Shared Mobility in the Greater Toronto and Hamilton Area

A backgrounder on industry trends
and a summary of stakeholder discussions

February 2017

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St. James Cathedral Centre
65 Church Street, Toronto ON M5C 2E9
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Table of Contents

1. Introduction

On November 2, 2016 Metrolinx convened a workshop that brought together 80 stakeholders from 24 municipalities and transit providers to discuss shared mobility. Through facilitated discussion, attendees were asked to begin to identify opportunities and challenges for shared mobility in the GTHA.

This summary report provides background information about shared mobility (Section 2), sets some of the context for the legislated review of the Regional Transportation Plan (Section 4) and provides highlights from discussions that took place at the workshop (Sections 3, 4 and 5).

Feedback has been categorized and includes the following key themes:

- Awareness among the public and elected officials;
- Identifying existing, new and underserved transportation market segments;
- Roles of the public and private sectors;
- Data collection, analysis and security;
- Shared autonomous vehicles;
- Agile and coordinated regional policy framework; and
- Potential roles for municipalities, Metrolinx and the Province.

New technology is changing the mobility landscape in the Greater Toronto and Hamilton Area (GTHA) and beyond.

The evolution in urban transport from horse and buggy to gas powered vehicles necessitated changes to the way cities are structured and how transportation networks are planned. Today's rapidly changing technology presents another major crossroad for urban form and mobility systems.

The traditional travel options available to residents for half a century are being reinvented as new mobility models and technologies emerge. These new options can bring benefits to users, but create complexity and controversy when they replace or interact with incumbent services and policy frameworks.

These new and emerging service models, autonomous and connected vehicles, and other communications technologies have the potential to influence how people and goods move around our region. The future depends on users' preferences for these services and the policy frameworks that guide the technologies' use. The GTHA has an opportunity to collaboratively develop a vision for an integrated mobility future that embraces the strengths of these new shared service models while anticipating and mitigating potential risks.

Metrolinx's Discussion Paper for the Next Regional Transportation Plan was published in August 2016 as part of the legislated review of the Regional Transportation Plan (RTP). The discussion paper identifies as its priorities:

- Leveraging the committed transit investments;
- Connecting and aligning the transportation system in the region; and
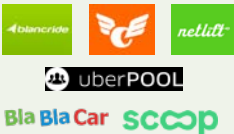- Exploring and incorporating new mobility.

2. Shared Mobility Background

Shared mobility refers to a broad set of transportation services that are shared among users.[1]

Advances in consumer electronic and wireless technologies including smartphone apps, GPS technologies and wireless payment have made sharing assets easier in a number of industries (i.e. the sharing economy) and these trends have arrived in the transportation sector. Shared mobility includes new and expanding business models that respond to, and drive demand for, more flexible, responsive and on-demand mobility options.

Transportation Network Companies (TNCs), such as Uber, are one of the best known manifestations of shared mobility but the industry also comprises other services such as bikesharing, carsharing, ridesharing and microtransit. Each of these services has its own operating characteristics and considerations that make it appropriate for different challenges and community needs. Figure 1 describes the characteristics of a few shared mobility options.

Figure 1: Spectrum of options for shared mobility

	Dynamic Carpooling	Ridesourcing	Microtransit
Routing	On-Demand	On-Demand	On-Demand
Drivers	Non-Professional	Non-Professional	Non-Professional or Professional
Typical Vehicle Occupancy	1-5 Passengers	1-5 Passengers	4-14 Passengers
Vehicle Type	Personal Vehicle	Personal Vehicle	Personal or Commercial Vehicle
Typical Trip Length	Longer trips ~5-75km	~5km	~3-8km
Examples			

Shared mobility services present new opportunities to introduce more convenient and affordable transportation options for travelers in the GTHA. There may also be broader potential to contribute toward regional social and economic policy objectives, such as reducing traffic congestion, limiting greenhouse gas emissions, improving the efficiency of services, increasing the attractiveness of sustainable options, and filling gaps in the existing transportation network.

However, these services are not without risk and more work is needed to understand and mitigate potential challenges. If not properly managed, more individualized forms of mobility

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[1] Shared mobility is one aspect of new mobility. Refer to Key Shared Mobility Definitions (p.7-8) for more information about the shared mobility typology.

could result in increased vehicle travel, less viable transit service, or less equitable access to mobility for vulnerable population groups.

One way to manage risk is by collecting data and determining best practices through research and pilot projects. Figure 2 describes a number of pilot projects from around North America.

Figure 2: Examples of pilot partnerships underway or completed in North America

Service and Partner		Description	Technology	Funding	Date
GO Connect Milton, Ontario	Milton Transit with RideCo	Dynamic shuttle service as station access option to/from Milton GO. Vehicles: taxi sedans. Replaced three local transit routes for duration of pilot.	Dynamic routing and mobile app by RideCo		May 2015 (10 month pilot)
"RideKC" Pilot Kansas City, Kansas	Kansas City Area Transit Agency with Bridj	Dynamic shuttle picks up and drops off within service zones. Routes and stops are dynamic. Vehicles: Ford 14-passenger vans owned by KCATA.	Dynamic routing and mobile app by Bridj	$1.3 million pilot funding provided through sales tax revenue	March 2016 (1 year pilot)
"Direct Connect" Pilot and "TD Late Shift" Pilot St. Petersburg, Florida	Pinellas Suncoast Transit Authority with Uber & United Taxi Lyft added as partner in pilot extension	Authority provides a subsidy of 50% (up to $3) for any Uber or taxi trip from certain zones to public transit facilities.	A promo code unlocks the discount. A phone number is used to access taxis.	Original pilot budget was $40,000 for a 6 month pilot.	January 12 2016 (6 month pilot)
		Original pilot extended for 6 months with expanded service area across county. Riders pay an average of $1 to connect to bus stop (5$ subsidy per trip).	Promo code removed and eligibility determined by geo-fence		October 26 2016 (6 month pilot)
		"TD Late Shift" Qualifying low income residents are eligible to purchase a monthly pass for $11. It provides up to 23 free rides after transit operations cease (9pm-6am).		$300,000 grant from the Florida Commission for the Transportation of the Disadvantaged	August 1 2016 (1 year pilot)
Altamonte Pilot City of Altamonte Springs, Florida	City of Altamonte Springs with Uber	City provides a subsidy of 20% for any Uber trip within city boundaries and 25% to SunRail stations.	Software and dispatch provided by Uber	$500,000 budget ($300,000 from city and $200,000 from sponsorship)	March 21 2016 (1 year pilot)

Service and Partner		Description	Technology	Funding	Date
SEPTA Transit Pilot Philadelphia, Pennsylvania	Southeastern Pennsylvania Transportation Authority with Uber	Discount of 40% up to $10 per ride is provided for Uber trips to and from 11 suburban rail stations. Stations are selected on basis of high ridership and limited parking availability.	Request an Uber ride to/from the station parking lot and discount is applied	n/a	May 25 2016 (14 week pilot)
Centennial First and Last Mile Pilot Centennial, Colorado	City of Centennial with Lyft	Lyft Line will provide free trips between the light rail station and an adjacent residential zone. Riders may be paired with other Lyft Line passengers not travelling to the station.	Users download Go Denver app (developed by Xerox) and Lyft app. Lyft Concierge is used to book trips by phone.	$350,000 budget for the pilot which expects to cover 43-60k trips. Additional $25,000 to Xerox for app updates and $50,000 for overhead costs.	August 2016 (6 month pilot)
Summit Parking Pilot Summit, New Jersey	City of Summit with Uber	100 Summit residents are eligible for rides to/from the rail station. Parking at the station is very limited. Uber rides are $2 each way or free for users with prepaid monthly parking pass.	Users apply online and use Uber app to book trips	$167,000 per year (estimated savings of $5million over 20 years compared to expanding parking)	October 2016 (6 month pilot)

Key Shared Mobility Definitions[2]

As new shared mobility business models emerge it is important to develop a common language to facilitate conversation. The following definitions are adapted from the Shared-Use Mobility Toolkit for Cities published by the Shared-Use Mobility Center.

New mobility refers to a variety of emerging transportation solutions and business models that are enabled by new technologies, such as: smartphones, high speed internet, drones, real-time data, big data, integrated payment, and connected and autonomous vehicles.

- **Integrated mobility** is a subset of new mobility and refers to technology-enabled mobility services that seek to unify the travel experience through: integrated trip planning; seamless digital fare payment and mobility pricing packages. These services leverage big data analytics and uninterrupted connections between services (including public-public or public-private).

- **Shared mobility** is a subset of new mobility referring to a broad set of transportation services and business models that are shared among users including bikesharing, carsharing, microtransit, ridesourcing and ridesharing. It refers to components of the sharing economy related to transportation. Many, but not all, shared mobility services are provided by private operators.

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[2] Definitions adapted from Shared-Use Mobility Center "Shared-Use Mobility Toolkit for Cities" (2016). Graphics from Mowat Centre. "Sharing the Road: The Promise and Perils of Shared Mobility in the GTHA" (2016).

Bikesharing involves shared use of a bicycle or fleet of bicycles by multiple users. Typically, users access bikes through a network of tech-enabled stations which are often located in higher density areas.

- **Dock-based** systems secure and rent bikes from technology-enabled stations distributed throughout a service area (e.g. Toronto Bike Share).

- **Dockless/flexible** systems place technology on the bike itself but often have designated 'hubs' to pick-up and return the bike (e.g. Hamilton's SoBi system).

- **Tech-light** are simple systems without technology and can be provided by employers (e.g. the City of Mississauga offers an employee bike share program for travel to meetings).

- **Peer-to-peer (P2P)** provides an online platform for private individuals to rent bicycles to others.

Carsharing provides members with access to a fleet of vehicles, which are available on-demand and allow for flexible rental periods and payment options. Vehicles are usually available from multiple locations. A universal access card or smartphone app is used to gain entry to the vehicle.

- **Traditional (two-way)** requires customers to borrow and return vehicles to the same location (e.g. Zipcar and Enterprise Carshare).

- **Point-to-point (one-way)** allows customers to pick up and drop off vehicles at different locations (e.g. Car2Go).

- **Peer-to-peer (P2P)** provides an online platform for customers to rent private vehicles to others (e.g. Turo).

Microtransit: Technology-enabled shuttles serve passengers using dynamically generated, rather than fixed, routes between designated stop locations or door-to-door. These services have been referred to as microtransit because they provide transit-like service on a smaller, more flexible scale. Rides are often ordered on-demand with a smartphone app, telephone, and/or website.

Ridesourcing providers use an online or app-based platform to connect passengers with drivers who drive personal, non-commercial vehicles. Unlike taxis, these vehicles typically cannot be hailed without the use of an app. Operators are often known as Transportation Network Companies (TNC) but different jurisdictions use different terminology such as Private Transportation Companies (PTCs) in Toronto.

- **Ride-splitting** allows passengers to pay a lower fare by sharing a ridesourced vehicle trip with another passenger who is added to the trip in real time (e.g. UberPool). These services blur the boundary between other forms of shared mobility, such as ridesharing and microtransit.

Ridesharing/Carpooling involves adding additional passengers to a trip that will already take place (ex. a daily commute). It provides alternative transportation options for passengers and allows drivers to fill extra seats in their vehicles. The driver is not 'for-hire' but is sometimes compensated for mileage.

- **Traditional Carpooling** is a long-standing form of ridesharing. Carpools can be established on an ad-hoc basis by individuals, or through ride-matching programs (e.g. the online tool offered by Smart Commute). Programs are often workplace-based and match users with similar origins.

- **Dynamic Carpooling** makes use of technology for real-time matching of drivers and passengers based on having a convenient origin/destination along the driver's route.

Shared parking is a tool to increase parking capacity by leveraging excess capacity that is available in adjacent private parking lots by making a single space available to many users through the use of technology.

- **Traditional shared parking** involves organizations that already operate paid parking making use of an app or web interface to more effectively market existing parking.

- **Peer-to-peer (P2P) shared parking** provides an online platform enabling private individuals or businesses to rent their unused parking spaces or driveways to others for a small fee.

Policy Response to Transportation Network Companies

Transportation Network Companies (TNC) are relatively new to Canada but expansion has been rapid in both jurisdictions where it is regulated and those where it is not. The GTHA has a complex ridesourcing framework and a variety of regulations exist (see Figure 3). In the United States, 39 states have passed bills regulating TNCs and ridesharing (see Figure 4). At present, regulation in Canada is evolving, with some municipalities establishing regulations, often in isolation of others in the same region (see Figure 5). Each jurisdiction has its own concerns, but common issues are:

- insurance;
- provision for passengers with disabilities;
- personal security and privacy;
- competition with taxicabs; and
- mode-shift from transit.

Figure 3: A snapshot of ridesourcing regulation across the GTHA (as of December 2016)

1 Hamilton
2 Burlington
3 Oakville
4 Milton
5 Halton Hills
6 Caledon
7 Brampton
8 Mississauga
9 Toronto
10 Vaughan
11 King
12 Newmarket
13 Aurora
14 Richmond Hill
15 Markham
16 Whitchurch- Stouffville
17 East Gwillimbury
18 Georgina
19 Uxbridge
20 Pickering
21 Ajax
22 Whitby
23 Oshawa
24 Scugog
25 Brock
26 Clairington

* pilot project approved

Approved   No Policy   Proposed   Suspended

Figure 4: Jurisdictions with state-level ridesourcing laws in the United States[3]

LEGEND

HAVE LEGISLATION
NO LEGISLATION

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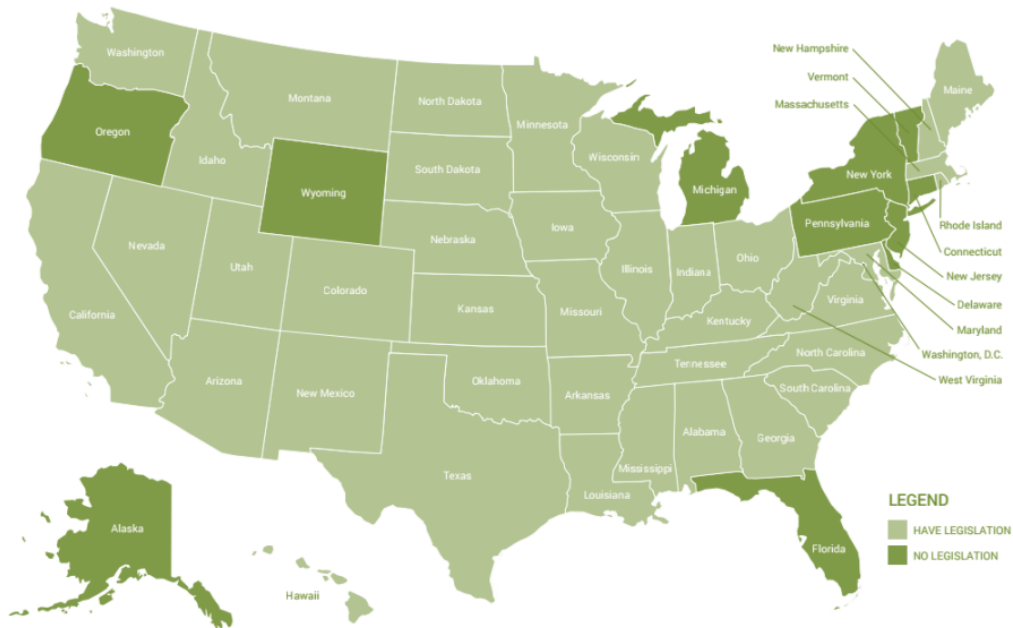
[3] Property Casualty Insurers Association of America (August 2016)."TNC Issue Status Map." Industry Issues; Transportation Network Companies.

Figure 5: Sample of Canadian TNC Regulations[4]

Jurisdiction	License	Insurance	Background Check	Licensing Fees	Data	Other
Alberta						
Edmonton (Mar 1 2016)	• Alberta Class 1, 2, or 4 license • Additional city issued TNC license	• Provide insurance as outlined in Provincial law	• Annual vehicle safety inspection	Regional PTP (0-199 vehicles): • $1000/year plus $400/vehicle • $100/2 years per driver • $50/vehicle accessibility charge Commercial PTP (200+ vehicles): • $50,000/year plus $0.06/trip $20,000/year accessibility charge	• Must keep record of requests for service, requests for accessible vehicles, GPS account of all trips, notices of refusal	• Alberta legislation facilitates ridesharing
Calgary (Nov 28 2016 1-year pilot)	• Alberta Class 1, 2, or 4 license (Class 5 is standard)	• Driver must provide insurance that meets Commercial Vehicle Certificate and Insurance Regulation AR 314/2002	• Drivers undergo criminal background check submitted to city • Annual vehicle safety inspection	Fees scaled by number of vehicles: • 0-100 vehicles $5000 • 101-5000 $10,000 • 501-1000 $15,000 • 1001+ $20,000 • plus $15/driver and $0.20/trip	• For purposes of enforcement TNC must collect and provide information about schedule/location and driver information	• Vehicle must be no older than 10 years
Ontario						
Toronto (July 15 2016)	• Ontario Class G license required • Additional TNC license obtained from company	• Driver must carry $2,000,000 insurance (and inform insurance company) • TNC must hold $5,000,000 commercial liability insurance	• Background check and driving history conducted by TNC • Annual vehicle safety inspection	• $20,000 initial application fee • TNC pays annual licensing fee of $10 per driver plus $0.20 per trip	• Must provide searchable database of driver and vehicle information • Time drivers are waiting, time spent transporting passengers & total users	• Vehicles must be less than 7 years old • Vehicles can carry a maximum of 7 passengers
Ottawa (Sep 30 2016)	• Ontario Class G license required • TNC issues every driver an ID card in print or electronic form	• Driver must carry $5,000,000 insurance with TNC endorsement • TNC must hold general commercial liability insurance of $5,000,000	• Police record check and driving record provided to TNC • Annual vehicle safety inspection	Fees scaled by number of vehicles + per trip: • 1-24 vehicles $807 • 25-99 vehicles $2469 • 100+ vehicles $7253 Plus $0.105/trip all levels	• Maintain records for 3 years including: total number of trips, date, time, origin/destination, and information about drivers and vehicles	• Vehicle must be no older than 10 years

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[4] Figure 5 provides a general overview of most of the TNC bylaws in Canada. For complete information about a jurisdiction please refer to the local bylaw.

Jurisdiction	License	Insurance	Background Check	Licensing Fees	Data	Other
Ontario (Continued)						
Region of Waterloo (Dec 1 2016)	• The Vehicle for Hire bylaw includes ridesourcing vehicles as "Auxiliary Taxis' • TNC issues every driver an Auxiliary Taxi-cab license	• TNC must hold comprehensive policy of public liability and property damage insurance of $5,000,000	• Police criminal background check • Ministry of Transportation driver's abstract • Province of Ontario Motor Vehicle Inspection	Fees scaled by number of vehicles: • 1-50 $150 • 51-100 $300 • 101-150 $600 • 201-500 $2400 • 501-999 $4800 • 1000-2999 $50,000 • 3000+ $22/vehicle • plus $0.11/trip • plus $0.07/trip accessibly fee	• Clerk may prescribe electronic data software required under bylaw	• Two exterior identifying decals on vehicle (at least 200cm^2) • Requires real-time GPS but not cameras (to be reviewed in 12 months)
Oakville (Dec 12 2016)	• Ontario Class G license required • TNC issues every driver an ID card in print or electronic form	• Drivers must carry $2,000,000 insurance with TNC endorsement • TNC must hold general commercial liability insurance of $5,000,000	• Drivers undergo third party criminal record checks submitted to TNC • Annual vehicle safety inspection	Fees by number of vehicles: • 0-24 vehicles $786 • 25-99 vehicles $854 • 100+ vehicles $50,000 & $0.11/trip	• Must provide a database with driver/vehicle information and number of trips provided	• Vehicle must be no older than 7 years • Identifying sticker on vehicle
Quebec						
Quebec (Oct 23 2016 1-year pilot) In Quebec vehicles-for-hire are regulated at the provincial level.	• Quebec 4C commercial license required	• Applicable insurance required • Additional $0.07 per ride is collected to account for higher insurance costs paid by taxis	• Drivers undergo criminal background check through Uber service provider • Vehicle inspection by certified mechanic	Fees by operating hours: • up to 50,000 hours $0.97/ride • up to 100,000 hours $1.17/ride • 100,000+ hours $1.77/ride	• Uber must submit monthly reports showing it is respecting the agreement	• Identifying sticker on vehicle • Drivers speak French • Customer service training provided by Uber

3. Regional Progress

Station Access and the First and Last Mile

Regional Express Rail (RER) and the Rapid Transit projects underway across the region represent transformational improvements to the GTHA's transportation network. This transformation will influence regional structure, urban form, and regional mobility patterns.

Regional Express Rail (RER) is a plan to provide faster and more frequent GO rail service on the GO Transit rail network with electrification on core segments of the network, including the Union-Pearson (UP) Express. GO RER will be delivered over 10 years, more than doubling peak service and quadrupling off-peak service compared to today. The number of rail trips per week offered across the GO rail network are expected to grow from approximately 1,500 to approximately 6,000.

RER is projected to double ridership on the GO rail system from an average 100,000 daily weekday riders in 2016 to 225,000 - 250,000 weekday riders in 2031 (excluding riders starting their GO rail round trip at Union), with a notable increase in ridership by off-peak and reverse commuters.

It is important to support the first and last mile of the transit journey to optimize ridership and utilization of the new transit infrastructure.

In December 2016, Metrolinx finalized the 2016 *GO Rail Station Access Plan*. Relevant points from the plan include:

- Emphasize reducing demand for driving-alone and parking at GO stations from a system-wide average of 62 percent (2016) to 36-38 percent (2031);
- Increase transit access mode share from 8.5 percent (2016) to a target of 25 - 27 percent (2031) – including microtransit services;
- Coordination between Metrolinx and municipalities to identify locations for potential microtransit services and opportunities for ridesourcing services to connect commuters to employment or retail destinations near GO stations; and
- Design of pick up/drop off facilities should consider shared mobility modes such as microtransit and dynamic carpooling.

Milton GO Connect

In exploring new approaches to delivering station access options Metrolinx partnered with the Town of Milton (Milton Transit) and Waterloo-based application developer RideCo to plan and operate an on-demand microtransit shuttle service called 'GO Connect' on a pilot project basis. The service was in effect from May 2015 until the end of March 2016. GO Connect operated during weekday peak hours and served an average of 85 bookings per day.

Shared Mobility RFI

In December 2015, Metrolinx released a Request for Information (RFI) seeking information about business models, technologies and partnership concepts from organizations providing on-demand and/or shared mobility solutions in the following categories: ridesourcing, ridesharing,

microtransit and carsharing. In total, responses were received from 12 service and technology providers highlighting their applicability as first- and last-mile solutions. The responses were used to inform research activities, the development of the RTP discussion paper, and modeling for the Station Access Plan.

The Next Regional Transportation Plan

The planning context in the GTHA has continued to shift and adapt to changing conditions since the release of *The Big Move* in 2008. The *Discussion Paper for the Next Regional Transportation Plan* reflects on past changes and proposes how they can be incorporated into current and future efforts.

Advances in shared mobility service models, autonomous and connected vehicle technologies, and mobile applications loom large over any future vision of transportation in the region. The next Regional Transportation Plan will lay the groundwork for an ongoing process of anticipating and responding to influential trends.

The updated RTP will be developed from a new baseline and incorporate emerging best practices and transportation innovations, aligned with current provincial plans, policies and guidelines. In recognition of these changing conditions, the discussion paper proposes updating the original *Big Move* vision, goals and objectives, as well as exploring:

- Opportunities to leverage committed transit investments;
- Opportunities to connect and align the transportation system in the region; and
- Opportunities for exploring and incorporating new mobility.

The Greater Toronto and Hamilton Area (GTHA) is a diverse region covering 8,242km^2, with 30 municipalities and more than 7.2 million residents. The 10 GTHA transit providers deliver more than 668 million transit trips annually. In addition to technological change, the legislated review of the Regional Transportation Plan is also responding to changing demographic and economic conditions and their implications for regional mobility:

- **Population Growth**: By 2041 the GTHA is projected to have a population of more than 10 million people. Growth rates are expected to be the highest in Halton Region (93%); York Region (93%), and Durham Region (90%). Other parts of the region are still expected to grow dramatically, though at a lower rate, including Peel Region (47%), the City of Hamilton (46%); and the City of Toronto (26%).

- **Employment Growth**: Employment and economic growth will be the main factor leading to population growth, particularly increased office employment in downtown Toronto and at major employment centres across the GTHA. Growth is managed by the *Growth Plan for the Greater Golden Horseshoe* which is currently under review.

- **Demographic Shift**: GTHA municipalities are also experiencing changing demographics. It will be important to identify mobility options that will fit the growing and changing needs of the population. By 2041, it is expected that 44% of the population will be composed of: seniors, aged 65+ (23%); and youth, aged 3-19 (21%). The seniors' population alone is expected to grow by 120% from 2016-2041.

Technical Backgrounders

A number of technical background papers have been prepared to support the legislated review of the Regional Transportation Plan. Two of these papers support the investigation of new and shared mobility:

- **New Mobility Background Paper**[5]: This paper discusses how new mobility may impact the GTHA. It explores key trends related to technology, government, individuals and the built environment, and presents different scenarios for how these trends might develop. It offers several strategic directions suggesting how the region can work together to prepare for coming change.

- **Sharing the Road: The Promise and Perils of Shared Mobility**[6]: This report examines shared mobility in the GTHA, describes the services that are currently operating, and offers six broad recommendations for building a regulatory and mobility system that can effectively respond to shared mobility's emergence.

Discussion Paper for the Next Regional Transportation Plan

The *Discussion Paper for the Next Regional Transportation Plan* summarizes the technical research that has been completed to date and identifies a need to lay the groundwork for an ongoing process of anticipating and responding to influential mobility trends. Some of these trends include the rise of TNCs, carsharing, Mobility-as-a-Service, connected vehicles and autonomous vehicles. The paper proposes that Metrolinx and municipalities can act to respond to these trends by:

- Monitoring the progress of related technologies and the impacts of pilot testing;
- Supporting research and development that advances the public interest (for example, related to congestion, safety and accessibility); and
- Enacting timely bylaws, regulation and legislation as needed—in conjunction with the Province.

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[5] Metrolinx (2016). New Mobility Background Paper. Prepared by WSP.
[6] Mowat Centre (2016). Sharing the Road: The Promise and Perils of Shared Mobility in the GTHA. Prepared by Ditta, S., Urban, M., & Johal, S.

4. Workshop Approach

Participants spent the day identifying the challenges and opportunities shared mobility presents for the GTHA.

The workshop was attended by 80 delegates from 24 upper-/lower-/single-tier municipalities and four municipal transit providers as well as staff from Metrolinx and the Province of Ontario.

Attendees brought a wide spectrum of experiences, with representation from numerous departments, including urban and transportation planning, municipal licensing and standards, transit operations, and others.

Throughout the day-long workshop, attendees were led through facilitated group discussions to anonymously identify current challenges and opportunities and to identify large questions that still need to be answered. Four key topics were identified in advance and were used to frame the conversation for the day:

> "There is a lot of work to be done. The status quo is not going to cut it anymore."
> – workshop participant

- **Ridesourcing:** A number of municipalities in the GTHA have already passed regulations or are considering regulating ridesourcing (see Figure 3) through amendments to municipal bylaws, often in conjunction with updating regulation related to incumbent taxi operators.

- **Ridesharing:** Carpooling has been a major part of transportation demand management programs like Smart Commute for decades. Ridesharing or 'dynamic carpooling' has the potential to make it easier and more attractive to share trips on congested corridors.

- **Microtransit:** Since 2014, there have been a number of pilot partnerships between public agencies and microtransit operators. Examples include GO Connect in Milton, Ontario, VTAFlex in San Jose, California and KCATA Bridj in Kansas City, Missouri.

- **Specialized and Accessible Services:** Demand for specialized services is increasing along with operational costs, and municipalities are moving toward integrating specialized and conventional fixed route transit wherever possible. Shared mobility options present opportunities to address service demands while increasing operational efficiency. In rural and exurban areas, those opportunities could extend to non-emergency medical transportation and similar services that link isolated groups to activity centres.

Overview of the Day

Workshop participants demonstrated a high level of interest in shared mobility and participated in lively conversation identifying potential challenges to and opportunities for its adoption.

The level of understanding about shared mobility options varied by participant. However, participants found that the workshop was relevant to their work with 100% of evaluation surveys reporting that it was "somewhat" to "very" relevant. This result suggests that people in the room were properly selected to help inform any future shared mobility projects or programs.

A varied understanding of shared mobility amongst participants was expected and resources were provided to ensure a basic overview of the spectrum of shared mobility options, key definitions, anticipated challenges and opportunities.

The full workshop agenda is available in Appendix B.

Shared Mobility Panel
A panel at the Shared Mobility Workshop provided perspectives from three researchers who had recently completed reports on shared or new mobility in the GTHA including:

- Daniel Haufschild, Vice-President, Urban Mobility, WSP
  New Mobility Background Paper
- Joeri van den Steenhoven, Director, MaRS Solutions Lab *Redesigning Regulation for the Sharing Economy*
- Michael Urban, Policy Associate, Mowat Centre *Sharing the Road: The Promise and Perils of Shared Mobility*

5. Issues and Opportunities Discussion

The shared mobility ecosystem is evolving rapidly. Through a coordinated effort we will be prepared to better maximize the benefits and mitigate the risks of shared mobility for the region.

Assessing Areas of Interest

In a 'dotmocracy'-type exercise, participants indicated both the level of interest and significance for each of four key topics from the perspective of their municipality or agency for the GTHA (see Figure 6).

Overall, there was strong interest in all four topic areas. Microtransit, ridesourcing, and the potential for shared mobility to provide accessible and specialized services were viewed as having a particularly high significance. The perceived significance of ridesharing was mixed, potentially because of previous experience with carpooling programs.

Figure 6: Quadrant plots indicating perceived significance and interest level for each workshop focus area
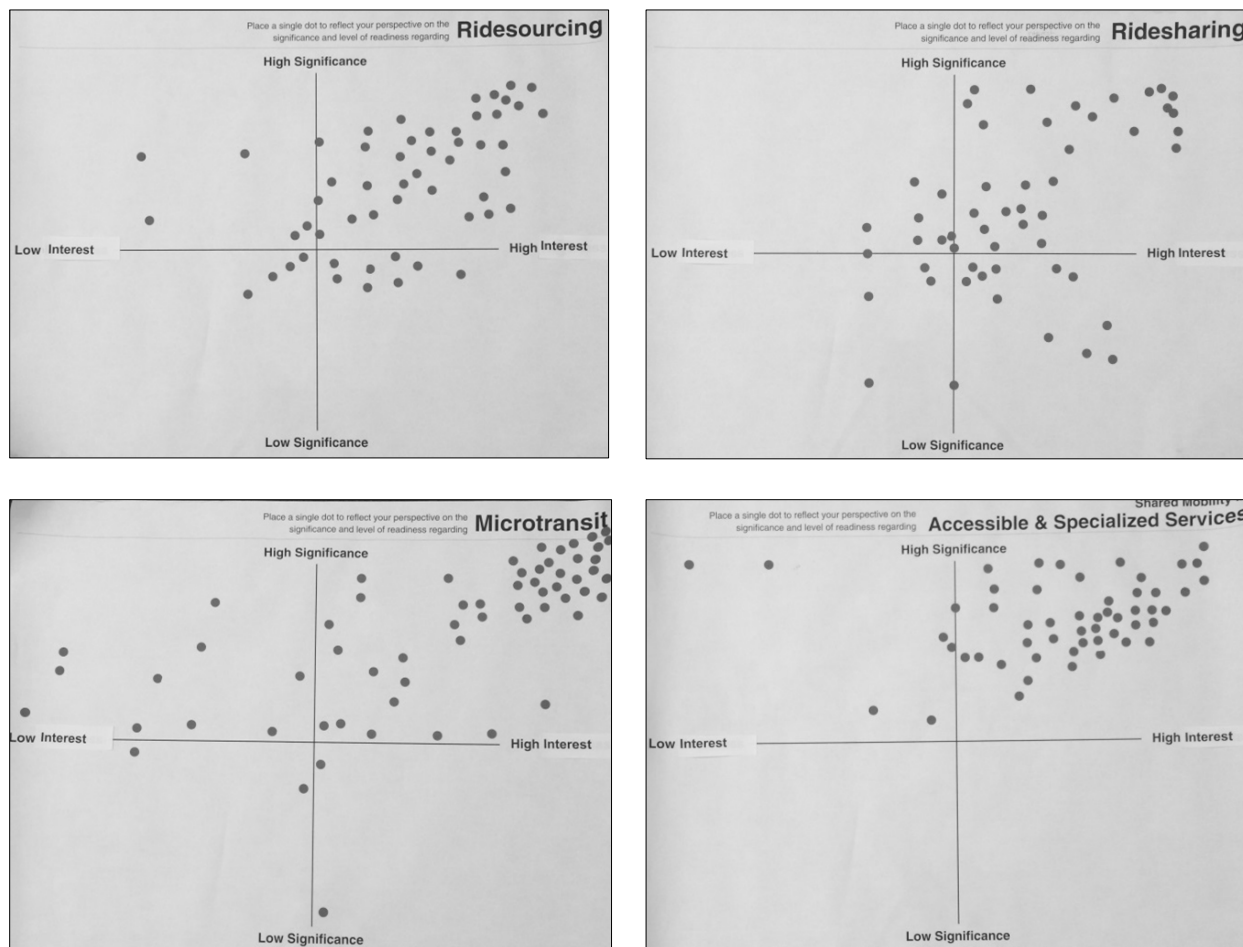
Awareness among the Public and Elected Officials

Several attendees mentioned the lack of awareness among the public, stakeholders and municipal councils about the challenges and opportunities presented by shared mobility. Without direction from council, it is challenging for municipal and transit staffs to prioritize shared mobility or undertake analysis and policy development.

Participants provided the following comments:

- Councils, boards, and committees are often unaware of shared mobility and its potential impacts, which make anticipating and planning for change difficult.
- Stakeholders need more resources and knowledge sharing to understand the nuances and opportunities of shared mobility.
- There is a need for public education and engagement about shared mobility services.

Identifying Existing, New and Underserved Transportation Market Segments

Significant growth of shared mobility services in Canada is expected. Currently services like bikeshare, carshare, and ridesourcing are catering to a niche market, but there is potential for more widespread adoption and acceptance. Seniors, young adults and those with low incomes could also be market segments.

For example, as Baby Boomers enter retirement years, there will be tremendous growth in the 65+ age group, with implications for transportation networks serving a generation that places great emphasis on personal mobility. The demand for specialized services such as paratransit, non-emergency medical, or community shuttles could increase substantially.

Comments from participants related to identifying existing, new, and underserved markets are summarized below:

Current State of Specialized Services
- There are often long wait times for current accessible transit services, potentially highlighting a need to rethink how services are operated. Some challenges of the current model include:
  - The current paratransit funding model is very expensive and the funding method is unsustainable over the longer term.
  - There are different standards regarding who qualifies to use accessible services, depending on the municipality, creating difficulties for regional coordination.
  - Booking a ride on conventional paratransit can be a cumbersome process requiring advanced planning on the part of the user. Shared mobility presents an opportunity to provide a service that is more responsive and oriented to the customer needs.

Challenges for Specialized Services
- Participants noted that relying on shared mobility extensively contains risks and could lead to unintended consequences. Some of the potential issues include:
  - Discrimination of customers through rating systems;
  - Increased auto trips, vehicle-kilometers-travelled, and greenhouse gas emissions;
  - Prohibitive costs to low-income groups; and
  - An inability to access services for those without access to a smartphone and/or credit card.

- There is a concern about the price of a specialized service operated using a (private) shared mobility model as it could be unaffordable to the users it is intended to serve.
- Using shared mobility services could present challenges because of the need for specialized vehicles or, in some cases, training. Specialized services need to consider the users being targeted and have alternate booking methods available such as a phone based customer service agent where appropriate.
- Specialized service offerings, particularly those offered by the private sector, could evolve to target particular market segments creating options tailored to certain demographics.

Ensuring Accessibility of Shared Mobility Services

- The importance of understanding how shared mobility services are regulated and how the *Accessibility for Ontarians with Disabilities Act* (AODA) applies was emphasized.
- There is a concern that private companies are not suitably incentivized to provide accessible rides as part of their service offerings.
- There is a concern that providing a regulatory space for shared mobility could create a two-tiered system if due consideration is not made to ensure enough vehicles and drivers are equipped to accommodate customers.

Ensuring Equitable Provision of Mobility Services

- There is a concern about a growing 'digital divide' between those with smartphones and access to mobile data plans and those without. This concern is particularly acute as many shared mobility services either require, or are greatly enhanced by, a smartphone.
- Services often require a credit card or use of a 'digital wallet'. Other credit/debit/cash options need to be developed to ensure access for those without credit cards.
- There is a concern that new services are geared towards the 'top' of the market and that the costs can be prohibitive for segments of the population that have the most need for better mobility options. This could be more acute if shared mobility services replace more affordable transit services.
- There is a concern that shared mobility services provide lower prices by relying upon, and creating the conditions for, a more precarious workforce.
- There is a concern that awareness of new services may range across demographics and targeted marketing may be required.

Roles of the Public and Private Sectors

Development of the shared mobility sector has been led primarily by private service providers, often in the form of 'disruptive' venture capital-fueled start-ups. They may play a more significant role in the future provision of shared mobility services. This would likely pose a challenge to the traditional plan-deliver model of public sector-led transportation services.

As the shared mobility sector continues to develop it will be important for government to provide oversight and ensure that the public interest aspects of the transportation system are maintained (e.g. safety, accessibility, equity).

Comments from participants related to the role of the public and private sectors are summarized below:

- The public sector will need to develop expertise in handling contracts and partnerships with companies using emerging business models.
  - There are concerns that private companies are driven by profit rather than transportation improvement and goals/interests may not always align.
- Questions still remain about the relationship between conventional transit, ride-sourcing and microtransit. There is a risk that, left on their own, private shared mobility services will focus on the most profitable public transit corridors drawing riders away from these services and routes.
- Questions still remain about how shared mobility may be able to provide transit-like service for places that do not currently have transit or are underserved by transit including low-density communities and first- and last-mile applications.

Data Collection, Analysis and Security

There is a need to develop capacity to better collect, share and analyze data from private service providers in order to undertake both enforcement and future transportation planning.

Since municipalities have limited experience with shared mobility, there is little data collected to support analysis and decision making at this time. There are also many remaining questions about the privacy and security aspects of app-enabled services.

Comments from participants related to data are summarized below:

Data sharing agreements
- Without data sharing agreements there is a risk that future planning and decision making will be hindered due to a lack of proper access to data that is being collected by private entities.
  - Data sharing agreements can be included in regulations. (Some participants thought it may be easier to obtain data under a regional system as there is a stronger negotiating position).
- There is a need to determine what data is needed and what should be sought. The data must be easy to access and use and should be available for future planning work.
- Some participants acknowledged that they did not know what data would be useful or what they should request and needed additional resources or guidance.

Common platforms + analysis
- A common data collection and storage framework for the region would allow for comparison between platforms and municipalities.
  - Conversations between government and private operators should occur to establish data needs and rapport.
- Data analysis ability should be developed. There is a risk that some municipalities will have to rely on analysis from shared mobility service providers.

Privacy and data security

- Privacy and data security are significant concerns and it will be important to continually improve security of both the data shared with municipalities and data held by private companies.
    - Data should be protected by anonymizing users.
    - Need to understand who controls the data and what is being collected.
    - There are privacy issues that need to be addressed by each level of government.

Shared Autonomous Vehicles

At this time, autonomous vehicles (AVs) are distinct from shared mobility although there is a potential for rapid convergence. For example, many new Tesla models have advanced automated features, Uber and Google are testing AVs in various US cities and many auto manufacturers have plans underway to undertake AV research and develop "mobility services" (e.g. Ford Smart Mobility).

For the purposes of the workshop AVs were only discussed at a high level and should be addressed in more detail at future forums. One of the final discussion questions asked how to encourage the sharing of autonomous vehicles.

Comments from participants related to autonomous vehicles and shared mobility are summarized below:

- Without a shared-use model for autonomous vehicles there is concern that the technology will result in increased VKT and large numbers of empty vehicles travelling on roads.
    - Policies should incentivize shared-use of vehicles and the road pricing structure should discourage vehicles from driving on roads while empty.
- Policy development needs to consider the impacts and safety of AVs on other road users, particularly active transportation users (people cycling and walking) and public transit.
- Future infrastructure needs to support safe and efficient operation of the technology are unclear, but given the long planning and construction timelines for infrastructure they will require more consideration.
    - Infrastructure needs could include requirements for connected vehicle infrastructure (vehicle-to-vehicle [V2V] and vehicle-to-infrastructure [V2I]), parking and street design, highway requirements, and more.
- There was a general understanding that technology is changing quickly. Participants wondered about anticipated arrival timelines and expected market penetration of AVs.
    - As AVs are adopted there are concerns that they may encourage people living further from work, and therefore increase demand for sprawling development patterns.

6. Potential Next Steps Discussed

Each level of government can play a role shaping the future of shared mobility in the GTHA.

Moving forward, participants addressed the need to rethink carpooling; develop a cross-region policy framework; prepare for autonomous vehicles; collect and use data from shared mobility sources; and identify roles for municipalities, Metrolinx, and the Province.

The main themes are summarized below and primarily focus on developing a regional policy framework and identifying roles. The workshop evaluation form also asked participants to identify next steps that each level of government could undertake.

Develop Agile and Coordinated Policy Frameworks

The shared mobility market is evolving quickly and participants frequently remarked that governments can be slow to respond to rapid changes in technology and new service offerings. Shared mobility will continue to provide all levels of government an opportunity to utilize flexible approaches to planning and policy development.

The challenge of dealing with TNCs is just one example of what the public sector could face in coming years. The continued emergence of new business models, changing consumer preferences, automated vehicles and other as-yet-unknown trends will continue to challenge the public sector to innovate and apply agile practices to policy making.

Comments from participants related to developing agile and coordinated policy frameworks are summarized below:

Coordinated regional policy

- Well-articulated values and principles for a future state of mobility need to be developed. Rather than describe methods or outcomes, the principles should provide a values framework to guide regulatory, planning and policy development even with dramatic change in technology and services.
- The complexities of governing shared mobility present challenges for developing a unified regional regulatory response. It is important to continue conversations among, and between, all levels of government. Participants identified a need for additional focused shared mobility workshops; GTHA-specific webinars; resources to educate other staff, councilors, and the public; and other tools to disseminate best practices.

Encourage flexible regulations where appropriate

For regulators:

- Some policies, particularly long-term plans, can benefit by encouraging flexibility and acknowledging several potential future scenarios. Planning for the future and developing a set of core values to guide the plan are even more important in times of uncertainty and can be used to maintain a coherent approach to decision making even when faced with new trends.

For service providers:

- Policies can encourage innovation by embedding scalability. For example, several TNC frameworks impose licensing fees based on the size of the provider allowing for the possibility of new market entrants.

Develop a toolbox

- Sunset clauses
  - Mechanisms can be put in place to ensure that regulations, bylaws and legislation are reviewed periodically to improve performance and respond to changing conditions. A sunset clause can be put in place to ensure that policies are updated.

- Sandbox models
  - In some cases it may be appropriate to allow sandbox models where no (or limited) regulatory framework is established for a trial period and lessons can be learned from operations before regulations are drafted.
    - Develop guiding principles for the process but in a pilot form.

- Pilots
  - The risk/reward of partnering with shared mobility services is unclear. Since there is limited experience with shared mobility, there is little data to support decision making. Pilots can be used to develop expertise in managing these partnerships and can be used to collect data and undertake research.
  - Pilots should test new concepts or models rather than being repeated in different locations.
  - Pilots should be well researched and the outcomes and learnings should be shared with other municipalities.

Potential Roles for Municipalities, Metrolinx and the Province

Opportunities for municipalities and transit service providers

Comments from participants related to opportunities for municipalities and transit service providers are summarized below:

- Municipalities could undertake pilot projects, as they are in an ideal position to adapt shared mobility models to local contexts and priorities. They are also responsible for the operational aspects of local transportation systems (transit, microtransit, curbside usage, bikeshare, etc.) and best positioned to liaise with the local council.
  - In some cases, there is a need to determine whether the lower- or upper- tier municipality would be the best to implement a pilot project.
  - Microtransit was specifically mentioned by a number of participants in terms of implementing a pilot project. Specifically: microtransit at GO stations by a local transit agency, reviewing case studies about microtransit, and continuing a regional dialogue on microtransit.
- Municipalities are also in a position to incorporate shared mobility in future strategic plans, such as Official Plan reviews, Transportation Master Plans and other plans.
- Municipalities are aware of a number of issues that would need to be anticipated, such as ensuring equitable access to services and affordability.
- Upper-tier or Regional Municipalities could facilitate conversations between local municipalities and transit leaders.

Opportunities for Metrolinx

Comments from participants related to opportunities for Metrolinx are summarized below:

- Providing support to municipalities for pilot projects and partnerships.
- Encouraging consistency across the region with regard to bylaws developed to provide regulatory space for shared mobility (ensure seamless connections).
- Conducting research, tracking developments in the industry, and providing updates to municipal partners.
- At the provincial level, contributing to shared mobility policy development.
- At the regional level, providing guidance for a regional shared mobility policy framework.

> "There is a strong desire for policy direction from the Province and Metrolinx"
> – workshop participant

Opportunities for the Province

Comments from participants related to opportunities for the Province are summarized below:

- Providing guidance and regulatory clarity, working toward a consistent response in all regions and municipalities.
- Leveraging available provincial infrastructure to support shared mobility, such as the Provincial highway network.
- Amending, clarifying, or passing Provincial statutes and regulations in order to create a regulatory space for shared mobility. For example the Public Vehicles Act and Highway Traffic Act.
- Leading the discussion with regard to insurance requirements for service providers.
- Leading the implementation of an "opt-in" shared mobility framework that can be adopted by municipalities.

Appendix A: Additional Resources

Title	Author	Date
Shared Mobility		
Private Mobility, Public Interest—How public agencies can work with emerging mobility providers	Transit Center	Sep 2016
Los Angeles County—Shared Mobility Action Plan	Shared-Use Mobility Center	Sep 2016
Sharing the Road—The Promise and Perils of Shared Mobility	Mowat Centre	Aug 2016
Shared Mobility and the Transformation of Public Transit	American Public Transit Association (APTA)	Mar 2016
Shared-Use Mobility Toolkit for Cities	Shared-Use Mobility Center	2016
Shared Mobility—Innovation for Liveable Cities	International Transport Forum (OECD)	2016
Shared-Use Mobility—Reference Guide	Shared-Use Mobility Center	2015
New Mobility		
New Mobility Background Paper	WSP	2016
Sharing Economy		
Shifting Perspectives—Redesigning Regulation for the Sharing Economy	MaRS Solutions Lab	Mar 2016
Policymaking for the Sharing Economy—Beyond Whack-A-Mole	Mowat Centre	Feb 2015
Microtransit		
Microtransit—An Assessment of Potential to Drive Greenhouse Gas Reductions	MaRS Discovery District	Fall 2016
Autonomous Vehicles		
Ontario Must Prepare for Vehicle Automation—Automated Vehicles can influence urban form, congestion and infrastructure delivery	Residential and Civil Construction Alliance of Ontario	Oct 2016
Robot, Take the Wheel—Public policy for automated vehicles	Mowat Centre	Feb 2016
Driving Towards Driverless—A Guide for Government Agencies	Isaac (WSP | Parsons Brinckerhoff)	2015
Automated Vehicles. The Coming of the Next Disruptive Technology	Conference Board of Canada	Jan 2015
Driving Change—Automated Vehicles in Toronto	Ticoll (for the City of Toronto)	2015
Data		
City Data Sharing Principles: Integrating New Technologies into City Streets	NACTO	Jan 2017

Appendix B: Workshop Agenda

Date:	**Wednesday, November 2nd, 2016**
Time:	8:00am – 3:45pm
Location:	65 Church Street, Toronto ON M5C 2E9

Agenda Item	Who	Time
Registration and Coffee		8:00-8:45
Logistics • Overview of agenda, logistics and introductions	**Glenn Pothier** Facilitator	8:45-8:55
Welcome and Opening Remarks	**Antoine Belaieff** Director, Business Transition	8:55-9:05
Introduction to Shared Mobility and the RTP • Key shared mobility definitions • Relationship to RTP and Station Access Plan	**Lisa Salsberg** Acting Director, Regional Planning	9:05–9:20
"Exploring Key Context" – Facilitated Discussion	**Glenn Pothier**	9:20-10:00
Break		10:00-10:15
Shared Mobility Panel Daniel Haufschild, Vice-President, Urban Mobility, WSP *New Mobility Background Paper* Joeri van den Steenhoven, Director, MaRS Solutions Lab *Redesigning Regulation for the Sharing Economy* Michael Urban, Policy Associate, Mowat Centre *Sharing the Road: The Promise and Perils of Shared Mobility*	**Ersoy Gulecoglu** Manager, Sustainability	10:15-11:30
"Issues and Opportunities Mapping" – Facilitated Discussion	**Glenn Pothier**	11:30–12:30
Lunch "Quadrant Exercise"	**Glenn Pothier**	12:30-1:10
Shared Mobility Showcase (5 minutes each) • Milton GO Connect (Mark Sadoway, Metrolinx) • Toronto Ridesourcing Regulations (Vanessa Fletcher, Toronto) • TTC Microtransit (Stephanie Simard , TTC) • Accessibility and Paratransit (Antonia Hammer) • Station Access Plan (Naren Garg) • Regional Transportation Plan (Kyle Kellam)	**Glenn Pothier**	1:10-2:00
Break		2:00-2:15
"How might we ..." – Facilitated Discussion	**Glenn Pothier**	2:15-3:30
Closing Remarks	**Peter Paz** Manager, Regional Partnerships	3:30-3:45

Appendix C: Workshop Participants

Participants at the November 2, 2016 Shared Mobility Workshop represented the following municipalities and organizations. Some of the following had more than one staff member present.

City of Hamilton

Regional Municipality of Halton
City of Burlington
Town of Oakville
Halton Hills

Regional Municipality of Peel
City of Mississauga
Miway
City of Brampton
Brampton Transit

Regional Municipality of York
York Region Transit
City of Vaughan
Town of Richmond Hill
Town of Aurora
City of Markham

Regional Municipality of Durham
City of Pickering
Town of Ajax
City of Oshawa

Regional Municipality of Waterloo
City of Cambridge
Woolwich Township

City of Guelph

City of Toronto
Toronto Transit Commission
Toronto Parking Authority
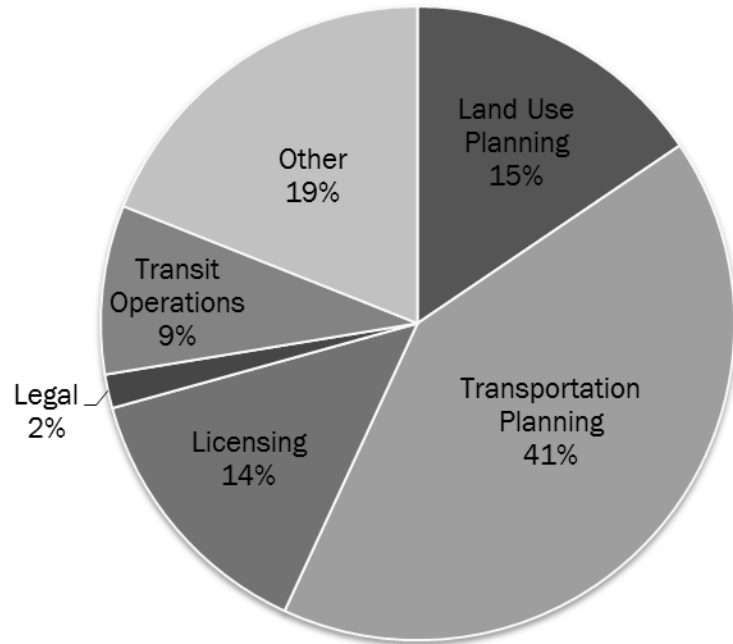Toronto Public Health

City of Barrie

Town of Innisfil

Province of Ontario
Ministry of Transportation Ontario
Ontario Ministry of Finance

Metrolinx

Figure 7 Workshop Attendance by Role
(as indicated on the post-workshop evaluation form)

Land Use Planning 15%
Other 19%
Transit Operations 9%
Legal 2%
Licensing 14%
Transportation Planning 41%

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