Research to inform the development of a shared micromobility program

for the Township of Langley

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Disclaimer

This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organizations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability across the region.

This project was conducted under the mentorship of Township of Langley staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of the Township of Langley or the University of British Columbia.

Land Acknowledgment

The author acknowledges that the work for this project took place on the unceded ancestral lands of the xwməθkwəy̓əm (Musqueam), Skwxwú7mesh (Squamish), Stó:lō and Səl̓ílwətaʔ/Selilwitulh (Tsleil-Waututh) Nations.

The Township of Langley is situated on the traditional lands of the Coast Salish peoples of the qʼic̓əy̓ (Katzie), qʼʷɑ:nƛ̓ən̓ (Kwantlen), Máthxwi (Matsqui) and se'mya'me (Semiahmoo) First Nations.

Executive Summary

The Township of Langley is exploring the prospect of piloting a shared micromobility program in support of its sustainability and transportation objectives. As a municipality enrolled in the B.C. Ministry of Transportation and Infrastructure (MoTI) electric kick scooter pilot project, the Township has the ability to incorporate e-scooters as a shared mobility platform. To support the Township's shared micromobility work, this report examines the experience of municipal staff involved in similar work in other jurisdictions, explains the perspective of private operators in the shared micromobility space, and profiles some potential areas for a pilot program. It then makes key recommendations for the design and scoping of any potential shared micromobility pilot program in the Township of Langley.

Jurisdictional Scan

To better understand the experience of other municipalities in implementing shared micromobility programs, a jurisdictional scan was conducted where municipal staff from seven municipalities were interviewed on the design of their respective programs.

While each program has unique features, staff frequently identified the following as guiding purposes: supporting transportation demand management and sustainability objectives; promoting public health; solving the last-mile problem; and supporting certain segments of the population (e.g., tourists or students at a local college or university).

Studied programs universally operate using a closed permit system with one to two year contracts. This model is praised for allowing changes at the conclusion of the permit while also obtaining public benefits through the RFP process. The geographic scope of each program varies significantly based on population distribution, density and other factors specific to each locality.

The large majority of programs operate with a mix of e-bikes and e-scooters, though some municipalities only have e-bikes due to safety concerns. Municipalities use geofencing to enhance safety and to ensure compliance via slow zones, no-go zones, no-parking zones and mandatory parking zones.

Operator Analysis

The municipal staff perspective is then complemented by the operator perspective, which is obtained from a mix of second-hand accounts relayed by staff and an interview with the executive of a major Canadian micromobility company.

The overriding point raised by operators is that a balance must be struck between the financial viability of operating shared micromobility from a private profitability perspective and the needs of the municipality to maximize public benefits through licensing requirements. Examples of profitability-enhancing features include a large e-scooter fleet, while examples of costly public benefits include equity programs.

Operators state that municipalities must be attentive as not to distort the business case of the program to such a degree as to make private sector participation unappealing or unviable.

Analysis of Pilot Areas

Finally, site profiles are analyzed for two potential shared micromobility pilot areas in the Township of Langley. When compared to shared micromobility program areas in Coquitlam and the North Shore, the larger of the two Langley sites appears to have suitable population and population density, though active and public transport use is presently very low. Additionally, high rates of local commuting and short commute trips within the Township of Langley may be supportive of shared micromobility.

Recommendations

Based on the analyses above, this report recommends that any future shared micromobility pilot program at the Township of Langley adopt the following features: (1) a flexible pilot area, (2) a two-year timeframe, (3) a closed permit system, (4) a mixed fleet of e-bikes and e-scooters, (5) legalization of sidewalk parking in neighbourhoods, and (6) a data aggregator to process and analyze device data.

Table of Contents

Introduction

Over the past decade, shared micromobility has emerged as a new instrument in municipalities' toolkits for enhancing the mobility of their residents and promoting alternatives to car dependence.

Shared micromobility is an emerging domain and broadly refers to a variety of shared human- and electric-powered light devices available for public use, including pedal bicycles, electric bicycles (e-bikes) and electric kick scooters (e-scooters).

Concurrently with many other municipalities in the Lower Mainland, the Township of Langley is exploring the prospect of piloting a shared micromobility program in support of its sustainability and transportation objectives. As a municipality enrolled in the B.C. Ministry of Transportation and Infrastructure (MoTI) electric kick scooter pilot project, the Township has the ability to incorporate e-scooters as a shared mobility platform.

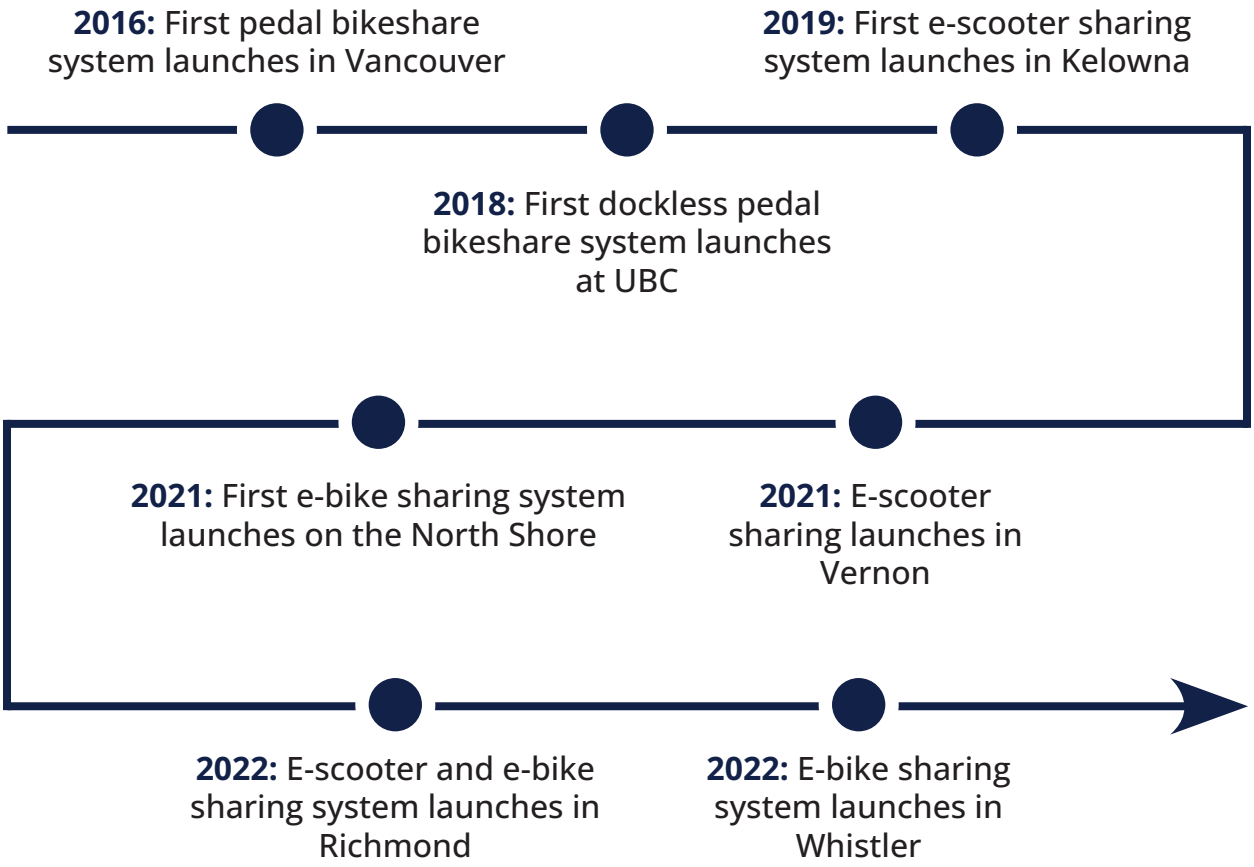
This UBC Sustainability Scholars project was conducted in partnership with the Township of Langley to support the potential development of a shared micromobility pilot program in the Township. As such, this report aims to provide background information on ongoing and upcoming work at other similarly situated Canadian municipalities, explore the current state of the shared micromobility industry, highlight the key characteristics of prospective pilot areas, and make recommendations for the design and scoping of any eventual shared micromobility pilot.

Context

Though shared micromobility has a relatively short history in British Columbia, municipalities across the province are experimenting with how this emerging domain can contribute to their environmental, health and transportation objectives. While the first shared systems consisted only of pedal bikeshare, the B.C. market has since diversified to include both e-bikes and e-scooters.

In 2019, TransLink released guidelines based on best practices to help guide Lower Mainland municipalities in the development, implementation and regulation of local shared micromobility pilot programs. In 2021, the B.C. Ministry of Transportation and Infrastructure (MoTI) began enrolling municipalities in a trial program whereby e-scooters could be legalized within their boundaries until 2024. Today, the shared micromobility landscape continues to rapidly evolve and ongoing learning is needed to keep up with new operators, novel technologies and evolving best practices.

Figure 1. Timeline of shared micromobility milestones in B.C.



Methodology

This report takes a three-phase approach, comprising a jurisdictional scan of selected municipalities, an analysis of shared micromobility operator perspectives, and an analysis of two prospective pilot site areas. The report culminates with a series of recommendations for the development of a shared micromobility pilot program in the Township of Langley based on identified commonalities, best practices and other considerations.

The first step is a jurisdictional scan, which aims to summarize the ongoing and upcoming work of various municipalities whose characteristics or program details may be of particular relevance to the Township's own efforts. Through interviews with staff at these municipalities, a number of innovations, lessons learned and best practices for shared micromobility are identified.

The second phase of the project consists of an operator analysis, which aims to better understand the considerations and preferences that underlie the decision-making of private shared micromobility providers in response to municipalities' program design decisions. This piece is crucial in order to understand not just the perspective of municipal staff but also of the private interests which actually deliver the shared micromobility platforms.

Finally, the third phase of the project consists of an analysis of pilot site areas, whereby key demographic information and summary statistics are calculated for two prospective shared micromobility pilot areas within the Township of Langley. In order to better understand if and how these sites differ from other municipalities' chosen sites, the site profiles of the two sites are compared to those of two other Lower Mainland shared micromobility programs—the North Shore and Coquitlam.

PART ONE

Jurisdictional Scan

About the Process

Methodology

In order to understand how comparable municipalities approached shared micromobility programs, a series of staff interviews were conducted between November 2022 and February 2023. The interviews were conducted in a semi-structured format via Zoom and took around 30-60 minutes. The questions (see Appendix 1), which were developed in partnership with the Township of Langley, sought to learn why each municipality embarked on a shared micromobility program; what design decisions they took prior to the program launch; how they selected their operator(s); and what the next steps are for shared micromobility within their borders in the short- to medium-term.

Prospective participants were offered a choice between a call or an email questionnaire. In either case, once they had agreed to participate, they were provided with the set of questions in advance. During and after the interviews, participants had the opportunity to provide additional information via the Zoom shared screen feature and by email follow-up. Some interviews were conducted one-on-one, while Meghan Woods, Environmental Sustainability Coordinator at the Township of Langley and Scholar Project Mentor, was present at other meetings and helped to conduct the interview.

Interview Selection

The list of municipalities to interview was developed in an iterative process in

collaboration with the Township of Langley. A preliminary shortlist was developed at the start of the project, comprising every municipality approved for the B.C. Ministry of Transportation and Infrastructure (MoTI) electric kick scooter pilot project along with every Lower Mainland municipality known to be operating or exploring a shared micromobility system. The shortlist was then triaged into three categories—most relevant, potentially relevant, and nice to have—based on their geographic similarity to the Township of Langley, the recency of their shared micromobility work, and other factors.

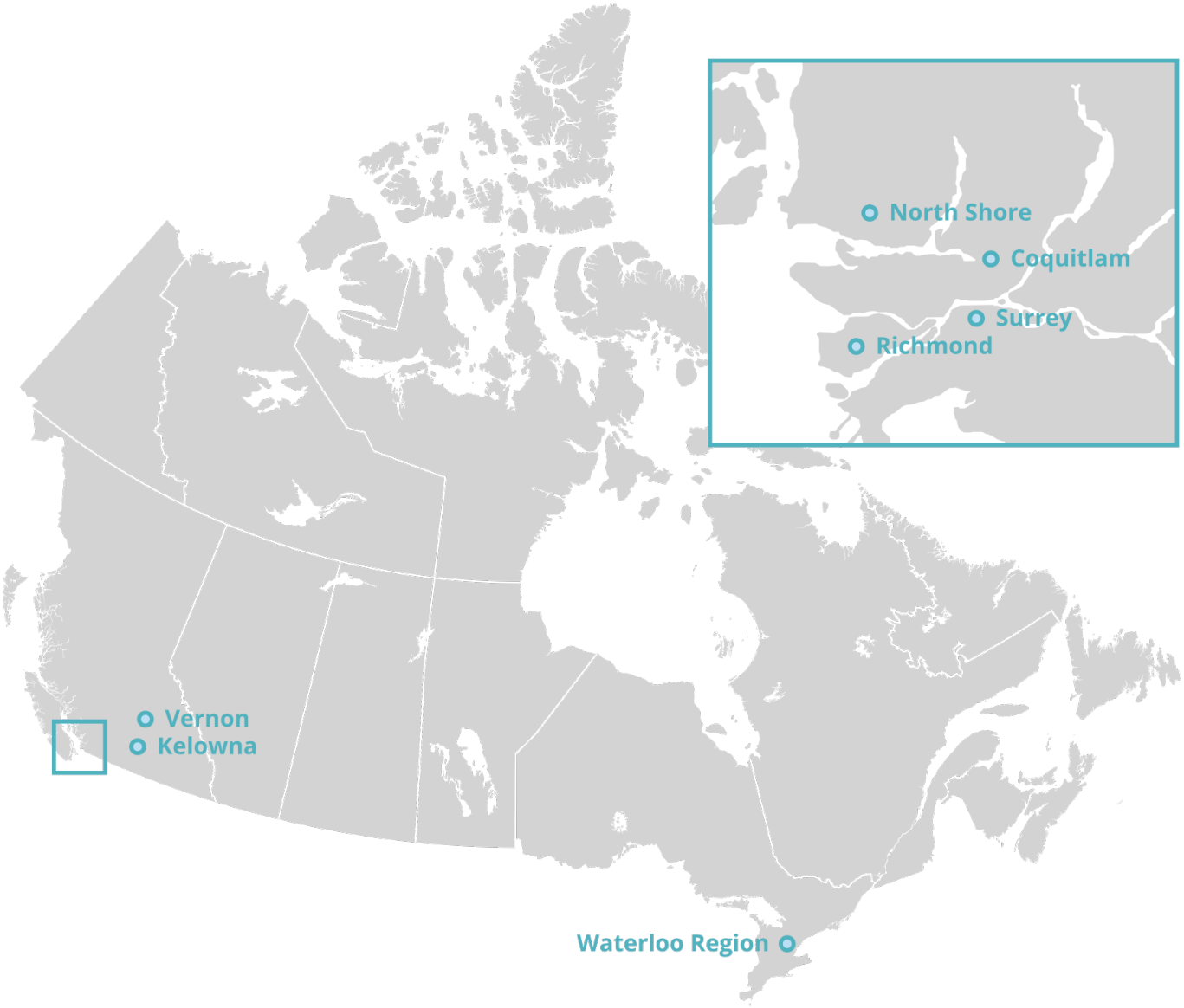
The list of prospective municipalities to contact was continuously refined as the interviews were conducted, as the interviewed staff members were asked whether they had heard of any interesting initiatives or knew of any contacts at other municipalities that may be of relevance. This information was then incorporated into the list and triaged as necessary into the three-category system. While there was a strong preference for B.C. municipalities due to the shared experience of dealing with MoTI pilot project regulations, municipalities in Alberta and Ontario were also considered based on interviewees' recommendations and the recency with which they had undergone a request for proposal (RFP) process.

Ultimately, municipal staff from the following municipalities, all in British Columbia, discussed their respective municipalities' shared micromobility work in some form: the City of Coquitlam, the City of Kelowna, the City of Richmond, the City of Surrey and the City of Vernon. In addition, two interviews were conducted with municipal staff concerning inter-municipal or regional shared micromobility initiatives: these interviews were with staff from the District of North Vancouver, who spoke about the common shared e-bike program of the North Shore municipalities; and the Regional Municipality of Waterloo, Ontario, who spoke about the ongoing efforts by Waterloo Region and its constituent lower-tier municipalities[1] to jointly launch a shared micromobility program.

Not all of the municipalities studied in this section have existing shared micromobility programs and therefore some staff interviews focused on preliminary program development work, which may or may not culminate in implementing a shared program.

1 Most municipalities in Ontario are two-tier, meaning that they are comprised of a single upper-tier entity responsible for public transit and regional planning (called a "county" or a "regional municipality") and any number of lower-tier entities responsible for more local infrastructure (often called a "city", "village" or "township").

Figure 2. **Map showing locations of interviewed municipalities**



Key Findings

Initiation and purpose

The impetus for the development of a shared micromobility program varies from city to city. In many municipalities, the impetus came from a staff desire to introduce new modes of travel, while in others it was Council that gave directions to staff to begin exploring the prospect of introducing a shared program. In other cities still, the impetus came from external stakeholders such as business improvement associations, which saw benefits in the introduction of micromobility modes. The initiation of a shared micromobility program is a delicate process that must navigate the preferences and sensibilities of Mayor and Council, as they are the final decision-maker on whether to proceed. For instance, some municipalities highlighted their political leadership's opposition to e-scooters, thereby resulting in the prioritization of e-bikes; others mentioned Council's concerns about public safety, resulting in a focus on enhanced education and outreach initiatives.

Once the impetus exists for the development of a shared micromobility program, municipalities established clear goals that the program is intended to support. These goals range from supporting transportation demand management and sustainability objectives to promoting public health through active travel and solving last-mile gaps in public transit network coverage. Other goals related to specific segments of the population, such as meeting the travel needs of a local university campus or giving tourists and other recreational users greater mobility throughout the city. Several staff highlighted in their interviews that selecting a clear set of goals is important, as other elements of the program design flow naturally from the initial problem statement.

Stakeholders

A variety of internal and external stakeholders were consulted by the interviewed municipalities in the course of their development of a shared micromobility program.

Within each municipality, various departments can have important input on issues relating to shared micromobility. These can range from transportation and engineering, who have interests related to the circulation of vehicles and curbside

management, to police and bylaw enforcement, who are concerned with the proper operation of micromobility devices. Other city departments identified as potential stakeholders include parks, who may object to the use of certain recreational facilities by micromobility devices, and legal, who will be involved in the RFP process and the selection of operator(s). Several staff additionally identify their main, most important internal stakeholder as Mayor and Council, due to their final decision-making authority.

External stakeholders include funding partners, such as regional or provincial entities that award grants to municipalities to undertake shared micromobility work, and local civic groups that have particular needs in regard to the operation of a shared micromobility program, such as business improvement associations and equity-focused community organizations. Prominent local trip generators are also considered stakeholders by several municipalities, namely universities and major employers. In the abstract, the public at large can also be considered an external stakeholder, both in the sense that they will be the users of the programs and that they may have concerns relating to parking and safety.

Timing

The permits to operate shared micromobility systems granted or planned by the municipalities are of short duration, ranging from one to two years. Staff say that having short- term agreements allows the municipalities to reassess whether the program is working at the end of the term, make necessary changes to any future RFP or contract renewal, or opt to select a new operator partner if the performance of the current operator is unsatisfactory. A major advantage with two-year terms identified by some staff is that having two full years of data allows for comparisons to be made between the two years—permitting for trends and directions to be identified.

A common concern identified among the B.C. municipalities interviewed is the end of the MoTI electric kick scooter pilot project, currently slated for April 5, 2024. The existence of this looming deadline adds uncertainty to the long-term viability of an e-scooter-based program and requires contracts to be written with flexibility in order to ensure continued service via e-bike in the event that the pilot scheme is discontinued and that e-scooters remain prohibited or heavily restricted by the *Motor Vehicle Act*. However, staff seem generally optimistic that the provincial government will elect to allow e-scooters to remain in some capacity at the end

of the pilot period, whether through an extension of the deadline, by outright legalization, or by delegating the decision to the municipalities.

Geographic Scope

There was a broad common understanding between the various municipalities that a shared micromobility program's geographic coverage should be congruent with the ideal travel distances for e-bikes and e-scooters. As such, the geographic scope should be right-sized to ensure that the bounded area has the sufficient density for potential users to access shared devices while not being overtly restrictive as to limit utilization and trip options.

What right-sizing means to each municipality depends on its geography. While smaller, geographically compact municipalities like Vernon and the City of North Vancouver permit shared micromobility devices throughout their jurisdiction, almost every other municipality limits them to certain urban neighbourhoods in order to achieve sufficient coverage and device density. Many criteria are used to determine the suitability of neighbourhoods, though they invariably include the city centre and major urban transit exchanges. Specific factors that have been identified as considerations in neighbourhood selection include population density, sustainable mode share, operator appeal, presence of high-quality micromobility infrastructure, and presence of equity-seeking groups.

The program area can also change over time: in some municipalities with more mature programs, work is ongoing to expand the coverage into new areas, including both residential neighbourhoods and areas dedicated to recreation and tourism. Other municipalities that operate shared micromobility on a trial basis have also expressed a willingness to explore expansion of the program area at the end of the trial period.

E-bikes vs. e-scooters

Generally, municipalities prefer to have a mixed fleet of e-bikes and e-scooters. Reasons expressed by staff for this preference include the different average trip length between the two modes, the different prospective riders that each mode appeals to, specific directions from Mayor and Council, and operator preferences for an e-scooter element over an exclusive e-bike fleet. The majority of programs currently in operation use a mixed fleet model, though the North Shore municipalities'

program does not currently include e-scooters. Conversely, none of the programs exclusively use e-scooters, though the Vernon and Kelowna program initially began that way and have only recently integrated e-bikes.

While the reviewed programs generally favoured a mixed approach between the two device types, some staff expressed a marked preference for e-bikes over e-scooters over the course of the interview process. One reason for this preference is that there is much greater benefit to public health from using an electric pedal assist e-bike, as the operation of such a device still requires the user to engage in physical activity. Another common concern is the perception among both councillors and the public at large in several municipalities that e-scooters are less safe due to issues such as sidewalk riding, speeding, and failure to wear a helmet. Furthermore, it was pointed out that several municipalities with mature shared micromobility programs permit e-bikes while prohibiting e-scooters, including Toronto and Montreal.

Responses to these issues with e-scooters range from omitting them outright from the shared micromobility program, as in the North Shore municipalities, to explicitly specifying a minimum ratio of e-bikes to e-scooters in the RFP, as in Waterloo Region and Kelowna. A component identified as essential to mitigate the potential harms associated with e-scooters is public outreach and education about how to operate them safely and in compliance with the applicable rules.

Figure 3. Table showing micromobility mode choice of select municipalities

Municipality	Mode Choice	Composition	Notes
Coquitlam, BC		TBA	Currently at RFP, not in operation
Kelowna, BC		700 e-scooters to 300 e-bikes[a]	E-bikes added in 2021
North Shore, BC		200+ e-bikes[b]	—
Richmond, BC		85 e-scooters to 10 e-bikes[c]	—
Vernon, BC		350 e-scooters to 50 e-bikes[d]	E-bikes added in 2022
Waterloo Region, Ont.		425 e-scooters to 850 e-bikes[e]	Launch in Summer 2023

Compiled in March 2023 based on public municipal reports, staff interviews and press releases; see page 20 for references.

Contracts and permitting

The surveyed municipalities invariably partner with one or more private operators to run a shared micromobility program, typically using a permitting model where a number of permits are granted to private operators to run dockless shared micromobility systems in the municipality within the confines of the permit and of any governing agreements or contracts. Each municipality has a bespoke permitting system that incorporates various requirements and desired specifications which meet local needs, and may range from desired device features (e.g., horns, rear view mirrors, helmets) to staff manpower (e.g., requiring the operator's staff to assume responsibility for rebalancing and addressing complaints).

The number of permitted operators varies from municipality to municipality, based on a variety of factors and the municipality's own preferences. Some municipalities award a permit to a single operator selected through a competitive RFP process, while others award permits to two or more qualified operators through the RFP process. A final approach is to employ an "open permit", whereby any and all qualified operators receive a permit to operate shared micromobility services in free competition. There seem to be few established rules about which model is preferred, though in interviews it was suggested that the open permit model was falling out of favour due to shifting market conditions and a greater focus among operators towards profitability over expansion.

Figure 4. Table of permitting systems for select municipalities in March 2023

Municipality	Permitting System	Number of operators	Notes
Coquitlam, BC	Closed permit	Up to 2	Current at RFP, not in operation
Kelowna, BC	Closed permit	1 (a second operator withdrew mid-season)	Previously used an open permit system
North Shore, BC	Closed permit	1	—
Richmond, BC	Closed permit	1	—
Vernon, BC	Closed permit	1	—
Waterloo Region, Ont.	Closed permit	1	Launch in Summer 2023

Another key issue highlighted by some municipal staff is that the number of operators at the beginning of the contract may not remain constant for the duration of the contract, as operators can withdraw from the market due to business decisions or financial conditions. For instance, while Kelowna began the 2022 season with two operators in the summer, one operator withdrew from the local market in October leaving the city with a single provider.

Safety and education

Safety is viewed as a major concern with shared micromobility programs, particularly in those which integrate e-scooters. Particular safety issues that have been identified by the interviewed staff include underage riding,[1] failure to use a helmet, riding on sidewalks and other prohibited spaces, doubling-up of riders, unsafe speed, reckless operation, and inappropriate parking.

Municipalities have multiple ways of addressing or mitigating these safety concerns. One way is technological: some municipalities require operators to limit devices to safe speeds and use monitoring tools to prevent behaviours such as unsafe riding or unlawful parking. Other tools are regulatory: one municipality imposes as a permit condition that the operator provide helmets with every shared micromobility device. A final piece that is commonly used by municipalities to ensure safety is public education, with the municipality securing a commitment from the operator to participate in public education and engagement events that aim to increase helmet compliance and safe riding behaviours.

Geofencing

Geofencing—the use of a virtual geographic boundary to limit device functions in predefined zones for safety and enforcement purposes—is a common strategy among the interviewed municipalities for addressing the nuisances and safety concerns associated with dockless shared micromobility devices. According to staff based on their discussions with operators, geofencing technology is very precise and can be used to distinguish between sidewalks and road surfaces and to enforce specific boundaries. Some staff highlighted the importance of including geofencing requirements as part of the RFP process, and some went a step further by scheduling a demonstration session where operators were required to demonstrate the

1 Under the terms of the MOTI pilot project (s 3 of the *Electric Kick Scooter Pilot Project Regulation*), a person under the age of 16 may not operate an e-scooter.

claimed precision and performance of their geofencing technology to municipal staff.

While geofencing is typically conceived in terms of preventing micromobility devices from being taken out of bounds, this technology has also been used by the interviewed municipalities for a variety of other purposes. The most common alternative use is to establish dedicated parking areas at which shared micromobility device trips must be ended, thereby preventing unwanted obstructions caused by the unregulated parking of devices on roads, sidewalks and private property. Municipalities take different approaches to the enforcement of micromobility device parking areas, with some requiring all trips across the board to end in such areas and others only employing this management tool within the city centre. One concern raised with the use of dedicated parking areas in single family neighbourhoods is that this would result in long walks for prospective users to access shared micromobility devices, thereby limiting uptake.

Other uses for geofencing include excluding micromobility devices from areas where they are undesirable, including trails through public parks and unpaved recreational multi-use paths. Finally, a novel application of geofencing is implemented on the North Shore, where it is used to enforce a 15 km/h speed limit within city parks, along popular areas of the Spirit Trail and in the areas around Lonsdale Quay and the Shipyards in order to prevent unsafe movement through pedestrian-dominated spaces.

Figure 5. Various shared micromobility geofencing techniques in use

Mandatory parking zones
Areas in which shared micromobility device trips can only be ended within predefined parking sites

Riding restrictions
Areas in which the motor of an e-bike or e-scooter will automatically switch off once entered

No-parking zones
Areas in which shared micromobility device trips cannot be ended due to parking restrictions

Slow zones
Areas in which the speed of the e-bike electric pedal assist or e-scooter motor can be capped as desired

Modal integration

The importance of integration between shared micromobility and other modes of sustainable transportation varies between municipalities based on the objectives of the particular program.

In municipalities where shared micromobility is conceived of as a solution to the last-mile problem of getting transit users between transit stations and their ultimate destinations, considerable thought has been placed into the design of shared micromobility to complement the public transit network. While this integration primarily consists of located shared device parking areas near transit hubs, Waterloo Region—where the micromobility program is housed within the regional transit agency—goes further by including within the RFP desired features such as incentives for using transit as part of the trip and the ability to integrate with local transit mobile applications.

The relationship between shared and private micromobility devices is tenuous. No staff interviewed expressed their belief that there was any strong link between the two, and several interviewees highlighted that the program's goal was to incent modal shift from single occupancy vehicle users rather than users of privately owned micromobility devices.

Monitoring and evaluation

Every interviewed municipality expresses its desire to monitor the progress of its shared micromobility program and to evaluate its success. As one staff member stated, success may be broken down into two distinct aspects: operator success and program success—highlighting the need to evaluate the success of shared micromobility in general separately from the success of the selected commercial operator(s). Either way, an important data source for municipalities is the trip data provided by the operators themselves; indeed, several municipalities explicitly put certain data-sharing requirements within their RFPs to ensure that their monitoring needs are satisfied.

While most staff did not outline any particular metrics by which operator evaluation is to be performed, one municipality has developed such an approach. Their approach comprises an analysis which is to be conducted at the end of the contract term and asks whether the operator has met RFP requirements, how responsive the

operator is to staff, customer and public communication, how long it takes for the operator to fix issues once identified, and whether rebalancing and maintenance schedules are being met. This analysis in turn informs the municipality's decision on whether to renew the operator's contract and whether to modify the terms of the licence going forward.

With respect to the overall evaluation of the shared micromobility program, a wide variety of variables have been identified by staff as worthy of inclusion in a monitoring framework. Common elements include overall system use, percentage of single-occupancy vehicle trips replaced, costs to the municipality, and safety statistics (e.g., improperly parked devices, sidewalk riding, prevalence of injuries and accidents, etc.). Other factors that have been mentioned include the number of complaints filed by members of the public, the number of trips starting or ending in lower-income or otherwise disadvantaged neighbourhoods, and the tons of carbon dioxide saved.

However, most of the surveyed municipalities do not solely rely on quantitative data to analyze successes and challenges. Some conduct travel surveys to learn more about the experiences of shared micromobility users, while others do public engagement events to learn more about public perception in the community. Digital platforms also exist which can assist municipal staff in processing and visualizing the raw data that they receive from operators. According to staff, the main North American data platforms are Ride Report (www.ridereport.com) and Populus (www.populus.ai), which are both paid subscription services that are focused on the micromobility curbside management and travel.

References

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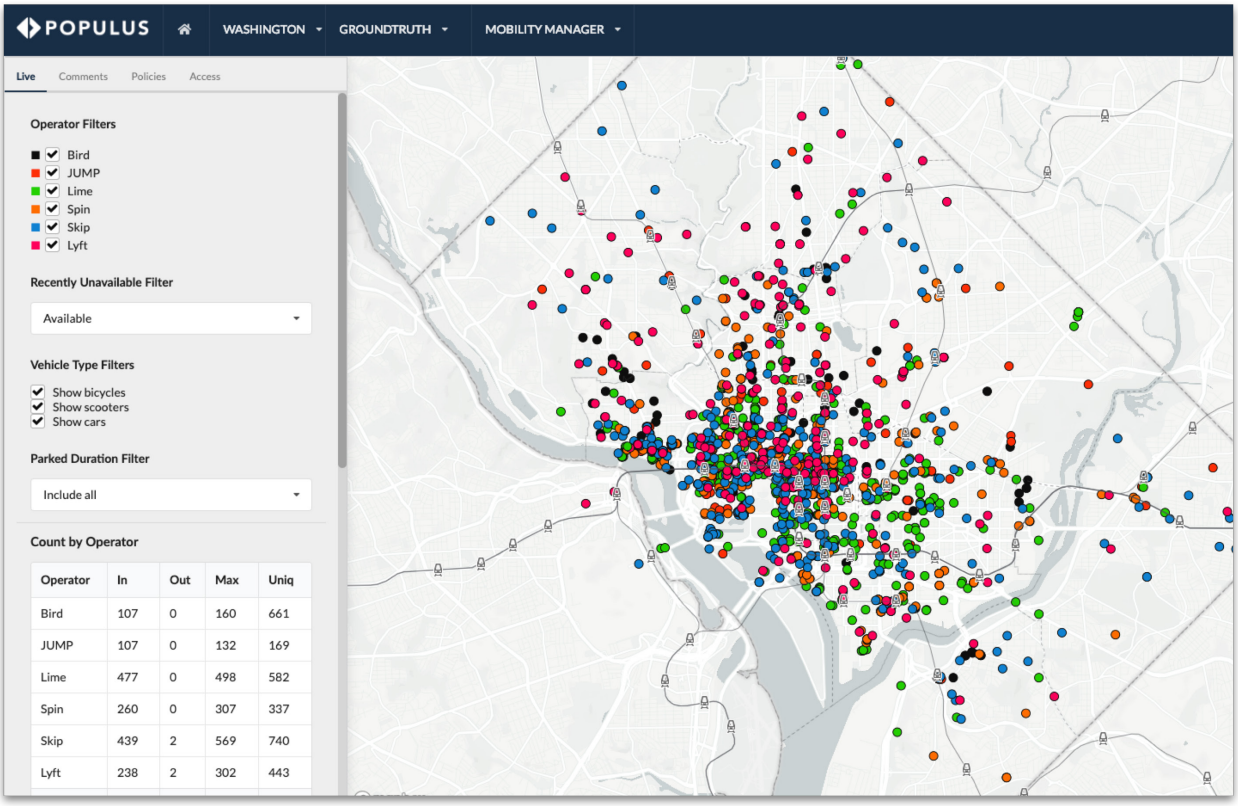
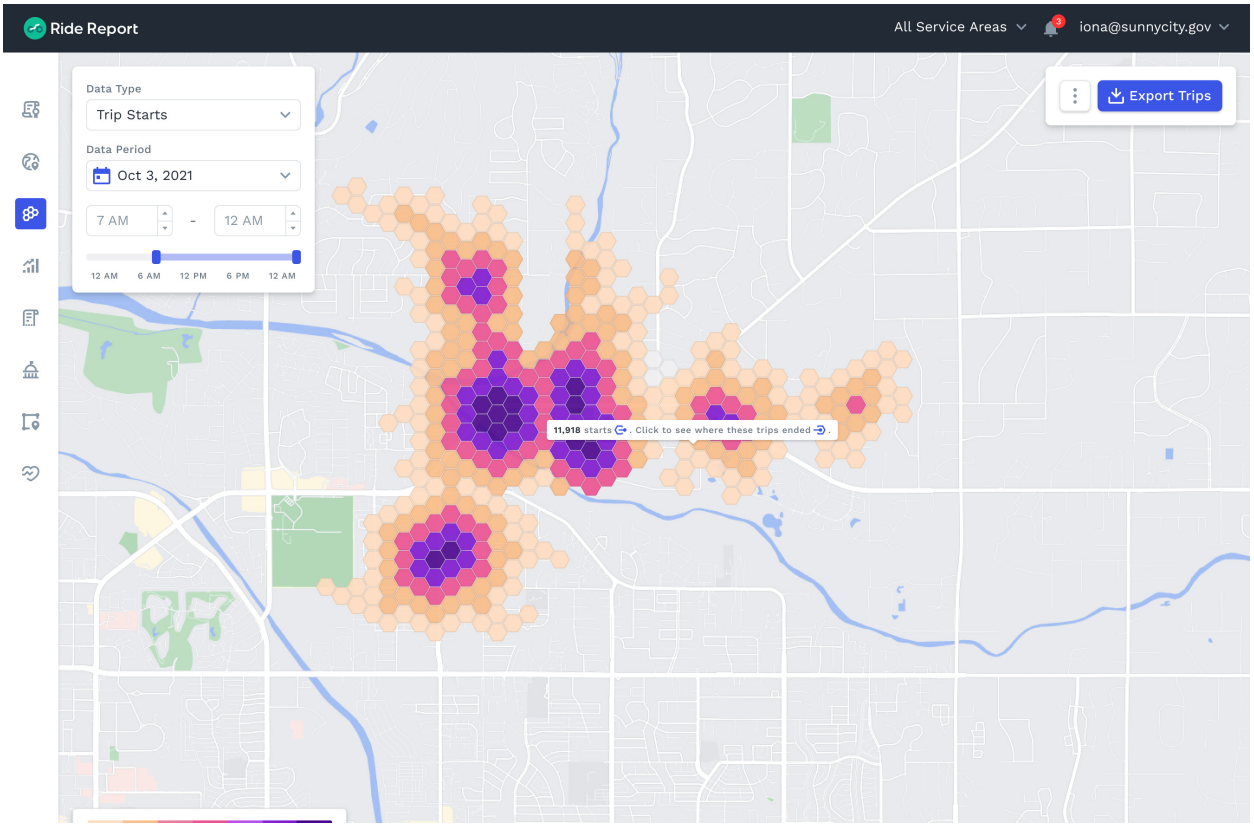
b. Brent Richter, "North Shore rolls out e-bike share program," *North Shore News*, Jul. 26, 2021 (link)
c. City of Richmond, "Richmond first to launch e-scooter sharing in Metro Vancouver." Jun. 22, 2022 (link)
d. Pete McIntyre, "Vernon's e-scooter program ends its second season," *Vernon Matters*, Nov. 30, 2022 (link)
e. Regional Municipality of Waterloo, "Region of Waterloo Shared Micromobility Program Proposal P2022-18 - Bid Document" (p. 45), Aug. 1, 2022 (link)

Figure 6. **Demonstrative screenshots of the Populus and Ride Report data aggregation platforms showing sample data pertaining to shared micromobility programs**





PART TWO

Operator Analysis

About the Process

Shared micromobility is a rapidly evolving space where the operators, market conditions and profitability considerations change rapidly. As such, it is important that the design of a shared micromobility program be appropriately tailored as to attract high-quality operators who are willing to deliver the greatest amount of public benefit possible. To better understand the operator landscape in British Columbia and what program design considerations are relevant from the private sector perspective, this section aims to summarize findings and insights about operators' thinking from two sources.

The first source is the municipal staff that were interviewed as described in the previous section, many of whom have recently interacted with operators as part of program launch or renewal work and heard relevant details that can help inform the design of a prospective RFP. The second source is an executive at a major Canadian shared micromobility company, who agreed to provide some insights from the perspective of an industry insider on the condition that their employer and identity were anonymized. The information from the micromobility executive was collected by means of a semi-structured interview conducted via Zoom which took approximately 30 minutes. The questions, which can be viewed in Appendix 2, were prepared in conjunction with the Township of Langley and a participant consent form was filled out prior to the call.

Operator Considerations

Profitability

Both municipal staff and the industry executive have expressed the view that the overriding consideration of shared micromobility operators is profitability—making it essential that any program design be carefully tailored as to maintain a viable business case for prospective private-sector partners. The industry executive likened the tension between profitability and public benefit to a balancing task, as the for-profit nature of the companies means that there will be no bids on a program that is not designed in a way that is conducive to meeting the company's business case.

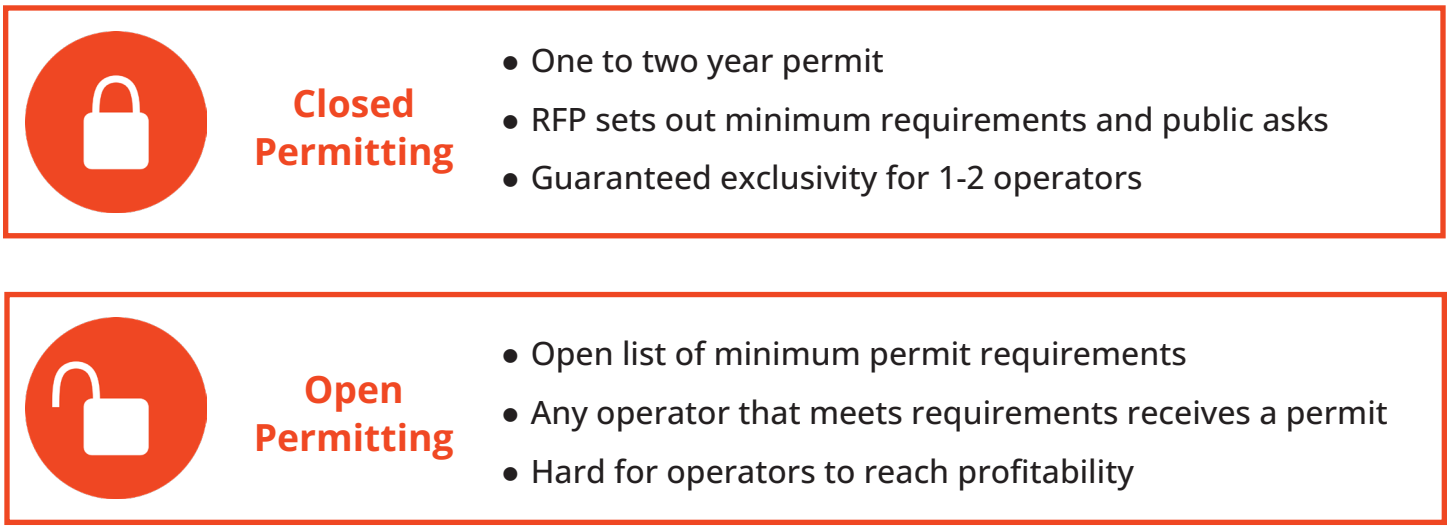
As a result, both the industry executive and some municipal staff have stressed the need for flexibility in program design, with it being desirable for a municipality to set broad, flexible parameters within its RFP in order to gauge from the resulting submitted proposals what operators are willing and able to deliver. The industry executive stated that the program tender ought to be a conversation rather than a one-way exchange, with ongoing discussions between municipalities and prospective operators about what can work within the experience of the operator and the preferences of the municipality.

Licensing and contract design

One municipal staff expressed concern about an open-permit system where any qualified operator can receive a permit as of right, suggesting that operators seemed to prefer and would perhaps only operate where a closed permit or RFP process allowed the municipality to tightly control the number of operators and to guarantee a degree of exclusivity. There was some agreement about this among municipal staff interviewed and it was noted in one jurisdiction that they decided to adopt a closed permit model because it allowed for the municipality to extract greater public benefit by requesting certain features within the RFP's requirements which advanced municipal objectives. However, the industry executive seemed to express little preference on this question, noting that the main step for expanding into a suitable municipality is to seek regulatory permission, whether via RFP, exclusive contract, or licensing.

Municipal staff also saw benefit to holding an operator demonstration after the RFP is put out and bids are received from prospective contractors. They suggest that a demonstration be organized at this stage in order to verify the claims of the various operators, as well as allow staff and decision-makers to examine the technology. In their municipality, they used this opportunity to demonstrate the accuracy of the geofencing technology and inspect the e-mobility devices.

Figure 7. Comparison of open vs. closed permitting systems



E-bikes vs. e-scooters

Municipal staff generally expressed the sentiment that shared micromobility operators had a marked preference for e-scooters over other devices, with one noting that, if left to their own devices, operators would only deploy e-scooters. One staff noted that while e-bikes generally had longer trips, e-scooters had significantly more use per device and were more profitable for the operator. As such, municipal staff generally expressed support for including an e-bike component to the program as a condition of the permit in order to correct for the disconnect between operator and staff preferences.

The industry executive generally agreed with the analysis of municipal staff about operator preferences, noting that economically, e-scooters win out over e-bikes as a result of strong user preference for scooters. They caution that a key challenge with program design is that skewing the preference too far away from e-scooters risks undermining the viability of the program, and that an ideal ratio would be predominated by scooters. As an example of a profitable model, they suggested that 400 e-scooters to 50 e-bikes would be a typical ratio preferable to operators.

Geofencing

Municipal staff generally indicated that geofencing technology on shared micromobility devices was mature and highly accurate, resulting in a high level of precision in detecting sidewalk parking and other improper usage. They also indicate that operators are able to accommodate a variety of parking restrictions using geofencing, including both no-parking and mandatory-parking zones.

The industry executive notes that marked improvements in the accuracy of geofencing have occurred between 2019 and 2023, with the previous GPS technology now being complemented by dead reckoning and wheel rotation measures to correct for imprecision in GPS tracking. According to the industry executive, most municipalities will ask for a slowdown to 20 km/h for general travel and 15 km/h in geofenced slow zones, and that no-ride zones can be implemented which disable the motor on the mobility device but which still allow the e-bike or e-scooter to be operated by manual power (i.e., by pedalling the e-bike or kicking the scooter). The operator agreed about the breadth of parking measures that can be implemented, but notes that it is not strictly impossible even with these measures to park a device in a prohibited zone. However, they note that the user would be unable to end a trip within the zone, causing accruing financial penalties that would disincentivize unlawful parking.

Figure 8. Various tools for the geolocation of shared micromobility devices

GPS Tracking
Uses a GPS receiver and satellite-based trilateration to track the location of the micromobility device

Wheel Rotation
Uses the number of rotations of the device's wheels to estimate the distance travelled

Dead Reckoning
Uses algorithms that estimate distance from a point to correct for GPS inaccuracies

Safety and enforcement

Generally, municipal staff did not express strong concerns about the safety of shared micromobility devices, though several stressed the importance of public education in delivering a program that is safe for all users. The industry executive lists a variety of safety and enforcement measures which can be taken to ensure that shared micromobility devices are used in a safe and responsible manner. They note that all devices are equipped with a large, prominent identification number, allowing members of the public to report violations. They further note that operator employees regularly patrol the streets to conduct spot enforcement and answer concerns from the community, as well as having the ability to respond to reports within a short amount of time.

Specific enforcement actions available to operators include issuing warnings, imposing fines and banning the user from the app.

Rebalancing

Rebalancing refers to the active redistribution of shared micromobility devices throughout the operation area in order to co-locate the devices with hotspots of consumer demand and is viewed by municipal staff and operators alike as a key element in the operation of the shared micromobility program.

The industry executive stressed that rebalancing is a priority task for the company regardless of municipal requirements, as it is an economic imperative on account for the need to allocate shared devices where there is greatest demand. They state that, with the help of proprietary technology with both automated and human elements, they dispatch employees throughout the day to rebalance devices to optimal locations across the network. They further state that, when conducting rebalancing, they are able to accommodate municipal preferences for certain sites where local officials desire for a certain number of devices to be available at all times, even when the economics may not necessarily justify that number.

Equity programs

According to the industry executive, it is not typical for a shared micromobility program to include an equity component as it could contribute to an excessive public ask that undermines the economics of the program. Programs that the

operator has implemented in the past at the request of partner municipalities include discounts for seniors and individuals on social assistance. Generally, the operator operates such equity programs and accepts applications for discounts through its customer service e-mail line.

The executive also notes that operators will sometimes offer bulk discounts when users purchase multiple ride passes, which would bring down the cost of using the devices for any member of the general population who takes advantage of the promotion.

Data sharing

The industry executive stated that data sharing was not an issue on the side of the operators and that the issue was more often due to the lack of municipal staff capacity to analyze the data usefully. Accordingly, they note that many municipalities work with data aggregators—namely Ride Report and Populus—to make sense of the large amounts of raw data that operators retain. The standard format for raw micromobility data is MDS, which is compatible with the aggregators.

They further stated that some municipalities express to the operator that they are unable to manage the data, in which case the operator can accommodate the lack of capacity by providing regular reports in lieu of sharing raw data. Such a report would likely contain data that the municipality has expressed interest in, such as key metrics and where people are travelling, and is typically delivered by the operator once or twice per season.

List of Operators

Based on the discussions with the interviewees and general research about municipalities with active or upcoming shared micromobility programs, a number of operators are regularly mentioned as major players in the Canadian market as of March 2023. While not all of these operators are necessarily seeking to currently expand and this list is inexhaustive, they include:

Bird Canada
Operates in 10+ Canadian municipalities, primarily in Alberta and Ontario

Lime Micromobility
Operates in four Canadian markets: Edmonton, Kelowna, the North Shore and Richmond

Evolve (by BCAA)
Operates in Whistler (e-bikes only) as part of the Evo car-sharing platform

Neuron Canada
Operates in seven Canadian municipalities, primarily in Alberta but also in Vernon

PART THREE

Analysis of Pilot Areas

About the Process

Methodology

While no decisions have been made about a potential shared micromobility program in the Township of Langley, including the location of any pilot area, some areas have been suggested by staff as interesting to consider. As such, this report aims to provide a brief spatial profile of two of these areas based on commonly cited indicators of micromobility uptake and success.

To do so, tables of headline statistics and maps of indicators with particular relevance to shared micromobility uptake have been developed and are summarized in this section. Moreover, in order to understand if and how these potential pilot areas differ from the sites selected by other municipalities for their own programs, similar profiles have been compiled for two other Lower Mainland shared micromobility areas as a point of comparison.

Indicators and Data Sources

Most of the indicators employed in this spatial profile come from the 2021 Canadian Census and include data at both 25% (i.e., from the long-form census) and 100% (i.e., from the short-form census) sampling fractions. All census data is at the dissemination area level, the lowest level of aggregation provided by the Census. The selected indicators are as follows:

- Average household income, in 2020 dollars

- Population density, per square kilometre
- Average household size
- Percent of the employed labour force, aged 15 or above, commuting less than 15 minutes per day‡
- Percent of the employed labour force, aged 15 or above, commuting more than 60 minutes per day‡
- Percent of the employed labour force, aged 15 or above, commuting to a Lower Mainland municipality other than the Township of Langley‡
- Percent of the employed labour force, aged 15 or above, commuting primarily by public transit‡
- Percent of the employed labour force, aged 15 or above, commuting primarily by active modes (walking and cycling)‡

‡ indicates data from the long-form census at 25% sample

Additional data comes from the Canadian Bikeway Comfort and Safety (Can-BICS) metric, a nationwide dataset evaluating the quality of every piece of dedicated cycling infrastructure on an ordinal scale of 1-3 as of January 2022.

Areas for Comparison

Four areas are subject to this pilot area analysis: the two in the Township of Langley and two others in other Lower Mainland municipalities for comparative purposes.

Pilot Area A is centered on the area of Northwest Langley involved in Connected Communities, a pilot project to improve cycling and pedestrian infrastructure funded in part through TransLink's Bicycle Infrastructure Capital Cost Share (BICCS) program, and covers all census dissemination areas which adjoin any part of the active mobility corridors (i.e., Glover Road, Telegraph Trail and 96 Avenue)

Pilot Area B includes Pilot Area A but also includes the residential neighbourhoods to the west to incorporate greater density as well as the Carvolth Exchange bus terminal to represent a modal integration element with public transit.

The **North Shore Area** covers all census dissemination areas which largely overlap with the current operational area of the North Shore municipalities' joint program.

The **Coquitlam Area** covers all census dissemination areas which overlap with the proposed operational area of Coquitlam's program as described in its RFP.

Figure 9. **Map of Pilot Area A in the Township of Langley**

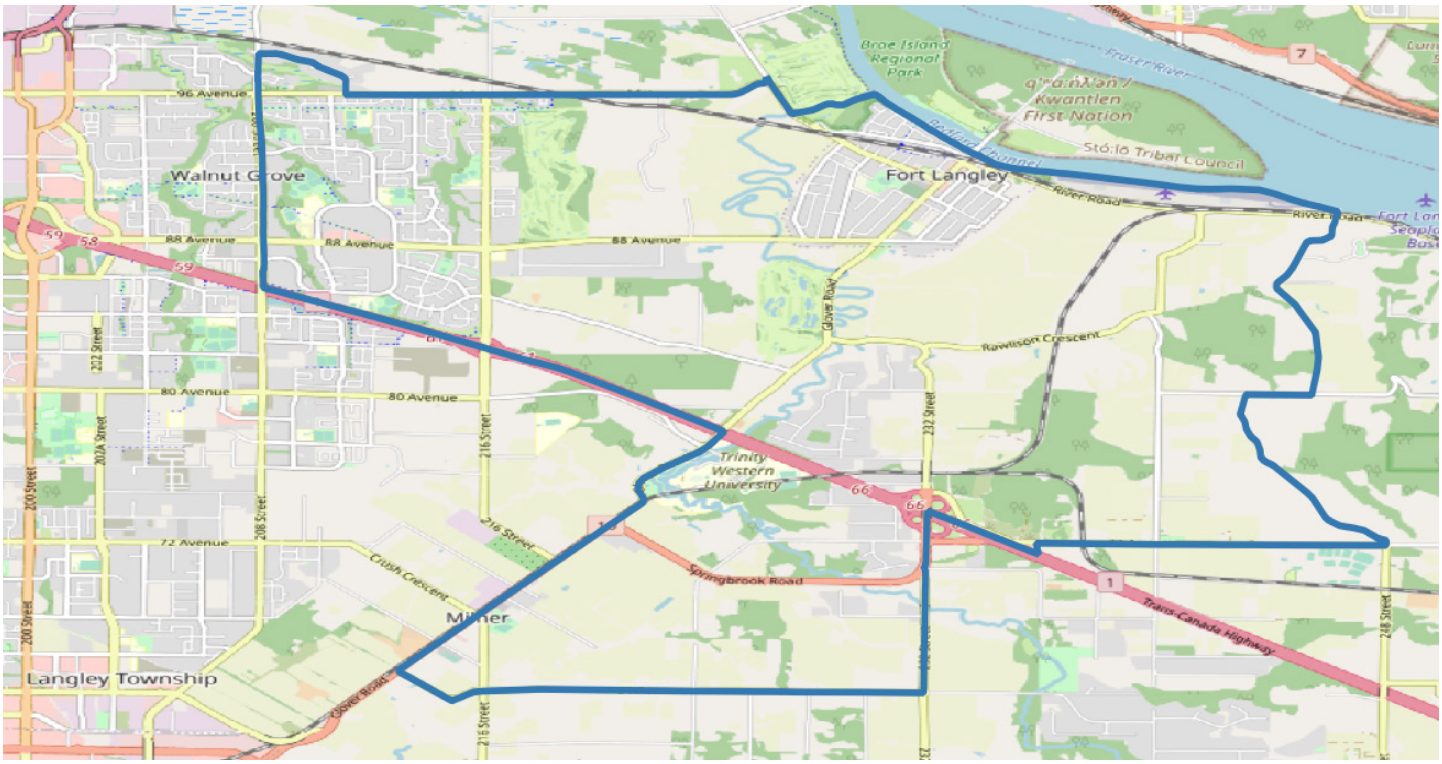


Figure 10. **Map of Pilot Area B in the Township of Langley**

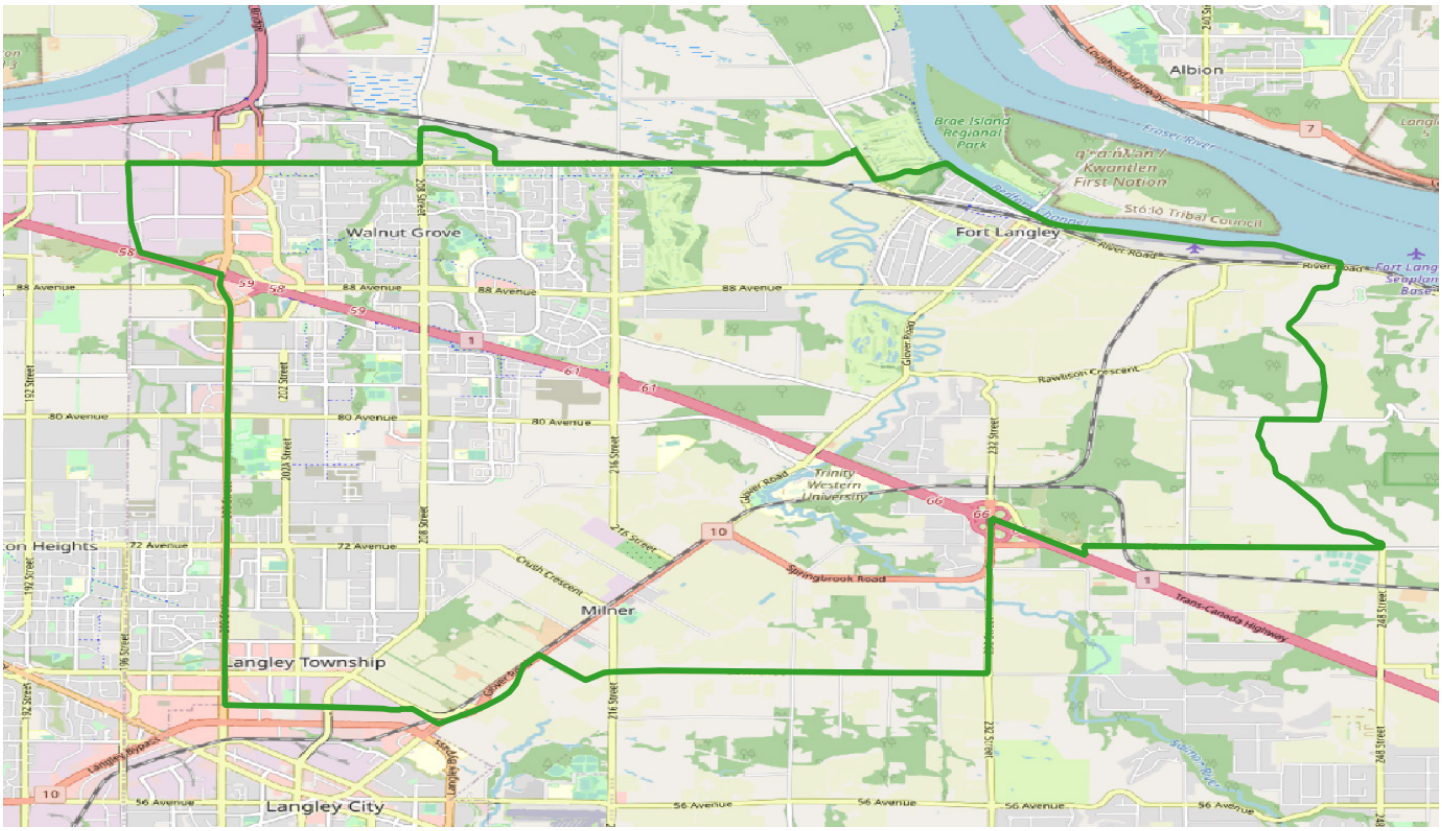


Figure 11. **Map of the North Shore Area**

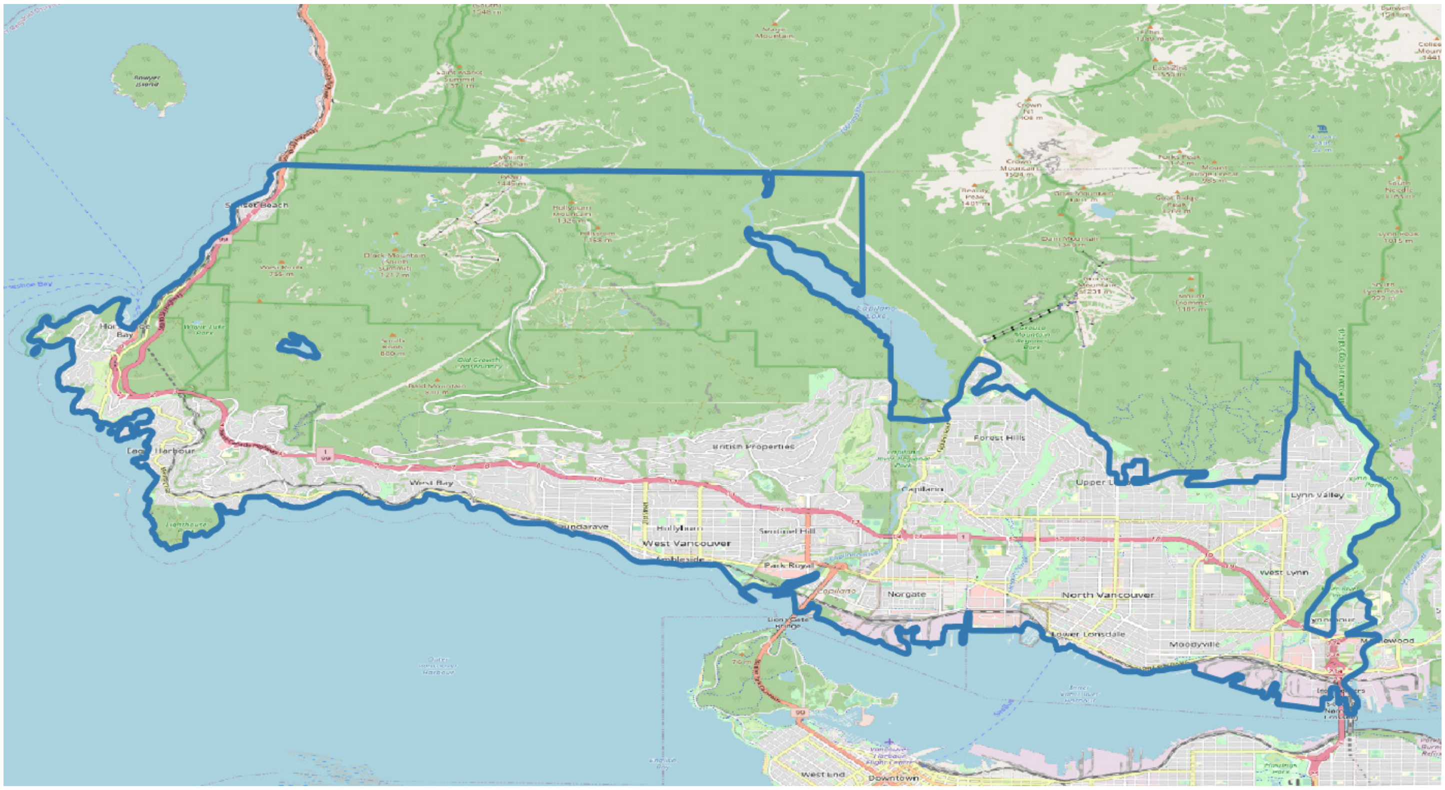
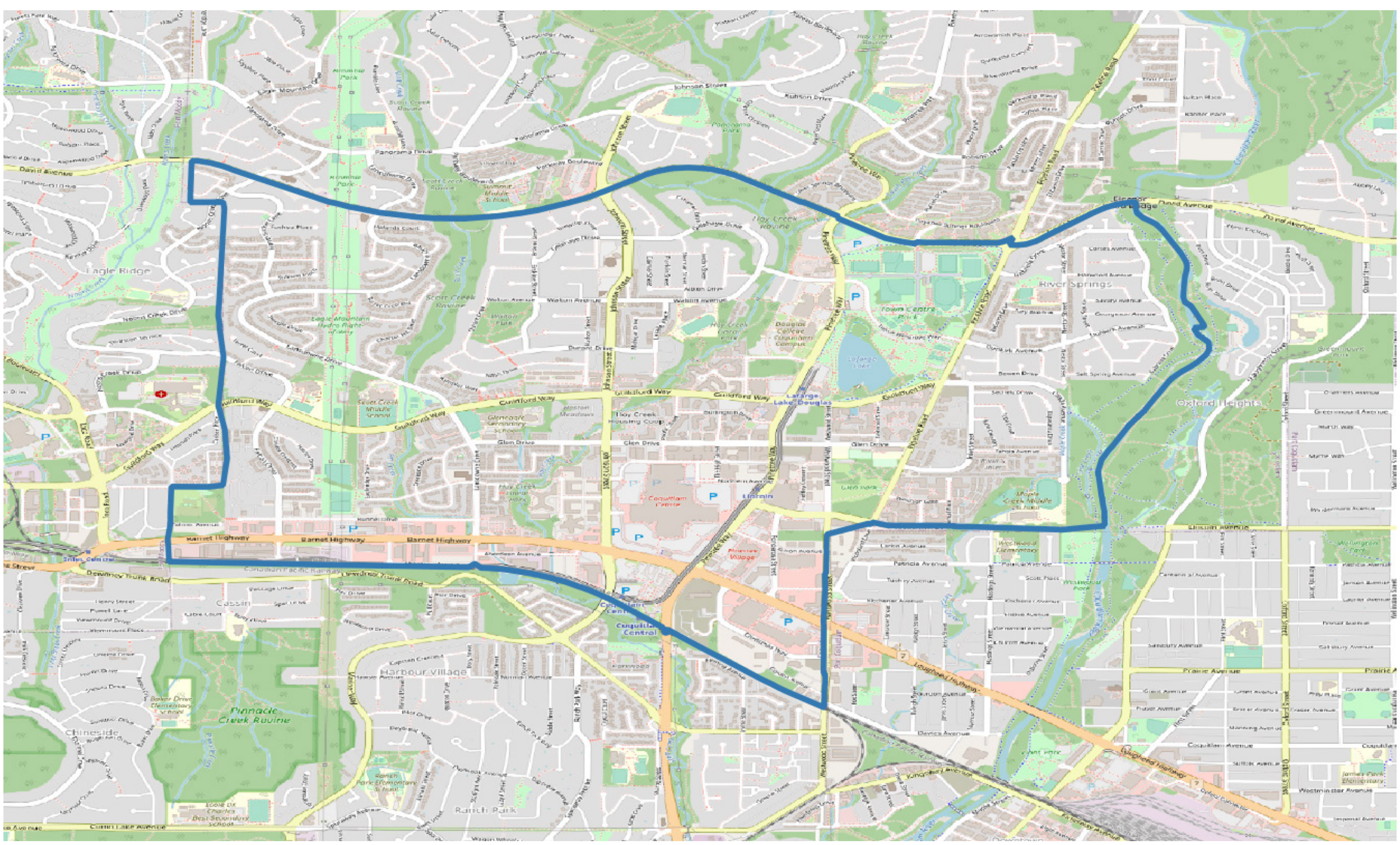


Figure 12. **Map of the Coquitlam Area**



Comparative Site Characteristics

Indicator or Statistic	Langley Pilot Area A	Langley Pilot Area B	North Shore Area	Coquitlam Area
Population	20,803	61,608	**167,383**	33,218
Land area	32.12 km²	53.24 km²	**126.21 km²**	7.22 km²
Population density	668 / km²	1,157 / km²	1,326 / km²	**4,601 / km²**
Household income (average)	$143,896	$129,048	**$164,895**	$96,323
Household size (average)	**2.81**	2.77	2.39	2.38
% commute out of municipality	51.3%	58.3%	65.2%	**66.5%**
% commute under 15 mins.	26.5%	24.2%	**29.2%**	21.3%
% commute over 60 mins.	5.9%	7.0%	4.0%	**12.8%**
% commute by transit	1.8%	3.3%	11.7%	**16.4%**
% commute by active mode	3.5%	3.0%	**10.3%**	8.9%

Pilot Area A has a much smaller population and population density than either Coquitlam or the North Shore, suggesting that it may be difficult for the site to support a viable shared micromobility program. However, Pilot Area B is not only larger in population than the Coquitlam Area, but it also has broadly comparable population density to the North Shore Area—indicating similarity with two existing shared micromobility programs' geographic scopes. Crucially, much of the population in the Township of Langley is distributed towards the west (see Appendix 3, Figure 14), so shared micromobility would reach more people by extending coverage towards that part of the municipality.

Average household income is higher in all four sites relative to the Canadian average, which may indicate a smaller prevalence of low-income populations to which equity programs would be most directly beneficial. Within the Township of Langley, average household incomes are higher in Fort Langley relative to the westerly neighbourhoods, with nearly all parts of Fort Langley making in excess of $150,000 in 2020 (see Appendix 3, Figure 15).

The average household size is somewhat higher in the Township of Langley compared to Coquitlam and the North Shore, which may suggest the presence of larger or intergenerational families. Whether such families have a different likelihood of becoming shared micromobility users should be studied further.

Interestingly, much fewer people commute out of the selected Township of Langley sites relative to either Coquitlam or the North Shore. Local commuting is particularly prevalent around Fort Langley (see Appendix 3, Figure 16). The higher prevalence of local commuting could indicate possible demand for shared micromobility solutions within the Township's borders.

Like in the two comparison areas. roughly one quarter of residents in the two Langley pilot areas have a daily commute of 15 minutes or less (see Appendix 3, Figure 17). Such short trips are ideal for shared micromobility, and the similar frequency across all four sites may indicate the Township's suitability for the deployment of shared micromobility as a local commuting tool.

Very few people currently commute by transit or active modes in either of the Langley pilot areas, especially compared to Coquitlam and the North Shore. Low transit use may reduce the salience of modal integration, while low active modal share may be symptomatic of less comfortable micromobility infrastructure.

Overall, Pilot Area A is quite dissimilar to either of the Coquitlam or North Shore comparison areas. Pilot Area B has key similarities in population size and density to the comparison areas, though it crucially has much lower current rates of active mobility and public transit use than either Coquitlam or the North Shore. While this may suggest that Pilot Area B could be more suitable for shared micromobility, whether the low incidence of existing use of sustainable transportation modes impacts program success should be further investigated.

Micromobility Infrastructure

In order to better understand whether the presence of an extensive network of micromobility infrastructure is necessary for a successful shared micromobility program, maps comparing the selected areas in the Township of Langley, Coquitlam and the North Shore on the national Can-BICS rating system are compiled below.

The maps indicate that micromobility infrastructure in the selected areas in the Township of Langley consist largely of low-comfort facilities along arterial roads and a smaller, less connected number of medium- and high-comfort facilities in residential areas. At first glance, this may suggest that there are relatively few roads and paths within the Township of Langley that provide a high-comfort, high-safety experience to shared micromobility device users.

However, comparing the Can-BICS maps of the Township of Langley with those of Coquitlam and the North Shore demonstrate that the Township is not an anomaly: both the comparison areas also feature a mix of low-comfort facilities along arterial roads and disconnected medium-comfort facilities within neighbourhoods.

As such, the limited scope of micromobility infrastructure within the selected areas of the Township of Langley may not be a significant barrier to the development of a successful and safe shared micromobility pilot program.

Figure 13. Maps of selected areas in the Township of Langley, the North Shore and Coquitlam with micromobility infrastructure by Can-BICS rating

- **Boundaries of selected area**
- **High-comfort (AAA) facilities**
- **Medium-comfort facilities, including multi-use paths**
- **Low-comfort facilities**
- **Non-conforming facilities (lacking in safety and comfort features)**

Figure 13.1. Can-BICS ratings of micromobility infrastructure in Pilot Area B of the Township of Langley

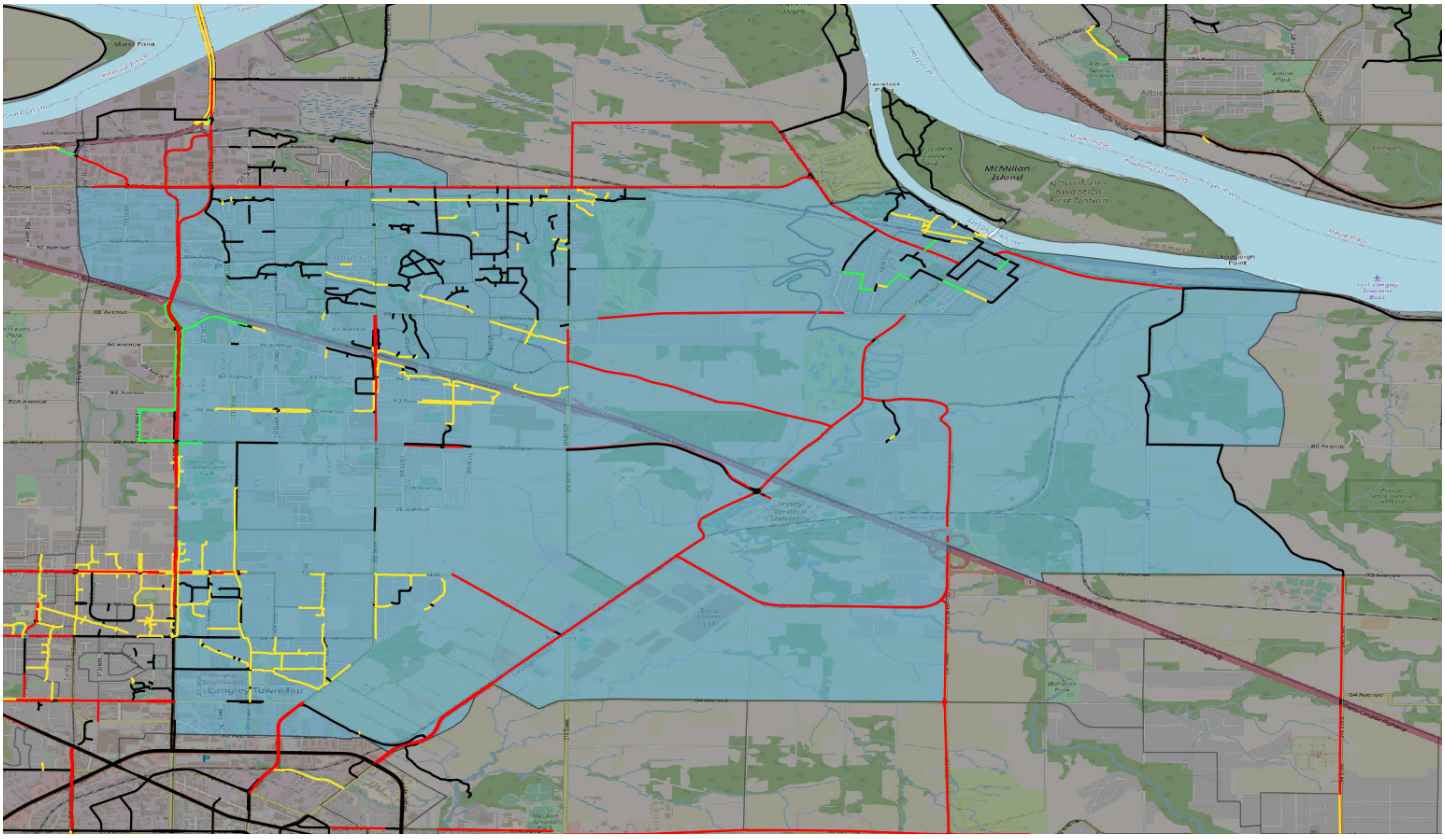


Figure 13.2. Can-BICS ratings of micromobility infrastructure on the North Shore

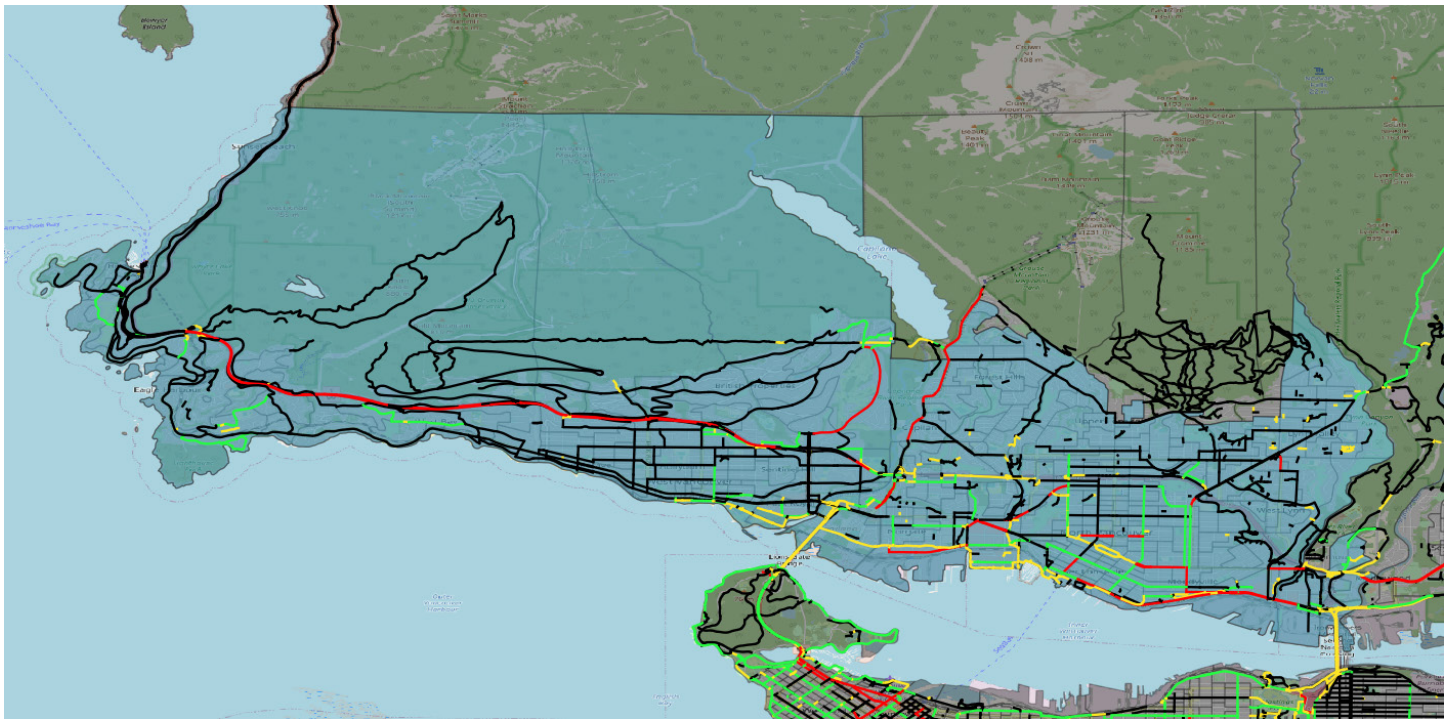
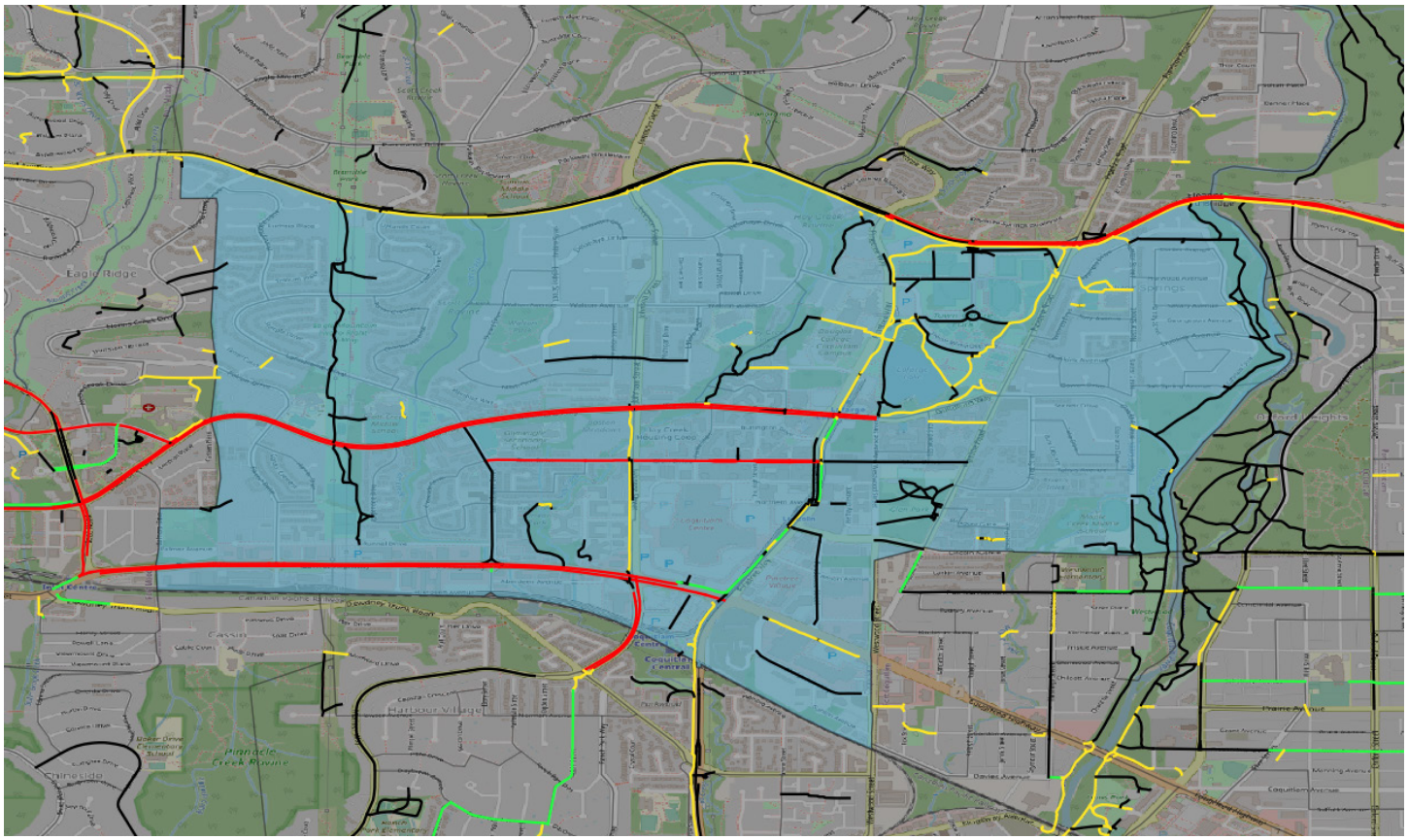


Figure 13.3. Can-BICS ratings of micromobility infrastructure in Coquitlam



Summary of Findings and Key Recommendations

Summary of Findings

Over the course of this project, a number of shared micromobility programs were reviewed across a great variety of municipalities and geographies—demonstrating that e-bikes and e-scooters have the versatility to be deployed across many local contexts. Moreover, the many differences that can be noted across different municipalities' implementations in order to achieve different local objectives are demonstrative of how flexible shared micromobility can be and how the closed permitting model and the short length of permits gives municipalities the ability to experiment in order to find solutions that best suit their needs.

A key insight into the operational side of shared micromobility came from the operator analysis, namely the importance of considering profitability when designing and scoping a problem. As the implementation of a shared micromobility platform comes at minimal cost to the municipality, the importance of attracting a reliable and trusted partner operator is crucial and many factors within the control of municipal staff can attract—or deter—their participation in the program. As such, striking a balance between the financial viability of the program and the public benefits that can be extracted through the RFP process is an economic imperative.

Finally, safety is shown to be a major concern for many stakeholders and decision-makers, particularly when it comes to e-scooters. As such, good public safety education, proactive enforcement and the effective use of geofencing are all important tools for abating the nuisances and avoiding the risks that can come with the widespread deployment of shared micromobility devices.

Key Recommendations

Based on key insights received from municipal staff, information learned about the needs and preferences of operators, and general best practices, a series of recommendations have been developed to aid in the Township of Langley in informing the design of any potential shared micromobility pilot. While none of these features are necessarily indispensable or critical to the success of such a program, they reflect general successful practices that have been implemented in similarly situated communities and that are consistent with the needs of both municipalities and private operators.

Licensing and permitting

As expressed by the unanimous opinion of all interviewed staff, a closed permit system is superior to an open permit system for private operators and municipalities alike due to its positive contribution to the profitability of the program and the ability to extract public benefits through the RFP design and subsequent negotiations with interested parties. As such, the Township of Langley should adopt a closed permit system with 1-2 operators and make requests for desired public benefits within the RFP.

Timing

Several municipal staff expressed the view that shorter-term permits allow for greater flexibility as program conditions can be revised at the end of the term, and no municipality reviewed in this report had a permit term greater than two years. Conversely, a key advantage of a two-year term over a one-year term is that two full seasons of data allow for year-over-year comparisons of trends and data. Therefore, the Township of Langley should ideally adopt a two-year period for a shared micromobility pilot program, though a one-year period could also be considered.

Geographic scope

The micromobility executive stressed the importance of a two-way negotiation in determining the geographic scope of a program, and several of the reviewed municipalities allowed significant flexibility for operators to propose their own

operational areas. Following in this advance, the Township of Langley should propose a flexible pilot area as a baseline and revise the final boundaries of any shared micromobility pilot area through negotiations and discussions with the selected operator(s). The pilot area should ideally include Carvolth Exchange and the surrounding residential neighbourhoods.

E-bikes vs. e-scooters

The vast majority of municipalities consulted implemented, or plan to implement, a mixed fleet of e-bikes and e-scooters, as the two modes attract significantly different riderships and the inclusion of e-scooters significantly enhances the economic viability of the program to private operators. As such, the Township of Langley should allow for both e-bikes and e-scooters in a shared micromobility program, and should avoid setting an exact mandatory breakdown of the ratio between the two modes without further discussion with operators.

Geofencing

Geofencing is a mature technology that interviewees widely describe as highly accurate and effective for rules enforcement. At the same time, some municipal staff caution that a minimum level of density is required to include geofenced mandatory parking areas into a program. Accordingly, the Township of Langley should, in conjunction with relevant internal stakeholders, direct any shared micromobility partner to use no-parking zones and slow zones to enhance public safety in sensitive or busy areas. However, the Township should not use mandatory parking zones, as single family detached neighbourhoods lack the requisite density.

Monitoring and evaluation

In order to monitor and evaluate the success of a shared micromobility pilot program, the Township of Langley should follow the common practice of municipalities with successful programs and purchase a subscription to a data aggregator (e.g., Ride Report, Populus), as the use of such a platform significantly reduces the pressure on staff capacity imposed by the need to process and analyze large amounts of raw micromobility data.

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Glossary

Closed permitting: a system where prospective operators bid for 1-2 exclusive permits to operate a shared micromobility program within the municipality

Data aggregator: a web platform that receives raw data from shared micromobility operators and displays simple visual summaries and analyses to municipal staff

Electric pedal assist: the use of an electric motor in an e-bike to complement or supplement human pedal power

Geofencing: the use of a virtual geographic boundary to limit device functions in predefined zones for safety and enforcement purposes

Last-mile problem: the challenge in getting transit users between the station and their eventual destination

Micromobility: a category of small, lightweight vehicles that includes bicycles, skateboards, roller blades, electric scooters and electric bicycles

Micromobility infrastructure: dedicated facilities for the use of micromobility devices, including greenways, multi-use paths and cycling lanes

Open permitting: a system where any number of qualified prospective operators can operate upon meeting a series of minimum criteria

Pedal bikeshare: shared micromobility system that consists primarily or entirely of human-powered pedal bicycles

Rebalancing: the active redistribution of shared micromobility devices across the network to ensure that vehicles are present in areas with high demand

Transportation demand management (TDM): a series of municipal policies designed to manage travel demand and to promote a shift to active and public modes

Appendix 1: Municipal Staff Interview Questionnaire

Preliminary probing questions

1. What resources/travel data/other data did you refer to inform the development of the shared micromobility program?
2. What stakeholders (internal and external) did you consult?

Detailed pilot design questions

1. What would you say are the biggest factors that went into your approach in designing the program?
    a. What user group(s) was the program designed for?
    b. How did you decide on the mode? Were bikes, e-bikes and e-scooters all considered?
    c. Were connections to transit considered?
    d. What was the process by which the operator was selected?
2. How did you decide on the geographic scope of the project?
3. Is your program considered a pilot?
    a. If so, what metrics have you put in place to evaluate the success of the pilot? If applicable, what have you learned from ridership data so far?
    b. If so, what are the planned next steps towards implementation of the full-scale program? And what does that involve?

Wrap-up questions

1. Are there any programs/jurisdictions that helped to inform the development of your program? Do you have a contact from those jurisdictions that you suggest we connect with?
2. How does your shared program interact with the private use of e-kick scooters allowed through your status as a pilot community?

Appendix 2: Operator Interview Questionnaire

Preliminary probing questions

1. Are you currently looking to expand your offerings into new municipalities?
    a. If so, what criteria are you broadly looking for in a partner municipality?
2. Do you offer e-bikes, e-scooters, or both? What does an ideal ratio between the two look like to you?
3. How long have you been in operation? What jurisdictions have you launched a program in?

Detailed operational questions

1. What programming and technologies does your company implement to ensure public safety?
    a. How do you prevent riders from operating the mobility device in an unsafe manner?
2. In terms of geofencing and maintaining accessibility, what does your company offer?
    a. How accurate is your geofencing technology?
    b. What measures do you implement to keep sidewalks free of abandoned mobility devices?
3. How does your company handle rebalancing?
4. What kinds of equity programs have been created in the municipalities that you are currently operating in?
5. How can municipalities and members of the public contact your company to address complaints or issues with a mobility device?

Wrap-up questions

1. What kind of data do you share with partner municipalities?
2. Does your platform have the ability to integrate with third-party platforms, particularly data tracking tools (e.g. Ride Report, Populus) or transit apps (e.g. Transit)?

Appendix 3: Pilot Area Analysis Maps

Figure 14. Map of population density per km² in selected areas of the Township of Langley

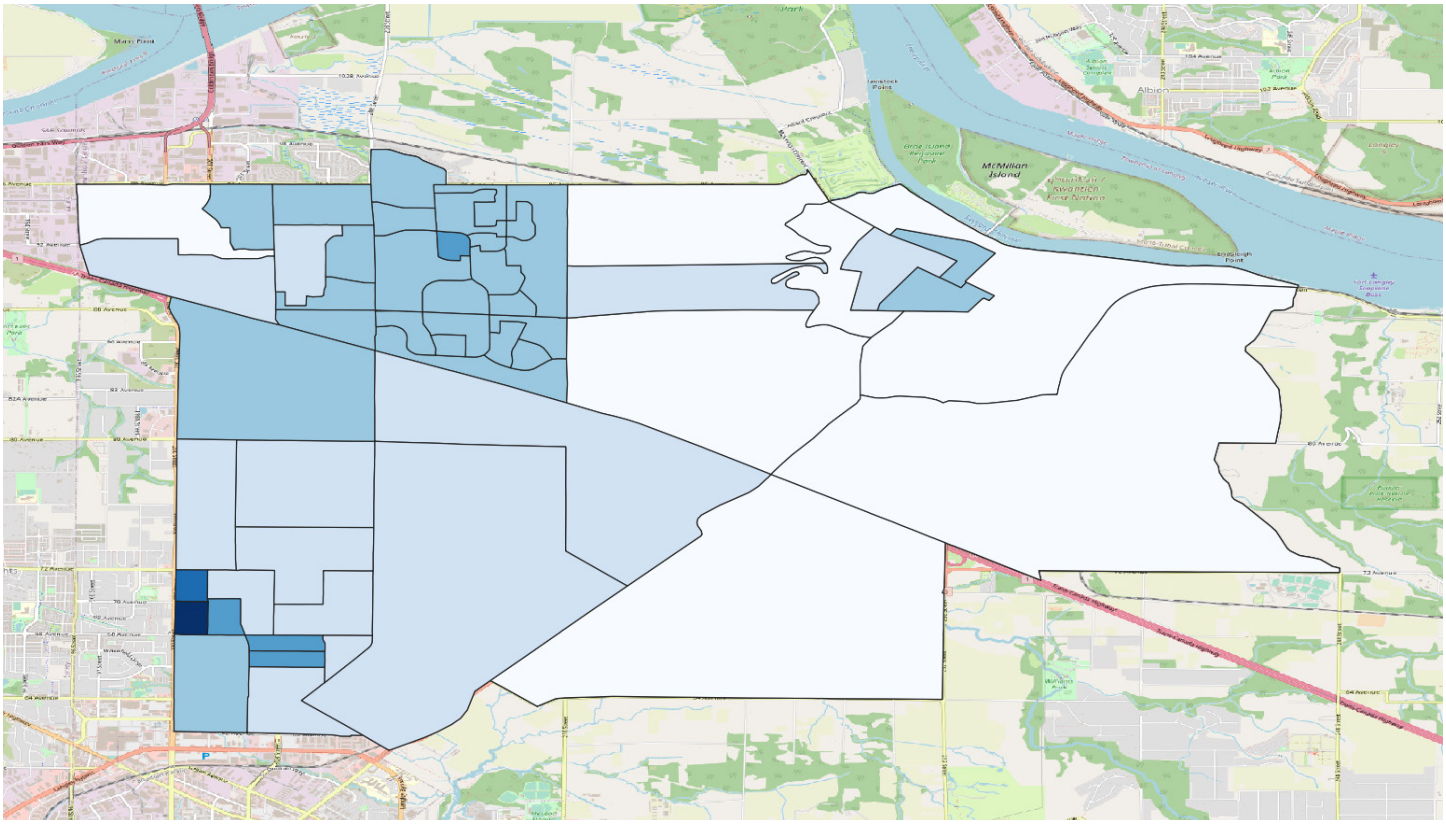


Figure 15. Map of average household income (2021 dollars) in selected areas of the Township of Langley

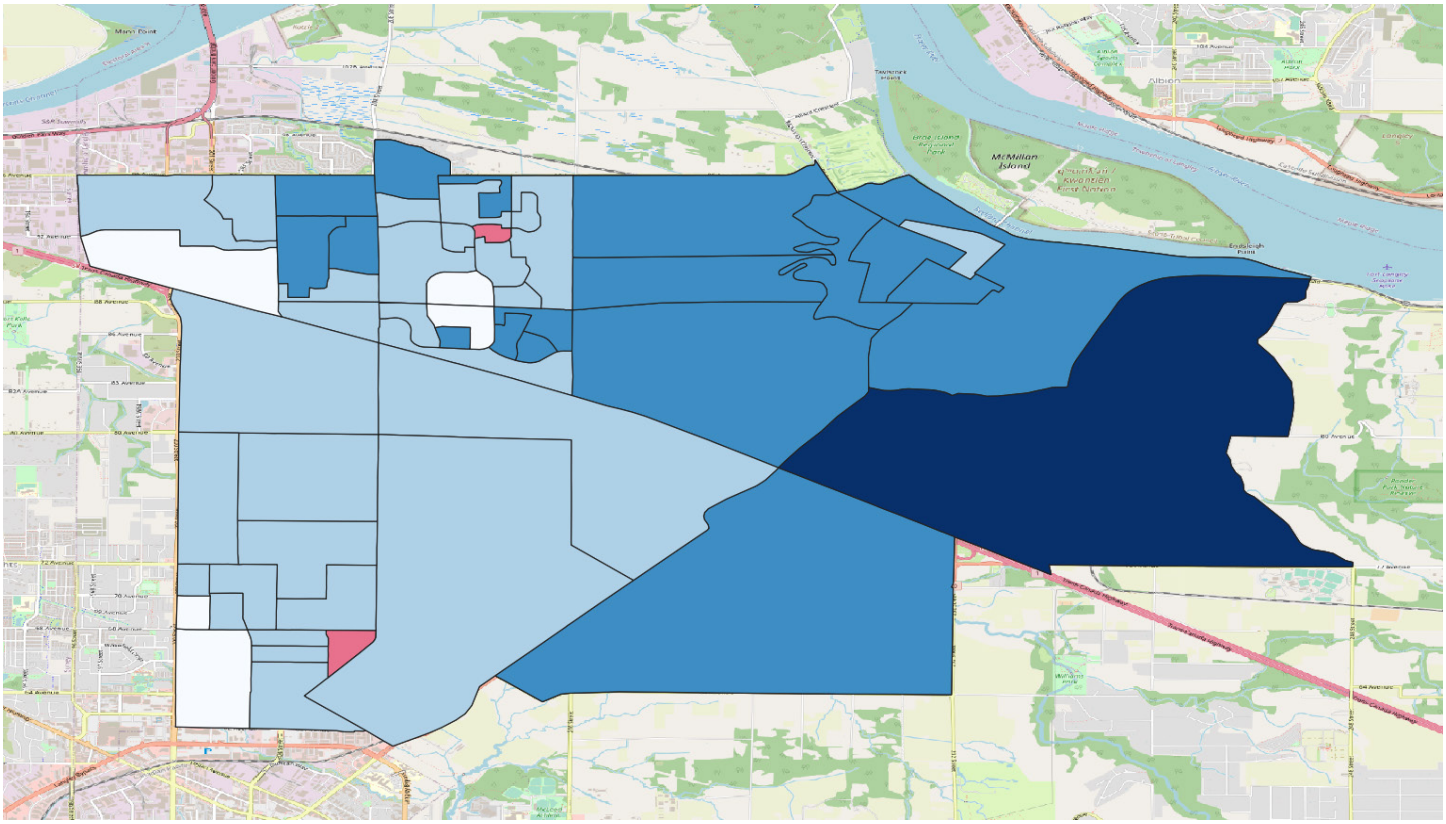
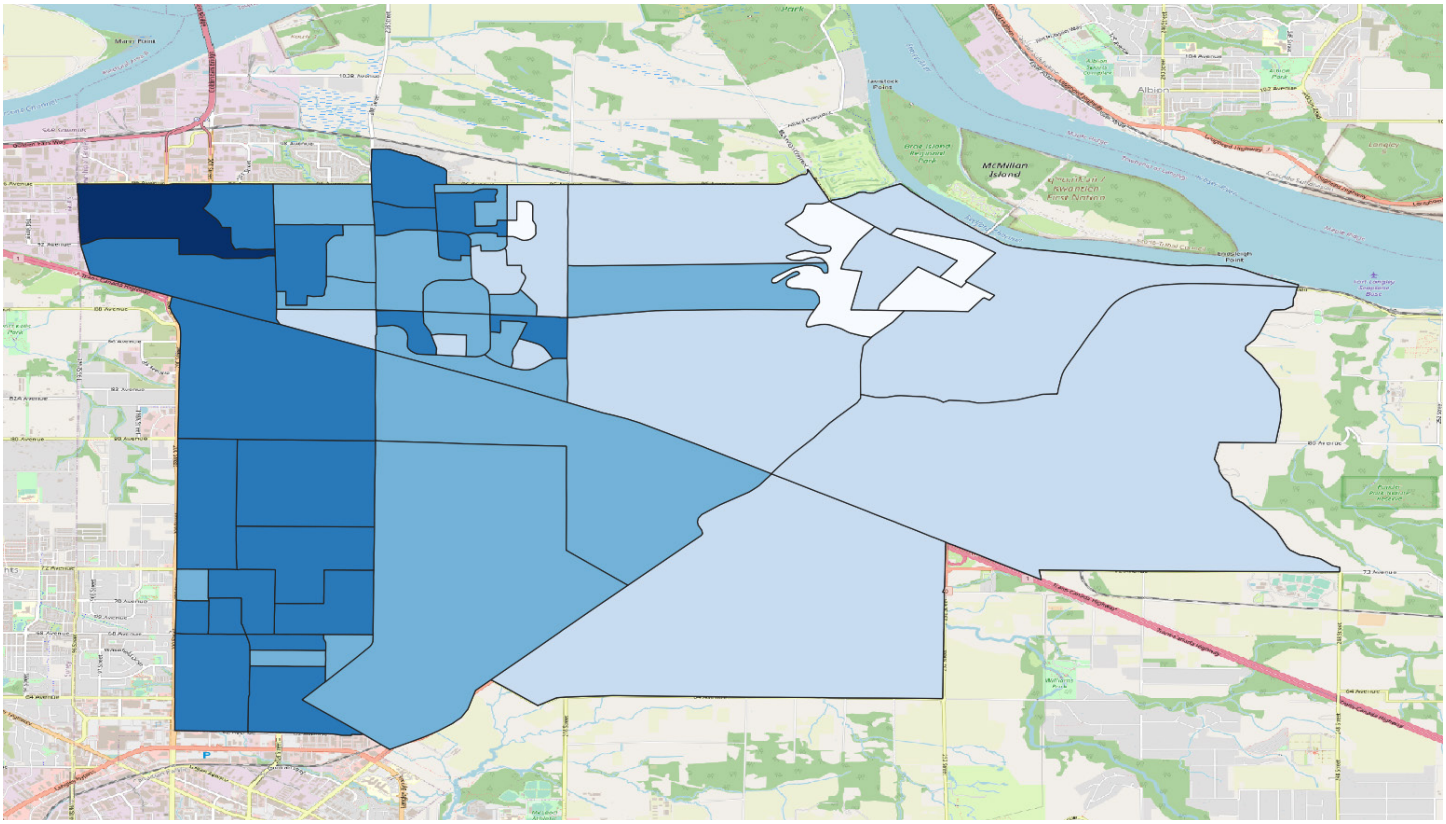
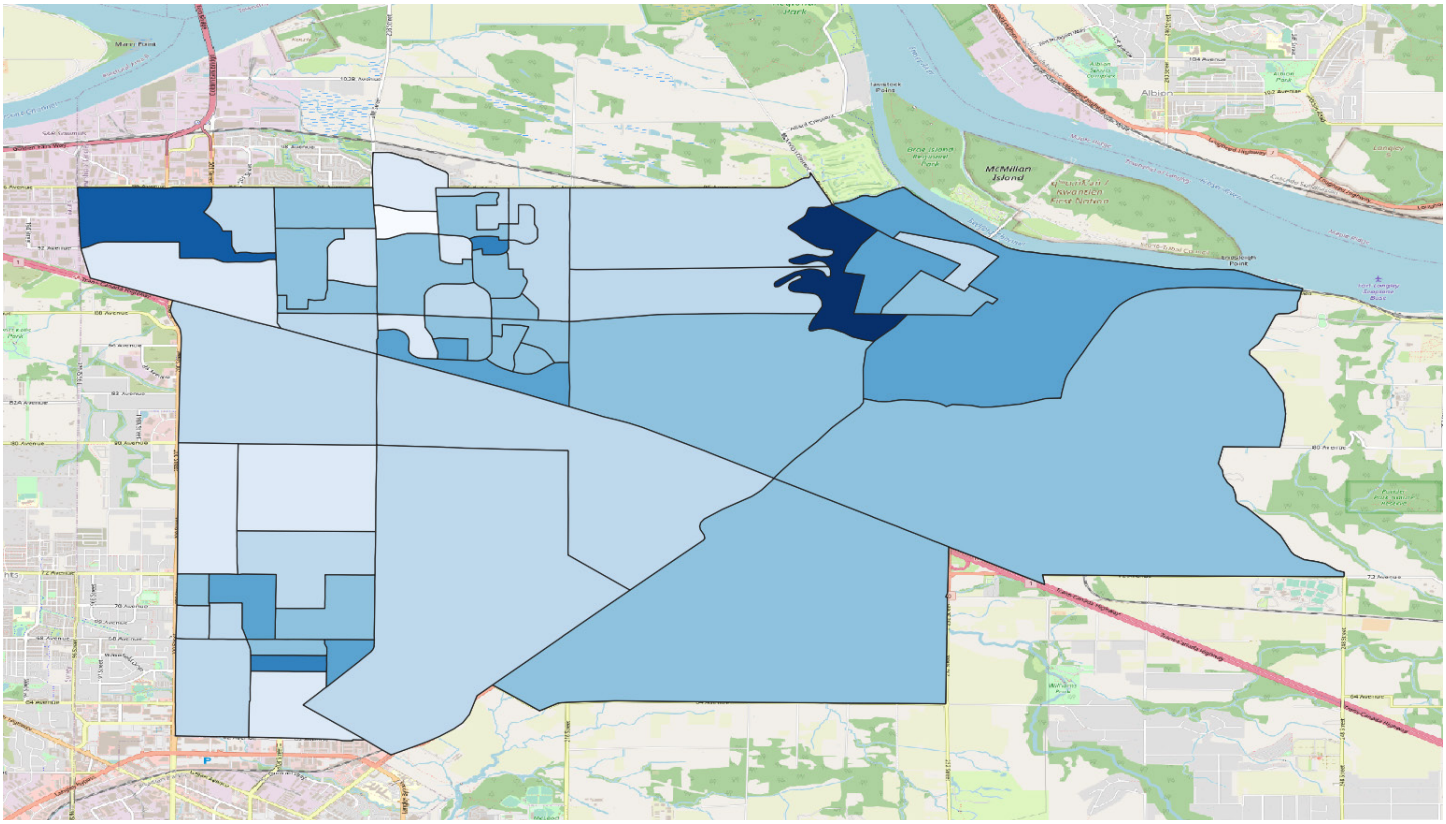


Figure 16. Map of percentage of daily commuters who commute to other Lower Mainland municipalities in selected areas of the Township of Langley



- 30-40% commute to other municipalities
- 40-50% commute to other municipalities
- 50-60% commute to other municipalities
- 60-70% commute to other municipalities
- 70%-80% commute to other municipalities

Figure 17. **Map of percentage of daily commuters who commute 15 minutes or less in selected areas of the Township of Langley**



- 10-15% commute less than 15 minutes per day
- 15-20% commute less than 15 minutes per day
- 20-25% commute less than 15 minutes per day
- 25-30% commute less than 15 minutes per day
- 30-35% commute less than 15 minutes per day
- 35-40% commute less than 15 minutes per day
- 40-45% commute less than 15 minutes per day
- 45-50% commute less than 15 minutes per day