- Seventh Street from Fifth Avenue to Sixth Avenue
- Twelfth Street from Tenth Avenue to Fifth Avenue
- Twentieth Street from Dublin Street to Hamilton Street on the west side only.
- Sixth Avenue from Fifth Street to Eighth Street
- Belmont Street from Sixth Street to Seventh Street
- Columbia Street from Tenth Street to Elliott Street
- Columbia Street East from Brunette Avenue to Braid Street

In section 6.27 of the bylaw, which addresses displaying advertising matter, the regulations state that "no person shall park a Vehicle or Cycle upon any public space for the purpose of displaying signs." The City should confirm whether operator branding on shared e-bikes or branded parking signage related to e-bikeshare would fall under this regulation.

Business License Bylaw

According to the City's Business License Bylaw, "no person shall carry on any business within the City unless a valid and subsisting license is issued." Licenses are issued annually, and potential private operators of e-bikeshare would need to apply for a business license before commencing operations. Bikeshare or bike rental services are not addressed specifically in the bylaw.

Metro Vancouver 2050 Regional Growth Strategy 2022

The Metro Vancouver region's Regional Growth Strategy is the regional federation's collective vision for how growth will be managed to support the creation of complete, connected, and resilient communities, while protecting important lands and supporting the efficient provision of urban infrastructure like transit and utilities.

One of the strategy goals is to support sustainable transportation choices by continuing to develop active transportation, micromobility, and transit networks as a means to create redundancy in low-cost, low-emission

travel options. Metro Vancouver states that it will collaborate with TransLink to increase the share of trips made by transit, shared mobility options, cycling, walking, and rolling.

The Growth Strategy states that member jurisdictions will support the development and implementation of transportation demand management strategies, such as: parking pricing and supply measures, transit priority measures, end-of-trip facilities for active transportation and micromobility, as well as shared mobility services. Member jurisdictions will also support implementation of local active transportation and micromobility facilities that provide direct, comfortable, all ages and abilities connections to the Regional Greenway Network, Major Bikeway Network, transit services, and everyday destinations.

TransLink's Transport 2050 Regional Transportation Strategy

Transport 2050 is the new Regional Transportation Strategy for Metro Vancouver. As a "roadmap" for the next 30 years, it identifies projects, services, and policies to make transportation better for everyone in the region. Goal One is to make active transportation the most convenient choice for shorter trips, which is aligned with the benefits of shared micromobility. Transport 2050 also calls out electric micromobility vehicles in its typology of active transportation (Figure 4).

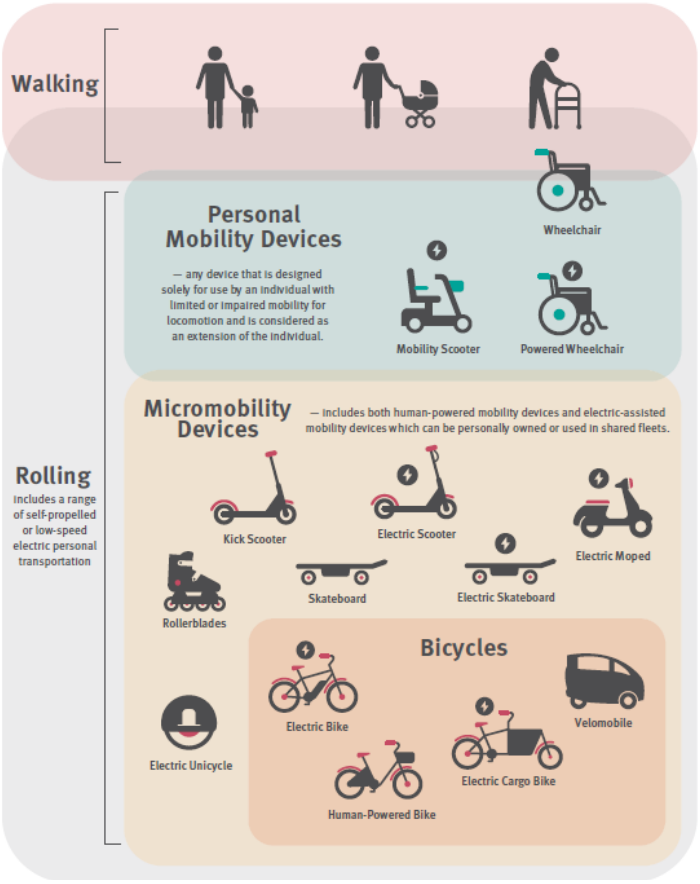

Figure 4: Active Transportation Typologies
Source: Transport 2050

One of the Transport 2050 goals is to improve access to shared micromobility by enabling convenient, safe, accessible and interporal services that are well distributed across the region. The Strategy seeks to do this by:

- Developing a region-wide shared micromobility standards for safety, data collection and management, space and curbside allocation, fleet and operational requirements, and supporting infrastructure that makes it easy to support and scale these services and ensure they are interoperable
- Supporting access to shared micromobility services for Indigenous Peoples living on reserve and treaty lands, where desired by the community
- Ensuring shared micromobility vehicles are equitably accessible and affordable across the region, including by communities with a high proportion of disadvantaged residents
- Regulating end-of-trip procedures to ensure that vehicles are not blocking sidewalks, entrances, or rights-of-way so that pedestrians — especially people with disabilities — are unobstructed

CleanBC Move Commute Connect B.C.'s Active Transportation Strategy

Move. Commute. Connect. is B.C.'s strategy for cleaner, more active transportation, part of the Province's CleanBC plan to build a better future for all British Columbians. The Strategy's goal is to make active transportation safer and more convenient for everyone, with the aim of doubling the percentage of active transportation trips taken by 2030.

The Strategy recognizes that technology improvements, such as e-bikes, have helped to make cycling more viable over long distances and provide a cycling option for people of different ages and abilities. Acknowledging that e-bikes can help transition people to more active forms of transportation—especially drivers of single-occupant motor vehicles. However, the strategy recognizes that e-bikes are significantly more expensive than regular bicycles and in response have developed the Transportation Options Program under Scrap-It, which provides an incentive of $850 toward the purchase of a new e-bike to people who scrap high-polluting vehicles. The non-for-profit Scrap-it program is available to New Westminster and B.C residents to use.

BC Ministry of Transportation & Infrastructure Motor Vehicle Act: Motor Assisted Cycle Regulation Update 2022

The Motor Assisted Cycle Regulation sets out the conditions for e-bikes and other motor assisted bikes, including specifications for the following:

- The motor and associated power rating and speed
- The type and number of wheels
- Operation of pedals or hand cranks
- Motor shut-off requirements
- The requirement to not possess a generator, alternator or combustion engine
- Brake performance and stopping distance
- Drive system and equipment securement
- Electric terminals and cover

Any potential e-bikeshare initiative should adhere to these regulations, which will be detailed further in the full Feasibility Assessment.

BC Ministry of Transportation & Infrastructure, Motor Vehicle Act: Electric Kick Scooter Pilot Project Regulation 2021

The provincial pilot project regulation defines rules for the use of electric kick scooters, which are defined as a motorized personal mobility vehicle powered by an electric battery and motor, with up to four wheels placed along a longitudinal axis, possess a steering handlebar, and has one or more electric motors. They typically resemble a conventional human powered scooter but are instead powered by an electric motor.

Regulation 90/2021 sets out the conditions for use of electric kick scooters. They are regulated for use within 10 pilot communities within B.C in accordance with the provincial regulation and bylaws of the pilot community. The pilot communities are:

- City of Coquitlam
- City of Kelowna
- City of Nanaimo
- City of North Vancouver
- City of Richmond
- City of Vancouver
- City of Vernon
- District of North Vancouver
- District of West Vancouver
- Town of Oliver
- Town of Osoyoos
- Township of Langley

The Province notes that generally, the rules of cycling in BC apply to the use of e-scooters, and the pilot regulations specify that e-scooters must be operated in accordance with provincial regulation and bylaws of the pilot community.

The pilot program came into effect on April 5, 2021 and is due to be repealed on April 5,2024. E-scooters are still illegal to operate in any community that is not participating in the pilot project and in any pilot community that has not yet enacted bylaws for the pilot project. Therefore, the use of electric kick scooters and other one-person electric mobility devises are not permitted within the City of New Westminster.

Although the e-bike feasibility study focuses on e-bikes, and e-scooters and other forms of micromobility are not currently legally permitted in New Westminster, this information is included to help the City plan for the possibility that these types of active transportation are legal and permitted for use in the future.

E-BIKESHARE BEST PRACTICES AND PEER CITY REVIEW

This section summarizes industry best practices as well as peer city policies and requirements for shared micromobility programs. The overall regulatory environment and operations of each program were reviewed for specifics related to system/fleet types, service area, fleet size, vehicle specifications, safety requirements, fees, parking management, data sharing, evaluation, and equity considerations.

There are several communities in BC that have existing or pending shared micromobility programs. Three peer cities with existing e-bikeshare programs were included in an in-depth review– a city within Metro Vancouver (**City of North Vancouver**), a city within British Columbia (**City of Kelowna**), and a city with similar demographics and topography to New Westminster (**City of Ithaca, NY**). Three e-bikeshare operators who have worked or are currently operating in BC were also interviewed: **Lime, Neuron** and **BCAA**.

The in-depth review included interviews conducted via video calls or by email with staff from the jurisdiction. For the City of North Vancouver interviews, the project team also spoke to representatives from the District of North Vancouver and a shared mobility coordinator who manages operations of the regional bikeshare program across the City of North Vancouver, the District of North Vancouver, and the District of West Vancouver. A full list of current or planned shared micromobility programs in the province as well as in Ithaca, NY is included in Table 1.

Table 1: Planned and Existing Shared Micromobility Programs in BC & Ithaca, NY

Jurisdiction	System Type	Micromobility Vehicle(s) Allowed	Operator(s)	Program Start
City of Coquitlam	Dockless	E-scooters	TBD	TBD 2023
City of Ithaca	Dockless	E-bikes	Center for Community Transportation	2022
City of Kelowna	Dockless	Pedal bikes and e-bikes, e-scooters, and e-mopeds	Lime, Spin	2018
City of North Vancouver, District of North Vancouver, and District of West Vancouver	Dockless	E-bikes	Lime	2021
City of Richmond	Dockless	E-scooters and e-bikes	Lime	2022
City of Vancouver	Docked	Pedal bikes and e-bikes	Vancouver Bike Share Inc. (operating as Mobi)	2016
City of Vernon	Dockless	E-scooters	Neuron	2022
City of Whistler	TBD	E-bikes	TBD	TBD 2023

ORGANIZATIONAL MODEL AND PROCUREMENT

For most systems operating in the Lower Mainland (and most newer systems in North America) the most common organizational model is an agency-permitted program operated by a private third party. In this model, the city oversees and regulates the program. A third party (or third parties) apply for a permit or respond to an RFP for the opportunity to use the right-of-way. The third party is responsible for providing the equipment and operating the shared micromobility service. Some agencies charge fees and/or require revenue sharing from their third-party operators, which is detailed further on page 20.

The City of Vancouver and the City of Ithaca have a slightly different organizational model - both cities have contracts or MOUs with their third-party operator that specify the rules and regulations to operate a shared micromobility program within their jurisdictions, but instead of collecting fees or requiring revenue-sharing, the City commits to compensating the operator a certain amount to provide bikeshare services.

Ownership and procurement methods used by the three interviewed cities and all other cities with current shared micromobility programs in BC are described in Table 8.

Table 2: Shared Micromobility Program Ownership and Procurement for BC jurisdictions & Ithaca, NY

City	Ownership	Procurement Process	Timeframe
City of North Vancouver, District of North Vancouver, City of West Vancouver	Agency permit, privately operated	Permit	2-year pilot program
City of Kelowna	Agency permit, privately operated	Currently permit, moving to RFP	1-year permit (originally an 18-month pilot permit)
City of Ithaca	Non-profit owned and operated	MOU	5-year contract
City of Richmond	Agency permit, privately operated	RFP	3-year pilot program
City of Vernon	Agency permit, privately operated	RFP	2-year pilot program
City of Vancouver	Privately owned and operated	RFP	5-year contract

Within BC, bylaw amendments are not required to allow for e-bike usage in the public right of way, but as prior to beginning the procurement process, a few cities amended their existing bylaws in the following ways:

- The City of Kelowna amended their Traffic Bylaw to add definitions for “Bikeshare Device” and “Bikeshare Service” and established rules for a new bikeshare program permit and fees.
- The City of North Vancouver added a definition for “Motor Assisted Cycles” or “E-bikes” in its Traffic and Safety Bylaws that aligned with the provincial definition as well as definitions for “E-Bike Share Permit”, “E-Bike Share Service”, and “E-Bike Share Zone” to establish regulations for the operation and permitting of bikeshare within the city.
- The City of Richmond amended bylaws related to fees, charges, and enforcement to allow the City to collect permit fees and enforce bikeshare regulations. Richmond also amended its Traffic Bylaw to lower the maximum speed of e-bikes on shared pathways to 15 km/hr.

BC cities with shared micromobility programs all required operators/permit holders to indemnify and hold the city and its agents harmless from liability. Types of insurance required included:

- General liability insurance
- Property insurance
- Automobile third party liability insurance
- Cyber and privacy liability insurance
- Worker's compensation coverage

SYSTEM AND FLEET TYPES

Docked vs Dockless

A **docked** or "station-based" bikeshare system includes bikes that can be rented from an automated "docking station" and returned to a station in the same system. A **dockless** or "free-floating" bikeshare system does not require bikes to be parked at a docking station. In most dockless systems, bikes can be parked in the sidewalk furniture zone or at existing bike racks throughout the service area.

Left: Docked bikeshare in Vancouver. Right: Dockless bikeshare in Ithaca, NY.

Table 3: Benefits and Challenges of Docked and Dockless Systems

System Type	Benefits	Challenges
Docked	- Limited sidewalk clutter due to organized pick-up and drop off of bikes - Fleet redistribution and rebalancing occurs on a smaller geographic scale	- Availability of bikes is limited to stations - Can be costly and time-intensive to launch due to capital costs of purchasing station infrastructure and identifying, permitting, and installing stations in the public right-of-way - Service area cannot be easily adjusted
Dockless	- Travel behavior is not determined by location of docks/stations, allowing for flexible route choice - Service area can be easily modified - Can be easily integrated with public transit	- Parking management can be challenging, as sidewalk clutter and right-of-way obstruction is more likely - Fleet redistribution and rebalancing of bikes across the service area occurs on a larger geographic scale - Fleet must be large enough to ensure riders are always in close proximity to available bikes

All three cities interviewed by the project team operated dockless systems, and none had plans to pursue a docked bikeshare system, mainly due to the high costs of docked infrastructure (while e-scooters and e-bikes can

cost $1500-$4000, station equipment can range from $50,000-$60,000 per station). The District of North Vancouver expressed interest in a future docked scootershare program, and stated that a docked bikeshare system would be preferable but not currently feasible based on the District's current capacity and resources. The prevalence of dockless systems across BC reflects industry trends, as there has been a significant increase in dockless shared micromobility systems in recent years. In 2021, 48% of shared micromobility systems in North America had a dockless component.[1]

Bikes vs Scooters

The two most common fleet types (e-scooters and bikes) cater to different use cases, trip lengths, and appeal to different user groups and demographics. The operators interviewed noted that bikeshare is often chosen for longer trip distances and by users who are more familiar with riding a bike or more comfortable in a seated position, while scootershare is often used for shorter trips and by a younger demographic. 2021 data from shared micromobility systems across North America demonstrates that on average, differences in trip distance and duration between bikes and scooters are minimal – see Table 4. However, e-scooters have risen in popularity in recent years, accounting for almost half of all shared micromobility trips in 2021, up from just over a third in 2020.[2]

Table 4: Average Shared Micromobility Trip Distance and Duration

Vehicle Type	Average Trip Distance	Average Trip Duration
E-scooters	2.2 km	14 minutes
Bikes	2.4 km	15 minutes

Source: North American Bikeshare and Scootershare Association 2021 Report

Operators noted that e-scooters typically generate more revenue compared to e-bikes and expressed a preference to launch a combined fleet with both e-scooters and e-bikes. Knowing that the City of New Westminster is not currently part of the provincial e-scooter pilot, all three operators had slightly different recommended approaches for e-scootershare: one suggested building flexibility into an e-bikeshare program contract to allow for e-scooters in the future, pending how the province decides to regulate e-scooters, another stated that they would not consider applying for a program that only allowed e-bikes, and another did not currently offer e-scooters and was enthusiastic about a fleet that only included e-bikes. Vehicle types offered by each operator interviewed as well as other large operators working in BC and across the country are captured in Table 5.

Table 5: Vehicle Types offered by Shared Micromobility Operators working in Canada

Operator	E-Bikes	Pedal Bikes	E-Scooters
BCAA	Yes	No	No
Bird	Yes	No	Yes
Lime	Yes	No	Yes
Neuron	Yes	No	Yes
Spin	Yes	No	Yes
Vancouver Bike Share Inc.	Yes	Yes	No

Of the eight cities in BC with current shared micromobility programs, four are part of the provincial electric kick scooter pilot and include e-scooters in their permitted shared fleets. The District of North Vancouver stated that their operator has asked about the potential to bring e-scooters, and the City of North Vancouver is interested in bringing on e-scooters if future provincial regulation allows. The manager of the bikeshare fleet in the City of

[1] North American Bikeshare and Scootershare Association. (2022). *3rd Annual Shared Micromobility State of the Industry Report - 2021*
[2] North American Bikeshare and Scootershare Association. (2022). *3rd Annual Shared Micromobility State of the Industry Report - 2021.*

Ithaca strongly preferred a bike-only program, stating that although bikes are more expensive, they are safer and can provide higher quality transportation.

E-Bikes vs Pedal/Human-Powered Bikes

E-bikes and pedal bikes are operated very similarly, with the difference being the battery pack that aids an e-bike rider. E-bike benefits over pedal bikes include the ability to carry heavier loads, go longer distances, bike in hotter temperatures, and climb steep hills. While e-bikes are more expensive than traditional bicycles, e-bike sales have grown significantly in recent years, even outpacing growth rates for more traditional bicycles.

Left: Pedal bikeshare in Vancouver. Right: E-bikeshare in Whistler.

All operators interviewed were confident in their e-bikes' ability to navigate hills and the steep topography in New Westminster. One operator noted that the throttle on an e-scooter is especially helpful for going uphill, compared to many e-bikes offered by shared micromobility operators which require pedal-assist from the rider. For example, BCAA only offers pedal-assist bikeshare.

FLEET SIZE

Establishing minimum and maximum numbers of vehicles, as well as criteria for when the program can be expanded and by how much, provides cities with greater control over shared micromobility programs. Minimums help ensure that the program remains viable and provides utility to users. Maximums ensure that new programs are introduced in a controlled fashion and allow the public to get used to them and build support for expansion. Seasonal changes in ridership demand due to winter weather should also be considered when defining fleet caps or minimums.

The North American Bikeshare and Scootershare Association (NABSA) found that cities with populations less than 200,000 had average of 1.8 bikes available per 1,000 residents and approximately 4.0 scooters available per 1,000 residents.[3] With a population of approximately 79,000 people, this would equate to around 142 bikes for New Westminster.

BC cities do not have consistent fleet minimums or maximums, which is to be expected based on differences in geography, density, and populations. Most cities had built-in flexibility for fleet expansion according to ridership performance.

[3] North American Bikeshare and Scootershare Association. (2022). *3rd Annual Shared Micromobility State of the Industry Report - 2021.*

Table 6: Shared Micromobility Fleet Caps in BC cities and Ithaca, NY

City	Population (based on 2021 Census data)	Vehicle Type	Min[1]	Max[1]	Estimated vehicles/ 1,000 residents	Expansion Terms
City of Kelowna	144,576	Bikes	100	N/A	0.7	City may adjust maximum fleet size of any permit holder at any time. Permit holders for combined e-scooter and e-bike permits can increase or decrease their e-scooter fleet size based on ridership and parking compliance.
		E-bikes	N/A	300 (all operators)	2.1	
		E-scooters	N/A	700 (all operators)	4.8	
City of North Vancouver, District of North Vancouver, City of West Vancouver	187,637	E-bikes	120	200	1.0	Permit application requires fleet expansion plan, including key performance indicators. The city works with operator during winter months to reduce fleet size.
City of Ithaca	31,710	E-bikes	100	None	3.2	CCT plan to expand the fleet to 160 in 2023 and to 300 by Spring 2024.
City of Richmond	209,937	E-scooters, E-bikes	None	None	N/A	None
City of Vancouver	662,248	Pedal bikes and E-bikes	None – current fleet is 2500 bikes	None	3.7	Evaluated with the city based on expected demand
City of Vernon	67,086	E-scooter	N/A	350	5.2	Fleet expansion has been phased (started at 150, expanded to 250 in a few months, and increased again to 350 the next year)

[1] Minimum and maximum caps are per operator unless otherwise noted.

SERVICE AREA

The Institute for Transportation and Development Policy (ITDP) recommends a minimum bikeshare service area of 10 square kilometers, as smaller areas may drive down system usage (New Westminster is approximately 16

square kilometers).[4] Service areas are often defined as the entire area under the jurisdiction of the regulating agency, e.g., the city boundary. Some cities choose to define boundaries that restrict the system to specific areas within the city – especially during pilots, which usually operate within limited geographic zones focused on central business districts. All cities that were interviewed used slight variations on their jurisdictional boundary:

- **The City of North Vancouver** partnered with the **District of North Vancouver** as well as the **District of West Vancouver** to create a North Shore service area for e-bikeshare. While each city has its own permit with the operator, the program allows users to rent bikes in and ride across all three jurisdictions.
- **The City of Kelowna** operates temporal restrictions in its downtown area, restricting trips between the hours of 10:30pm to 4am. Each operator develops its specific service area in collaboration with the city - Lime and Spin subsequently use slightly different service areas (see Figure 5).
- **The City of Ithaca** defines their service area as the city limits plus the distance they were willing to collect and distribute bikes (around 19.3 sq km). They further altered the service area to provide bikeshare access to key destinations that lie just outside the municipal boundary, such as Cornell University.

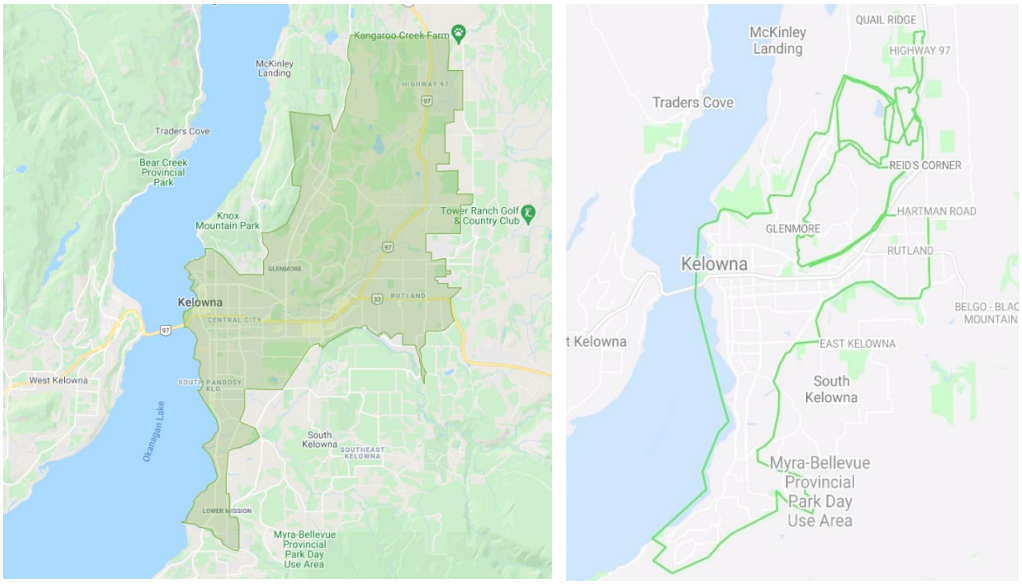

Figure 5: (Left) Spin Service Area in Kelowna. (Right) Lime Service Area in Kelowna.

[4] Institute for Transportation and Development Policy. "*The bikeshare planning guide."* (2018).

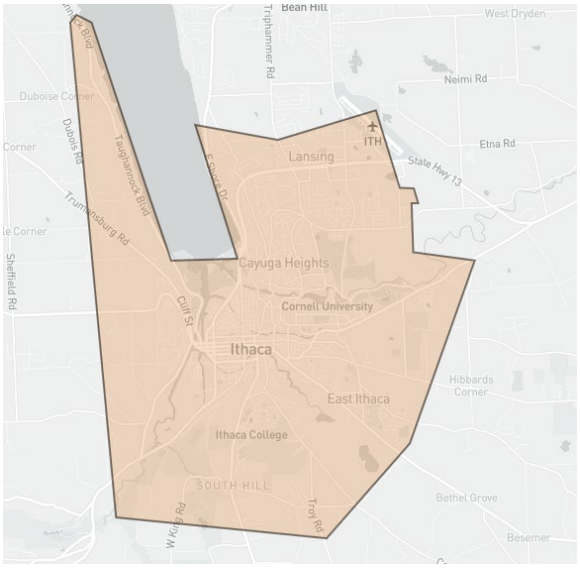

Figure 6: City of Ithaca E-bikeshare Service Area

E-BIKE FEATURES & REQUIREMENTS

All e-bikes ("motor-assisted cycles") in the Province must be aligned with the following regulations established in the Motor Vehicle Act:

- **Motors**: Motors must be electric, have continuous power output ratings that in total do not exceed 500 watts, and not be capable of propelling the motor-assisted cycle at a speed greater than 32 km/hr on level ground.
- **Wheels:** Wheels must be 350 mm or more in diameter, and no more than three wheels may be in contact with the ground.
- **Motor shut-off requirement:** Motor assisted cycles must have a mechanism separate from the accelerator controller that allows the driver to turn the motor on and off from a normal seated position while operating the motor-assisted cycle, or prevents the motor from turning on or engaging before the motor-assisted cycle attains a speed of 3 km/hr. The motor of a motor-assisted cycle must turn off or disengage if the operator stops pedaling, an accelerator controller is released, or a brake is applied.
- **Generators:** A motor-assisted cycle must not be equipped with a generator, alternator, or similar vehicle powered by a combustion engine.
- **Brake performance requirement**: A motor-assisted cycle must be equipped with brakes on all wheels or on each axle. The braking system must be capable of bringing the motor-assisted cycle, while being operated at a speed of 30 km/hr, to a full stop within 9 m from the point at which the brakes were applied.
- **Drive system and equipment securement:** The motor drive system and all energy storage vehicles of a motor-assisted cycle must be secured to prevent movement in any direction relative to the motor-assisted cycle during operation.
- **Electrical terminals**: All electrical terminals on a motor-assisted cycle must be completely insulated or covered.

Along with these requirements, some cities that were interviewed included additional vehicle features and requirements in their permits and/or RFPs as outlined in Table 7.

Table 7: E-bike Requirements for Interviewed Cities

Jurisdiction	Requirements
City of Ithaca	Specific vehicle requirements include GPS, 5G, and self-locking technology. Although not specifically required in their current MOU, CCT noted that would like to procure bikes with a high accuracy GPS data package in the future, as this enables better precision for geofencing parking and restricted areas.
City of Kelowna	Specific vehicle requirements in addition to those specified in the Motor Vehicle Act include: - Adjustable seat post - All-weather tires - Front and rear fenders - Cargo basket - Kickstand - Bell - Lights on the front and back - Each vehicle must have a unique identifier number that is clearly displayed and visible to the customer on the vehicle - Active location tracking component capable of providing real-time location data of the vehicle, even when it's not in use - Braille identifier - A helmet that meets the safety standards set for "Cycles" in British Columbia, which must be affixed to the vehicle Swappable battery of 70km range on a single charge
City of North Vancouver, District of North Vancouver, District of West Vancouver	No specific vehicle requirements, but permit requires description and images of all e-bike models that will be used in the fleet, and evidence that they meet or exceed safety standards in the BC Motor Vehicle Act.
City of Richmond	No specific vehicle requirements.

As shared e-bikes are maintained by private operators, cities often include specific maintenance requirements in their regulations. Common requirements include meeting providing a maintenance and repair plan or an up-to-date record of maintenance activities, tamper-resistant security hardware on all vehicles, and monthly maintenance checks conducted by the operator (i.e., checks for tire condition, brake function, handlebar grips, brake levers, bell, lights, kickstands, etc.). The City of Ithaca also specifies a minimum number of (90%) deployed bikes that should be always in an excellent state of cleanliness and repair at any time.

AGE AND HELMET REQUIREMENTS

Provincial regulations require that all riders of motor assisted cycles be at least 16 years old and wear a helmet.

Cities in BC have mostly addressed helmet requirements with operator requirements in their permits and regulations. In Richmond, Vancouver, Vernon, and Kelowna, operators must provide helmets affixed to each shared micromobility vehicle, while the City of North Vancouver, the District of North Vancouver, and the District of West Vancouver do not require operators to provide helmets. Kelowna allows operators to choose between donating helmets to a location organization or providing one helmet per bike. Kelowna also requests that operators provide a 'helmet selfie' feature that provides a discount or incentive if the user wears a helmet during the trip.

Across Canada, some operators provide free helmets that are shipped directly to the user's home when requested through the app. Others are providing free helmets at various locations and community events. CCT in the City of Ithaca and operators Lime and Neuron note that helmet distribution programs should be closely tied to community outreach and safety programs and events.

While age verification was not specified in the regulations for shared micromobility programs in BC, many operators now offer technology to confirm a user's age by requiring a selfie and a photo of legal identification.

In the City of Ithaca, riders aged 12 and older are permitted to use an e-bike. The non-profit organization who run Ithaca's bikeshare system, Centre for Community Transportation (CCT), expressed that they wanted the e-bikeshare service to be as accessible as possible particularly for education trips. They also expressed the limitations of setting an age restriction of 18 and over and estimated that approximately 10-15% of shared micromobility users lend their accounts for their children to use.

FEES

Permit fees varied across BC cities, but most often included a one-time application fee, an upfront security deposit, and some form of annual fee per vehicle (up to $40). This per-vehicle fee contrasts with trends seen in cities across the United States that have increasingly moved to lowering or eliminating per-vehicle fees and replacing them with per-trip fees. Per-trip fees help ensure that fee levels are proportional to usage, incentivizing both operators and agencies to increase demand. Two of the three operators interviewed preferred per-vehicle fees over per-trip fees, with one stating that the costs of per-trip fees are often passed along to the end user and make trips more expensive for riders.

Fees from operators are used by the cities to cover staff time to oversee and monitor the program, offset any cost burdens associated with removing or impounding vehicles, responding to community complaints, and running programs and activities to promote the program, conduct safety and equity outcomes. For example, the City of Kelowna introduced fees in April 2022 to fund a staff position to manage the program. City staff costs (on a per-hour basis) for oversight, reviewing permit applications, responding to media and public information requests, data analysis, operator coordination and communications, field checks, Council reporting, etc. should be considered in the development of fees.

In other cities across North America, fees are also used to support costs related to active transportation infrastructure. For example, the City of San Francisco uses its e-scooter fees to accelerate its bike rack installation program, the City of Seattle plans to add 1,500 bike parking spaces using fees from its dockless bike share program, and the City of Arvada has funded trail wayfinding signage from its fee collection.

Most peer cities include the option of leveraging fines or taking funds out of the security deposit if vendors do not follow or are non-compliant with the program's regulations.

Table 8 details the fees charged by the cities with shared micromobility programs in BC as well as Ithaca, NY.

Table 8: Micromobility Program Fees in BC Cities and Ithaca, NY

City	Application Fee	Per Vehicle Fee	Per Trip Fee	Other Fees
City of North Vancouver, District of North Vancouver, District of West Vancouver	N/A	$40 (minimum annual fee is $8,000) – fees are split across all three jurisdictions	None	$10,000 security deposit, retrieval fee (based on staff time), $50/bike impoundment fee
City of Kelowna	$500	$0.40 (assessed daily, paid annually)	None	$30/vehicle security deposit, due before permit is issued
City of Ithaca	None	None	None	None
City of Richmond	None	None	None	$25,000 security deposit
City of Vancouver	None	None	None	City is entitled to revenue share if the operator's revenue exceeds a specific average. A penalty fee of $100/bike is issued if bicycles are not maintained.
City of Vernon	None	$15 ($5000 max)	None	None

As previously stated, the City of Vancouver and the City of Ithaca do not charge operators fees to provide shared micromobility services. The City of Vancouver contracts with its bikeshare operator and compensates them for their operating costs; fees are either punitive or are standard permit fees not specific to bikeshare. The City of Ithaca works with the Center of Community Transportation (CCT), a non-profit organization. CCT has developed and manages a number of transportation equity programs, including the city's carshare program. The bikeshare program is the newest program for the CCT, and is funded through multiple streams:

- $50,000 from the City of Ithaca (funds are from 2022 American Recovery Plan Act)
- $140,000 from private sources (including sponsorship and public donations)
- $750,000 from other public and private sources

PARKING MANAGEMENT

Docked systems usually have minimal parking issues, while improper parking is the most common complaint cities receive about dockless micromobility systems. While parking issues can be a major concern for cities preparing to launch shared micromobility programs, a recent study observing parking behaviors of 3600 shared bikes, shared scooters, and personal cars saw that only 0.8% of bikes and scooters were improperly parked, while 24.7% of motor vehicles were parked incorrectly.[5]

Dockless shared micromobility parking can be managed in a variety of ways. These include:

[5] Brown, Anne, et al. "Impeding access: The frequency and characteristics of improper scooter, bike, and car parking." *Transportation research interdisciplinary perspectives* 4 (2020): 100099.

- **Parking Areas**: Programs can create or expand formal parking opportunities using bike racks, on-street bike corrals, docking stations, and delineating parking areas with paint and/or stencils. Kelowna uses tape and stickers to denote designated parking areas in commercial districts but does not require users to park in specific parking zones in the rest of the city (users may park in the furniture zone of the sidewalk, or in the parking lane of streets as long as there are no restrictions or pay parking in place). In the North Shore service area, the City of North Vancouver required all parking areas to be delineated with pavement markings in areas called “parking groves and patches” (Figure 7 and Figure 8), while the District of North Vancouver does not have designated parking zones due to its much larger and less dense geography.

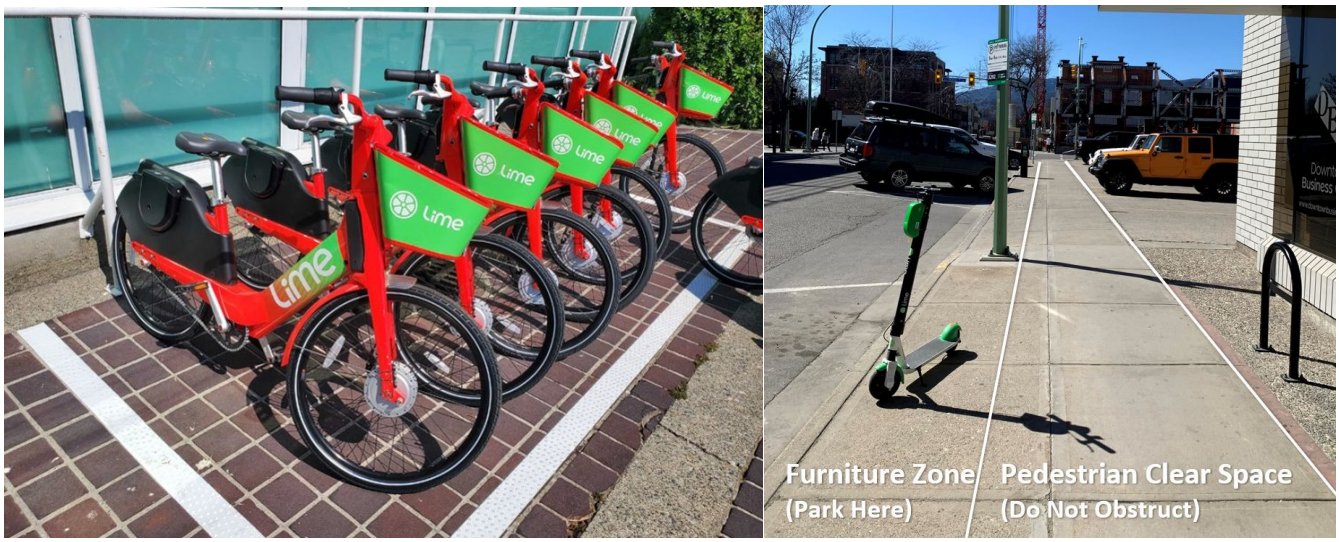

Figure 7: Left - In the City of North Vancouver, the operator (Lime) is required to paint and stencil designated parking areas. Right - City of Kelowna’s parking rules & etiquette.

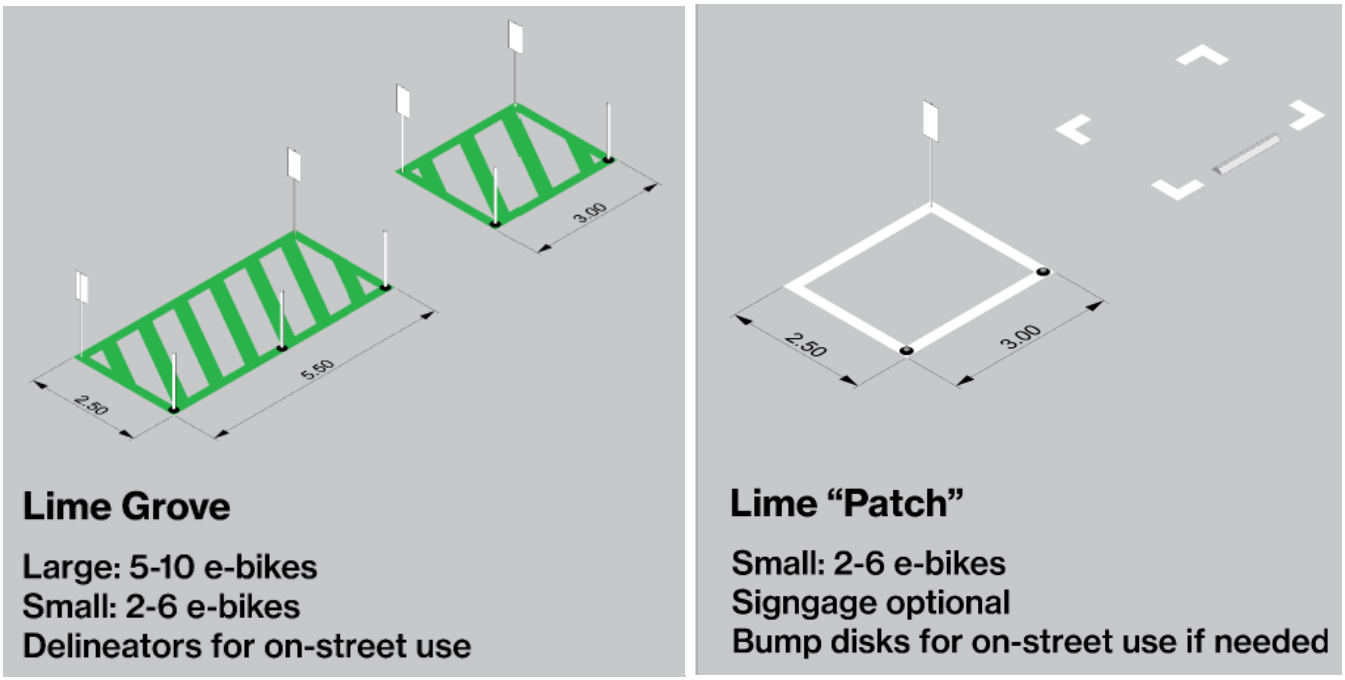

Figure 8: Standards for e-bikeshare parking in the City of North Vancouver

- **Regulation and Enforcement:** All peer city permits and policies state where vehicles can and cannot be parked, which can be communicated through physical infrastructure as well as within the shared micromobility smartphone app. Cities usually require operators to address improperly parked vehicles within a specific amount of time – the City of Kelowna reduces the maximum e-scooter fleet size by 50 vehicles every two weeks if operators do not meet parking compliance criteria. Operators often incentivize good parking behavior with discounts (Spin provides ride credits to users in Kelowna who park correctly) or levy fines to users who park improperly (CCT in the City of Ithaca charges a $1 USD fee if the user does park in a designated parking hub). The operators who were interviewed commented that the restrictive parking model was preferred and more effective than the incentivized parking model.
- **"Lock-to" Requirements:** Lock-to requirements are regulations that require devices to be fitted with a cable lock that has to be shown to be used to complete a trip. These are not common regulations but have been used to encourage riders to park and lock their vehicle to a bike rack or other parking infrastructure. However, this does require that adequate bike racks and parking opportunities be provided to be convenient to users.
- **New Technologies:** Operator technology continues to advance to support improved parking behavior. As an example, in 2022, Bird and Lime launched new tools that use a Google API to allow the companies to geo-locate parked micromobility vehicles within "less than a meter" accuracy.[6] Operators also can provide parking information and requirements on their website, including parking tips on their vehicles, or using pop-ups in their apps to remind users about proper parking.
- **Temporary Parking Restrictions**: the City of Kelowna requires operators upon direction of the city to operate temporary parking restrictions, this includes during a weather event, emergency event, construction, parade, public gathering or other situations affecting the normal operation of the right-of-way.

RIDERSHIP & USAGE

Ridership and usage characteristics are tracked differently across jurisdictions, making them difficult to compare. E-bikeshare ridership figures obtained through interviews and review of published evaluation documents include the following:

- **City of Ithaca**: Approximately 14,000 trips were made from November 2022 to February 2023. As of April 2023, there are around 250 trips per day, with 3 trips per vehicle per day.
- **Kelowna:** Approximately 225,000 trips were made over five months in 2021 (an average of 1500 trips per day), with the average trip lasting 16.5 minutes and traveling a distance of 2 km.
- **City of North Vancouver, District of North Vancouver, and District of West Vancouver (combined)**: Approximately 89,000 trips were made in 2022 (an average of 246 trips per day), with an average of two trips per vehicle per day.
- **Richmond**: Approximately 3,500 trips were made in May 2022 (an average of 112 trips per day), with a total distance travelled of 8,500 km.

Operators noted anecdotally that younger demographics utilize e-scooters more than older riders, and that for every e-bike ride, there are typically 3-4 e-scooter trips.

[6] Bellan, Rebecca. "Bird, Lime use Google's ARCore to power scooter parking solution." TechCrunch, 22 May 2022. https://techcrunch.com/2022/05/11/bird-lime-to-use-googles-arcore-to-power-scooter-parking-solution/

DATA SHARING

Shared micromobility vehicles can produce a wealth of data for cities to monitor the program, adapt regulations, and make informed decisions about the use of the public right-of-way. In addition to regular "static" reports that cities may require of operators for updates on the program, there are two data specifications that provide real-time data and make up the application programming interfaces (APIs) that are most frequently required by agencies:

- **General Bikeshare Feed Specification (GBFS):** originally developed for docked bikeshare systems, this API reports real-time location and battery charge of available dockless vehicles and is often used to develop user apps to find available vehicles. GBFS does not include data on vehicles while in-use or historical data. The North American Bikeshare and Scootershare Association (NABSA) found that in 2021, 87% of agencies with shared micromobility programs required GBFS data feeds.
- **Mobility Data Specification (MDS):** in addition to real-time location and battery charge of available dockless vehicles, MDS also includes information about unavailable vehicles and can include real-time and historical data about trip origins, destinations, and some "breadcrumb" data about the routes taken by users recorded by GPS units on the micromobility vehicles. Agencies require MDS feeds less often than GBFS feeds.

All cities in BC and the City of Ithaca require regular reporting of key metrics, which include fleet inventory and historical trip, fleet, parking, and incident (such as customer complaints, theft, and vandalism) data; and all require that personally-identifiable data cannot be shared with the city. Most cities specify that data must be accessible through an API such as MDS or GBFS.

SAFETY

Ensuring safe operations is a critical component of a micromobility program. There are multiple ways cities have tried to promote safe usage of shared e-bikes and e-scooters. Common safety concerns and potential solutions are included below:

- **Collisions and injuries**: Studies show injury severity is higher for people riding bikes than for those driving in cars. Helmets can provide additional protection for shared micromobility users, and approaches to providing helmets and compliance with the mandatory helmet law are provided on page 19.
- **Lack of familiarity with shared micromobility vehicles**: Many users of shared e-bikes and e-scooters have never used that kind of device before. To ensure that new riders travel at safe speeds, operators in Kelowna restrict the speed of new riders to 15km/h. BCAA also restricts the speed of a new rider's first three rides.
- **Understanding the rules of the road:** Operators are often required to develop outreach and education campaigns to support safe rider behavior. These campaigns can take the form of pop-up events and safety trainings, traditional and social media campaigns, and in-app education. Lime typically works with local partners to provide at least one e-bike and e-scooter safety workshop each month. The City of Kelowna requires operators to provide a quiz within the first three rides and again every three months to ensure riders know the rules, as well as an intoxicated riding pledge before a vehicle is unlocked in the evening.
- **Riding on the sidewalk**: Many cities have concerns about conflicts between pedestrians and shared micromobility riders. A study that reviewed micromobility rider behaviors in Salt Lake City, UT and Tucson, AZ found that riders are less likely to ride on the sidewalk when bike lanes are available, and those who predominately rode on a sidewalk were 151% more likely to report experiencing a crash than

those who rode in bike lanes.[7] Operators are developing technology for e-scooters that can detect sidewalk riding and slow down the rider, however, this technology is in beta form and not yet deployable at scale. Adequate active transportation infrastructure (bike facilities or shared-use paths that allow use of shared micromobility vehicles) is likely the most effective way to deter sidewalk riding.

EQUITABLE ACCESS

There are multiple regulatory tools that jurisdictions can use to promote equitable access to shared micromobility. Many operators provide discounted pricing for low-income individuals and strongly recommended partnering with community-based organizations and/or using already established low-income qualification programs to confirm eligibility. CTT in the City of Ithaca have set up the Easy Access Program for low-income users. This is administered through an online survey, and once granted, they can access an hour of free ride time each day. They estimated that 0.5% of users use the program, and the service is currently limited to those who use a smartphone.

Most peer cities include equity goals in their permit guidelines or RFPs, but leave it up to potential operators to submit details on how to meet City goals and objectives related to equity. The City of North Vancouver requires potential operators to submit their plan to provide affordable options for low-income individuals. North Vancouver also requires operators to submit a plan for those with alternate mobility needs and a description of how geographic equity will be practiced. The City of Kelowna is currently working with Lime to implement adaptive vehicles (i.e., vehicles that include a seat to make them more accessible for people with disabilities).

Lime Access

Lime's equity program, 'Lime Access'; provide 70% discount off the base fare to anyone who is on federal, provincial or municipal subsidies. This can be as simple as a BC bus pass or subsidized recreation pass, but the operator ultimately collaborates with third party organizations to identify groups of interest who would be eligible for the program. The operator estimated that approximately 2% of services users use Lime Access in Canadian markets.

EVALUATION & NEXT STEPS

Evaluation of shared micromobility programs is critical to measure success, understand ridership and demand, to plan for potential expansion and changes to the program, and to address common concerns and issues. It is important to establish specific evaluation criteria for pilot programs to determine if and when they should be upgraded to permanent programs.

Quantitative data (e.g., static reports provided by operators and data collected through the GBFS and MDS platforms) and qualitative data (e.g., public surveys, a register and summary of complaints, etc.) should be used to determine next steps for the program. In BC, only the City of Vancouver and the City of Kelowna (which have the two longest-standing programs) had published evaluation reports on their programs. See Table 9 for the findings and next steps from those reports. The North Shore jurisdictions plan to produce a summary report of the e-bikeshare program by the end of 2023 and stated that city/district leadership will advise on whether or not to continue with the program or make additional changes.

Key performance indicators to measure while evaluating a shared micromobility program include:

- the number of trips
- vehicle availability

[7] Currans, Kristina M., et al. "Scooting to a New Era in Active Transportation: Examining the Use and Safety of E-scooters." *National Institute for Transportation and Communities* (2022).

- trip time and distance
- the use of vehicles by geography and time of day
- parking and riding citations
- number and type of crashes
- volume and type of complaints

Public and user surveys can further help elicit additional measures of success like trip purpose and mode shift, as well as allow for a comparison of local demographics to rider demographics.

Table 9: Key Findings and Next Steps from Evaluation Reports from Kelowna and Vancouver

Jurisdiction	Key Findings	Next Steps
City of Kelowna (report published in 2021)	Basic statistics: - The average trip is 2km, lasting 16 minutes - The program averaged 1500 trips per day Ridership: - Most riders are residents of Kelowna, and skew slightly younger than the city's population - 33% of e-scooter trips are replacing car trips Administration: - The City has had challenges dedicating enough staff capacity to manage the program - The city received 211 complaints about the program in the first six months, but complaints are decreasing Safety: - Riders possess a good understanding of the rules of the road, and the rate of improperly parked vehicles has decreased over time - Adherence to the helmet law was low, but users were willing to utilize a shared helmet	- Add fees to cover the cost of program administration, and limit the number of operators to no more than two companies to help reduce staff administrative time - Bundle e-scooter and e-bike permits together and allow operators to offer both modes - Require helmets affixed to each vehicle - Expand parking options
City of Vancouver (report published in 2017)	Basic statistics: - The average trip is 4 km, lasting 18 minutes - Monthly ridership varies from <20,000 monthly trips to almost 100,000 monthly trips Ridership: - Ridership is strong: 2.5 rides per bike per day on average - Riders don't mind hills: 43% of all trips gained elevation - Riders use bikeshare as a supplement to a personal bike: 69% of bikeshare members own at least one bike Safety: - Adherence to the helmet law was high (70%)	- Amend bylaws to facilitate bikeshare across the entire city - Review industry changes (such as the rise of e-bikes and dockless bikeshare) and determine whether or not to accommodate new technologies - Increase system accessibility for low-income residents (through additional membership types, payment plans, and pricing)

BASELINE CONDITIONS REVIEW

An analysis of the potential for an e-bikeshare program in New Westminster reviewed the geospatial, infrastructural, and demographic attributes that correlate with bikeshare demand. The following section analyzes the local context for bikeshare and details opportunities and challenges for launching e-bikeshare in New Westminster.

GEOGRAPHY AND POPULATION

New Westminster is the tenth-largest city in Metro Vancouver, with a population of around 79,000 and land area of 15.62 square kilometers. A map of New Westminster's residential neighbourhoods is shown below (Figure 9), showing 10 defined neighbourhoods:

1. Queensborough
2. Connaught Heights
3. West End
4. Moody Park
5. Brow of the Hill
6. Glenbrooke North
7. Queen's Park
8. Massey Victory Heights
9. McBride Sapperton

D. Downtown (including Quayside)

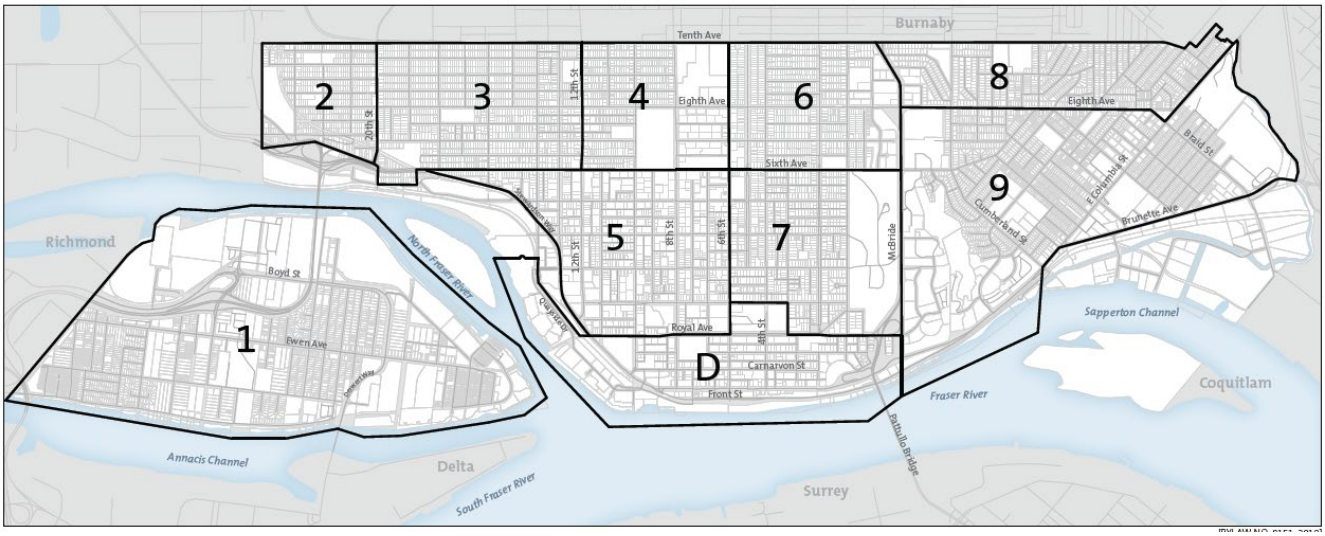

Figure 9: New Westminster - Residential Neighbourhoods
Source: New Westminster Official Community Plan

Most of the population in New Westminster in concentrated in Downtown and Brow of the Hill. Other dense neighbourhoods Glenbrooke North and parts of Sapperton as shown in Figure 10.

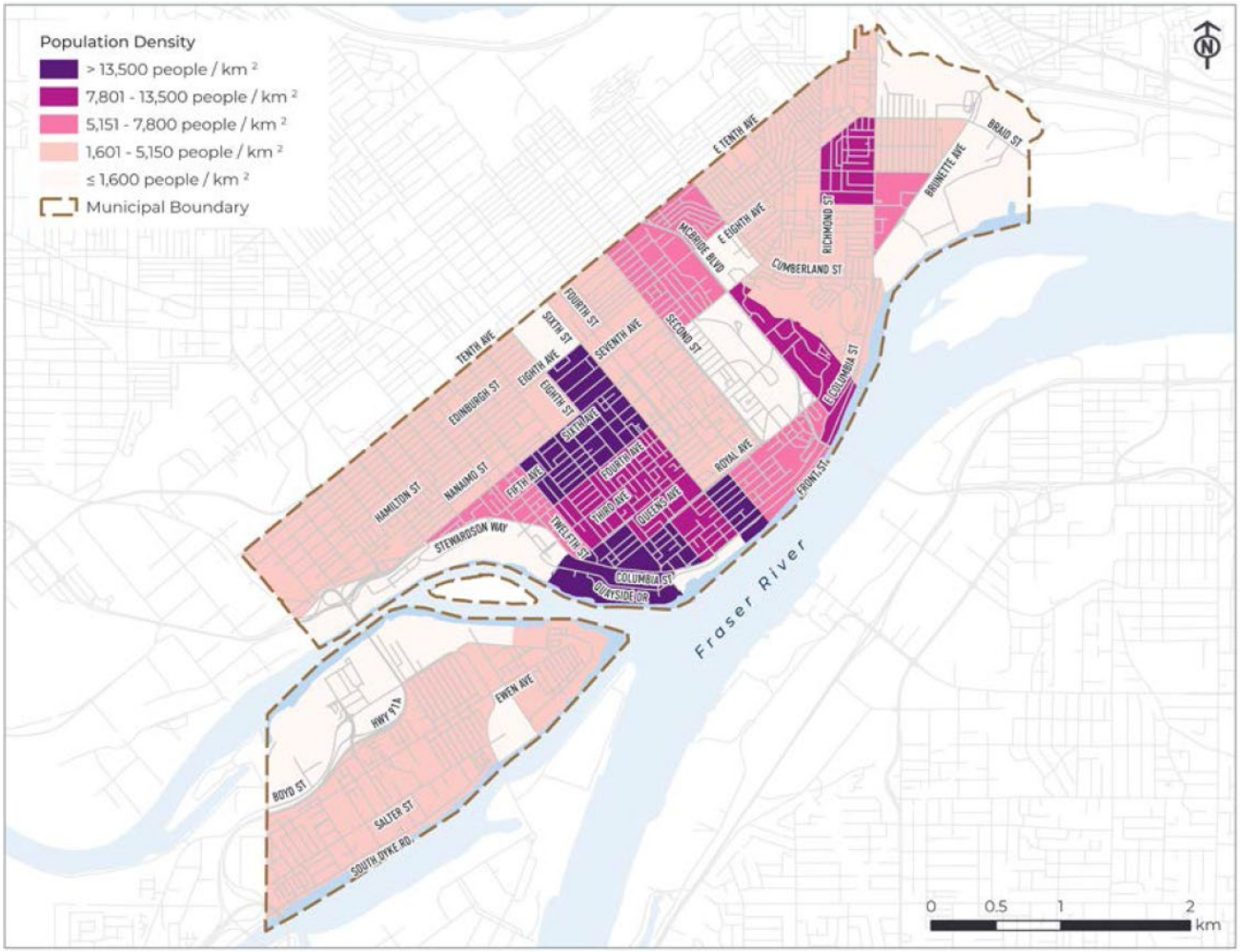

Figure 10: New Westminster Population Density 2021
Source: Active Transportation Network Plan

New Westminster is the second most dense Census division in Canada and one of the fastest growing municipalities in Metro Vancouver (see Table 11 for a comparison of density to other jurisdictions in the region). Higher population density is generally linked to higher demand for shared micromobility, and private shared micromobility operators often prioritize large, densely populated markets. As private operators are already providing shared micromobility services in other Metro Vancouver municipalities with smaller populations and population densities, New Westminster is likely an attractive location.

Table 10: Population Density in Metro Vancouver Jurisdictions with Shared Micromobility Programs

Municipality	Population (2021)	Size (Sq.Km)	Population Density (Population / Sq.Km)
District of West Vancouver	44,122	87.8	506.1
City of North Vancouver	58,120	11.83	4,913.0
City of New Westminster	**78,916**	**15.62**	**5,052.4**
District of North Vancouver	88,649	160.66	548.8
City of Richmond	209,937	129.7	1,629.1
City of Vancouver	662,248	115.18	5,749.9

Source: 2021 Census

TOPOGRAPHY

Elevation rises from the Fraser River throughout the city's neighbourhoods to the northwest, except for Queensborough where grade is generally flat (see Figure 11). There are substantial grades on many city streets, making it challenging for riders of pedal bikes to navigate the hills. E-bikes generally have no issues on streets with the grades seen in New Westminster.

Figure 11 Elevation - 5m Contours
Source: CityViews Public 3.0, ArcGIS

LAND USE

High density housing is primarily concentrated in Downtown, Uptown and parts of Brow of the Hill. Low density housing is concentrated in the West End, Kelvin, Glenbrooke North, Victoria Heights and Queensborough neighbourhoods. Commercial uses are primarily concentrated in Downtown and Queensborough. The western (North Arm North & South) and eastern (Brunnette Creek) regions of New Westminster near the Fraser River feature industrial uses. A map of New Westminster land use designations is shown in Figure 12.

Industry research indicate that bikeshare services areas in dense, mixed-use areas have the highest potential for trip-generation and demand, but that is it also important to ensure that the service area extends to lower-density areas to provide connectivity where there may be limited public transit.[8] This points to a potential need for a citywide service area, especially as the city's total land area is relatively small while its density is relatively high.

[8] Institute for Transportation and Development Policy. "*The bikeshare planning guide."* (2018).

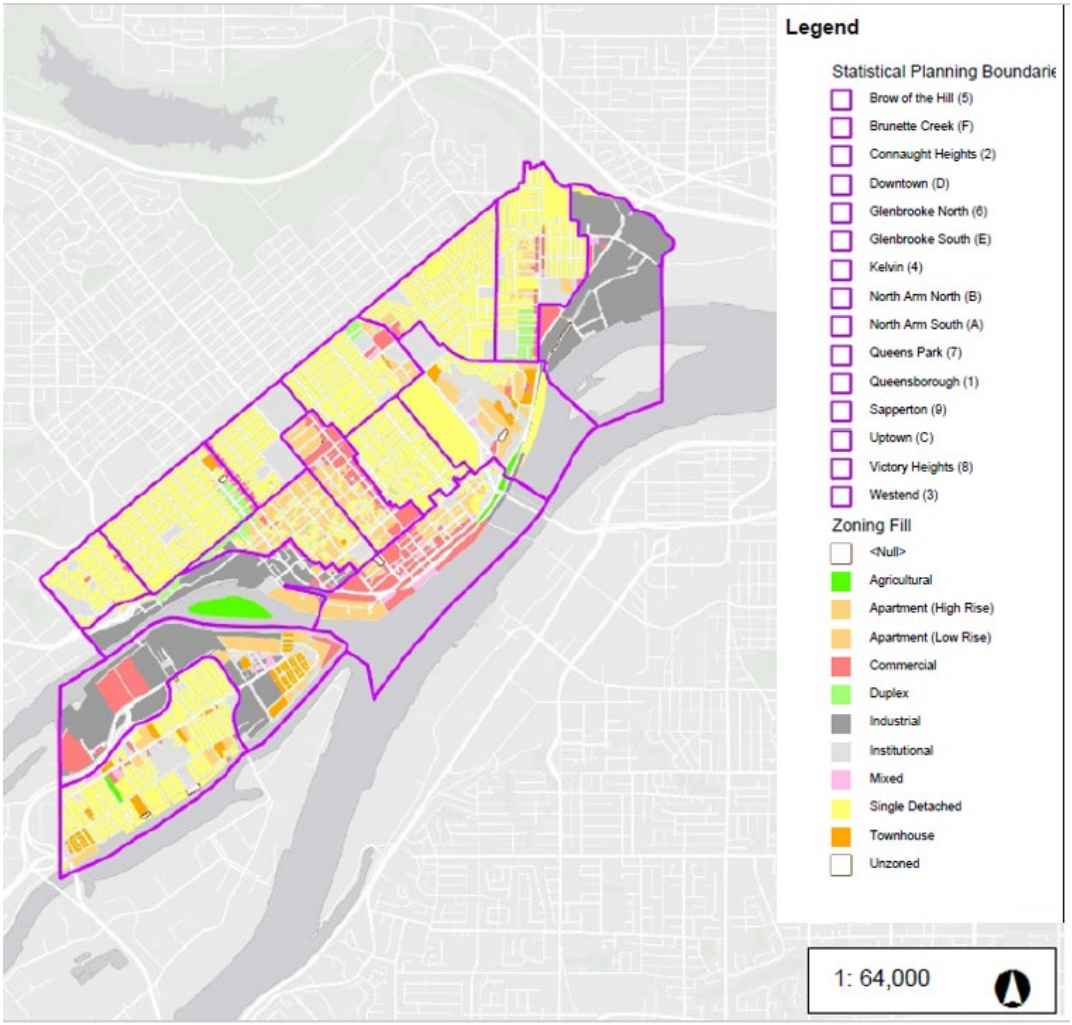

Figure 12: Land Use
Source: CityViews Public 3.0, ArcGIS

Key destinations within New Westminster are listed below:

- **Education:** 9 Elementary schools, 2 middle schools, 1 secondary school, Douglas College New Westminster Campus
- **Retail** : Downtown, Queensborough Landing, Royal City Centre, Westminster Centre
- **Medical Services**: Royal Columbian Hospital
- **Arts & Culture**: Fraser River Discovery Centre, Massey Theatre, Anvil Centre, Beggi Legge Theatre
- **Community & Recreation Centre**: Queensborough Community Centre, Canada Games Pool, Centennial Community Centre, Century House, Glenbrook Community Centre, Queens Park Arena & Stadium
- **Parks and open spaces**: Queens Park, Quayside Park, Westminster Pier Park, Tipperary Park, Moody Park, Albert Crescent Park, Port Royal Park, Glenbrook Ravine Park, Ryall Park, Sapperton Park, Mercer Stadium, Tipperary Park
- **Transit SkyTrain Stations**: 22nd Street, New Westminster, Columbia, Sapperton, Braid

Many destinations are concentrated in and around Downtown, where the majority of the City's population resides. New Westminster's densely populated neighborhoods and correlation of community destinations creates an environment conducive to short trips, which is suitable for e-bikeshare and other active transportation modes.

Areas focused for future development with New Westminster Official Community Plan are listed below and shown in Figure 13:

- Downtown Regional City Centre
- Uptown Local Centre
- Special Employment Area: Royal Columbian Hospital
- 22nd Street Frequent Transit Development Area
- Sapperton Frequent Transit Development Area
- Braid Frequent Transit Development Area

These areas are likely to grown in significance as more people live, work, visit and take transit in these locations., and an e-bikeshare program can support multimodal access to these areas as they develop.

Figure 13: Official Community Plan - Areas Focused for Future Development

DEMOGRAPHICS

The following demographic analysis uses NABSA's 2021 State of the Industry Report and 2021 Canada Census data to compare relevant demographics of shared micromobility users to New Westminster residents.

- **Race**: New Westminster has an extremely diverse population, 46.8% of whom are part of the visible minority population (10.4% South Asian, 10.9% Chinese, Filipino 8.7%, Black 3.5%, Latin American 3.3%, multiple visible minorities 2.1%, Korean 2.0%, Southeast Asian 1.7%, West Asian 1.5%, Japanese 1.3%, Arab 0.8%). Additionally, 3.1% of New Westminster residents are are Indigenous. Across North America, White riders are over-represented in micromobility, while visible minorities are mostly under-represented, and will likely require additional outreach to participate in a potential e-bikeshare program.

- **Income**: Across North America, the highest income earners (household incomes of US$100,000+) are highly over-represented in shared micromobility ridership, while the lowest earners (household incomes of <US$15,000) are also somewhat over-represented, likely due to jurisdictional equity requirements. People between these incomes are typically under-represented. In New Westminster, the median household income after tax in 2020 was $72,500. 10.1% of New Westminster's population are low-income based on the low-income measure after tax (LIM-AT). This includes 10.1% of people aged 0-17 years, 8.8% of people aged 18-64, and 16% 65 years old and over.

ACTIVE TRANSPORTATION POTENTIAL AND INFRASTRUCTURE

In New Westminster, most commute trips are taken in private vehicles (68.3%). While transit use is high (22.5%), walking makes up only 6.3% of commuter trips, while biking is only 0.9%. E-bikeshare can help provide a non-vehicular option to workers, visitors, and residents for shorter trips or trips connecting to transit.

The ATNP identified areas with the greatest potential for active transportation trips based upon existing land use, future land use, road network connectivity, density, barriers and topography (see Figure 14). Most of the city has high cycling potential, with the Downtown, Brow of the Hill, and Kelvin neighbourhoods showing the greatest potential. With the potential for e-bikes to tackle steep topography more effectively than conventional bikes, the potential for active transportation trips would further likely increase in areas shown in Figure 14, and e-bikeshare vehicle deployment could be concentrated in areas with the highest potential.

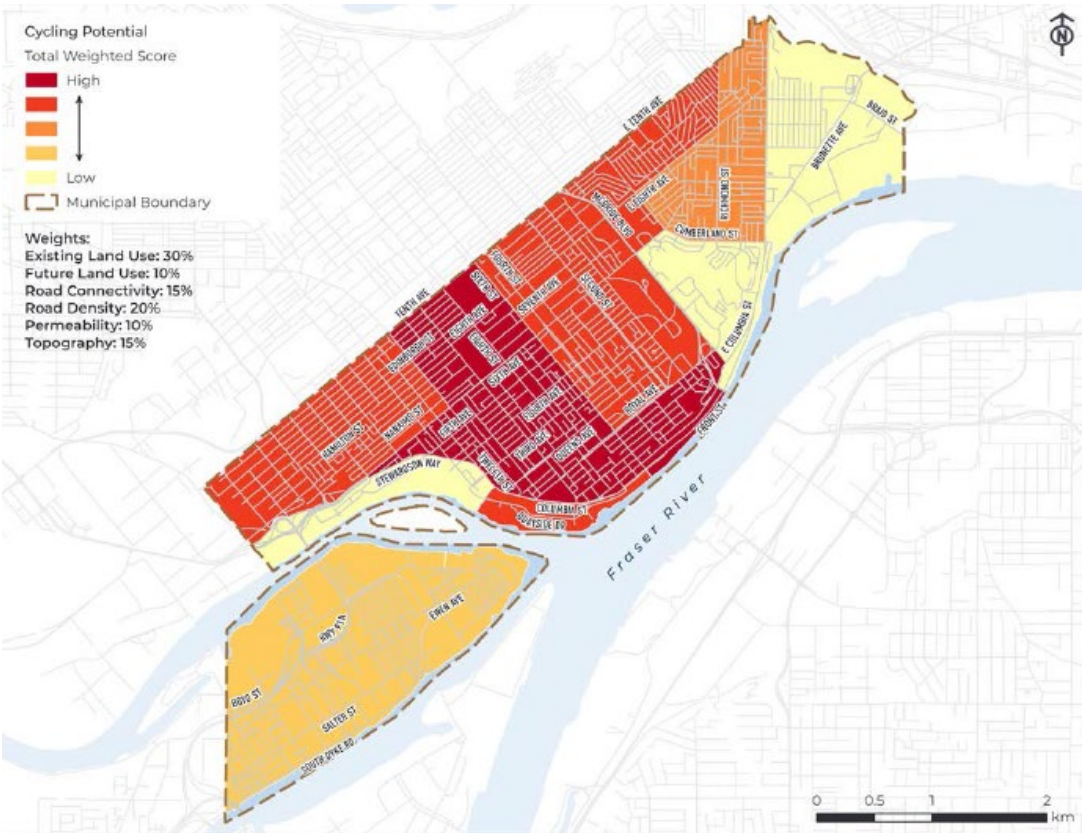

Figure 14 Active Transportation Potential
Source: Active Transportation Network Plan

A connected network of bike infrastructure is critical to supporting a successful e-bikeshare program. New Westminster's existing active transportation network is shown in Figure 15 and includes on-street and off-street facilities. There are a number of bikeways, greenways and off-street bike routes including the BC Parkway, Brunette-Fraser Regional Greenway, Rotary Crosstown Greenway, London/Dublin Greenway and the Agness Street Greenway that pose attractive rolling routes to support e-bikeshare riding.

Approximately 78% of the City is located within 400m of a bicycle route, and around 61% of the City is within 400m of a bicycle route that is "Comfortable for Most," as shown in Figure 16. Although the current cycling network is substantial, there are a few significant gaps. To address these gaps, New Westminster has identified a proposed network as part of the Active Transportation Network Plan (Figure 17). Full implementation of the proposed network would increase the number of facilities suitable for all-ages-and-abilities (AAA) cycling and will support increased e-bikeshare ridership as more routes become more accessible, safer and more comfortable for more of the population.

One neighbourhood to focus on during implementation planning of an e-bikeshare program is Queensborough. The neighbourhood has multiple bike facilities, but it is separated from New Westminster by the Fraser River. Walking and cycling connections are currently provided by the Queensborough Bridge or the Q to Q Ferry, which operates every 30-minutes. The ferry has the capacity to take only four bicycles at a time, and although there is a multi-use pathway across the bridge, it is narrow and not a comfortable facility for all ages and abilities. This will likely create a challenge for providing bikeshare connectivity to Queensborough which is not likely to be solved in the short-term.

Figure 15 New Westminster Existing Cycling Network
Source: Active Transportation Network Plan

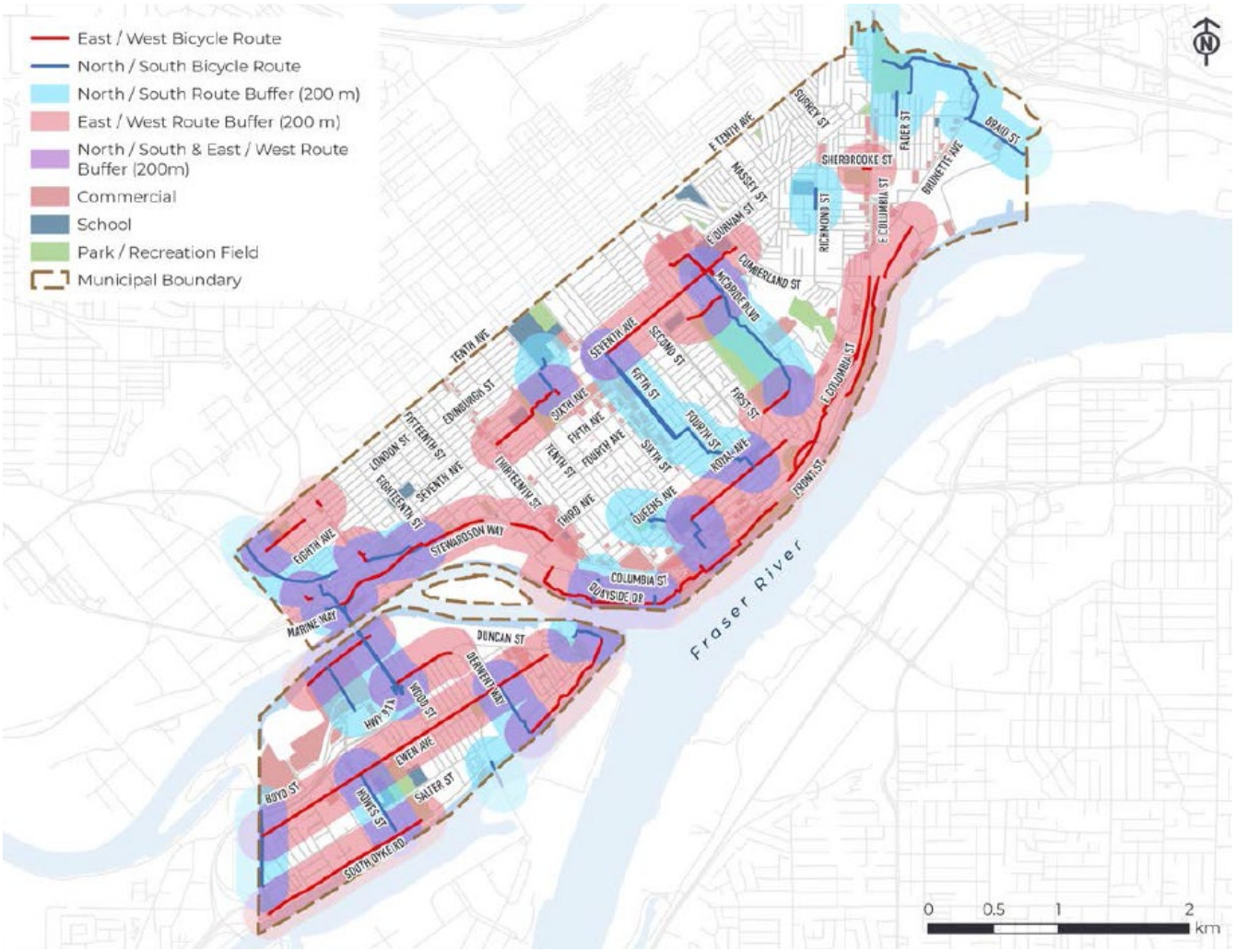

Figure 16: Active Transportation Network Plan Gap Analysis - Comfortable for Most Facilities
Source: Active Transportation Network Plan

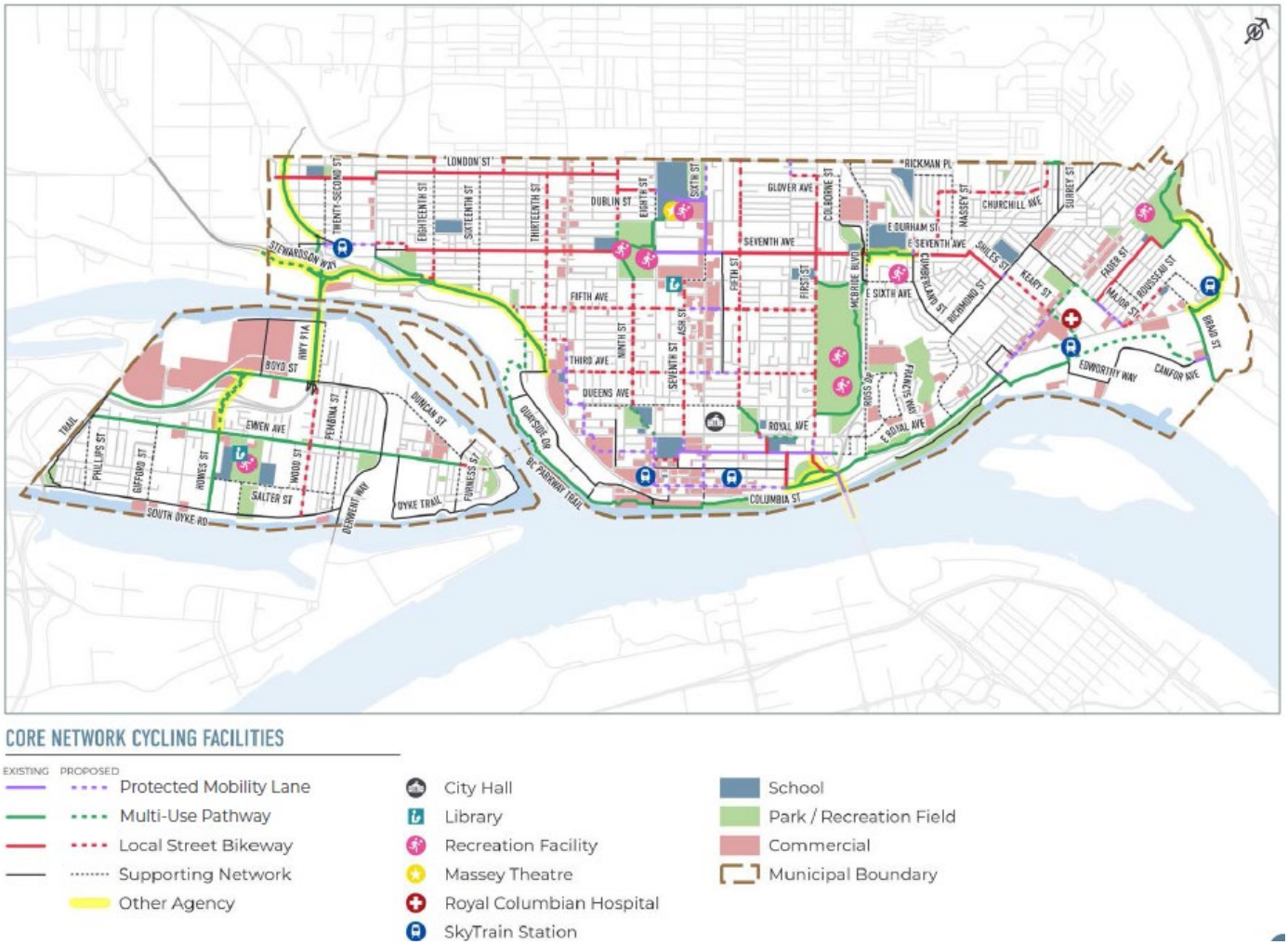

Figure 17: Proposed Active Transportation Network

Source: Active Transportation Network Plan

TRANSIT CONNECTIONS

Shared micromobility is often used as a first- and last-mile connection to transit. Within New Westminster, the major transit options from TransLink include SkyTrain and bus service. The 2021 average daily boardings for SkyTrain stations and local bus routes are included in Table 12 and Table 13.

Table 11: New Westminster SkyTrain Stations Average Daily Boardings (2021)

SkyTrain Station	Line	2021 Average Daily Boardings			Secure Bike Parking Provision Provided	Bike Parking Stands Provided
		Weekday	Saturday	Sunday / Holiday		
New Westminster	Expo Line	11,000	7,000	5,000	No	Yes
22nd Street		7,300	4,800	3,700	Yes - Lockers	Yes
Columbia		3,000	2,200	1,600	No	Yes
Sapperton		2,000	1,200	900	No	Yes
Braid		3,000	1,800	1,400	Yes - Lockers	Yes

Source: TransLink Transit Service Performance Review 2021

Table 12: New Westminster Top 3 Bus Routes Daily Average Boardings (2021)

New Westminster Bus Total Boardings Rank	Bus Route	2021 Average Daily Boardings		
		Weekday	Saturday	Sunday / Holiday
1	106 New Westminster Stn/Edmonds Stn	7,000	5,000	4,000
2	123 New Westminster Stn/Brentwood Stn	5,000	3,000	3,000
3	119 Edmonds Stn/Metrotown Stn	5,000	4,000	3,000

Source: TransLink Transit Service Performance Review 2021

New Westminster Station received the 7th largest average daily boardings in the entire SkyTrain network, and it is the busiest transit facility in the city. 22nd Street Station is also a popular transit interchange, with a number of connecting bus routes. While the top three bus routes in New Westminster are not in the top 10 bus routes for the entire TransLink bus system, they have more average boardings than all other subregions evaluated by TransLink, with the exception of the Vancouver/UBC subregion.

E-bikeshare could help provide a convenient option for New Westminster residents, workers and visitors to connect to transit. It will be important to consider parking management strategies as part of operator requirements, as well as parking provision at stations, interchanges and stops to encourage safe and accessible parking of e-bikeshare. Some stations already provide secure bike parking (lockers) and bike stands, as shown in Table 12. The adequacy of these parking facilities as well as their compatibility with e-bikeshare vehicles should be reviewed during program implementation.

Integrating Micromobility with Transit

The Institute for Transportation and Development Policy recommends the following methods to better integrate shared micromobility with public transit[9]:

- **Physical Integration**: Shared micromobility vehicles should be available in close proximity or visible to transit. This can include designated parking areas at bus stops and transit stations, active transportation infrastructure that connects to transit, or mobility hubs where multiple modes of transportation are available.
- **Payment and Fare Integration:** Payment integration allows users to reserve, transfer between, and pay for multiple modes of transportation. This can be costly and time-consuming to implement but can be (at least partially) achieved using smart/RFID cards, mobile payment apps, or reduced fare transfers.
- **Informational Integration:** Clear, accessible information is key for informed trip-making decisions. Wayfinding signage, trip-planning applications (optimized for mobile use), and multimodal maps in public transit stations can promote use of micromobility. There may be a wider opportunity for TransLink to consider integrating shared micromobility into their trip planning website and app Trip Planning.
- **Institutional Integration:** Cooperation across departments, agencies, organizations, and levels of government can increase opportunities to integrate micromobility with transit. Expanding micromobility service areas beyond city partners can improve access and align with regional transit routes.

EQUITY-SEEKING POPULATIONS

The Active Transportation Network Plan identified under-served areas with higher concentrations of people who depend on active transportation. Five indicators were used to examine equity across neighbourhoods, including the percentage of youth populations, senior populations, immigrant populations, Indigenous populations, and low-income populations. Figure 18 shows the results of the equity analysis: the areas of the city with the greatest equity need include the Brow of the Hill, Kelvin, and Connaught Heights neighbourhoods.

[9] Institute for Transportation and Development Policy. (2021). *Maximizing Micromobility: Unlocking Opportunities to Integrate Micromobility and Public Transportation.*

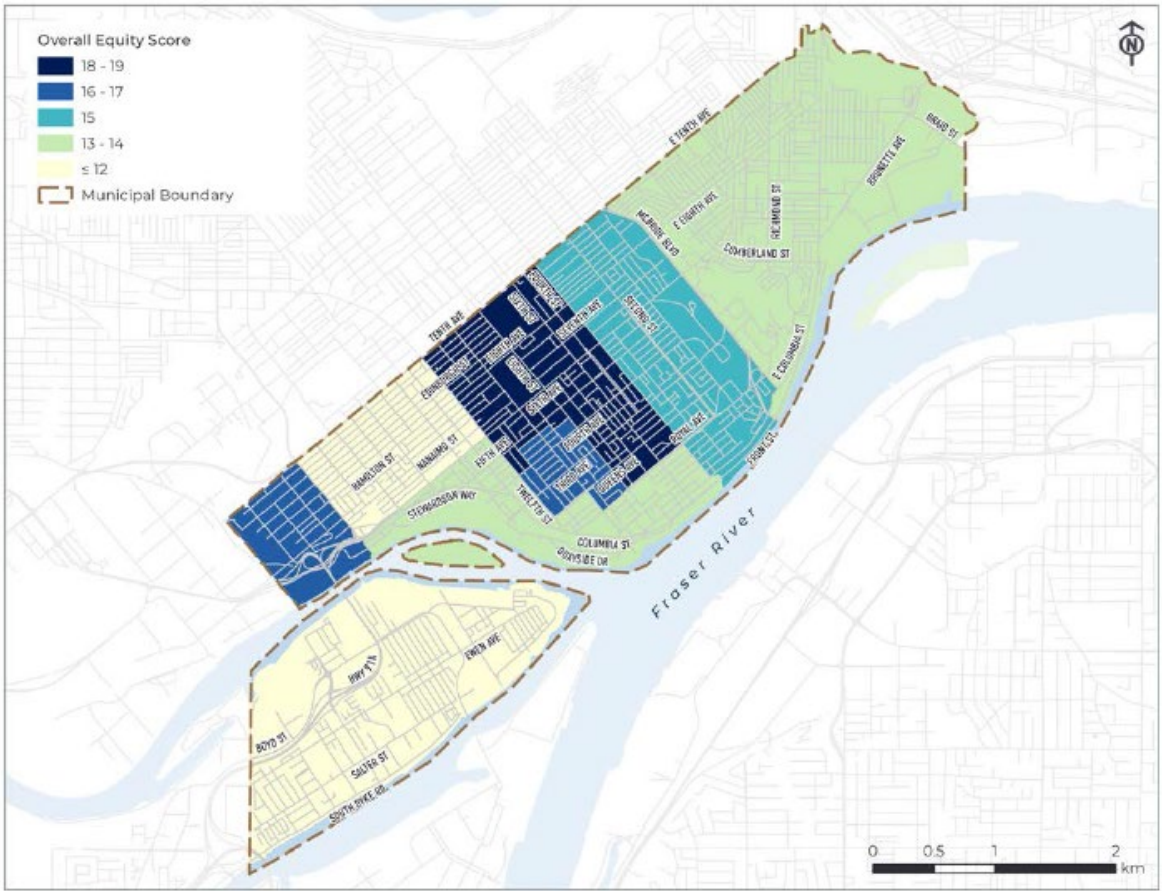

Figure 18 New Westminster Active Transportation Network Plan Equity Need Analysis
Source: Active Transportation Network Plan

Jurisdictions across North America require shared micromobility operators to provide a wide range of equity initiatives and programs, including discount programs (92% of all programs), alternative payment options (85%), education and outreach programs (79%), geographic distribution policies (75%), equitable hiring processes (75%), and adaptive vehicles (21%).[10] There is significant variation in the deployment of these tools based on the local context and the operator's capacity – New Westminster could require an "equity plan" from potential operators to show how low-income and historically marginalized populations will be engaged in the program.

[10] North American Bikeshare and Scootershare Association. (2022). *3rd Annual Shared Micromobility State of the Industry Report - 2021*

E-BIKESHARE RECOMMENDATION

BARRIERS & OPPORTUNITIES

Based on the policy review, peer city review, and best practice and local context analyses, the following list of initial barriers and opportunities to launching an e-bikeshare program in New Westminster were identified. Further analysis will be conducted in Tasks 3 and 4 to determine public concerns along with internal city challenges and opportunities.

Barriers	Opportunities
• **Limited City resources:** The city does not currently have resources for the capital investments required for docked bikeshare (other dockless options that are much less resource-intensive are still possible). E-bikes, which are preferred by bikeshare users and would support riders on the city's steep streets, are also more expensive for operators to provide than pedal bikes. • **Narrow public rights-of-way**: Many city streets have narrow sidewalks with small furniture zones / boulevard space - careful consideration will be needed when developing an implementation plan for parking management in these constrained locations. • **Fraser River:** The Fraser River creates a barrier to providing convenient access to e-bikeshare between Queensborough and the rest of New Westminster. The Queensborough Bridge is not a safe and comfortable facility for bikes, and the Q to Q ferry can only accommodate up four bicycles per trip. • **E-scooter prohibition:** E-scooters are not currently allowed to operate in BC without jurisdictional participation in the provincial pilot. Many e-bikeshare operators are more willing to launch in a new market if they can also operate e-scooters.	• **Market appeal:** New Westminster's high population density and compact urban form creates an appealing market for shared micromobility operators. Many key destinations are concentrated in Downtown, which also coincides with the majority of the City's population – these could be popular areas for potential e-bikeshare trips. • **Well-connected cycling network:** The city's cycling network is generally well-connected and includes low-stress local streets and separated facilities that are comfortable for cycling. The city has also identified an ambitious proposed actived transportation network for further corridor improvements. • **First-last mile connections:** Transit is a popular mode for New Westminster residents and there are several busy SkyTrain stations and bus routes in the municipality. A e-bikeshare system could help increase transit accessibility by offering an option for completing first-last mile trips. • **Regional collaboration opportunities:** The District of North Vancouver, City of North Vancouver, and District of West Vancouver are currently successfully managing a multi-jurisdictional e-bikeshare program. There may be an opportunity for local collaboration with neighboring cities Burnaby and Surrey, who do not currently have shared micromobility programs.

INITIAL RECOMMENDATION

The project team's initial recommendations based on the findings from this Feasibility Assessment includes the following recommendations for system type, fleet type, and ownership model, detailed in Table 13. These recommendations may be refined after additional assessment of financial needs and potential business models. Development of specific operational requirements (fleet size, service area, potential fee structure, parking management, etc) will occur during Tasks 4 and 5.

Table 13: Initial Program Recommendations

Category	Recommendation
System Type	*Dockless, with designated parking areas*: A dockless system has low start-up costs, limiting the financial burden on the city to launch an e-bikeshare system. Later tasks can determine the feasibility of physical parking areas compared to virtual parking areas denoted in a smartphone app - in less dense areas of the city, designated parking areas may not be necessary.
Fleet Type	*E-bikes*: Due to the city's steep topography, e-bikes are recommended over pedal bikes. Multiple private operators already offer shared e-bikes in Lower Mainland communities. E-scooters are not currently permitted in New Westminster as per the Motor Vehicle Act.
Ownership Model	*Agency-permit, privately owned and operated*: The majority of shared micromobility programs in BC utilize this model, which helps to minimize the city's capital investments and the staff time needed to oversee a program. New Westminster can look to the District of North Vancouver, the City of North Vancouver, the District of West Vancouver, the City of Richmond, and the City of Vernon for documents and policy examples of this model. A permit program with a privately owned and operated fleet of e-bikes could also easily expand to a regional program with neighboring jurisdictions, as additional jurisdictions would not need to purchase equipment and can adopt similar or identical permit regulations as New Westminster.

Equity Considerations for a Potential Program

In alignment with the city's Strategic Plan priority area of Reconciliation, Inclusion, and Engagement, the project team will focus on the following equity-focused topics as the study moves toward planning for program implementation:

- **Outreach/engagement with underserved communities:** Operators can conduct digital and/or in-person outreach targeting underserved communities. This may include ad/social media campaigns, tabling/pop-up events, and demonstrations of the micromobility vehicles. Underserved populations are engaged consistently and meaningfully throughout the program (not just during launch).
- **Equitable distribution of vehicles:** There are a variety of ways to ensure vehicles are available in equity-seeking populations, including requiring specific fleet numbers in equity areas or reducing operator fees for trips that start or end in specific areas.
- **Equitable access to the program:**
    - **Discounted pricing:** All operators interviewed provide discounted pricing for low-income individuals - often partnering with community-based organizations and/or using already established low-income qualification programs to confirm eligibility.
    - **Non-digital/underbanked access:** All operators interviewed can provide alternative access programs for people who do not have access to a smart phone or the operator's app or are

unbanked/underbanked and need cash or pre-paid card payment options. Operators noted that these types of programs are often underutilized.

- **Multilingual information:** Operators should provide their apps and communications in different languages appropriate for the New Westminster population.
- **Access for users with disabilities:** Some operators provide adaptive vehicles for users with disabilities or partner with other organizations that provide these services.