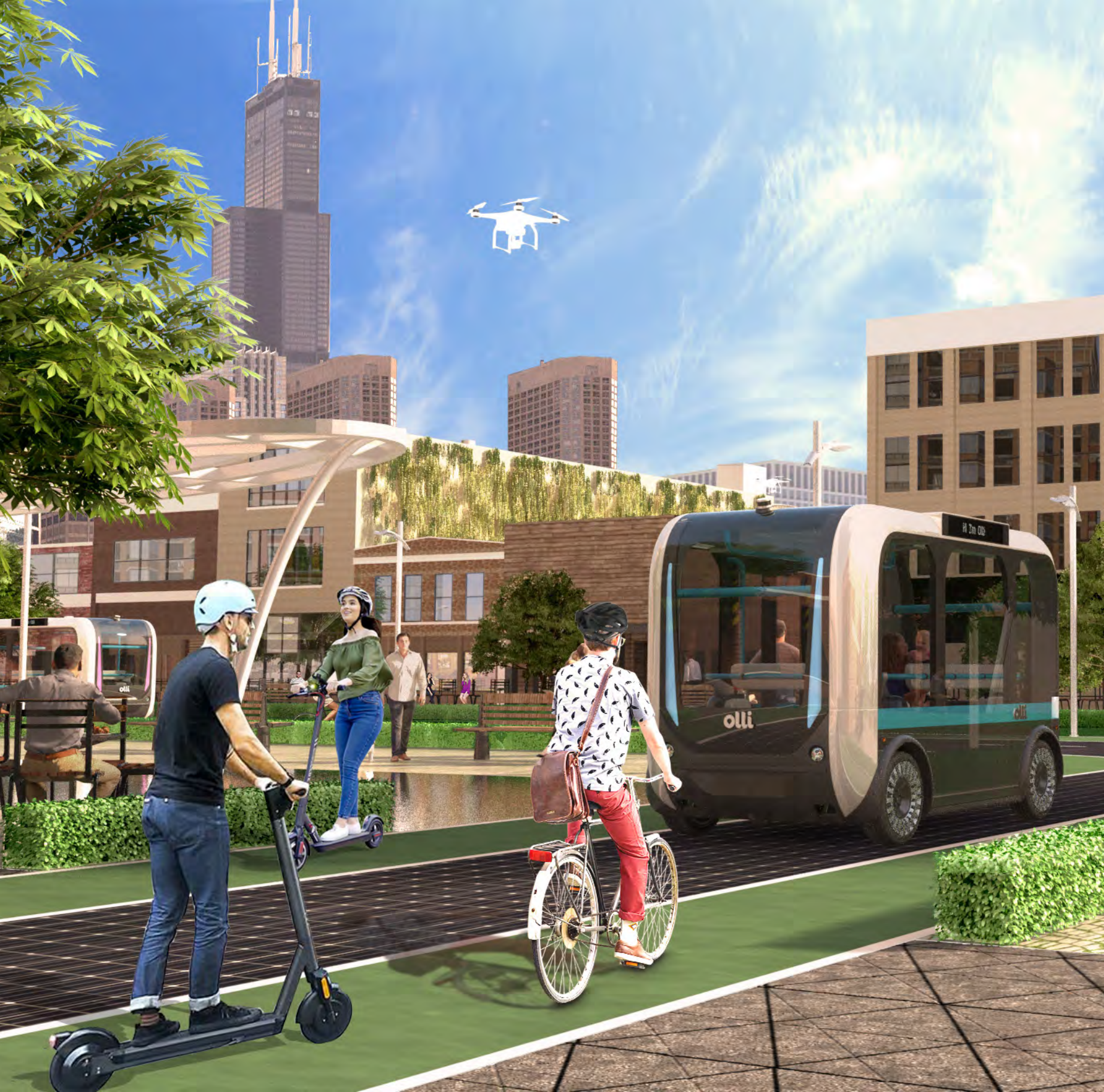


Micromobility





Micromobility

Stantec's Smart Mobility team provides consulting services for the full mobility ecosystem, of which Micromobility is a core component. Through its use of smaller, lighter-weight vehicles, micromobility bridges gaps in public transportation networks and brings mobility to a personal scale.

Today, there are several mobility options at our fingertips. The barriers between different transportation modes are increasingly blurred as they become more integrated. Streets are no longer just for automobiles, but rather, a mixture of mobility options to serve diverse needs.

Micromobility—dockless bicycles, e-scooter sharing services, and personal mobility devices—offers people a new,

convenient mode of transportation for navigating their communities. However, this comes with a variety of challenges and questions: is micromobility merely a trend? Where does it fit in? Will micromobility become an integral part of our mobility networks?

At Stantec, we understand the personal relationship that a community may have with transportation. Whether it is scootering to work or biking to a doctor's appointment, it's important to understand human behavior in relation to our mobility networks. We have experience working on emerging technologies, establishing a vision, and developing the policy framework around which opportunities can be realized—always keeping communities at the forefront of our minds.

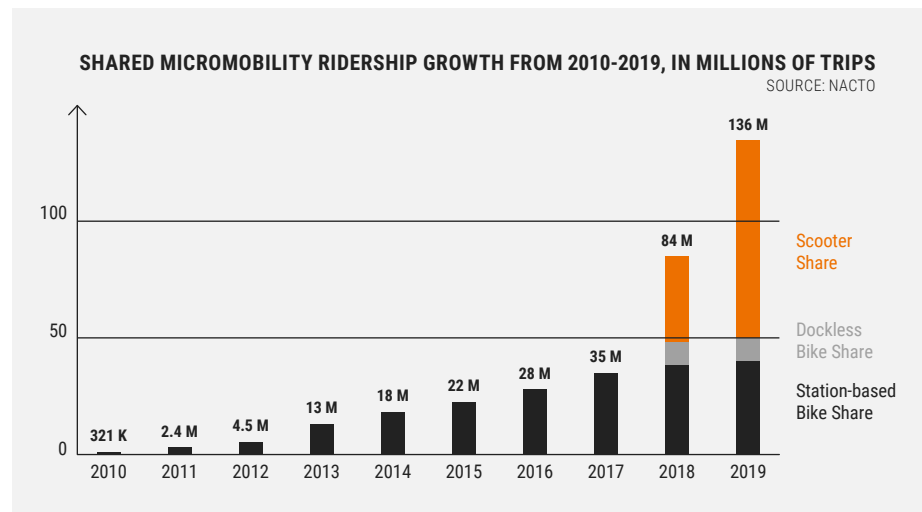
What is Micromobility: For a mode of transportation so talked about, micromobility can be a difficult thing to define. While efforts to standardize terminology continues, micromobility generally refers to smaller, lightweight, low-speed vehicles; these vehicles can be personally owned or shared, as well as human- or electric-powered. Furthermore, their use may vary: micromobility can be intended for human transport, such as bicycles, scooters, e-cargo bikes, or skateboards, for work-related tasks, or for goods delivery, such as delivery bots. Particularly with shared-use services, e-scooters and e-bikes also incorporate elements of wireless technology (for communication between vehicles) and data analytics to guide the management and balancing of fleets by Transportation Network Companies (TNCs).

The micromobility market: Where is it going?

Micromobility and shared micromobility have been around for some time. The first bike-sharing systems appeared over four decades ago, and their growth over the past decade has transformed the systems from novelty or luxury-use to an integral component of the transportation system in cities across the world. Over 136 million trips were taken in the United States alone in 2019, an increase of nearly 60% from the previous year.¹

While much of this growth is attributable to the rapid growth of e-scooters, both personally owned and shared, this hasn't led to a decrease in other modes of shared micromobility. Both dockless bike-sharing systems and station-based bike-sharing saw increases from 2018 to 2019, which means that both modes are serving more and different groups of users than before – a clear sign that micromobility is not only here to stay but has room to grow.

The rapid growth in micromobility services and trips may lead some to falsely conclude that the industry has reached maturity. However, despite its visibility, micromobility is an industry still in its infancy. Although there are public concerns regarding vehicle durability and user safety, innovations in hardware, technology, and system operations continue to push the industry forward. As service improves,

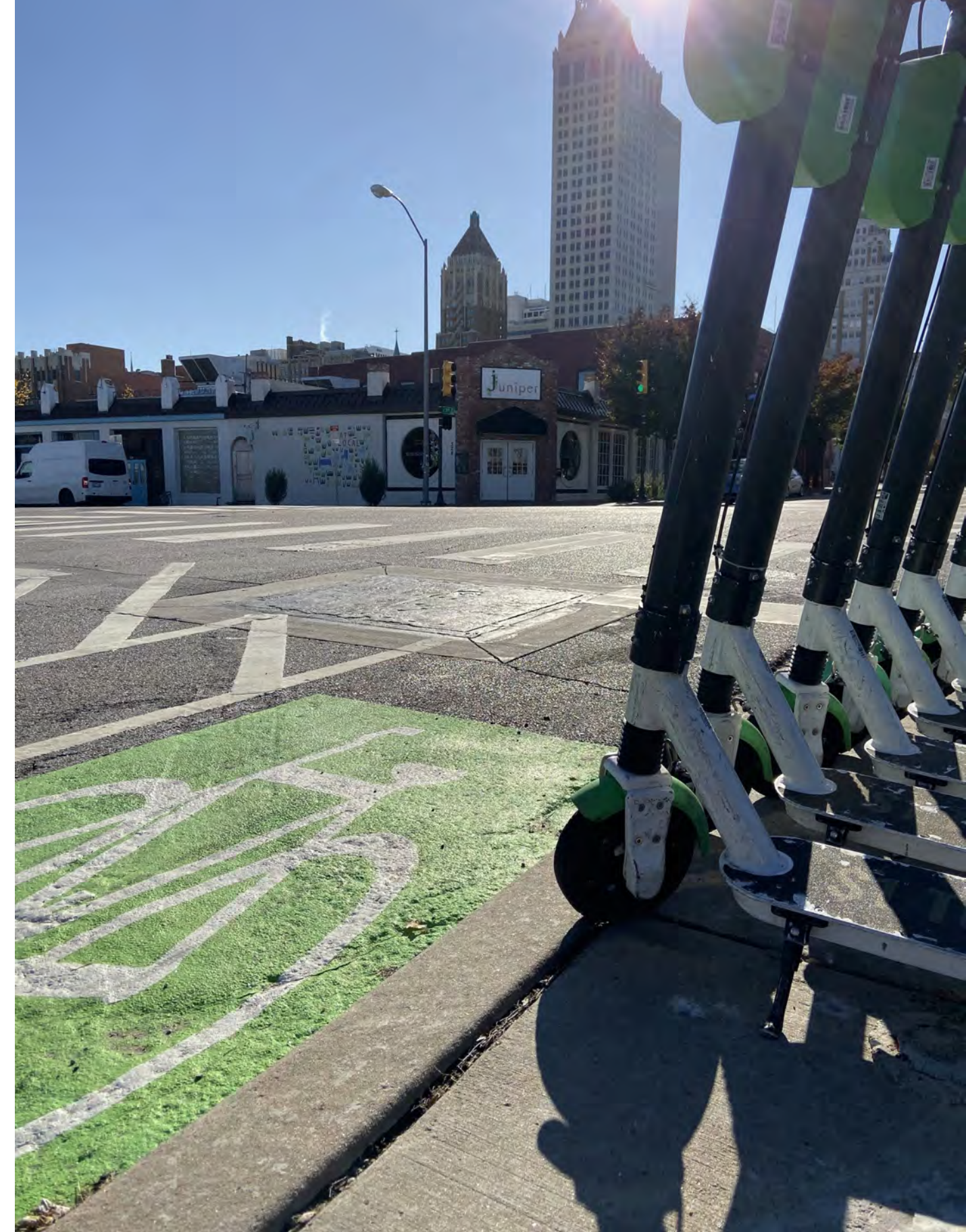


so will relationships with cities, which will eventually expand the market of people who might find micromobility service safe, affordable, and convenient relative to other modes of travel.

While micromobility, particularly e-scooters, may seem ubiquitous, just over 100 cities in North America currently have some service. Globally, the proportion of cities lacking micromobility dwarfs those with services, indicating there is much room to grow.

Expansion to new markets isn't the only means by which micromobility can grow, however. Even within existing cities, new

modes, including e-bikes, cargo bikes, and e-mopeds can provide alternatives for short distance travel to capture more trips normally taken by automobile. Designed for short, personal outings, micromobility vehicles excel for trips under three miles—a distance which makes up nearly half of all trips taken in the United States.² And while 136 million may sound like a significant figure, it represents less than 1% of all trips under three miles taken in the United States. Even a slight movement in the needle towards greater usage of micromobility represents a vast increase in total trips, and thus, a greater need for policies, plans, and infrastructure that can support its growth.



¹ NACTO, The State of Micromobility, 2019.

² US Department of Transportation Federal Highway Administration, National Household Travel Survey, 2017.



Using micromobility to benefit communities

Market Demand: Perhaps the simplest of reasons cities should seek to incorporate micromobility into their transportation networks is because residents and visitors alike want it. With 136 million trips taken in the past year,³ users are making their voice heard with regards to this new mode of transportation. That future growth is expected in micromobility, both owned and shared, means that cities can and should begin incorporating micromobility into their networks.

First-/Last-Mile Connectivity: While mass transit remains the most efficient method of getting around, the challenge of getting to or from transit locations—the “first/last mile problem” is a significant obstacle to reducing car dependency. Through smaller, more nimble vehicles, micromobility offers a convenient and affordable means of connecting people to transit, extending the reach of transit service and increasing access to jobs, education, healthcare, and other destinations.

Eco-Friendly: Electric vehicles, such as e-bikes and scooters, produce no emissions and require less energy to transport the same person as a car. While

the lifecycle impacts of shared mobility services remain an open question, it’s also important to note that electric vehicles do not release point-source emissions, shifting noxious exhaust from the streetscape to more regulated power generators.

COVID-Friendly: With the decline in transit ridership sparked by the COVID-19 pandemic, alternatives to the car are needed to offset increases in vehicle miles travelled and congestion. Micromobility has rebounded from early losses in ridership during the pandemic, proving to be a resilient, reliable alternative means of transportation in crowded urban environments.

Equitable: Access to a transportation network that provides reliable service and choices is an important function of a city. Equitable service using micromobility can be perceived as a challenge, as the programs have an accessibility standard to use (one must be physically able to use the bike and of a minimum age), and generally operate in a transactional manner. The former being a functional limitation of the system, like a car, the latter can be addressed through strong

business models and partnerships. There are three considerations for implementing and equitable service:

- area of deployment, which targets areas of the City that are limited in transportation choices
- meaningful integration with infrastructure which can provide comfortable use of a service
- a financially sound business model, which will define the costs for users and companies in a manner to minimize the cost per user and open the doors to as many people as possible

Efficient: The strength of micromobility is its ability to provide rapid, comfortable transportation solutions that increase efficiency, accessibility, and connections in our communities and cities. Providing efficient service is a function of effective system deployment and a sound policy environment. Threading a new transportation service into existing, often constrained rights of way is an exercise full of pit falls—each barrier can reduce the efficiency of the system which either impacts the value to the user or reduces compliance of those users.



Data

One of the important policy issues emerging around the use of technology in communities is the collection and use of data, which poses privacy considerations that need to be managed and mitigated. As more data from the use of new mobility innovations is collected, considerations around anonymization and avoiding reidentification become more important due to sensitivities around geolocation data. Data is also essential to power the many app-based solutions that the city is currently or planning to implement.

Our holistic approach to micromobility

Our approach is to create a vision and develop a strategy that fits. From policy and data management to contracts and permitting, we work with our clients throughout the full lifecycle of a micromobility project.

Stakeholder Engagement

Micromobility can, and does, mean a lot of things to different people. Through a defined community engagement process we can work with decision makers, stakeholders, the public, and the operators, to create the implementation plan that suits your needs.

We begin with a solid understanding of what your community hopes to gain from using micromobility. Engaging with your community early on is crucial to knowing how residents perceive micromobility services as well as their needs in maintaining and growing a successful program.

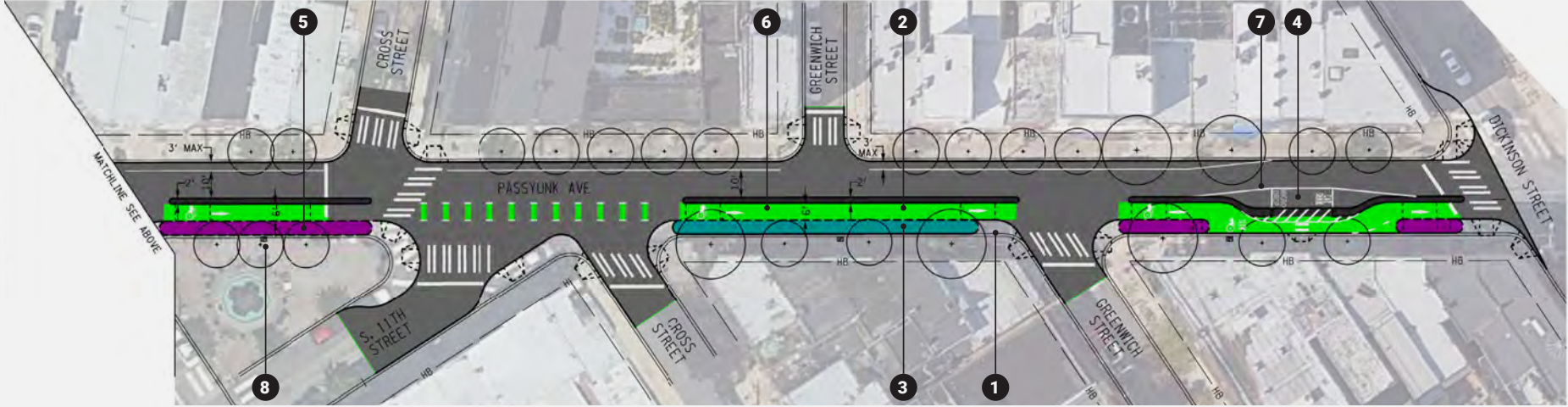
Policy, Ownership, Partnerships & Regulation

Fully integrating micromobility services into the transportation network begins with strong policies that expand mobility, improve safety, promote equity, engage, and reflect the wide set of stakeholders necessary to its success. Coherent, consistent policies, at the federal, state, and local level, set the playing field for cities and micromobility services by providing certainty and predictability.

Questions we ask at the beginning of a micromobility project:

- What is the city expecting to gain from the use of micromobility?
- Are there any areas within the city that have economic, social, environmental, or safety issues that can be solved with the use of micromobility?
- What is the network that would benefit the most from micromobility?
- Does the current infrastructure support the addition of micromobility to the network or are major upgrades needed to fully implement?

Infrastructure and micromobility



- 1** Existing Curb
- 3** Designated Micromobility Parking
- 5** Potential Parklet Location
- 7** Traffic calming Chicane
- 2** Grade Separated Micromobility Lane
- 4** Dynamic Vehicle Parking Zones
- 6** Embedded GreenWave LED Sensors
- 8** Parking Kiosk with Parking collection Technology

Whether you are thinking about deployment, currently trialing, or operating, one of the most common questions asked is: “where does micromobility belong in my existing street?” The sense of belonging defines every interaction between micromobility and other users and infrastructure. Every town or city is unique, not just physically, but as a community. The behaviors exhibited across the world are comparable but also unique. Therefore, simply selecting standardized infrastructure will not be robust enough to have micromobility working in harmony with the rest of the street.

A Multi-Disciplinary Challenge

Micromobility wraps traditional design challenges with innovative technology. Infrastructure that micromobility and its long-term growth, must account for these notable challenges:

- 1 Movement of People, Not Cars:** for most cities, our transportation network has been built in service of automobile movement. Complete Streets infrastructure, including bike lanes, traffic calming measures, and even street trees, all help bring our roads down to a scale that is safe for micromobility users, who are similarly vulnerable as bicycle and pedestrian users.
- 2 Wireless Communications:** connected, shared-use vehicles rely on a robust wireless communications network. Dense urban cores with high-rise buildings present challenges for GPS systems and wireless technology.
- 3 Urban Design of Public Spaces** must be rethought to account for how micromobility users and the TNCs that operate them interact with all other demands on limited public space. We work closely with our clients to establish urban design guidelines, review, create and modify policy tools that reflect the many forms of a city’s urban context.

Common Pain Points Regarding Micromobility Infrastructure

PHYSICAL	SAFETY/OPERATIONS	ENVIRONMENTAL
<ul style="list-style-type: none"> inadequate parking space undefined travelways disconnected network physical obstructions (drainage inlets, vegetation, uneven sidewalk surface) 	<ul style="list-style-type: none"> conflicts with other modes (motorist, pedestrian, and cyclist) low visibility mixed mode traffic 	<ul style="list-style-type: none"> extreme climates (snowy, wet, intense heat) challenging topography (hills, sharp curves, etc.)

Complete Streets: Creating spaces for all new modes

As operators of smaller, lightweight forms of mobility, micromobility users are uniquely vulnerable when using city streets. As consensus has formed that micromobility vehicles are best operated alongside bicycles, it's clear that Complete Streets have a role to play in supporting micromobility. Complete Streets are for everyone – be it children, elderly, disabled, bicyclists, pedestrians, and scooter users. This design approach helps reimagine our streets, sidewalks, and public spaces to prioritize safety, comfort, and accessibility to any and all destinations, for any and all modes.

When our transportation designers at Stantec design Complete Streets, they work with clients to improve the vitality of their communities by integrating transit, vehicle, bicycle, and pedestrian modes in designs that not only promote a healthy lifestyle and improve overall mobility but are also aesthetically pleasing. This design approach easily lends itself to planning for micromobility. The infrastructure set in place for Complete Streets is exactly what is needed for integrating micromobility into communities.



Where does Micromobility belong?

Stantec can help you answer that.

Our experts



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Dan Hemme JD, MPA
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Policy Lead



Frank Domingo PE
Smart Mobility Lead



Mike Rutkowski PE AICP
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Stephen Oliver
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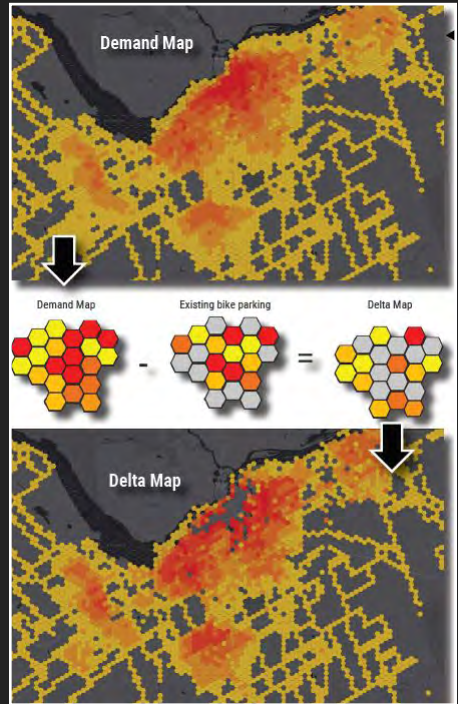


Rory Weilnau EIT, ENV SP
Micromobility Lead



Ottawa Bike Parking Strategy and Bike Share Study

The City of Ottawa aims to increase cycling mode share to 5% city-wide by 2031. Demand for bike parking has increased accordingly with the improved cycling infrastructure and expansion of the cycling community. Stantec is collaborating with the City of Ottawa to develop bicycle parking recommendations that focus on linking bicycle parking with cycling activity and land uses. As part of this study, Stantec is engaging a variety of internal and external stakeholders across the City of Ottawa to develop a mixture of physical, policy and Strategic recommendations to support cycling with bike parking. As part of this study we conducted a feasibility analysis of the various management models for the potential bike share programs and the city's micromobility ecosystem.



The intent of the Bike Parking Index Tool is to provide a systematic approach to planning and implementing public bike parking that is malleable and able to adapt to changing priorities, needs, and demands as cycling activity changes in the future.



Micromobility at Stantec

Our services

Policy - At the heart of a successful micromobility program is a policy environment that supports micromobility services and aligns stakeholder interests. Achieving this, however, is no small feat. At Stantec, we can help to lay the framework for your program or help chart a path forward from previous policies.

Planning - We start at the very beginning with establishing the goals of both the city and community stakeholders. From there, we define the network segments that best represent opportunity, explore how micromobility can satisfy the goals, and assess the existing infrastructure as well as any potential improvements needed.

Procurement - Procurement takes policies and planning and translates them into partnership. Our experts can assist with the procurement process, whether RFP, permitting, or otherwise, to help achieve your aims.

Infrastructure & Design - Infrastructure is the buzz word for shared mobility, but what does it truly mean to build infrastructure that supports micromobility? From Complete Streets to Electric Vehicle charging, we have the experts to translate dreams to reality.

Deployment & Implementation - Now it's time for rubber to meet road. Our team has experience with deployment and operations across the world.

Monitoring & Evaluation - Improving upon a pilot, or a current micromobility program, requires a thorough analysis and understanding of strengths, weaknesses, opportunities, and challenges—data-driven insight, with an eye on improvement.

DESIGN WITH COMMUNITY IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise; to appreciate nuances and envision what's never been considered; to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers innovating together at the intersection of community, creativity, and collaboration. Balancing these priorities results in projects that advance the quality of life in communities across the globe. Stantec trades on the TSX and the NYSE under the symbol STN. Visit us at stantec.com or find us on social media.

