KINGSTON**MOVES**

HOUSEHOLD TRAVEL SURVEY 2019

Daily Travel Characteristics

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Survey Highlights

2019 Kingston Household Travel Survey

The 2019 Kingston Household Travel Survey (KHTS) was undertaken with a random sample of households in the City of Kingston between early September and early December of 2019. The survey was the first such survey conducted since 2008. The KHTS obtained a total of 3,648 valid survey completions and gathered information on 7,463 residents of the city, representing a 5.1% sample of the population. The survey gathered information on household and demographic characteristics relevant to understanding travel patterns. It also captured detailed trip information for residents aged 5+ years, providing a snapshot of the 24-hour travel patterns over the course of a typical fall weekday. The survey establishes a new baseline for transportation data collection. In the future, comparison against this baseline will allow tracking of changes in transportation demand, and will allow the City to better understand the impacts of transportation initiatives and other trends on residents' travel choices.

The expanded survey results represent a total of 59,360 households living in private dwellings and a total of 139,580 residents of the city, including both permanent residents and seasonal post-secondary student residents. The survey results represent a total of 398,600 daily trips made by all modes of travel. Survey results are broken out by the four sub-areas (Central, West, East, Rural) and 15 transportation Focus Areas.
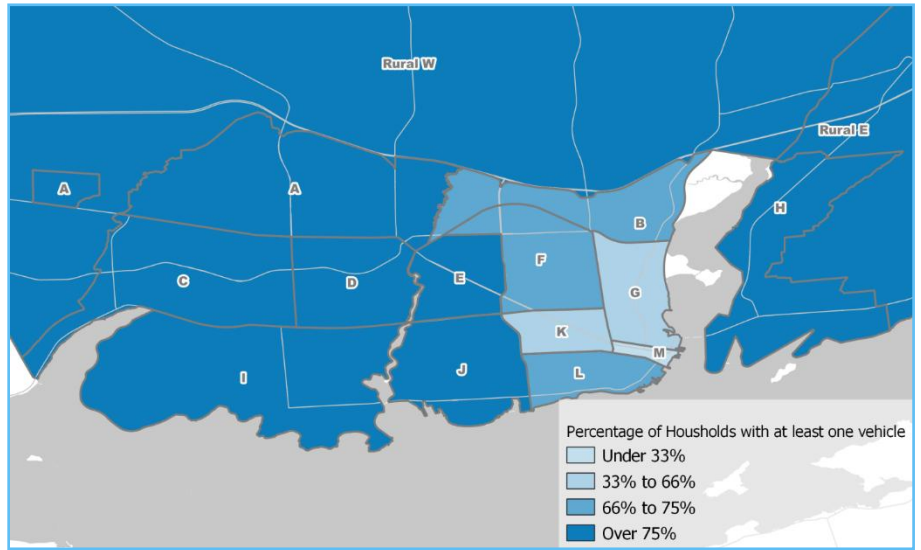
Demographics

The City of Kingston is home to 46,880 full-time and 14,970 part-time workers, for a total of 61,850 workers, representing approximately 45% of residents. Overall, 25,370 residents of the city, or 18% of the population in the fall months, are retirees. About 9% of workers are also students.

The overall median age across the city is 35, with large variances seen across the geographic areas of Kingston. Over one-third of the population in the fall-winter period are students, with 12% being K-12 students, and 23% being post-secondary students. During the fall months of the survey, approximately 30,470 full- and part-time students attend the three major post-secondary institutions, Queen's University (24,220), St. Lawrence College (5,030), and Royal Military College (1,230). The expanded survey estimates also show that about 17,110 K-12 students also reside in the city.

Of households surveyed, excluding students in residence, almost half (47%) reside in houses, 20% in other ground-oriented dwellings (townhouses, semi-detached, etc.), 17% in low-rise apartments (less than five storeys), and 16% in apartments of five or more storeys. Three in ten (31%) are single-person households, 27% are couples without children, 28% are couples or single parents with children, 8% are roommate households, and 5% more complex living arrangements such as extended family households.

Transportation Options

Household Vehicles. Residents of the study area have access to 79,880 household vehicles. Overall, 82% of households have at least one vehicle, with this being 69% in the Central sub-area where a large population of post-secondary students resides and more residents live in apartments, and at least 95% elsewhere in the City. Households in the Rural area have an average of 1.05 vehicles per person 16+, while households in the Central area have 0.51. Vehicle ownership across the city is highest for those living in houses, and lowest for those living in apartments less than 5 storeys. About 4.3% of household vehicles use alternative fuels, including 2.5% hybrids and 0.5% electric.

Map of Household Vehicle Access by Focus Area

The survey results suggest that only 3% of households have vehicles that cannot be accommodated by off-street parking (i.e. they must use on-street parking or other parking options when parking at home), although this varies by area. Virtually all houses have at least one off-street parking spot, with the average being 3.44 spaces per house. Higher-density dwelling units have fewer available parking spots, with 23% of households in apartment buildings with five or more storeys not having any off-street parking spots available.

Household Bicycles. Residents of the study area own about 79,500 bicycles, with 23% of these being children's bicycles. Overall, 52% of households have at least one adult bicycle. Among households with children, about 72% have at least one working children's bicycle. Households in the West, East, and Rural sub-areas are more likely to have access to a bicycle, at 55%, 66%, and 62% respectively.

Transit Passes. One third of residents 15+ years of age reported having a transit pass (about 39,600 residents in total). Most transit pass holders are young people (15-24 years old) – transit passes issued as part of student fees at Queen's University and St. Lawrence College account for over half of the transit passes.

Trip Volumes

Estimates derived from the survey results suggest that residents of Kingston make approximately 398,600 trips each weekday. On average, each person over the age of five makes 2.98 trips per day. Looking at the trip volumes by time of day reveals a morning peak hour starting at 8 AM and an afternoon peak hour starting at 4 PM, with about 40,700 trips having departure times in each of these hours. The 8 AM peak is a sharp peak, while the afternoon 4 PM peak is part of an overall extended afternoon peak, with high volumes also in the adjacent hours starting at 3 PM and 5 PM.
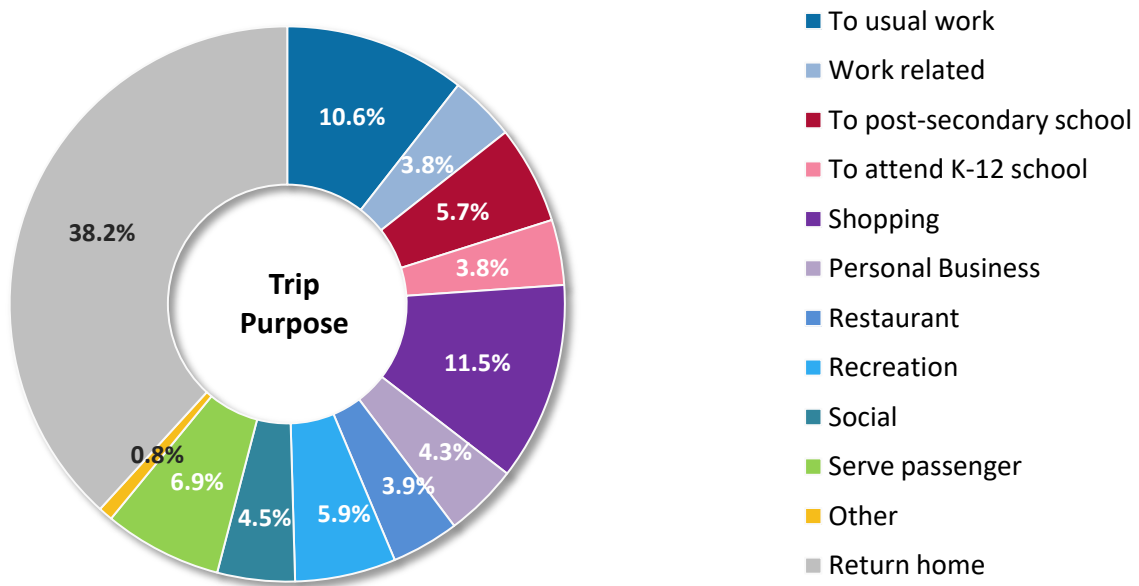
Breaking down the trip volumes by overall purpose reveals that home-based work (HBW) and school (HBS) commutes dominate the AM Peak (where a 'home-based' trip is either from home or a return home). The work trip peak hour is at 7 AM and the school trip peak hour is at 8 AM, with a number of home-based other (HBO) passenger drop-off trips in this period as well. Home-based other (HBO) trips dominate the rest of the day, including during the afternoon peak period. The afternoon peak hour for HBS school trips is at 3 PM, that for HBW trips is 4 PM, and HBO trips at 5PM.
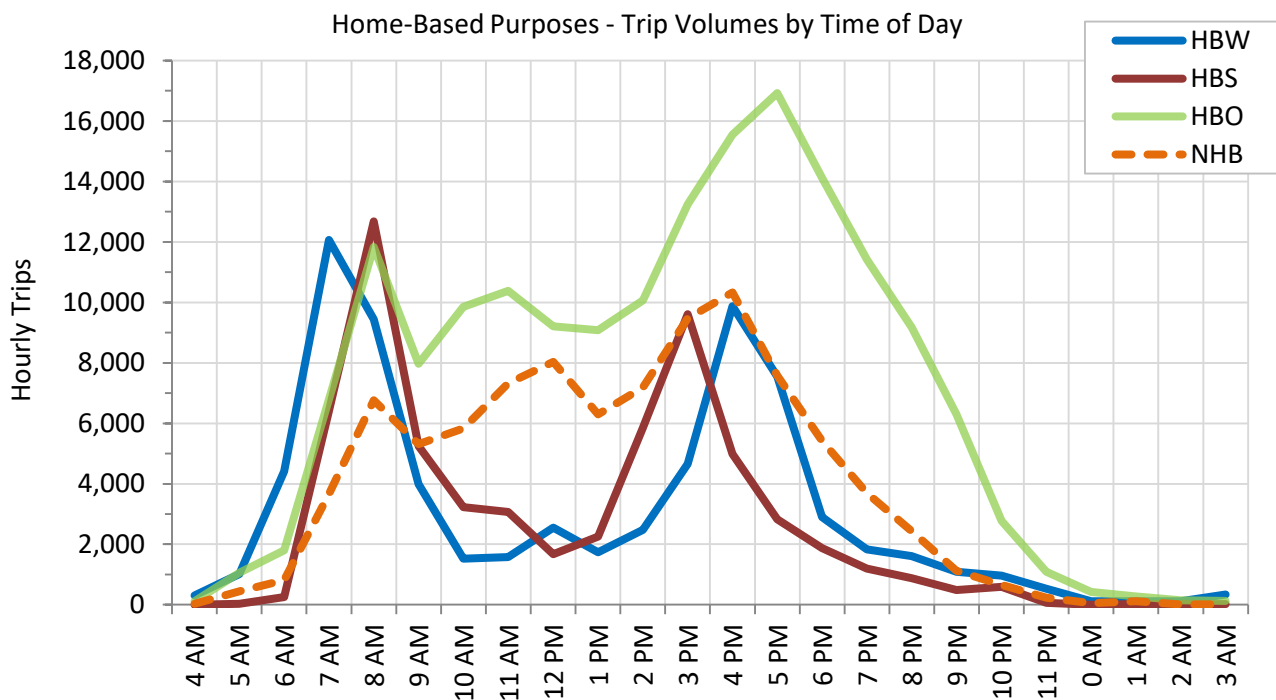
Home-Based Purposes - Trip Volumes by Time of Day

Residents who are currently employed have the highest trip rates (3.49 daily trips per full-time worker on average, and 3.31 per part-time worker). Amongst adults, retirees have the next highest trip rate at 2.61 trips per day. Students tend to have lower trip rates at all levels of education. The highest average person trip rates are for residents living in houses, those with household incomes of $125,000 or more, and those with access to at least one private vehicle. The lowest trip rates can be observed for residents of apartments or condominiums with five or more storeys, those with household incomes of less than $50,000, and those with no private vehicles.
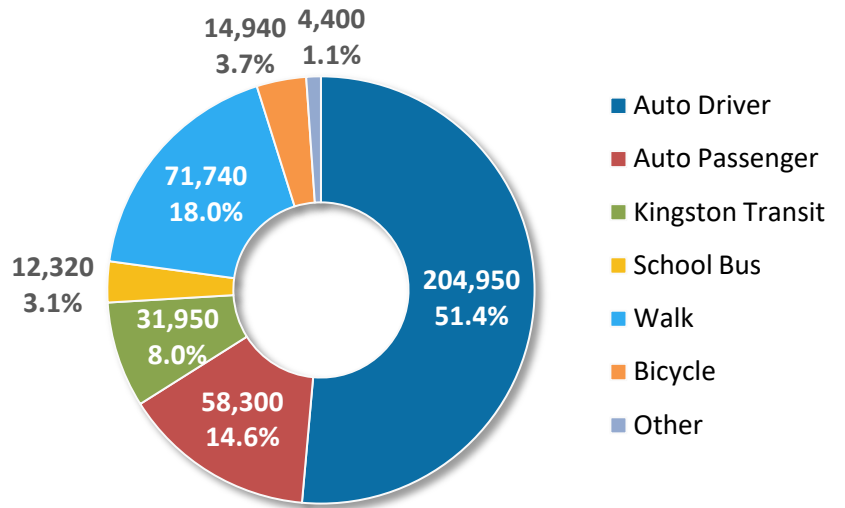
Reasons for Travelling (Trip Purpose or Destination Activity)

Just over one in ten trips made by residents of Kingston is for the purpose of traveling to work, while another 4% are to work-related activities, totalling close to 15% overall. K-12 and post-secondary school commutes together make up a little under 10% of all trips. Another 7% are 'serve-passenger' trips, a good portion of which may be pick-up and drop-off trips for children's school commutes and recreational/social activities. Non-commute purposes are substantial: trips for shopping make up almost 12%, personal business comprises another 4%, and leisure purposes (recreational, social and restaurant trips) combined make up another 14% of all trips. Of the total daily trips, 38% are returning home from commutes or the other activities noted.

Trip Purpose

- 10.6% To usual work
- 3.8% Work related
- 5.7% To post-secondary school
- 3.8% To attend K-12 school
- 11.5% Shopping
- 4.3% Personal Business
- 3.9% Restaurant
- 5.9% Recreation
- 4.5% Social
- 6.9% Serve passenger
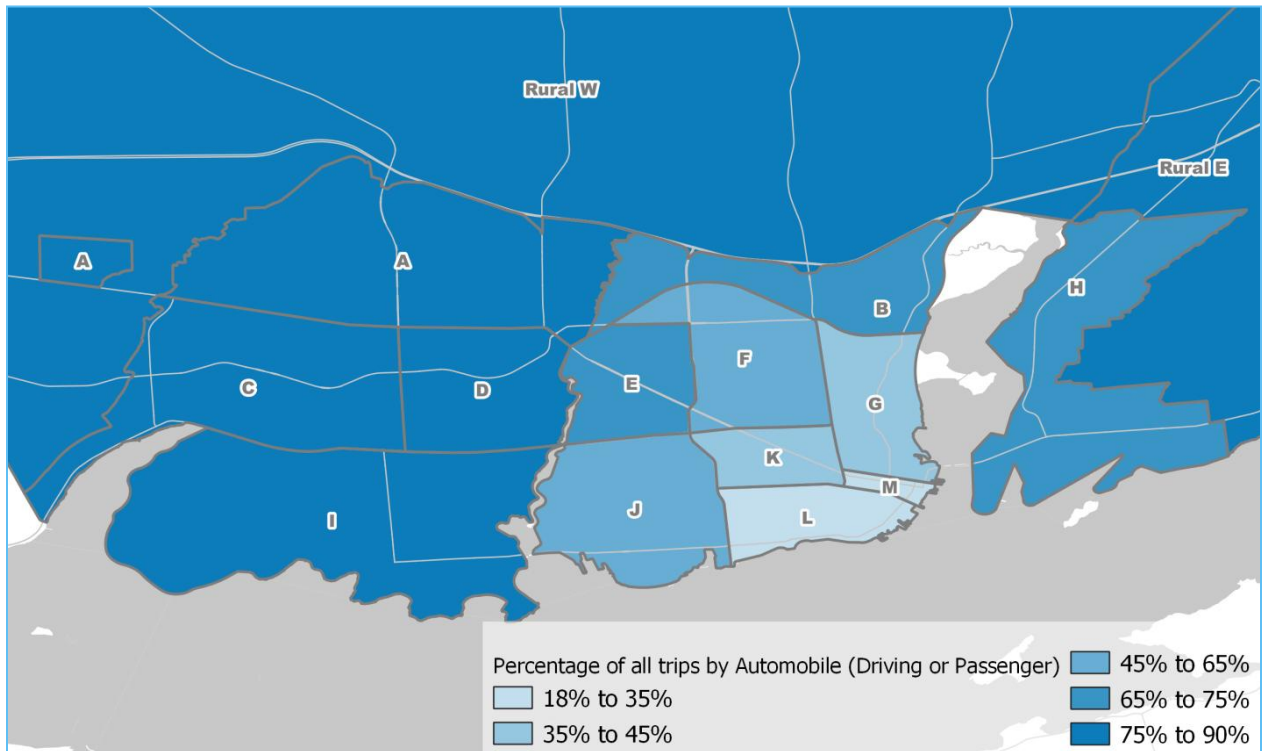- 0.8% Other
- 38.2% Return home

Transportation Modes

Mode Share. Just over half (51.4%) of all daily trips are driving trips (almost 205,000 trips per day), with auto passenger trips representing 14.6% of all trips. The transit mode share is 8.0%, representing almost 32,000 daily trips. Walking accounts for almost one-fifth (18.0%) of trips, while cycling trips account for 3.7%.

Legend:
- Auto Driver
- Auto Passenger
- Kingston Transit
- School Bus
- Walk
- Bicycle
- Other

Pie chart values:
- 204,950 — 51.4% (Auto Driver)
- 58,300 — 14.6% (Auto Passenger)
- 31,950 — 8.0% (Kingston Transit)
- 12,320 — 3.1% (School Bus)
- 71,740 — 18.0% (Walk)
- 14,940 — 3.7% (Bicycle)
- 4,400 — 1.1% (Other)

Map of Auto (Driver + Passenger) Mode Shares by Focus Area of Residence

Percentage of all trips by Automobile (Driving or Passenger)
- 18% to 35%
- 35% to 45%
- 45% to 65%
- 65% to 75%
- 75% to 90%

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Map of Transit Mode Shares by Focus Area of Residence

Percentage of all trips by Kingston Transit
- 0% to 3.5%
- 3.5% to 6.5%
- 6.5% to 9.5%
- 9.5% to 12.5%
- 12.5% to 18.5%

Map of Cycling Mode Shares by Focus Area of Residence

Percentage of all trips by Cycling
- 0% to 1.5%
- 1.5% to 3.5%
- 3.5% to 5.5%
- 5.5% to 7.5%
- 7.5% to 10.5%
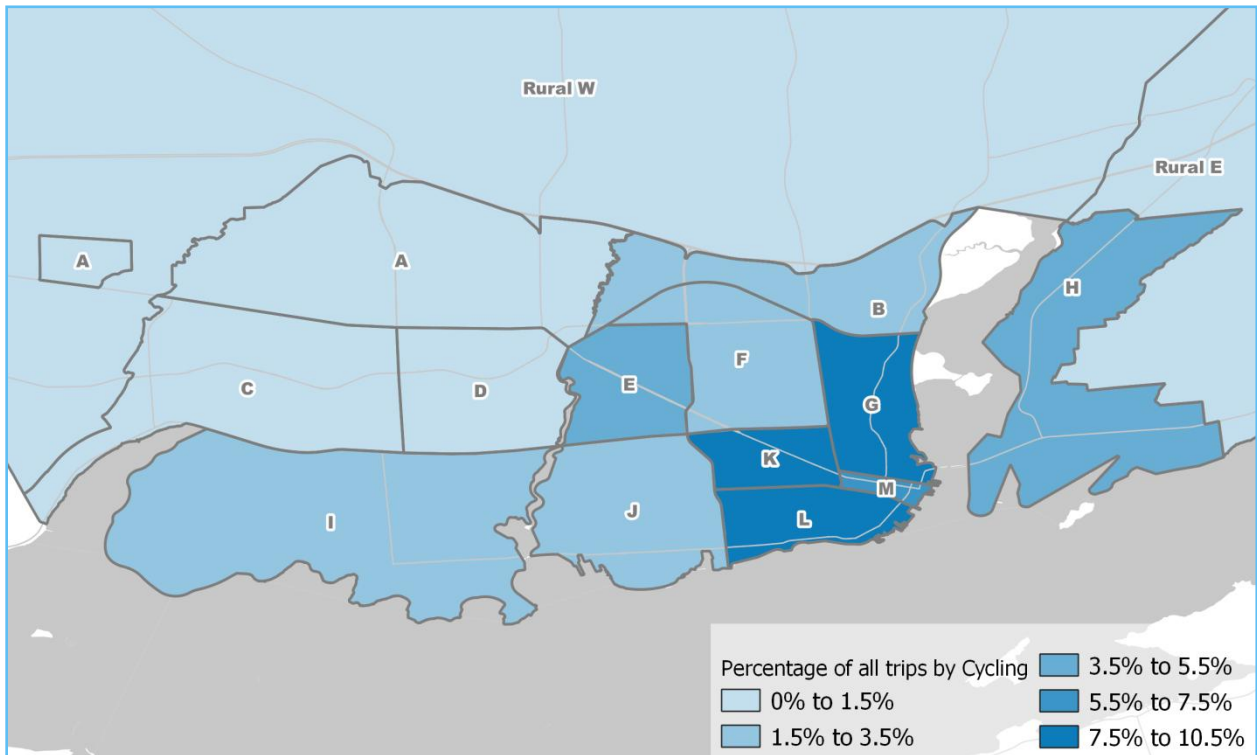
Map of Walk Mode Shares by Focus Area of Residence
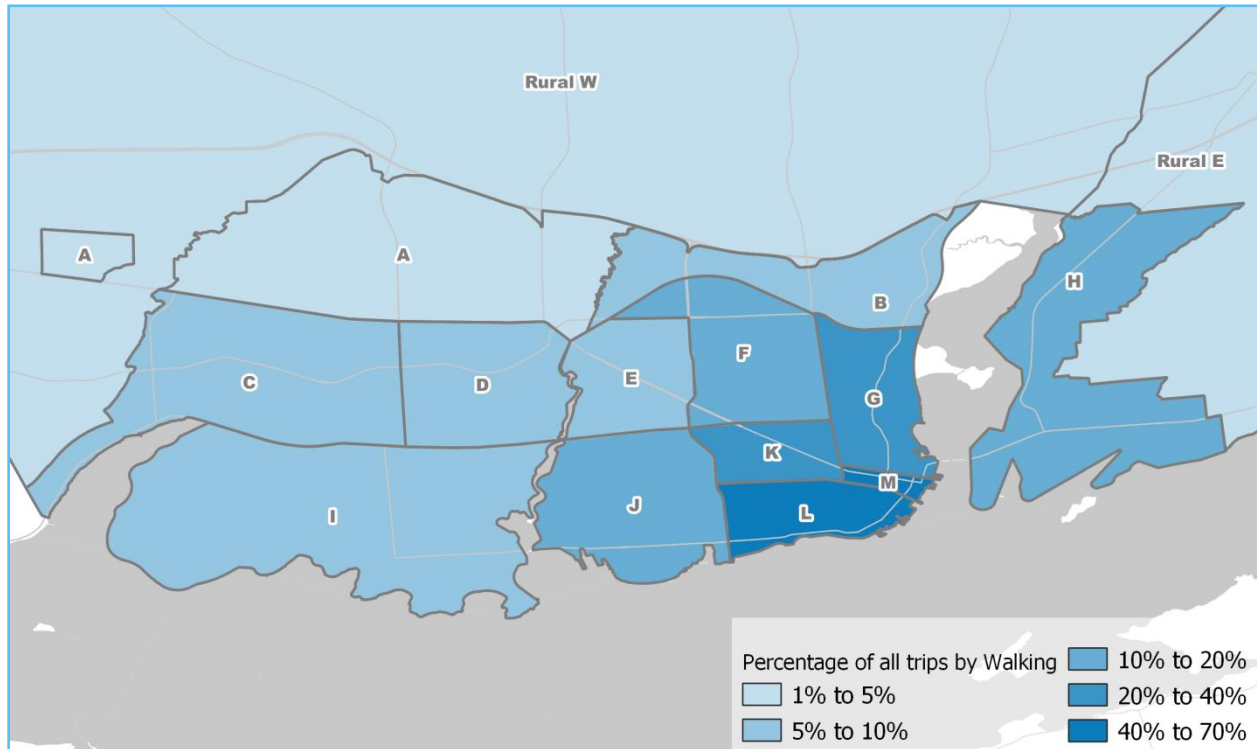
Sustainable Mode Share.

Combined, sustainable modes (transit, school bus, walking, and cycling) comprise a 32.9% mode share (one-third of all daily trips). Almost half (49%) of all trips made by residents of the Central sub-area are made via sustainable modes, with 36% of all trips being via active modes (walking or cycling). Sustainable and active mode shares are lowest in the rural sub-area. Active modes comprise a 21.7% mode share. Of note, an analysis of gender showed that while men and women's walk mode shares are similar, women are less likely to cycle (2.5% cycling mode share for women compared to 5.1% for men). Each day, Kingston residents make over 71,700 walking trips and over 14,900 cycling trips.

Transit Trips. The survey results suggest that residents of Kingston make approximately 31,950 transit trips each day, with 36,370 boardings (14% of transit trips entail at least one transfer). Approximately 4% of transit trips involved driving (park and ride, 3%) or being driven (kiss and ride, 1%) to or from one of the transit stops, while 1% involved cycling, and 1% involved other transit access modes (low speed motor vehicle, motorcycle, taxi, etc.). Of note, travelling to one of Kingston's three major post-secondary institutions is the single most common use of Kingston Transit.

Vehicle Occupancy. Of the 204,950 vehicle trips made by residents each day, average vehicle occupancy is 1.37 people (including the driver), with just over seven in ten (72%) of all vehicle trips being in single-occupant vehicles (SOVs).

Mode Shares by Age Group. Auto reliance increases with age, representing just over one-quarter of trips for those 20 to 24 years of age, doubling for those 24 to 34 years of age, and plateauing above age 35 until age 84. Transit mode shares are highest for youth between the ages of 15 and 24 (18%-19%) and still relatively robust for residents 25 to 34 (11%), but drop to 5% or less for those over the age of 35. Walking mode shares are also highest amongst those 15 to 24 years of age (39%-40%). Above the age of 35, fewer than 12% of all trips are made by walking. Cycling mode shares are highest for children 10 to 14 years of age (7%), but drop to 2% for those 15 to 19 years and increase again to 6% for those 20 to 24, after which there is a gradual decline in cycling with age.

Mode Shares for Household Characteristics. Auto driver mode shares are highest for residents living in houses (60%), and decrease as dwelling density increases (48% for other ground-oriented; 31% for apartments with fewer than five storeys), but rises again for people in apartment or condominium buildings with five or more storeys (46%). Walk shares are greatest amongst those living in apartments with fewer than five storeys (36%), as are transit shares (16%) and bicycle shares (6%). Over two-thirds of trips made by post-secondary students living in residence are walking trips, with the next largest mode share being transit (23%).

Mode Shares by Household Income. Only 23% of trips made by people in households with incomes of less than $30,000 are as drivers. Those with lower incomes also rely most on transit (under $30,000 per year, 20%; $30-$50,000, 13%). As income rises, reliance on vehicles increases (for both auto driver and auto passenger trips), while walking and transit use declines. Cycling mode shares fluctuate slightly by income (a low of 3% for household incomes of $30-$50,000 and a high of 5% for $125,0000 or more).
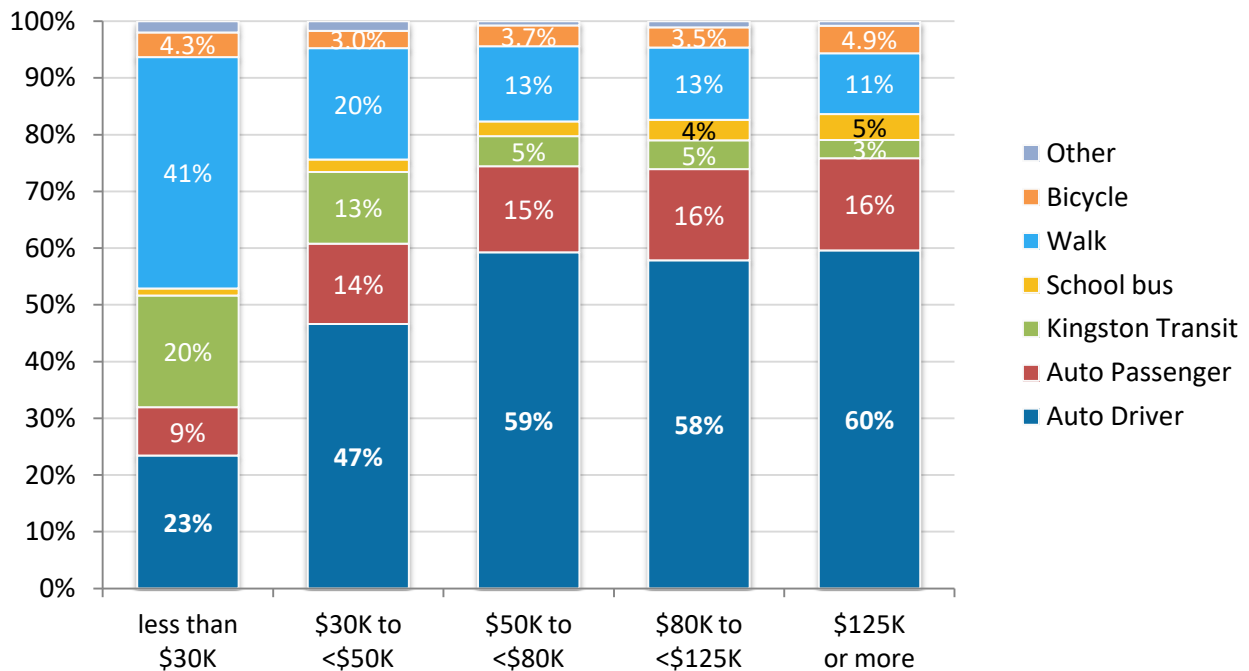
*Excludes households which declined to answer the question on income.

Seasonality and Active Modes (self-reported). Overall, 14% of respondents reported making a cycling trip at least once per week in the fall, with this dropping to 4% in the winter, and rising to 20% in the summer (or 17% for the population who reside in Kingston in the summer). Walking is less affected by seasonality, with 55% of respondents making a walking trip at least once per week in the fall, 48% in the winter, and 59% in the summer (46% for summer residents in Kingston).

## Transportation Mode Shares by Trip Purpose

The survey results illustrate the predominance of driving as a travel mode for work commutes (67% more share), while the modest auto passenger share (7%) infers that most work commutes are taking place as single-occupancy vehicle trips. Trips for shopping and personal business also have majority driving mode shares (64%, and 59% respectively), but with notable auto passenger mode shares (15%, 19%).

Transit comprises about one-quarter (26%) of post-secondary school commutes, with walking being the predominant mode (52% of trips to post-secpondary instutions) and driving accounting for 11%. Travelling to one of Kingston's three major post-secondary institutions is the single most common use of Kingston Transit**.**

Bicycle mode shares are highest for post-secondary commutes (6.7%), work commutes (5.2%) and trips to destinations for recreational activities (5.6%).

Of trips to attend K-12 school, 38% are school bus trips, with 27% via auto passenger (e.g., parents driving children to school) and almost 7% via transit bus. Auto passenger mode shares are also high for restaurant, recreation, and social trips, ranging from 20% to 25%, compared to drive mode shares of 48% to 50%, indicating higher auto occupancy for trips for these purposes.

Mode Shares by Trip Destination Purpose
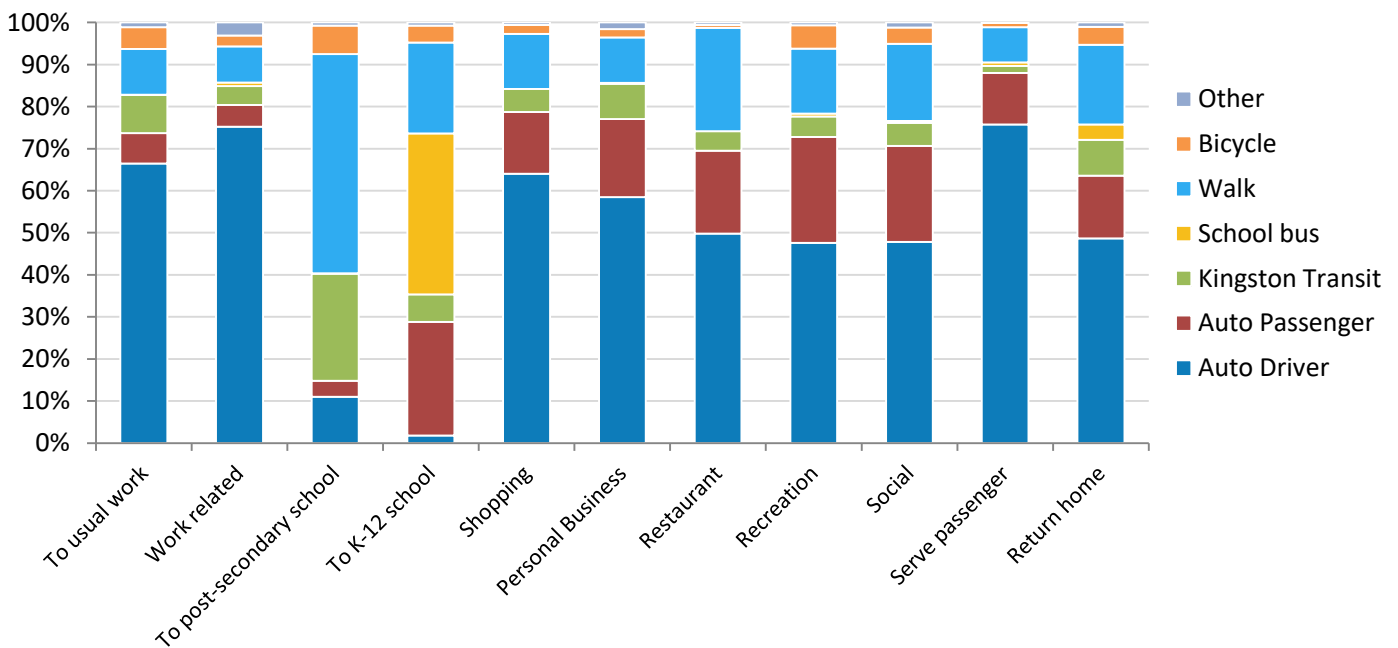
Trip Distances and Travel Durations

Straight-Line Distances. The origins and destinations of trips reported on the survey were used to calculate straight-line trip distances (as the crow flies). This provides a measure of how far people have to travel, although the actual distance travelled may vary depending on the configuration of the available roads, routes, or pathways for the given mode of travel. Work commutes are longest at an average of 7.2 km, while school commutes are shortest at an average of 2.5 km, with other kinds of trips averaging 4.6 km from origin to destination.

Person-Km Travelled (Based on Straight-Line Distance). In total, residents of Kingston travel almost 1.9 million kilometres in the local area each day (1,878,300 km, cumulative straight-line distance). Auto driver trips account for 1,293,000 km, auto passenger trips 315,000 km, transit trips 119,900 km, and school bus trips 50,100 km. Amongst active modes, walking accounts for 53,600 km of travel daily, while cycling accounts for 28,500 km.

Estimated Actual Distances and Durations. Trip origins, destinations, modes of travel, and departure times were used to determine the most efficient route for the given mode, time of day, and the length of the route as travelled on actual roads and pathways, as well as estimates of the trip duration considering typical congestion at the time of day. Auto driver trips average 8.2 km and 10.9 minutes, while walking trips average 900 metres and 11.6 minutes and cycling trips average 2.5 km and 8.5 minutes. Trips via Kingston Transit average 6.0 km and 26.1 minutes, including the time walking to the bus stop from the trip origin, time associated with transferring between buses (including wait times), and walking from the bus stop to the eventual trip destination.

Vehicle-Km Travelled (Actual Distance). The survey estimated the actual vehicle kilometers travelled (VKT) for auto driver trips based on the most likely route taken at the time of day of the trip. As noted above, the average length of auto driver trips is estimated to be 8.2 km. Looking across all trips, in total, residents of the study area drive about 1.67 million km each weekday for personal trips. Across an entire year, this amounts to 433.6 million km of road travel generated by personal vehicles on weekdays (excluding commercial driving trips and weekend trips).

Average Trip Distances and Duration by Mode

	Auto Driver	Auto Passenger	Kingston Transit	School bus	Walk	Bicycle	Other	Total
Average Straight-Line Distance (km)	6.4	5.5	3.8	4.1	0.7	1.9	4.9	4.8
Average Actual Trip Distance (km) (estimated)	8.2	7.3	6.0	n/a	0.9	2.5	7.0*	n/a
Average Trip Duration (min) (estimated)	10.9	10.1	26.1	n/a	11.6	8.5	9.9*	n/a

Distances of >100 km for inter-city travel were excluded (the top 1.0% of all trip distances), so as not to overly skew averages. Transit distances and durations are for walk-access transit only. Transit trip durations may include time transferring between buses, and walking between bus stops and origin and/or destination.
* Average distance and duration for 'Other' modes only includes motorcycle and taxi trips, and excludes intercity coach, ferry, airplane, etc.

Bikeable and Walkable Motorized Trips

The origins and destinations of motorized trips were used to determine the most efficient walking or cycling route for the given time of day, and the resulting estimates of actual distance travelled were used to determine whether the given trip was 'bikeable' (less than a 4.6 km bike ride) or 'walkable' (less than a 1.6 km walk). It should be noted that this analysis does not take into account real or perceived barriers that may or may not have influenced the practicability of cycling or walking along a route of a given trip. Therefore, the number and proportion of walkable and bikeable trips should be considered an upper limit for the potential to shift these types of trips to active modes.

About one half of auto driver and auto passenger trips are of a bikeable distance (50% and 52% respectively), while 15% of auto trips and 17% of passenger trips are of a walkable distance. Based on this analysis, residents of the West sub-area demonstrated the highest potential mode shift to cycling and walking trips.

Mode Shares Broken Out by Bikeability and Walkability
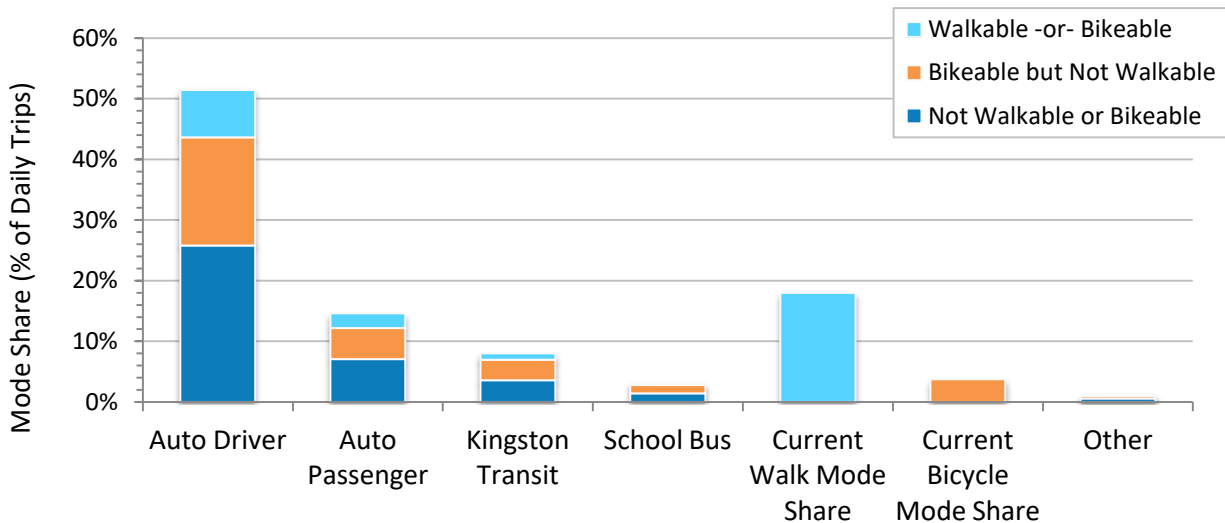
*Current Bicycle Mode Share may include some trips that are walkable. Only motorized modes were assessed for bikeability or walkability.

Special Generators

The survey provides estimates of the daily number of trips to different destinations across Kingston and the neighbouring areas. A number of institutional and commercial facilities have been identified as 'special generators' due to the high volumes of trips to these destinations. This includes Queens' University main campus, with an estimated 29,300 daily trips and the downtown (Focus Area M) with almost 20,000 daily trips. The survey results presented in the main report provide valuable information on the distribution of the origins of trips to these special generators, and how residents travelled to these locations. The bar chart that follows illustrates the variation in mode shares for trips to the different special generators. A map of trip origins to the downtown is also provided below.

Mode Shares for Total Daily Trips Destined to Special Generators

Legend:
- Other
- Bicycle
- Walk
- School bus
- Transit
- Auto Passenger
- Auto Driver

Queen's (Main Campus): Auto Driver 23%, Auto Passenger 7%, Transit 19%, Walk 42%, Bicycle 9%

Queen's (West Campus)*: Auto Driver 17%, Auto Passenger 7%, Transit 49%, Walk 18%, Bicycle 10%

St. Lawrence College: Auto Driver 37%, Auto Passenger 8%, Transit 36%, Walk 11%, Bicycle 5%

CFB Kingston: Auto Driver 71%, Auto Passenger 13%, Transit 6%

Cataraqui Centre: Auto Driver 56%, Auto Passenger 18%, Transit 19%, Bicycle 5%

King's Crossing: Auto Driver 66%, Auto Passenger 21%, Transit 6%

Kingston Centre: Auto Driver 62%, Auto Passenger 10%, Transit 12%, Walk 9%, Bicycle 5%

RioCan Centre: Auto Driver 70%, Auto Passenger 23%, Bicycle 5%

Area M (Downtown): Auto Driver 36%, Auto Passenger 13%, Transit 13%, Walk 30%, Bicycle 5%

Origin Density of Trips to Focus Area M (Downtown Kingston)

Each dot represents 10 origins. Placement is random within each Census Dissemination Area

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Acknowledgements

The survey research was conducted by R.A. Malatest & Associates Ltd. (the Consultant) with the guidance of the City of Kingston.

We gratefully acknowledge the direction and guidance of the Transportation Services team, as well as the marketing and public communications support provided by the Communications team at the City of Kingston. We also gratefully acknowledge St. Lawrence College, the Royal Military College of Kingston, and the Queen's University Graduate Student Society for their support of the survey in emailing survey invitations to post-secondary students.

This project would not be possible without the contributions of over 3,600 participating households that responded to this survey, via phone interview or online, and told us about their daily travel. We thank you for your participation in the City's household travel survey; you have contributed to transportation planning data that will be useful for years to come.

1   Project Overview

1.1   Project Background

The 2019 KHTS was undertaken to learn more about the travel patterns of the residents in the City of Kingston. By gathering information on how, where, and why residents travel within Kingston, the City is better positioned to develop its future transportation system and services. The survey provides robust data with information about Kingston's residents, their access to transportation options, and a profile of their daily trips made by all modes of transportation.

Previous household travel surveys of Kingston residents were conducted in 2002 and 2008. These surveys provided essential data that informed transportation master plans, active transportation plans and models used to influence future infrastructure needs. The 2019 survey builds on the legacy of the previous surveys while expanding the depth of the data collected and providing more detailed reporting on travel patterns captured by the survey. Given the differences in rigor and methodology, as well as the time elapsed between the survey cycles, only limited comparisons with previous cycles have been outlined in this report. With this iteration of the survey, the City sought to update its current mode share and establish a new baseline for transportation data collection going forward.

1.2   2019 Kingston Household Travel Survey

The 2019 Kingston Household Travel Survey (KHTS) was conducted between early September and early December of 2019. The survey was a voluntary 24-hour recall household travel survey that captured household characteristics, the demographics of all household members, and the details of travel undertaken by household members 5+ years of age on the most recent previous weekday. Respondents could complete the survey online or over the telephone. An address-based sample of households was randomly selected and invited to participate by letter. Households with a corresponding phone number were usually followed up with until neighbourhood-level survey targets were attained. Additional supplementary surveys were also undertaken via emailed invitations to students of the three major post-secondary institutions, Queens University, St. Lawrence College (SLC) and the Royal Military College of Kingston (RMC), and through on-campus engagement at St. Lawrence College.

The survey obtained a total of 3,648 valid surveys after data validation and rejection of surveys with data issues. After data processing to collapse surveys with residents in multi-person households who could not answer on behalf of their roommates, the final survey dataset includes information on 3,500 complete households, 7,463 residents of the city, and 21,878 trips made by those residents.

When weighted and expanded to represent the population of Kingston, the survey data represent 59,360 households in the community and 139,580 residents, including a substantial portion of post-secondary students who live in on-campus residences. Overall, the survey dataset constitutes a 5.1% random sample of the population, with an estimated margin of error due to random sampling of ±1.6%,

at a 95% confidence level, taking into account the effects of data weighting.[1] The trip data captured by the survey provide a snapshot of 24-hour travel patterns of residents of Kingston over the course of a typical fall weekday and represent an estimated 398,600 daily trips.

1.3   Report Organization

This remainder of this report is organized into the following sections:

Section 2: Survey Conduct
Section 3: Households, Vehicles and Demographics
Section 4: Daily Travel Characteristics
Section 5: Travel Destinations
Section 6: Travel Patterns for Population Groups of Interest
Section 7: Comparison with Previous Surveys

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[1] 19 times out of 20, for a given survey question, the survey response percentage should be somewhere within the margin of error of the survey results. The margin of error has been corrected to take into account the increase in error associated with data weighting to correct for over-/under-sampling and/or non-response bias.

[2] It may be noted that only graduate students at Queen's University received email invitations from the Graduate

2   Survey Conduct

2.1   Overview

The 2019 KHTS was designed to obtain information on mode shares and travel patterns in the study area. The survey captured information on key household characteristics (number of household members, number of vehicles, dwelling type, income); household residents' demographics, socio-economic characteristics, and places of work and school; and trips taken over the course of 24 hours (from 4:00 a.m. to 3:59 a.m. the next day).

The methodology for this study included the completion of surveys both by telephone and online via a 24-hour recall survey. Triptelligence™, Malatest's CATI/CAWI (Computer Assisted Telephone/Web Interview) system, accommodated both of these survey modes on a single integrated platform.

The diagram below illustrates the general process for the household travel survey. The survey process is summarized in the sections that follow and discussed in further detail in a separate report, *2019 Kingston Household Travel Survey – Survey Design and Conduct*.
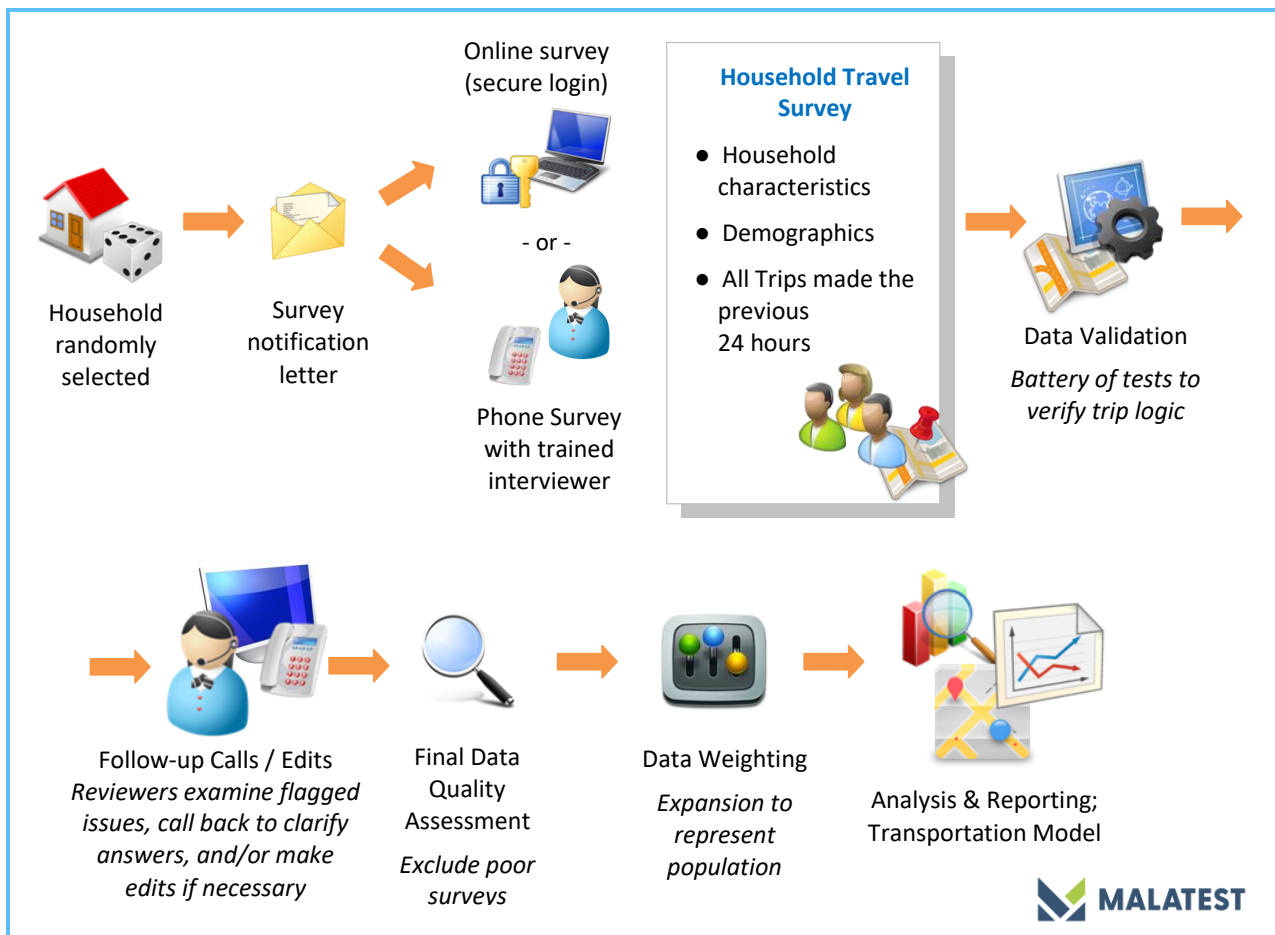
2.2 Survey Geography

The 2019 KHTS study area comprised the entirety of the City of Kingston. The daily travel patterns and socioeconomic characteristics of residents of households in the study area were captured through the survey.

For the purposes of defining trips external to the study area, a wider geographical 'Travel Area' (including the broader Kingston Census Metropolitan Area) was developed so that relatively local trips to, from, and within nearby communities were accounted for. Only trips well beyond the study area bounds were considered to be 'external trips'. The Travel Area includes a wider boundary around the study area to encompass the surrounding Loyalist, South Frontenac, Leeds and the Thousand Islands, Gananoque, and Frontenac Island counties. The map in **Figure 1** below shows the external areas alongside the City of Kingston study area.

Figure 1. Study Area and Travel Area
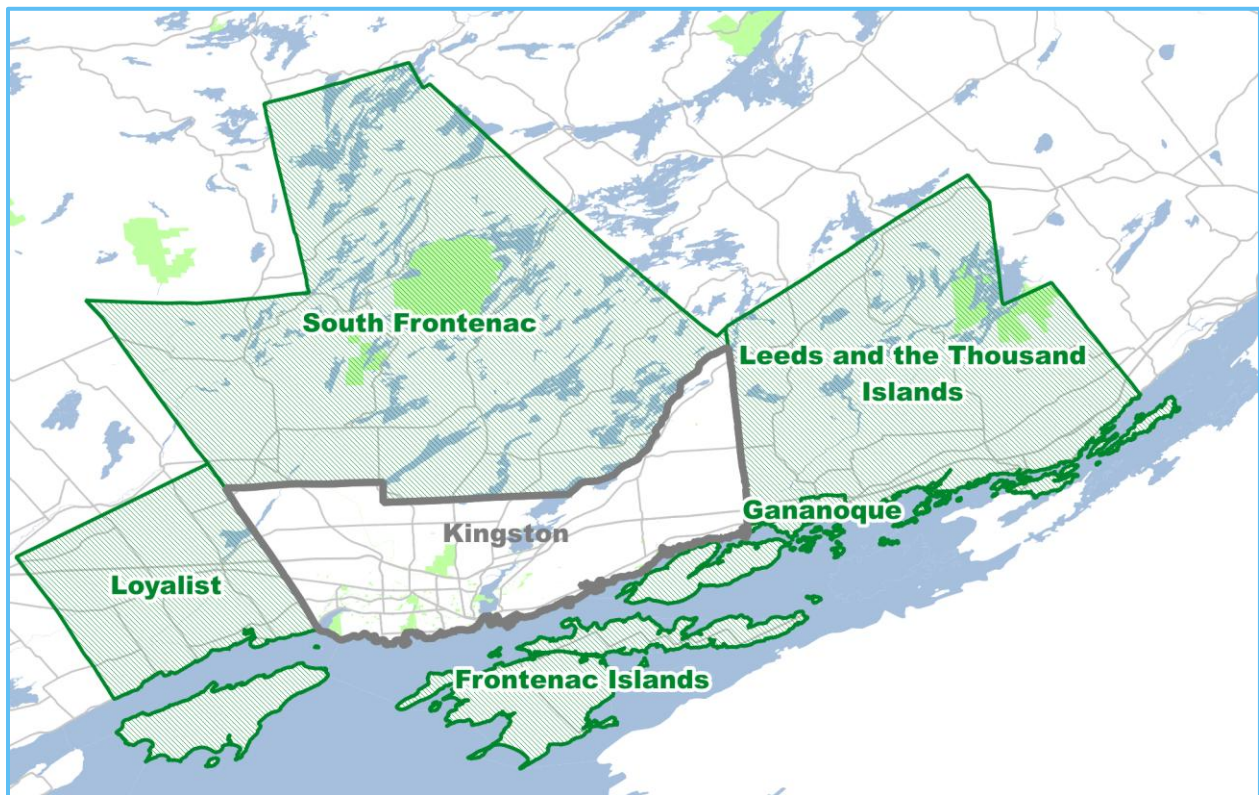
The study area is organized into a set of 15 Focus Areas developed by the City for previous transportation planning work, illustrated in **Figure 2**. The 13 urban Focus Areas fit within the Kingston Official Plan's Urban Boundary, including a small urban enclave within the rural area as depicted on the map (part of Area A). For the purpose of the 2019 KHTS, two rural Focus Areas were also defined (Rural West and Rural East). These geographies have been grouped into four sub-areas' for analysis: Central, West, East, and Rural.

The Focus Areas are detailed in **Table 1**, identifying the neighbourhoods contained within each Focus Area. The Focus Areas do not necessarily follow neighbourhood boundaries; as such, some neighbourhoods have portions in multiple Focus Areas.

Figure 2. Focus Areas
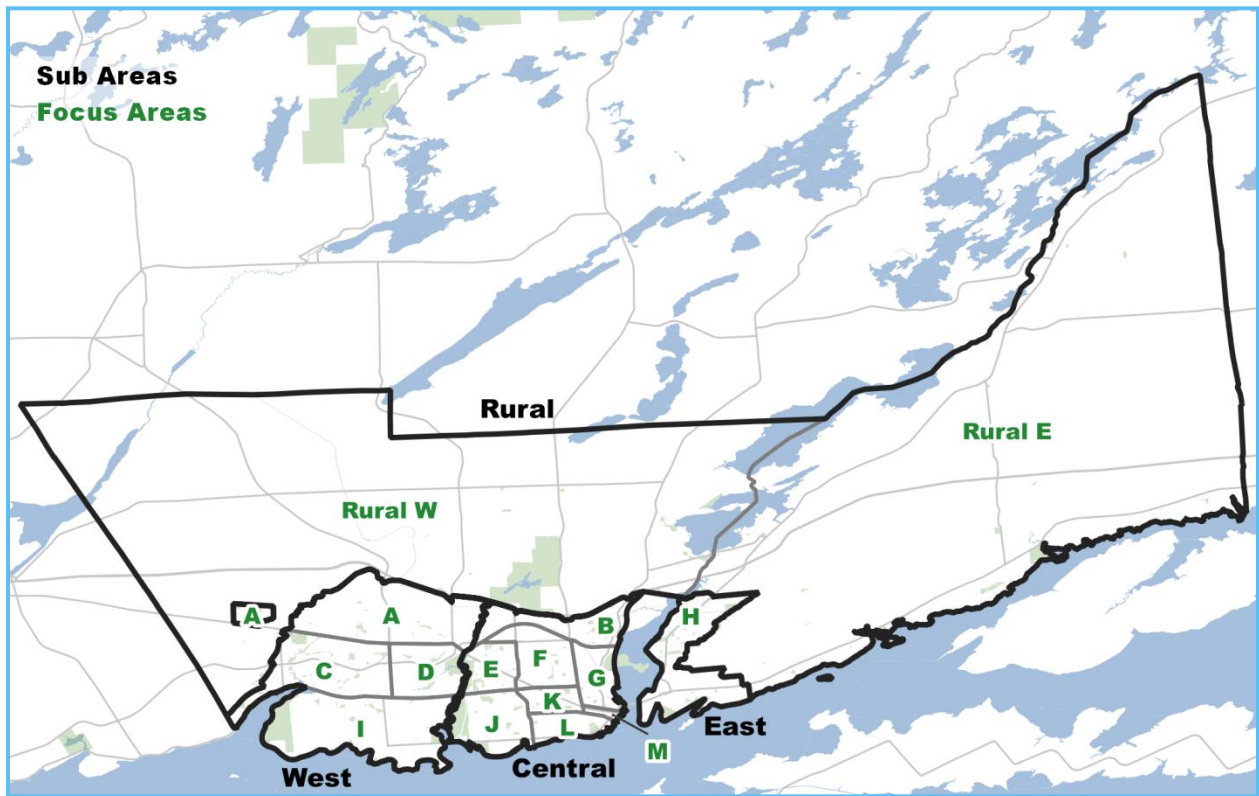
Table 1: Focus Area Geographies

Sub-Area	Focus Area	Neighbourhoods with Focus Area	Estimated 2019 Population	Estimated 2019 Dwellings	Estimated 2019 Dwellings Occupied by Usual Residents
West	A*	Cataraqui North, Westbrook Enclave	11,906	4,515	4,463
	C*	Bayridge, Westwood, Sutton Mills, Gardiners / Meadowbrook (west)	18,425	7,287	7,175
	D	Waterloo Village, Gardiners / Meadowbrook (east)	8,861	3,850	3,664
	I	Lemoine Point, Collins Bay, Auden Park, Henderson, Reddendale	11,786	4,733	4,575
Central	B	Marker's Acres, Rideau Heights (north), Kingscourt / Novelis (north)	7,400	3,390	3,250
	E	Grenville Park, Strathcona Park, Hillendale	7,436	3,653	3,525
	F	Kingscourt / Novelis (south)	5,203	2,798	2,658
	G*	Inner Harbour, Rideau Heights (south)	8,784	5,243	4,439
	J	Portsmouth, Fairway Hills, Calvin Park, Polson Park	11,009	6,041	5,496
	K	Williamsville, Sunnyside (north)	6,947	5,592	3,789
	L	Queens (south), Alwington, Sunnyside (south)	5,825	4,447	2,827
	M	Downtown (portions of Inner Harbour, Queen's, and Sydenham neighbourhoods)	1,300	1,475	796
East	H*	East End (Greenwood Park / St. Lawrence South, Catiraqui River East, CFB Kingston portions within urban boundary)	8,923	3,590	3,486
Rural	Rural W*	Rural East (outside urban boundary: Kingston Mills, Joyceville / Brewer's Mills, St. Lawrence North, Ravensview, Greenwood Park)	6,058	2,298	2,253
	Rural E	Rural West (outside urban boundary: Woodbine, Mile Square, Sharpton / Grenville, Elginburg / Silvers Corners / Shannon's Corners, Glenburnie)	6,824	2,571	2,418

Estimated 2019 population and dwelling counts are based on 2016 Census data by Dissemination Block projected to 2019 on the basis of City of Kingston forecasts of population growth by neighbourhood.

* The estimated population and dwelling counts for Focus Areas A, C, G, H, and W may be imprecise due to the Statistics Canada Dissemination Block geographies occasionally straddling Focus Area boundaries, creating challenges in apportioning population and dwellings to these Focus Areas.

2.3 Survey Design

The survey was a household-based survey that collected demographic information on all household members and trip information for household members 5 years of age and older. The survey employed a 24-hour recall method that asked survey respondents to report on their trips on the previous weekday, from 4:00 a.m. on the previous day to 3:59 a.m. the next day. The survey could be completed online or over the phone. The survey was conducted using Malatest's Triptelligence™ system, an integrated CATI/CAWI (computer assisted telephone/web interview) system incorporating Google Maps and data handling features developed specifically for origin-destination surveys. The survey was branded as "Kingston Moves", with a logo designed by the City of Kingston. A dedicated website was developed to provide prospective participants with information about the survey, including answers to frequently asked questions, and contact information should they have any concerns about the survey.

Outlined below are the types of information collected by the survey:

HOUSEHOLD LEVEL	PERSON LEVEL For each person in the household	TRIP LEVEL For each trip made by each household member 5+ years of age
Home location	Gender	Origin location
Dwelling type	Age	Destination location
Home parking (#off-street spots)	Driver's licence	Trip departure time
Household size (# people)	Transit pass	Purpose (destination activity)
Number of vehicles by fuel type	Student status (f/t, p/t)	Mode(s) of travel (up to 5)
Number of bicycles (adult, children's)	School level	Number of buses boarded (if bus transit used)
Household income	School location	Use of Park & Ride locations (if bus transit used)
Agreement to participate in future research	Parking at school (free or pay)	Number of vehicle occupants (if driver or passenger)
	Employment status (f/t, p/t)	
	Workplace location	
	Parking at work (free or pay)	
	Other occupational status (retired, unemployed, etc)	
	City of permanent residence (Kingston, elsewhere)	
	Whether lived in Kingston in May 2019 or will live in Kingston in May 2020	
	Frequency of cycling, walking, and other active mode use (Fall, Winter, Summer)	
	Whether took trips on travel day	

> **For this survey, a trip was defined as a journey from one place (origin) to another (destination) with a single purpose that may involve more than one mode of travel.** Travel to work with a stop at a coffee shop is two separate trips: one with a purpose of restaurant/dining, another with a purpose of work. Travel to work which involved driving to a park & ride location then taking transit the rest of the way is considered a single trip with a primary mode of transit and a transit access mode of driving.

2.4   Survey Conduct

Survey administration was conducted via two sampling approaches: the main survey of households and a supplementary survey of post-secondary students.

To obtain coverage of all households in the study area, including cell-phone-only households, the survey of households employed an address-based sampling approach. Households were randomly selected from databases of mailable residential addresses, with a portion of these households having only address listings (address-only) and the remaining having addresses that could be matched to listed phone numbers (address-and-phone). Households were sent survey invitation letters signed by the Mayor of Kingston with a branded brochure explaining the purpose of the study, along with a secure access code and instructions for completing the survey online or over the telephone. Addresses with listed landlines received follow-up telephone calls to prompt the completion of the survey over the telephone or online.

The survey was field tested from August 24th to 28th, 2019 with a small sample of households both online and via telephone interview to confirm that survey processes were operating as expected, and to obtain feedback from participants. A small number of surveys that were completed as part of this field test or submitted online after the initial field test period were included in the final survey data. Surveys conducted during this time period were discounted if the surveyed household included any post-secondary students who would be living outside the household in Fall (to align with the timing of the full survey administration) or any K-12 students who had not yet started Fall classes, or if workers in the household reported being on vacation.

Full survey administration was undertaken between September 13 and December 9, 2019. Survey completion targets were set for each of the 42 neighbourhoods in the city to ensure relatively uniform sampling could be obtained across the city. Three flights of letter invitations were sent in September, with two smaller flights of letters in October and November to target neighbourhoods with lower response rates. 90% of data collection was completed by the end of October, with targets for most neighbourhoods achieved by this time. Survey administration continued to early December to target neighbourhoods that were below target. Overall, across both sample types, the survey of households had a 15.8% response rate prior to the rejection of invalid surveys. After the invalid surveys were excluded, the valid response rate was 14.9%.

In addition to the address-based sampling of households, supplementary surveys were obtained with post-secondary students via emailed survey invitations, in-person recruitment, and social media. These methods were used to compensate for a lower response rate from post-secondary student households contacted via mail and phone in the main survey of households, as well as to attempt to reach students

living in on campus residences (who were not part of the address-based sample frame for the survey of households). St. Lawrence College, the Royal Military College of Kingston, and the Queen's University Graduate Student Society all sent email invitations to students with invitations to participate.[2] The City of Kingston was given permission to set up a display at St. Lawrence College on two dates, with staff assisting students in completing the survey on a provided tablet computer or inviting them to complete the survey at their convenience. Social media advertising targeting Queen's University students was also employed for a short period near the end of survey administration, obtaining a small number of additional surveys. Post-secondary students and other respondents living with roommates had the option to complete the survey about their own travel only (if they were not aware of their roommates' travel and could not obtain their roommates' participation); surveys from such respondents were later combined into composite households for analysis.

Across both sampling approaches, a total of 3,884 surveys were completed, 3,421 from the survey of households and 463 from the supplementary student surveys. A total of 236 surveys were rejected during data validation, for a final dataset of 3,648 validated households, or 3,500 households after combining the 222 surveys completed by individuals who could not report on their roommates into 74 composite households.

2.5   Data Processing

After data collection, the survey data were subjected to a battery of validation tests to ensure that the survey questions were completed as intended and to flag possible errors in the data or issues with trip logic. Each night, Malatest's Triptelligence™ data validation system automatically ran a battery of tests on survey completions from the previous day, and assigned flags for different issues with different levels of priority (critical issue, possible error, warning, etc.) for review by data validation staff. The data validation staff reviewed each flagged survey and either made logical corrections, re-geocoded locations, called back respondents to clarify information, or rejected the survey as unsalvageable. Surveys that passed all data validation tests were randomly selected for manual review to verify that such surveys appeared to be correct and that validation tests were working as expected. A number of valid surveys were also rejected as the households were determined to be outside City of Kingston boundaries (as postal-code-based sample database provided by Canada Post included some addresses outside municipal boundaries, and as the supplementary post-secondary student survey was completed by some students living outside the city). In the data validation, a total of 6% of surveys were rejected.

The data were also systematically reviewed and tested by data analysts to quality control the dataset and rule out the possibility of any systematic data issues. Any relevant recodes to the data were undertaken (such as combining captured information on work status, school status, or other status into a single occupation variable).

A small number of missing data points was imputed. In preparation for the data weighting, the few

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[2] It may be noted that only graduate students at Queen's University received email invitations from the Graduate Student Society. For technical reasons, the Queen's University Alma Mater Society was unable to send invitations to undergraduate students.

person records with unknown age or gender were imputed, and those reporting non-binary gender were randomly assigned to male or female for convenience in data weighting and analysis, as such respondents were too few to analyse separately (27 who indicated non-binary or other gender, 45 who declined to indicate their gender). The original responses are preserved in the final dataset.

After finalization of the dataset, all latitude/longitude coordinates for locations captured by the survey (home, work, school, trip origin, trip destination) were geocoded using GIS tools to relevant study geographies and to Universal Transverse Mercator (UTM) Zone 18 x-y coordinates.

2.6   Data Expansion and Weighting

The data for the surveyed households were expanded to represent the total population living in residential households in the study area and a portion of post-secondary students living in on-campus residences. The survey data were also weighted to more accurately represent the distributions of households by household characteristics and demographics. This is necessary to address non-response bias and uneven sampling rates in the final survey sample.

The study area geography was organized into expansion zones as the base geographical unit for data weighting. The expansion zones were developed based on Statistics Canada Dissemination Areas (DAs), for which detailed census profile data are available. The expansion zones were developed to fit the Focus Area geographies as closely as possible, although some component DAs extend across Focus Area boundaries. Rather than attempting to split the DA-level Census data to two different expansion zones, the DAs were assigned to either one expansion zones or another; thus a few expansion zones have slightly different boundaries from the Focus Areas. For areas with significant boundary overlaps, final recalibrations were undertaken to ensure the overall number of households by Focus Area is more accurate.

An iterative proportional fitting (IPF) method was employed to balance household weights and person weights for the multiple weighting controls. In this method, incremental adjustments to the household weights are made in succession for each of the household controls, as well as a composite adjustment to each household weight to account for the disproportionate distribution by age/gender amongst the members of each household. Each successive adjustment to balance a given control may slightly or significantly unbalance the correction previously introduced for a different control. However, iteratively cycling through each control results in convergence to a solution where all household and population controls have expected distributions (to within reasonable tolerance; some deviations may be expected, particularly for expansion zones with smaller sample sizes). In this manner, all persons within each household carry the same weight as the household. Limits were set on extreme weights, although they were allowed to range from 0.25 to 4.0 times the base expansion weight for the household's expansion zone. The weights received final calibrations to ensure that the total number of households in each expansion zone matched the control totals.

The weighting controls were developed from 2016 Census data and other reference data sources. The controls were selected for having significant influence on trip-making behaviour and for completeness of the information in the survey data. Estimates for 2019 were projected forward from 2016 Census counts using neighbourhood-level growth rates from City of Kingston forecasts applied to each DA within the

neighbourhood, modified by more recent City of Kingston municipal-level growth forecasts.[3] Adjustments to the resulting counts were also made to remove the portion of the population outside the survey sampling frame (approximately 3% of the population) that lives in collective dwellings (other than student residences) or without a fixed address. The adjustments to the distributions of population by age group took into account that seniors make up a greater portion of the population living in collective dwellings. In some smaller expansion zones, certain age and/or gender categories may have been collapsed further due to small sample sizes or cells with no sample.

The survey data were segmented into households with at least one permanent resident that would normally be counted in the Census (Census households), non-Census households composed entirely of non-permanent residents (seasonal post-secondary student residents living in Kingston between September an April) and post-secondary students living in on-campus residence.

For each expansion zone, the weighting controls for <u>Census households</u> included:

- **total households** (private dwellings occupied by usual residents),
- household counts by **dwelling type** (house, apartment, other ground oriented),
- household counts by **household size** (1-person, 2-person, 3-person, 4-person, 5+ person)[4],
- population counts by **age and gender** (12 age ranges, 2 genders),
- **total employed labour force** estimates (with the expansion zone-level Census projections modified by more recent municipal-level employment forecasts from the City).

For each expansion zone, the weighting controls for <u>non-Census households</u> included:

- **estimated non-permanent households** occupied only by seasonal students.

For each institution, the weighting controls for students living in <u>on-campus residences</u> included:

- **total beds in on-campus residences**, in the case of St. Lawrence College; or
- **estimated residence beds by level of education** (first-year, undergraduates in other years of study, graduates), in the case of Queen's University.[5]

A global weighting control was applied across post-secondary students from all three of the above groups, drawing on institutional enrolment figures:

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[3] *Population, Housing and Employment Growth Forecast, 2016 to 2046,* City of Kingston, Watson & Assoc. Economists Ltd. (2019) (https://www.cityofkingston.ca/documents/10180/31619068/Projects_Planning_PopulationHousingEmploymentForecast_Final-Report_March2019.pdf/d39310e1-e11c-4f05-b1fb-2695b9a9ea71).

[4] For weighting purposes, Census households were categorized by household size in May (the usual time of the Census) even if the household surveyed included seasonal post-secondary student residents only present between September and April.

[5] For Queen's University, the counts of on-campus residence beds exclude buildings that are not strictly student residences, but which are rental properties which Queen's University rents out as a landlord (John Orr Tower, An Clachan complex, or other rental houses or apartments on Queen's-owned property adjacent to the campus.)

- **total post-secondary student enrolments** (segmented by students living on-campus vs. off-campus), in the case of St. Lawrence College and the Royal Military College; or
- **post-secondary student enrolments by level** (first-year, undergraduate, and graduate, further segmented by estimated students of each level living on-campus vs. off-campus) in the case of Queen's University.

In addition, estimated counts of dwellings by Focus Area were used as a final weighting control to recalibrate the dwelling counts for Census households, given that certain expansion zones used for other data weighting and expansion controls do not exactly match the Focus Area boundaries.

In order to contain the variance of the data weights (as such weighting could create more extreme high or low data weights, no attempt was made to adjust the weighting to balance the survey sample by day of week. It may be noted that travel on Thursdays and Fridays is somewhat over-represented, while travel on Mondays, Tuesdays, and Wednesdays is somewhat under-represented.

2.7 Validation of the Weighted Survey Data

The weighted survey data were validated against Census statistics (various household and demographic characteristics, employed labour force estimates, usual mode of travel for journey to work) and other available reference data (enrolments, Kingston Transit boarding counts). The results compared favourably for most characteristics, including geographic distributions, household size, dwelling type, age/gender, and employed labour force. This suggests that the survey results can be taken to be generally representative of the total population.

There were a few deviations of the survey data from the reference statistics. Within the dwelling category of "other ground-oriented dwellings" used in the weighting, the survey data may somewhat under-represent mobile homes, although these are a marginal fraction of total dwellings. The survey results may somewhat under-represent households with higher incomes, although it is difficult to say this with certainty given that 14% of households did not provide an answer to the income question. While the number of residents with a usual place of work outside the home compares well, the survey results appear to deviate in terms of the balance of those who work from home (possibly over-represented by the survey) and those who have no fixed workplace address, although this could be due to a difference in how this question was asked on the travel survey compared to the Census. Census journey-to-work data were also compared against the survey results for the first reported trip to work or for work-related purpose. These results compared favourably, although the survey data have higher journey-to-work mode shares for transit and bicycle than the Census. However, it is difficult to determine whether the differences from the Census indicates an increase in these mode shares for work commutes between the 2016 Census and the 2019 KHTS, an indication of possible bias in the data, or simply differences in data definitions. The Census asks about the respondents' usual mode of travel to their main job for anyone who worked at some point in the previous year, whereas the KHTS captured the actual mode of travel for only those workers who are currently employed and worked on their surveyed weekday travel day.

The survey data provide good representation of St. Lawrence College students living both off and on campus. The survey data do not represent students living on-campus at the Royal Military College, as no

surveys were completed with such students, although the survey results are representative of students living off-campus, some of whom participated. The survey is quite representative of Queen's University undergraduate and graduate students living off-campus, with a robust survey sample obtained. However, the survey under-represents Queen's University students living on campus, the majority of whom are first-year students, due to the small sample of such students surveyed and limits placed on extreme weights. Users of the dataset who wish to analyse the data for smaller sub-samples or for modelling at the level of neighbourhoods or transportation analysis zone (an even smaller geography) may wish to consider whether to exclude the Queen's on-campus sub-sample, by, for example, running sensitivity tests on the results with and without this sub-population. For other researchers working with the data, it may be preferable to expand the sub-sample of on-campus surveys to represent the entire population despite generating extremely high weights for this sub-sample. The analysis in this report takes a compromise approach, providing some representation albeit with a crude sample relative to the total population, without allowing this representation to overly skew the results.

Finally, Kingston Transit ridership counts were compared against the survey data. The ridership figures of about to 27,500 daily transit trips and 30,300 boardings compare against expanded survey estimates of 32,000 transit trips (16% more) and 36,370 boardings (20% more). This does not necessarily mean that the survey results over-represent transit usage. The ridership figures are based on recorded fares plus manual registering of boardings by post-secondary students presenting their student IDs (with this group constituting the largest segment of transit riders). As manual recording of such boardings may not always consistently be registered, particularly during busy periods with large numbers of riders boarding at once, the reported number of transit trips may in fact be reasonable, and no actions were undertaken to adjust the survey data to match the ridership figures.

2.8   Statistical Reliability

2.8.1   Data Reliability

The 2019 KHTS was conducted with a sample of about 5.8% of households in Kingston (excluding on-campus residents) and 5.1% of Kingston's total Fall population (including on-campus residents). The final survey dataset includes information on 3,500 complete household records, 7,463 residents of the city, and 21,878 trips made by those residents.

As with any survey, the data collected can be subject to sources of error or bias that can affect the reliability of the survey results. Potential sources of error can include the following:

- *Undercoverage.* Coverage error is associated with the failure to include some populations in the same frame used for sample selection, which may occur with samples of convenience such as telephone directories. The sample frame used was a Canada Post database of mailable residential addresses which provides excellent coverage of private dwellings in the study area, reducing the concern of under-coverage. However, the Canada Post database may sometimes miss some housing types, such as basement/secondary suites, mobile home parks and other non-conventional dwelling types.

- *Non-response bias.* Non-response bias occurs when individuals who do not participate in a survey differ in relevant ways from individuals who do participate. For example, younger people are often less inclined to participate in surveys. This bias has also been addressed, in part, through the data expansion process, including the weighting by household size, dwelling type, age, gender, and post-secondary enrolments. However, it should be noted that there can be other, hidden biases in the data that could not be corrected by the data weighting.

- *Measurement error.* This type of error is associated with the failure of survey instruments to capture correct information (e.g., through misunderstanding survey questions). To control for this, the questionnaire and associated materials were based on previously well-tested survey questions, thoroughly reviewed for content and meaning, and field-tested with a sample of respondents prior to the full survey administration. Telephone interviewers were trained on the objectives of the survey, definitions of key terms, the intent of survey questions, and how to address different trip circumstances described by respondents. During survey administration, interviews were regularly monitored by a supervisor to ensure consistent application of questions. The online survey also included a number of built-in tests to prompt respondents to confirm key data and clarify illogical responses.

- *Processing error.* Processing errors include data entry, coding, editing, and imputation errors. These potential sources of error were addressed through comprehensive training of survey staff and survey validation staff, continuous quality management practices, and data validation.

- *Sampling error.* Sampling error refers to the variability that occurs by chance because a sample was surveyed, rather than the complete population. As best as possible, sampling error was controlled for by obtaining a robust survey sample and targeting of areas with lower than expected sampling rates.

- *Error due to extreme weights when analysing small samples.* Notwithstanding the limiting of very extreme weights in the data weighting, small sample sizes for some strata and non-response bias may contribute to the assignment of high weights for some cases relative to others within the same geographic zone or population stratum. Users of the data should take note that the sample sizes for some zones are relatively modest, and the survey results for such zones should be interpreted with caution. Caution should also be exercised when analysing any small subgroups of the total population.

2.8.2 Estimates of Sampling Error

Sampling error can be estimated based on the size of the sample universe (number of households in the study area) and the number of household survey completions. The estimated margin of error for the survey results at the household level is at ±2.1% at a 95% confidence level (theoretically, for a given survey question, the true response proportion for the population would be somewhere within the margin of error of the survey results 19 times out of 20), taking into account the effects of data weighting on sampling error. For person- and trip-level survey results for the entire study area, the sampling error is estimated to be ±1.4%.

Sampling errors increase when the study area is disaggregated into sub-areas, Focus Areas, and neighbourhoods or when analysing population sub-samples. **Table 2** provides the household and person sampling errors by Focus Area.

Reporting of survey results related to trips originating in or destined to given sub-areas or Focus Areas will include trips made by residents of the given geography as well as other residents of the study area from outside the given geography. For example, while the survey sample for residents of Focus Area M, the Kingston downtown area, is modest (77 households with 119 persons), the reporting on trips within this area is based on a considerably larger sample of surveyed residents (1,055 persons) who reported travelling to or within this Focus Area. Therefore the sampling error associated with information on trips to, from or within the area would be much better than that for just the trips made by residents of the area. The sampling errors for person-level information can be considered to carry over to the trips those people make (i.e., the sampling error is associated with the entire trip chain). Therefore the calculation of sampling error was undertaken using the number of persons as the sample size rather than number of trips.[6] Sampling errors for trips destined to each geography are also listed in **Table 2**.

Sampling errors associated with post-secondary student population sub-groups of interest are as follows: all post-secondary students, ±3.9%; seasonal post-secondary students who live in Kingston from April to September, ±5.4%; Queen's University students, ±4.5%; St. Lawrence College students, ±7.3%; and students living in on-campus residence, ±18.6%. The data set include surveys with 20 of approximately 180 RMC students living off-campus, but does not include any of the 1,050 Officer Cadets who live on campus; therefore a sampling error has not been computed for RMC students, and the results for off-campus RMC students should not be interpreted to represent all RMC students.

2.8.3   Caveats

It should be understood that sampling error is not the only possible source of error. While efforts have been made to control for possible error and to weight the data to be more representative of the population, there may still remain some non-response bias or other sources of error not accounted for in the data weighting and data processing.

The weighted survey data are based on a 5.1% sample of population expanded to represent the total population of persons living in private dwellings (excluding population living in collective dwellings) and a portion of post-secondary students living on campus. As such, expanded counts from the survey data should be understood to be estimates not exact counts.

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[6] It may also be noted that the person-level sampling errors are a crude estimate, in that the actual sample units were households, and individual persons were not independently sampled. The sampling errors have not been adjusted to take into account the clustered nature of the sampling of persons.

Table 2. Survey Samples and Sampling Errors for Different Levels of Reporting

	Households in Given Area				Persons Living in Given Area			Trips Destined to Given Area				
	House-hold universe (excl. on-campus residents)	Sample size (n house-holds)	Sample rate	Sample error	Expanded persons (incl. on-campus residents)	Sample Size (n persons)	Sample error	Expanded trips with destination in area	Expanded persons with at least 1 trip destined to area	Trip records	Sample size (n persons with at least 1 trip destined to area)	Sample error
City of Kingston	59,360	3,465	5.8%	±2.1%	139,580	7,460	±1.4%	384,780	113,720	21,114	6,140	±1.6%
Urban Area	54,910	3,221	5.9%	±2.2%	128,039	6,850	±1.5%	374,570	112,410	20,189	6,059	±1.6%
Central	31,100	1,810	5.8%	±2.9%	68,029	3,680	±2.1%	215,150	84,750	11,638	4,584	±1.8%
West	20,160	1,171	5.8%	±3.4%	50,747	2,610	±2.3%	133,180	58,120	7,211	3,147	±2.1%
East	3,650	240	6.6%	±8.3%	9,263	570	±5.4%	22,510	12,980	1,340	773	±4.5%
Rural	4,450	244	5.5%	±7.7%	11,542	620	±4.8%	16,820	12,160	925	669	±4.7%
Area A	4,620	276	6.0%	±7.1%	12,533	650	±4.5%	35,460	24,340	1,917	1,316	±3.3%
Area B	3,350	178	5.3%	±8.5%	7,651	390	±5.6%	16,890	11,530	934	638	±4.5%
Area C	7,140	402	5.6%	±5.9%	18,264	910	±3.9%	43,270	26,390	2,271	1,385	±3.1%
Area D	3,780	218	5.8%	±8.2%	8,602	440	±5.7%	28,020	19,270	1,594	1,096	±3.6%
Area E	3,610	195	5.4%	±9.1%	7,260	380	±6.4%	13,900	9,950	757	542	±5.3%
Area F	2,750	148	5.4%	±9.8%	5,391	270	±7.1%	18,060	13,920	1,059	816	±4.2%
Area G	4,750	283	6.0%	±7.9%	9,449	540	±5.7%	26,110	17,270	1,529	1,011	±4.0%
Area H	3,650	240	6.6%	±8.3%	9,263*	570	±5.4%	22,510	12,980	1,340	773	±4.5%
Area I	4,620	275	6.0%	±6.8%	11,348	610	±4.5%	26,420	16,010	1,429	866	±3.9%
Area J	5,890	368	6.2%	±6.1%	12,767	760	±4.4%	29,830	20,040	1,755	1,179	±3.6%
Area K	5,180	305	5.9%	±7.3%	11,309	620	±5.1%	25,220	17,160	1,387	944	±4.0%
Area L	4,220	256	6.1%	±8.3%	12,221*	610	±6.0%	55,640	35,060	2,798	1,763	±3.1%
Area M	1,360	77	5.7%	±14.5%	1,980	120	±11.7%	23,930	17,790	1,419	1,055	±3.8%
Rural West	2,150	116	5.4%	±11.1%	5,501	290	±7.1%	9,040	6,520	481	347	±6.3%
Rural East	2,310	128	5.5%	±10.6%	6,041	330	±6.7%	7,780	5,920	444	338	±6.7%
External Destinations								13,690	11,900	764	664	±4.6%

* Expanded survey counts do not include RMC students living on campus (Area H), and somewhat under-represent Queen's university students living on campus (Area L).

Sampling rate: the percentage of households surveyed. Sampling error: in random sampling, the actual results for the population may be expected to lie within the range of the survey result plus or minus the sampling error, at a 95% confidence level (i.e., 19 times out of 20); adjusted for sampling design effects due to over-/under-sampling.

3   Households, Vehicles and Demographics

This section profiles the households and population in the City of Kingston. Household characteristics and population demographics are explored, as well as household transportation options (vehicles, bicycles, transit passes). This information provides important context for the analysis of travel patterns presented later in this report.

The importance of presenting the demographics of the survey area is threefold. First, it profiles Kingston's residents: these are the people who are making trips. Second, exploring demographic trends can help to explain the reasons for travelling and the travel choices residents make. The explanations, in turn, enable a further understanding of the travel characteristics. Third, the results of the travel survey will provide a baseline which future surveys can be compared to; changes in household and demographic characteristics over time may provide context to help explain changes in travel patterns.

The 2019 Kingston Household Travel Survey obtained a robust sample of residents across 42 neighbourhoods in Kingston, including a representative sample of post-secondary students living in the community. It should be noted that due to the limited opportunities to engage students living on post-secondary campuses, the ability to make inferences on their travel habits in this report is limited. As well, the survey as a whole does not represent populations living in collective dwellings other than on-campus residences, such as group homes, care homes, or prisons, nor does it capture those experiencing homelessness at the time of the survey.

This report provides analysis at both a 'resident' and 'household' level. The analysis at a 'resident' level includes both the permanent residents of the city as well as the portion of post-secondary students who are temporary residents between September and April each year, including students living in on-campus residences. The term 'households' includes residents living in private dwelling units, whether living in the private dwelling year-round or as a temporary resident, but does not include the on-campus student population. The on-campus population is included in the reporting of population demographics and travel patterns to the extent possible given limited sample sizes. Temporary residents who are post-secondary students may be referred to as 'seasonal', meaning that they live in Kingston only from September to April of each year.

The survey results are based on a 5.1% random sample of the population weighted and expanded to represent households and population living in Kingston. As the expanded results are based on a population sample, the results should be understood to be estimates only. When presenting expanded survey counts, most figures are rounded to the closest ten. Individual figures may not always sum exactly to the stated total due to rounding. It should be noted that the actual margin of error of the expanded results may often be much greater than the closest ten.

3.1 Population and Households

Kingston has an estimated 61,490 private dwellings. The majority, 54,820, are occupied by usual residents (who live in Kingston in the summer and would be counted in the Census, which is always conducted mid-May). A large number of private dwellings serve as non-permanent student housing from April to September only, estimated at 4,570 dwellings (just over 8% of all private dwellings).[7] The remaining 2,100 private dwellings either are not occupied, are second homes or vacation cottages, or are occupied by other types of temporary residents other that students; such dwellings are excluded from the survey universe. In addition to private dwellings that house permanent and non-permanent (seasonal) populations, the three major post-secondary institutions provide on-campus housing for 6,370 students during the Fall/Winter school semesters; on-campus residences are considered part of the survey universe.

The expanded survey results represent a total of 59,360 households in private dwellings. This includes both dwellings occupied by usual residents and temporary student housing. Surveyed students living in on-campus residences are not counted as households in the analysis.

In the fall months during which the survey was conducted, the total population of Kingston was an estimated 146,570 people including post-secondary students. About 30,500 (21%) are post-secondary students attending Queen's University, St. Lawrence College or the Royal Military College, almost 6,400 of whom live in student residences on campus. Of the total population, 3,780 (2.6%) are residents of other types of collective dwellings such as group homes, prisons, or senior care homes, or were experiencing homelessness at the time of the survey; residents in these categories were not captured within the survey universe.

The city has a large seasonal population present only during the school year. About two-thirds of the 30,500 post-secondary students (19,860) would not be captured in Census statistics if it were conducted in 2019. This seasonal student population represents 14% of the total population in the city in the fall months. It may be noted that not all of these residents live in 'temporary' housing or in on-campus residences: about one in ten such students live in private households occupied by usual residents, either as boarders or relatives in family homes, or as roommates of other students for whom Kingston is their year-round residence.

The expanded survey results represent a total of 139,580 residents of the city, about 95% of the total population in the fall months. This is less than the total population for two reasons. First, as noted above, residents of most collective dwelling types and those without a fixed address were not included in the scope of the survey. Second, only a modest sample of post-secondary students living in on-campus residences was obtained. The expanded survey data represent 2,100 or 44% of approximately

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[7] *City of Kingston Population, Housing, and Employment Growth Forecast, 2016 to 2046* (Figure I-2, pI-3) estimates: 4,050 dwelling units of post-secondary student non-permanent off-campus housing in 2016, growing to 4,910 in 2021. The 2019 estimate of 4,570 units was derived from these projections. It may be noted that there are more private dwellings than this that house post-secondary students, including seasonal students who may live with permanent residents.

4,720 students who live in residence at Queen's university during the school term, all 600 students in residence at St. Lawrence, and none of the 1,050 in residence at RMC. The under-representation of students in residence is due to limits place on the data weights for the small survey sample of students living on Queen's campus, while no RMC students living on campus completed the survey.

The composition of the survey universe is detailed in **Table 3**, with totals for the City, the area within the city's urban boundary, three urban sub-areas, and the rural sub-area outside the Urban Boundary. The Central sub-area accounts for 49.1% of population, West 35.6%, East 7.5%, and Rural 7.8%. Later in this chapter (Section 3.6, page 63; Section 3.13, page 81), the distribution of expanded households and population is detailed for the thirteen urban and two rural Focus Areas with selected demographics.

Table 3. 2019 Survey Universe: Permanent and Temporary Dwellings, Households and Population[8,9]

Private Dwellings / Households	City of Kingston	Urban Area	Central	West	East	Rural
Total private dwellings (from Census and City forecasts)	**61,490**	**57,140***	**32,650**	**20,620***	**3,860***	**4,360***
Private dwellings occupied by usual residents	54,820	50,660*	26,790	20,110*	3,760*	4,170*
Private dwellings occupied by seasonal student residents	4,570	4,560*	4,320	210*	30*	10*
Other private dwellings (not occupied or occupied by other temporary residents); outside survey scope	2,100	1,920*	1,540	300*	70*	180*
Survey expanded households	**59,360**	**54,900**	**31,100**	**20,160**	**3,650**	**4,450**

Population	City of Kingston	Urban Area	Central	West	East	Rural
Total Census population	**126,710**	**115,300***	**53,920**	**51,640***	**9,730***	**11,410***
Population in private dwellings occupied by usual residents	122,930	112,160*	52,530	49,940*	9,690*	10,770*
Population in collective dwellings; outside survey scope	3,780	3,140*	1,390	1,700*	40*	640*
% of Census population living in collective dwellings	3.1%	2.8%	2.6%	3.4%	0.4%	5.9%
Seasonal (Sept.-April) population not counted in the Census	**19,860**	**19,860**	**18,190**	**560**	**1,050**	**40**
Estimated seasonal student residents living off campus	13,490	13,460	12,870	560	30	40
Students not counted in Census but living in private dwellings also occupied by permanent residents[10]	2,290	2,280	1,900	390	0	10
Students living in temporary student housing where all household members are temporary residents	11,200	11,180	10,970	170	30	30
Students living in on-campus residences	6,370	6,370	5,320	-	1,050	-
Total population during fall months	**146,570**	**135,310**	**72,110**	**52,200**	**10,990**	**11,450**
Population in scope for the survey	**142,790**	**132,170**	**70,720**	**50,500**	**10,950**	**10,810**
Survey expanded population[11]	**139,580**	**128,040**	**68,030**	**50,750**	**9,260**	**11,540**

[8] Sources: Statistics Canada 2016 Census Profile; City of Kingston Population, Housing and Employment Growth Forecast, 2016 to 2046 (used as the basis of projecting 2016 Census data to 2019); and Queen's University 2019-20 Enrolment Report and residence descriptions; St. Lawrence College 2019/20 Annual Report; estimated counts of Royal Military College enrolments and students living in residence based on secondary sources; and selected expanded survey results.

[9] Census counts of population and private dwellings in East, West and Rural sub-areas are approximate, as the Census dissemination area geographies do not conform exactly to the OCP urban boundary used to delineate the sub-areas. These and related counts are marked with an asterisk (*). The expanded and weighted survey data may provide a more accurate representation of actual dwellings and population within the actual boundaries.

[10] Examples include seasonal student residents who are roommates of other students who live in Kingston year-round or lodgers or relatives of other permanent residents who come to live in the household just for the school year.

[11] The expanded population represented by the survey is somewhat less than total population as it excludes population living in collective dwellings, does not represent RMC students living on campus, and only a small sample was obtained for Queen's students living on campus.

3.2 Household Characteristics

3.2.1 Dwelling Type

Dwelling type often has a strong relationship to household income, vehicle availability, level of transit service, and proximity to amenities. **Figure 3** illustrates the distribution of private dwelling types while **Table 4** provides the breakdown by sub-area, and as well as population distribution by dwelling type. Just under 47% of dwellings are single-detached houses. Another one-third are apartments, split almost evenly between those in buildings with five or more storeys and those with fewer than five storeys.

Higher concentrations of apartments can be found in the Central sub-area, particularly within Focus Areas G, J, and M (Figure 4). Within the neighbourhood system (not depicted), the following neighbourhoods are comprised of more than 60% apartments: Williamsville, Polson Park, Fairway Hills, Hillendale, and Sydenham (the latter two at more than 80%).

Figure 3. Private Dwellings by Type
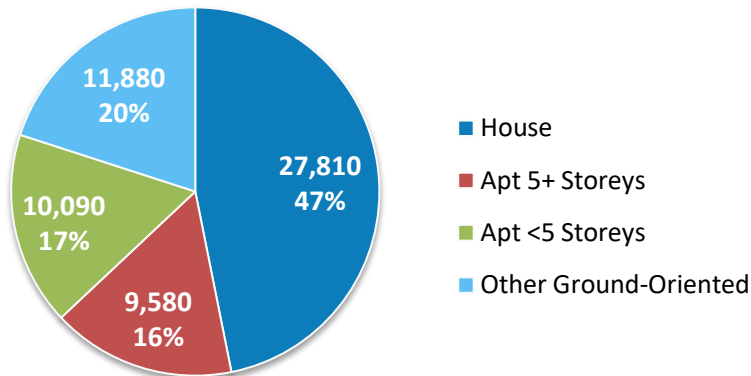
Table 4. Private Dwellings Type by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Total Private Dwellings	59,360	54,910	31,100	20,150	3,650	4,460
House	47%	43%	26%	65%	63%	96%
Apartment 5+ Storeys	16%	17%	24%	7%	16%	0%
Apartment <5 Storeys	17%	18%	27%	8%	4%	1%
Other Ground-Oriented	20%	21%	23%	20%	18%	3%
Total Residents	136,880	125,350	65,330	50,750	9,260	11,550
% Living in Houses	55%	51%	33%	71%	74%	97%
% Living in Apartments 5+ Storeys	11%	12%	18%	4%	9%	0%
% Living in Apartments <5 Storeys	12%	13%	21%	5%	2%	1%
% in Other Ground-Oriented*	22%	24%	28%	20%	15%	2%

*Other ground oriented includes rowhouses, townhouses, semi-detached, duplex, mobile home, etc.

Figure 4. Map of Dwelling Types by Focus Area
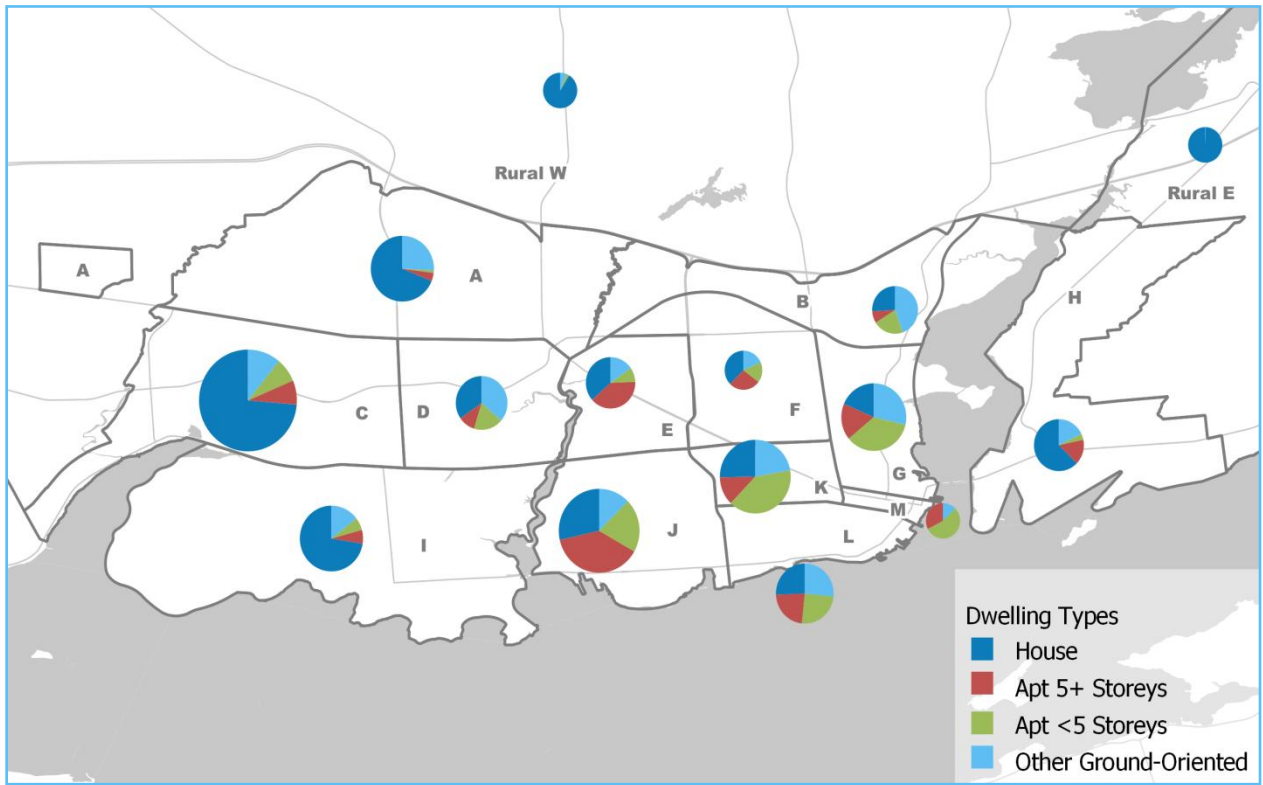
3.2.2   Household Size

The distribution of surveyed households by number of household members is presented in **Figure 5** and broken out by sub-area in **Table 5** and by Focus Area in **Figure 7**.

Households in Kingston are relatively evenly split between one-person households (31%), two-person households (36%) and households with three or more people (33%). As might be expected, higher concentrations of one-person households may be found in the Central sub-area, while the West and Rural sub-areas have higher proportions of households with three or more people. Focus Areas A, C, H, I, Rural West and Rural East all have high proportions of three-or-more-person households (40% of households or more). Within the neighbourhood system (not depicted) the following individual neighbourhoods have more three-or-more person households (50% of households or more): Sharpton/Glenvale, Glenburnie, Westwoods, Mile Square, Meadowbrook, Waterloo Village, and Greenwood/St. Lawrence South.

Figure 5. Households by Size
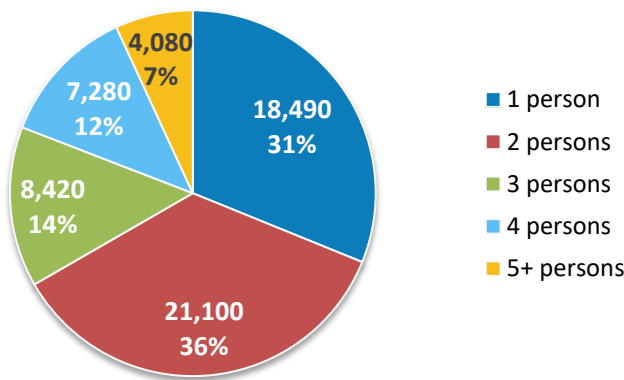
Table 5. Household Size by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Total Households	59,360	54,910	31,100	20,160	3,650	4,450
1 person	31%	32%	39%	24%	22%	17%
2 persons	36%	35%	34%	35%	38%	43%
3 persons	14%	14%	12%	17%	14%	18%
4 persons	12%	12%	9%	16%	18%	15%
5+ persons	7%	7%	6%	8%	9%	9%
Avg. household size	2.31	2.28	2.10	2.52	2.54	2.59

Figure 6. Map of Household Size Distributions by Focus Area

Figure 6. Map of Household Size Distributions by Focus Area

Figure 7. Map of Average Household Size by Focus Area

Figure 7. Map of Average Household Size by Focus Area
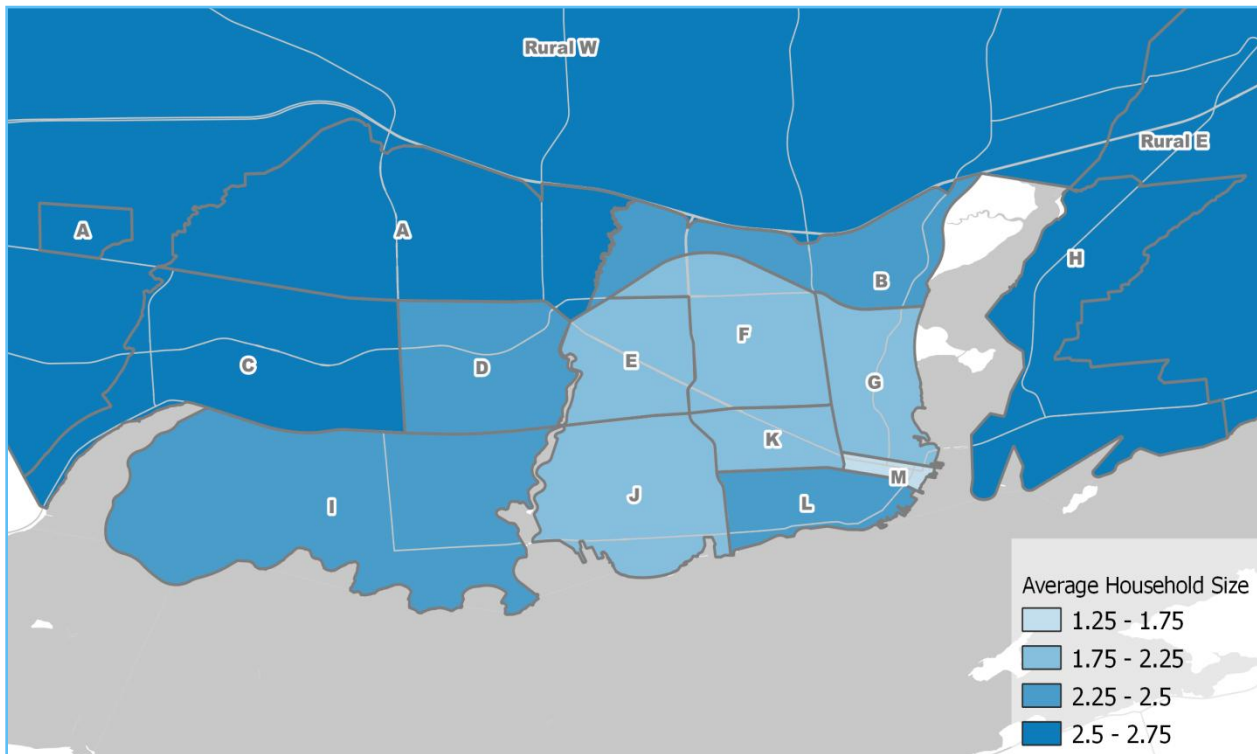
3.2.3 Household Type

The distribution of surveyed households by household type is presented in **Figure 8** and broken out by sub-area in **Table 6** and by Focus Area in **Figure 9.**

Just over one-quarter (27%) of households are couples without children, while 31% are single-person households. Another 31% of households are immediate-family units with at least one child, with just under one-quarter (23%) being couples with at least one child, and 8% being single-parent households. Another 5% are extended-family, multi-family, or other complex households (such as those with lodgers, live-in care-givers, or other atypical living arrangements); a number of these complex households also include parents and children. Roommate households account for 8% of all households.

Figure 8. Households by Household Type
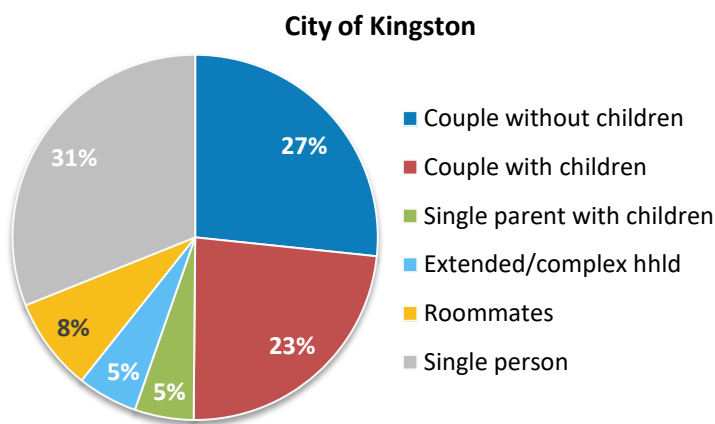
Table 6. Household Type by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Total Households	59,360	54,910	31,100	20,160	3,650	4,450
Couple without children	27%	26%	23%	29%	34%	36%
Couple with children*	23%	22%	13%	34%	35%	37%
Single parent with children*	5%	5%	6%	5%	4%	2%
Extended/complex household**	5%	5%	5%	6%	4%	8%
Roommates	8%	9%	14%	2%	1%	0%
Single person	31%	32%	39%	24%	22%	17%

* Couple with children, single parent with children may include some households with adult children/

** Other complex households include extended families, multi-family households, households with lodgers, households with elderly individuals with live-in carers, etc.

Figure 9. Map of Household Type by Focus Area
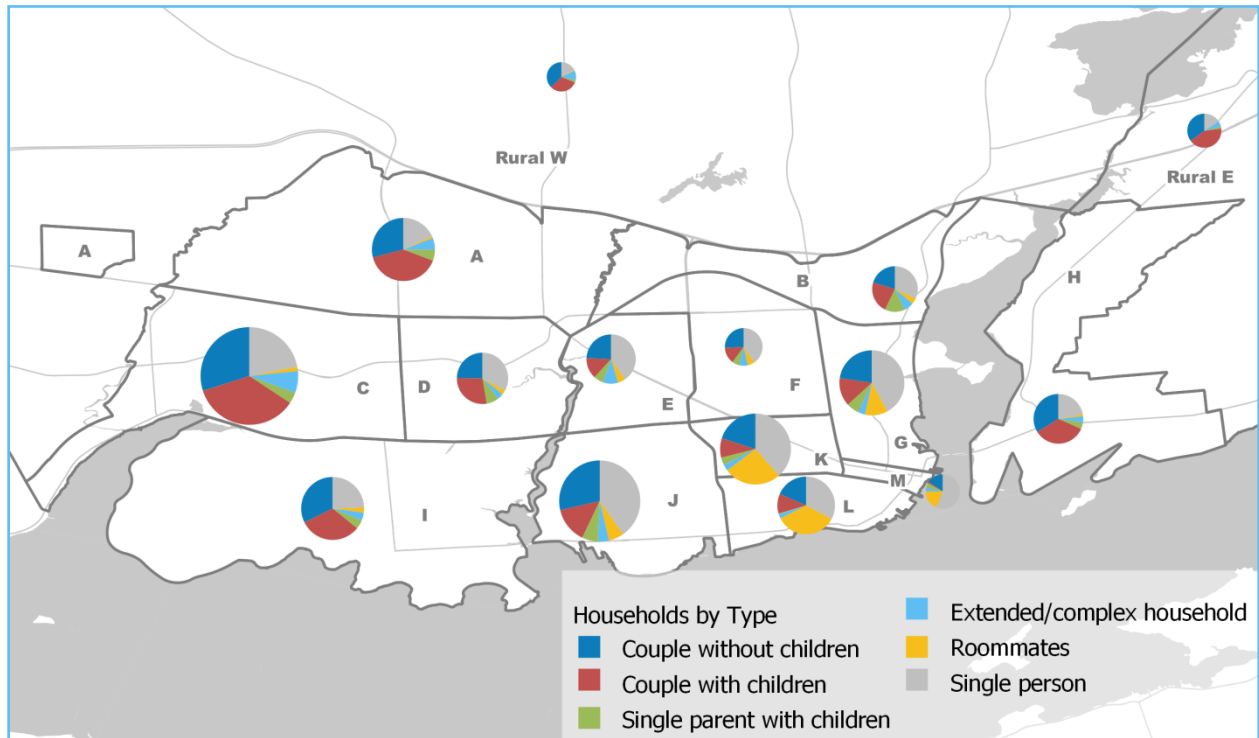
3.2.4   Household Income

Income is an important consideration for transportation as it is often correlated to transportation behaviours. The household income profile for surveyed households is presented in **Figure 10** and by sub-area in **Table 7**. It may be noted that 14% of respondents declined to answer this question, and results may be subject to non-response bias.

Overall, one quarter of households have incomes of less than $30,000 per year, in part due to the large number of post-secondary students residing in the city. Higher income levels may be observed for the East and Rural sub-areas. Exploration of the data reveals that Focus Areas A, C, H, I, Rural East and Rural West have larger proportions of households reporting incomes of over $80,000 per year (**Figure 11**). By individual neighbourhood (not depicted) this is highest in the Glenburnie, Reddendale, Westwoods, Ravenview, Greenwood/St. Lawrence South, and Lemoine Point neighbourhoods.

Figure 10. Households by Household Income
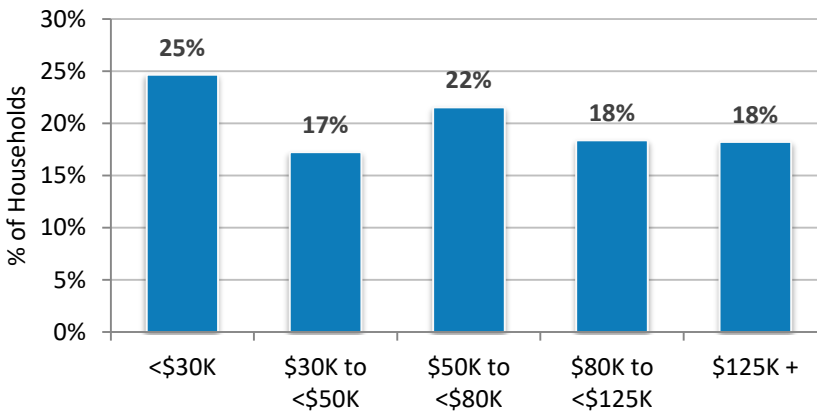
Table 7. Household Income Distributions by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Total Households	59,360	54,910	31,100	20,160	3,650	4,450
$0 to less than $30,000	25%	26%	39%	9%	5%	5%
$30,000 to less than $50,000	17%	18%	21%	15%	10%	11%
$50,000 to less than $80,000	22%	21%	20%	23%	25%	22%
$80,000 to less than $125,000	18%	18%	11%	28%	26%	26%
$125,000 or more	18%	17%	10%	26%	34%	36%
Question gross non-response rate	*13%*	*13%*	*11%*	*16%*	*11%*	*19%*

Figure 11. Map of Household Income Distributions by Focus Area

Household by Income
- Under $30k
- $30k to $50k
- $50k to $80k
- $80k to $125k
- More than $125k
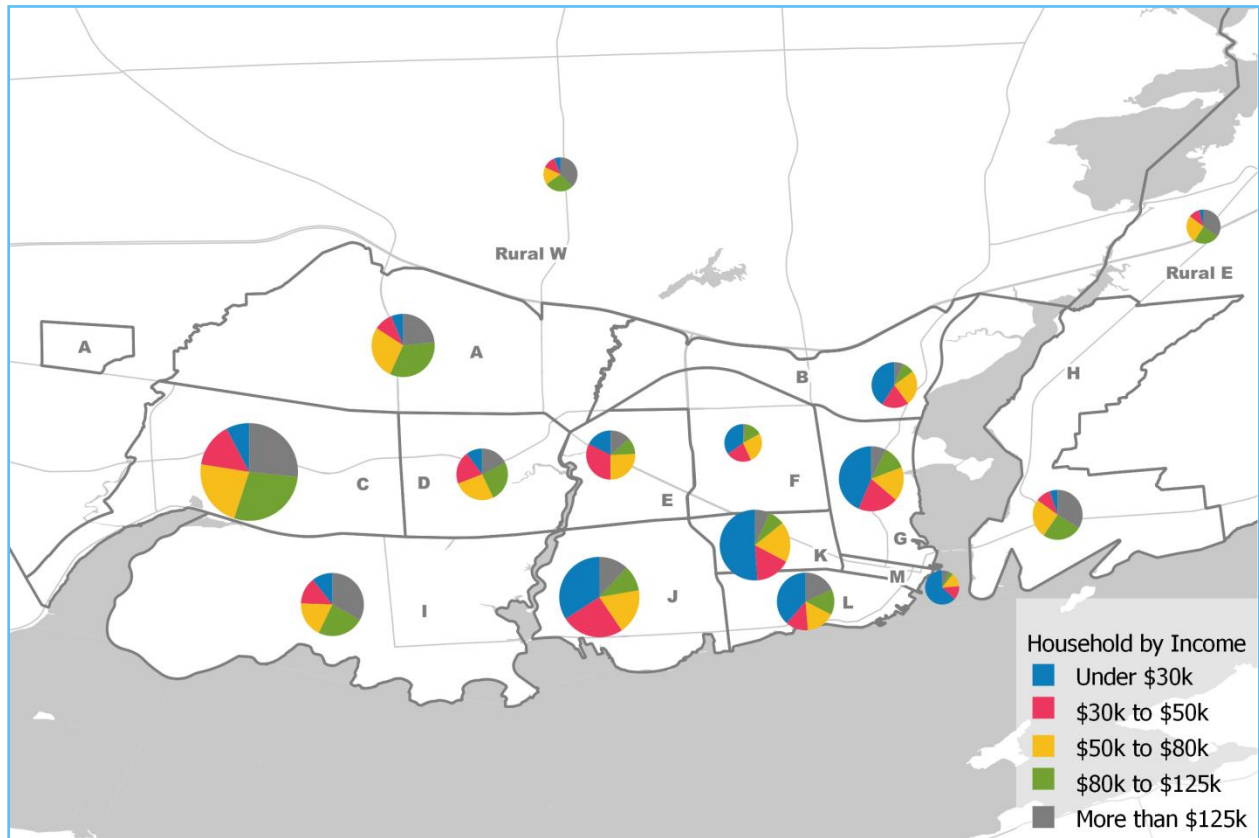
3.3   Household Vehicles

3.3.1   Vehicles and Vehicle Access

Four-fifths (82%) of all households have at least one vehicle (**Table 8**). On average, there are 0.69 vehicles per person 16+ years of age (those eligible for a driver's licence). The average number of vehicles per household is 1.35.

The expanded survey results suggest that Kingston households have almost 80,000 insured vehicles (including cars, light trucks, vans, and motorcycles, and including vehicles provided by employers that household members use for commuting or personal business).

The level of vehicle ownership is lower in the Central sub-area, with only 69% of households having at least one vehicle, likely due to higher concentrations of students and a greater density of housing and amenities. Vehicle ownership is greater in the West, East, and Rural sub-areas. As illustrated in **Figure 12** vehicle ownership is lowest in Focus Areas L and M (at 51% and 32% of households with at least one vehicle, respectively). By individual neighbourhood (not depicted), it is lowest in the Alwington, Queen's, Sydenham, and Inner Harbour neighbourhoods. It is greatest in Focus Areas A, C, H and I, with almost all households in these areas having at least one vehicle.

Table 8. Vehicles, Households with Access to a Vehicle, Average per Household and per Person

	City of Kingston	Urban Area	Central	West	East	Rural
Households	59,360	54,910	31,100	20,160	3,650	4,450
Total Household Vehicles	79,880	69,630	29,580	34,000	6,040	10,250
Persons 16+ years of age	116,560	106,800	58,140	41,380	7,280	9,760
Avg. vehicles per household	1.35	1.27	0.95	1.69	1.65	2.30
Avg. vehicles per person 16+	0.69	0.65	0.51	0.82	0.83	1.05
% of households with at least one vehicle	82%	80%	69%	95%	98%	98%
% of persons 16+ with access to a hhld. vehicle	85%	84%	73%	96%	99%	99%

Figure 12. Map of Household Vehicle Access by Focus Area
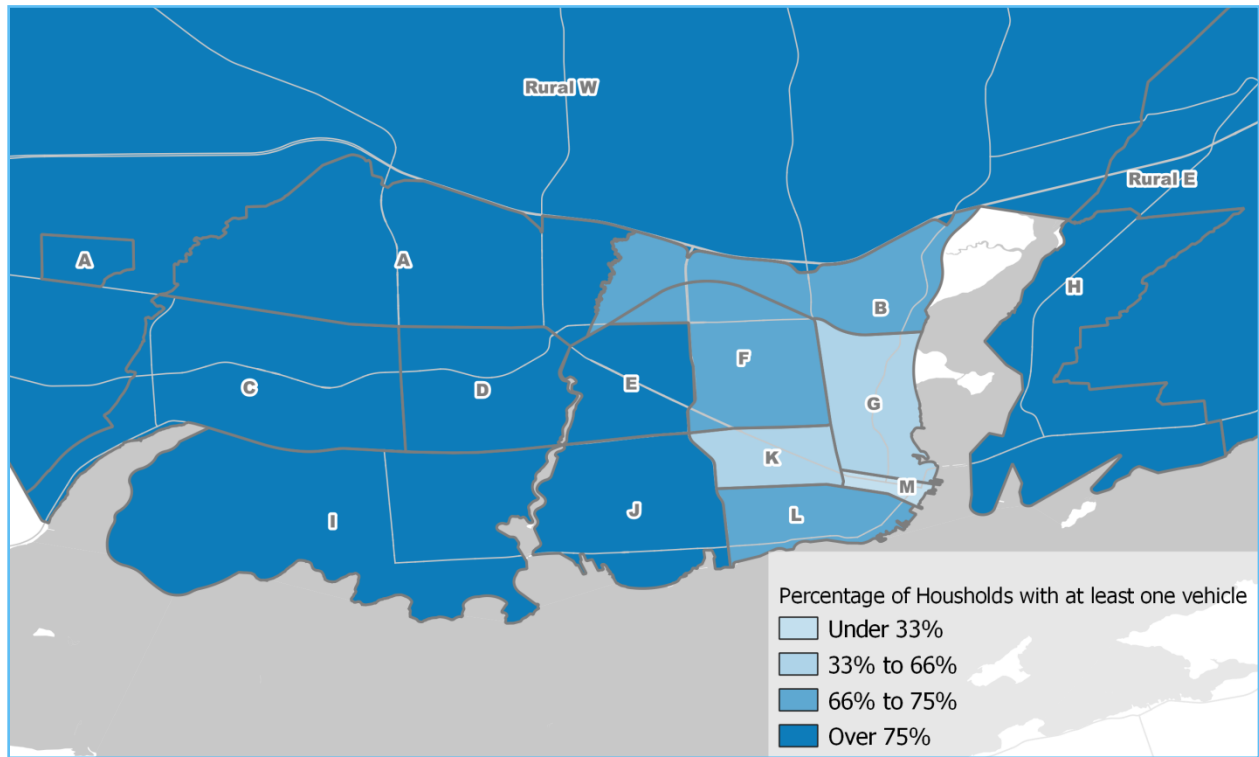
3.3.2 Relationship of Vehicle Ownership to Dwelling Type

Figure 13 illustrates the relationship between dwelling type and vehicle availability. The average number of vehicles per single-detached house is 1.83, dropping to 1.24 for other ground-oriented dwelling types, and 0.62 for apartments in buildings with fewer than five storeys. This figure is somewhat higher for apartments in buildings with greater than five storeys. As household size will vary by dwelling type, the plot of vehicles per person 16 years of age or older provides a perspective on vehicle access for people living in different types of dwellings. **Table 9** details these statistics.

Figure 13. Dwelling Type and Vehicle Availability
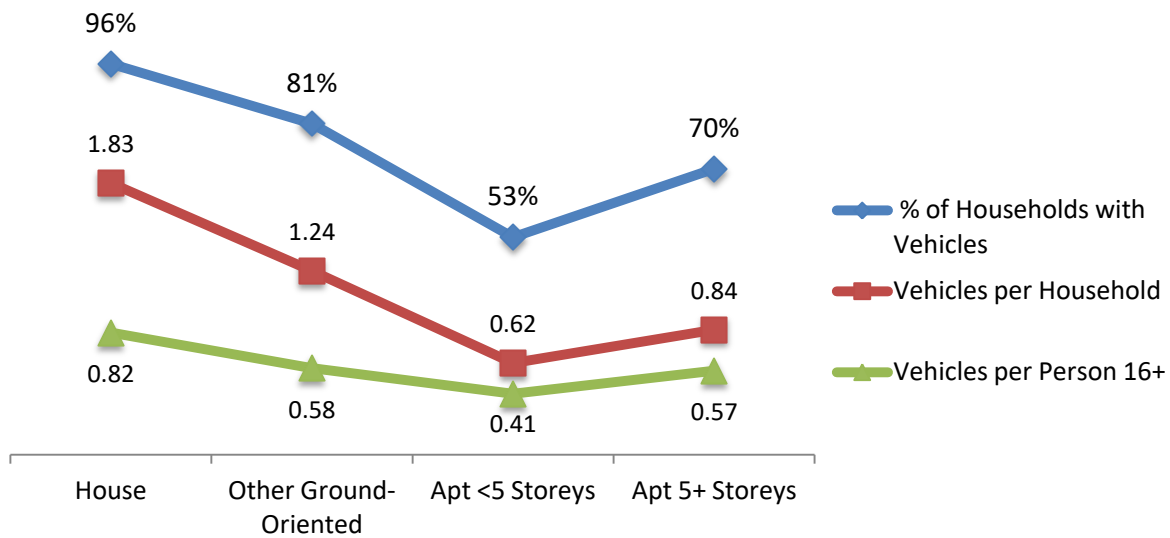
Table 9. Vehicles per Household by Dwelling Type

	Households	Persons 16+*	Vehicles	% of Households with Vehicles	Vehicles per Household	Vehicles per Person 16+
House	27,810	61,890	50,870	96%	1.83	0.82
Other Ground-Oriented	11,880	25,230	14,710	81%	1.24	0.58
Apt <5 Storeys	10,090	15,170	6,230	53%	0.62	0.41
Apt 5+ Storeys	9,580	14,260	8,070	70%	0.84	0.57

*Population 16 years or older who are eligible for a driver's licence, whether or not they hold a licence.

3.3.3   Vehicle Fuel Types

Figure 14 highlights the survey estimates for the number and proportion of private vehicles by fuel type for the region, while **Table 10** breaks this information out by sub-area. In summary, only 4.3% of household vehicles employ alternative fuels or electric engines, with hybrids being the most popular alternative type, at 2.5% of all vehicles. Diesel is more common in the rural sub-area, at 3.0% of vehicles.

Ministry of Transportation of Ontario (MTO) information indicates that 426 electric vehicles are registered in the City of Kingston. The expanded survey result is 370 electric vehicles, which is close to the MTO figure. It is important to note that the expanded survey results are based on a sample of approximately 5% of the population and should be understood to be estimates. These estimates should be generally representative but subject to a margin of error due to random sampling.

Figure 14. Vehicle Fuel Types
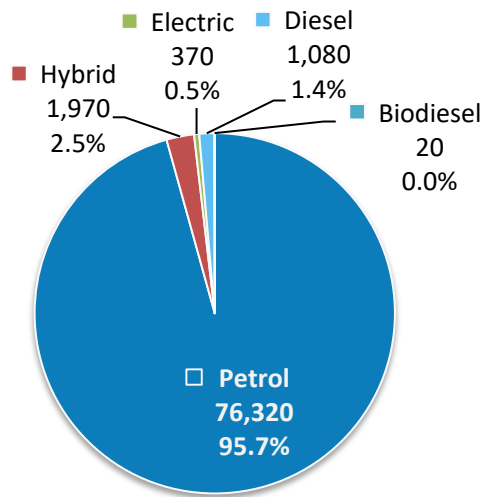
Table 10. Private Vehicles by Fuel Type

	City of Kingston	Urban Area	Central	West	East	Rural
Total Household Vehicles	80,450	70,200	30,140	34,010	6,060	10,250
Petrol	95.5%	95.8%	94.5%	96.8%	96.2%	93.8%
Hybrid	2.5%	2.5%	3.1%	2.0%	2.1%	2.4%
Electric	0.5%	0.5%	0.6%	0.3%	0.5%	0.5%
Diesel	1.3%	1.1%	1.6%	0.7%	0.5%	3.0%
Biodiesel	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%

3.4   Parking at Home

The survey asked respondents to identify the number of parking spaces at home available to members of the household, excluding on-street parking. The great majority of households (92%) reported having at least one off-street parking spot, with the majority having access to multiple parking spots (**Figure 15**). **The average number of off-street parking spots per household is 2.53.** Examination of the data of households with vehicles compared to available parking spots in each household suggests that **only 3% of vehicles could not be housed in available parking spots.**

These figures vary by geography. On the following pages, **Table 11** and **Table 12** present the data for sub-areas and Focus Areas respectively, while **Figure 17** and **Figure 18** depict the average number of off-street parking spots per household and the proportion of household vehicles that cannot be accommodated by home-based off-street parking, by Focus Area. It appears that off-street parking at home is less available in the Central Focus Areas G, L, and M (with 19%, 22%, and 61% of households having no off-street parking spots). This does not necessarily represent the areas with the greatest need to use on-street parking; vehicle ownership is lower in these areas. Looking at the data for households with vehicles that have no parking spots or more vehicles than off-street parking spots, it appears that the need to use on-street parking at home is greatest in Focus Areas D, G, and K (with 9%, 6%, and 7% of vehicles in excess of available parking spots in each household, respectively).

Figure 16 on the next page illustrates the relationship between dwelling type and the availability of off-street parking. **Virtually all houses have at least one off-street parking spot, while higher-density dwelling units have fewer available parking spots, with 23% of households in apartment buildings with five or more storeys not having off-street parking spots available.**

Figure 15. Number of Parking Spots Available for Use at Home (Excluding On-Street Parking)
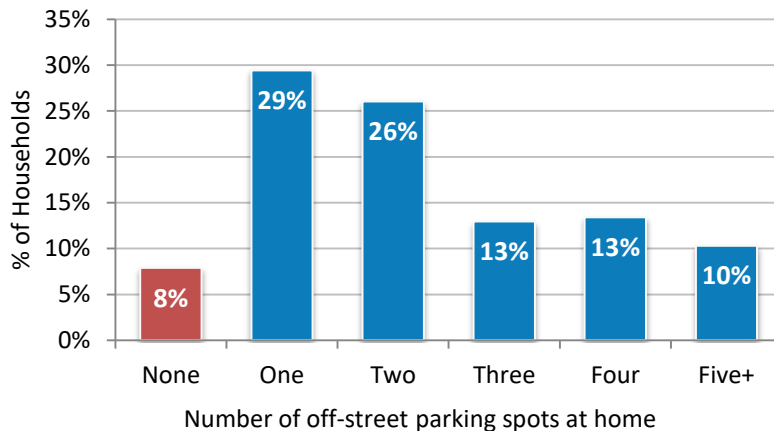
Table 11. Availability of Off-Street Parking by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Households	59,360	54,910	31,100	20,160	3,650	4,450
Number of household vehicles	79,880	69,630	29,580	34,000	6,040	10,250
Total home parking spots available for use (other than on-street parking)	150,162	124,972	59,288	56,530	8,506	25,245
Average number of available off-street parking spots per household	2.53	2.28	1.91	2.80	2.33	5.67
% of Households						
No off-street parking available	8%	8%	14%	1%	3%	3%
One off-street parking spot	29%	32%	43%	17%	20%	3%
Two	26%	27%	22%	32%	45%	13%
Three	13%	13%	10%	16%	13%	14%
Four	13%	13%	6%	24%	16%	15%
Five or more	10%	7%	6%	9%	3%	53%
Estimated % of household vehicles that could not be accommodated by the available off-street parking at home	3%	4%	4%	4%	4%	1%

Figure 16. Dwelling Type and Availability of Off-Street Parking
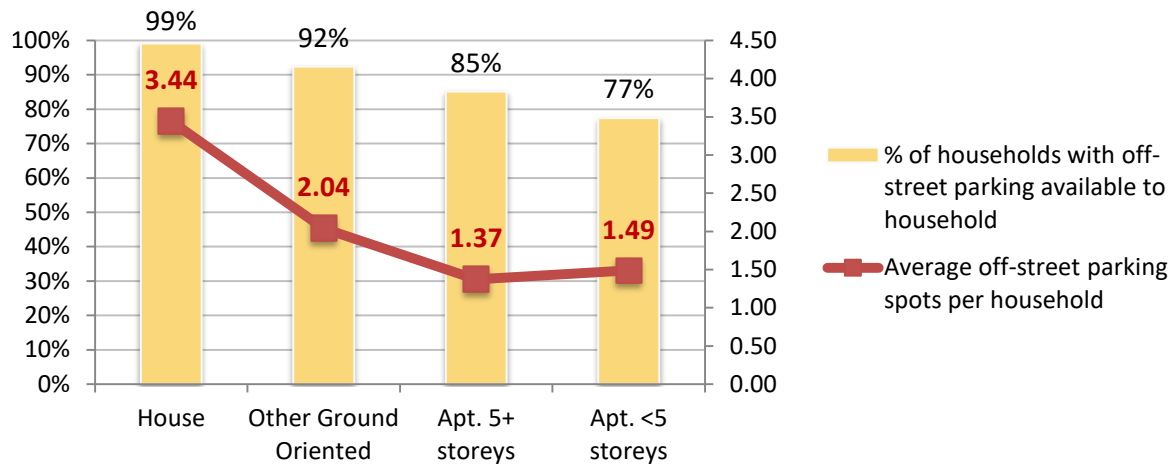
Other ground oriented includes rowhouses, townhouses, semi-detached, duplex, mobile home, etc.

Table 12. Availability of Off-Street Parking by Focus Area

	Focus Area A	Focus Area B	Focus Area C	Focus Area D	Focus Area E	Focus Area F*	Focus Area G	Focus Area H	Focus Area I	Focus Area J	Focus Area K	Focus Area L	Focus Area M*	Rural Area West*	Rural Area East*
Households	4,620	3,350	7,140	3,780	3,610	2,750	4,750	3,650	4,620	5,890	5,180	4,220	1,360	2,150	2,310
Number of household vehicles	8,040	3,830	12,810	5,830	4,140	2,990	3,940	6,040	7,330	6,010	4,360	3,780	530	4,820	5,430
Total off-street home parking spots available for use	12,718	9,648	21,718	8,195	6,783	5,866	7,651	8,506	13,975	11,479	9,695	7,252	850	12,220	13,272
Avg. # of off-street parking spots per household	2.75	2.88	3.04	2.17	1.88	2.13	1.61	2.33	3.02	1.95	1.87	1.72	0.63	5.68	5.75
% of households															
No off-street parking available	0%	4%	1%	3%	7%	6%	19%	3%	2%	8%	11%	22%	61%	5%	0%
One off-street parking spot	11%	27%	19%	30%	44%	42%	44%	20%	11%	45%	48%	47%	28%	7%	0%
Two	43%	29%	23%	36%	27%	24%	19%	45%	31%	27%	18%	14%	4%	16%	10%
Three	15%	21%	15%	15%	12%	12%	9%	13%	20%	8%	12%	5%	3%	7%	20%
Four	24%	11%	30%	13%	5%	8%	3%	16%	25%	6%	4%	5%	4%	12%	17%
Five or more	6%	9%	12%	3%	5%	8%	5%	3%	10%	5%	7%	8%	0%	53%	53%
Estimated % of vehicles that could <u>not</u> be accommodated by available parking at home	3%	2%	3%	9%	3%	3%	6%	4%	1%	2%	7%	4%	2%	2%	0%

*Asterisk indicates that results for the given Focus Area are to be interpreted with caution due to modest survey sample sizes (n<150)

Figure 17. Map of Average Parking Spots per Household by Focus Area
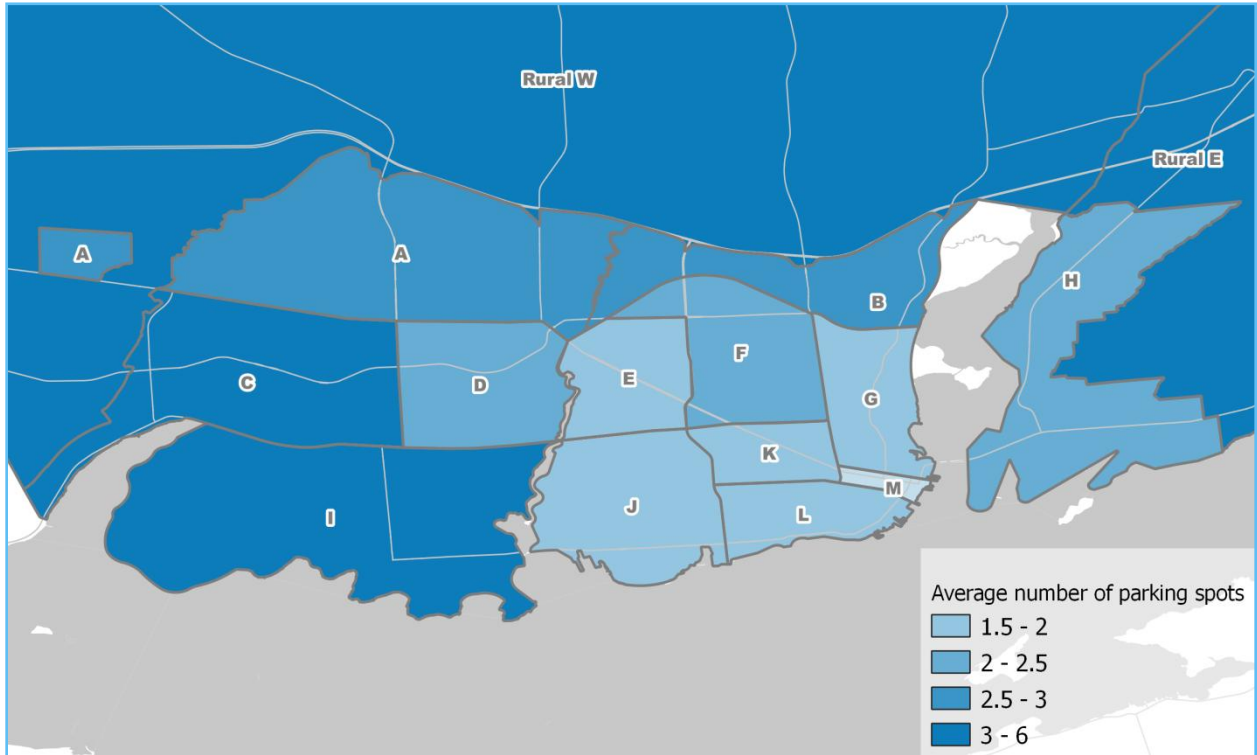
Figure 18. Map of Estimated % of Household Vehicles that Could Not be Accommodated by Available Off-Street Parking at Home
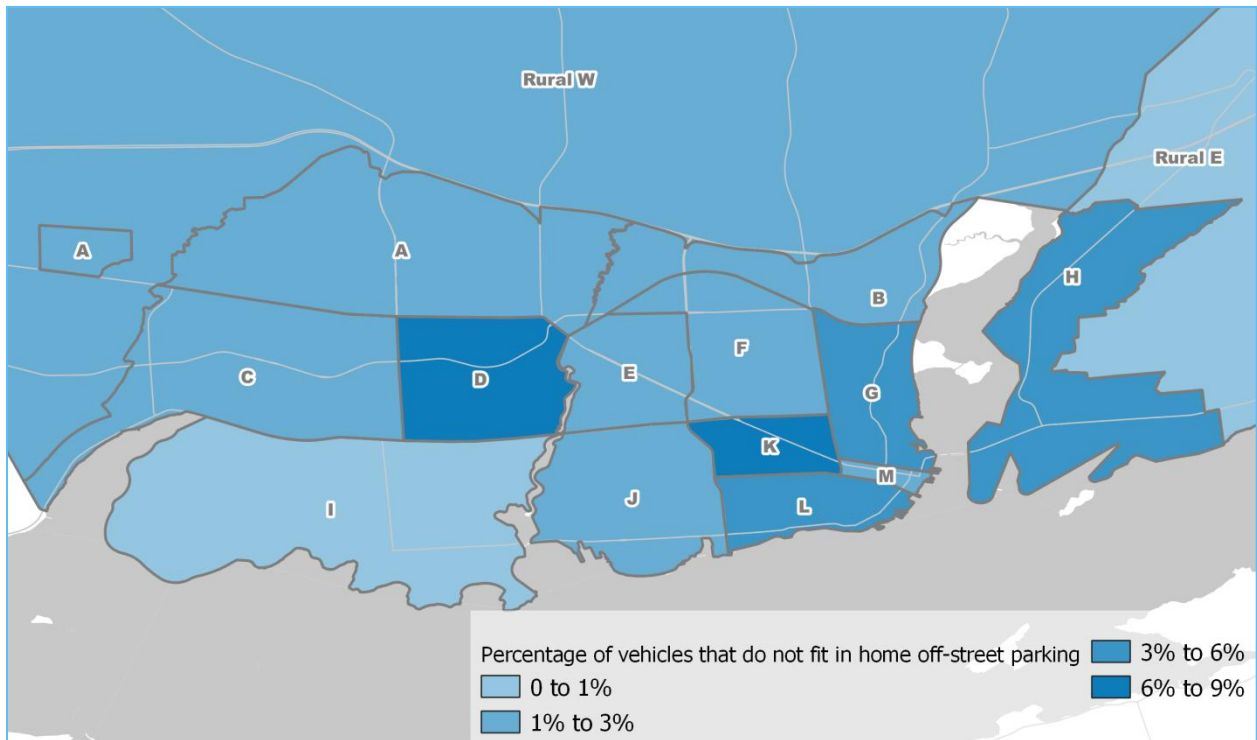
3.5 Household Bicycles

The survey results suggest that residents of Kingston own about 79,500 bicycles, with 23% of these being children's bicycles. **While this represents, on average, 1.34 bicycles per household, as illustrated in Figure 19, only 52% of households have at least one adult bicycle. The story is slightly different for households with children: almost three quarters (72%) of households with children have at least one working children's bicycle.** Per capita, the average is 0.58 bicycles per person.

Households in the West, East, and Rural sub-areas are more likely to have access to a bicycle, at 55%, 66%, and 62% respectively, also with higher average bicycles per capita and per household (**Table 13**, following page). This information is also detailed by Focus Area in **Table 14** (page 62). The proportion of households with at least one adult bicycle is mapped by Focus Area in **Figure 21** (page 61)

Figure 20 below illustrates the relationship between dwelling type and bicycle access. As illustrated, **bicycle access is greatest for those living in houses and diminishes as density of dwelling units increases.**

Figure 19. Bicycle Access
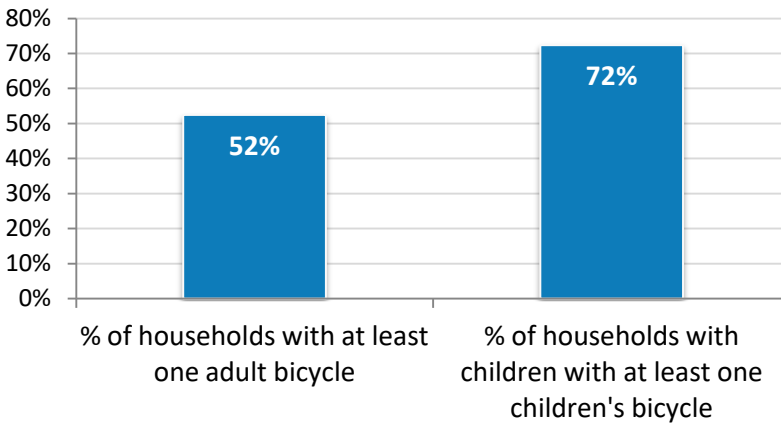
Figure 20. Dwelling Type and Bicycle Access
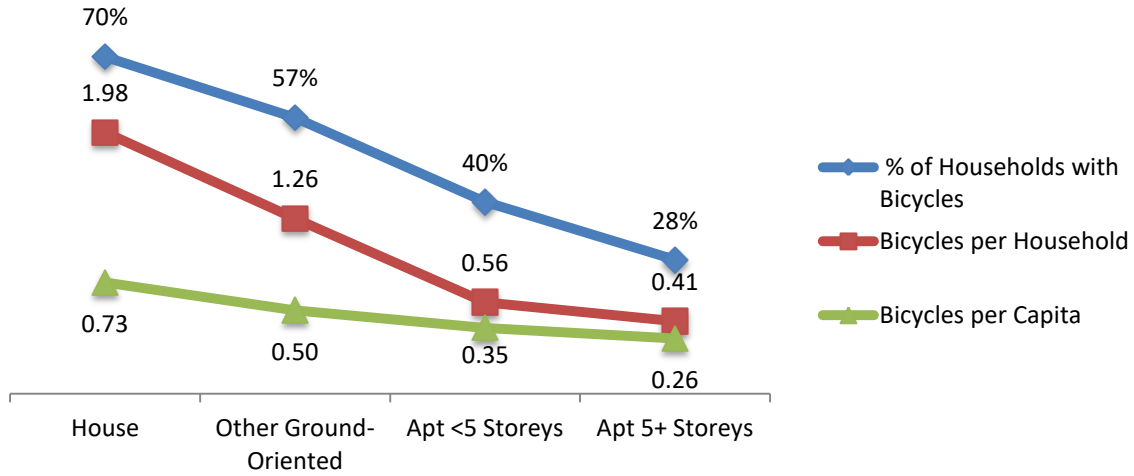
Table 13. Bicycles, Households with Bicycle Access, Average per Household and per Person

	City of Kingston
Total households	59,360
Population in households	136,880
Households with children <18 yrs	13,160
Total bicycles	79,460
Adult bicycles (including e-bikes)	61,430
Children's bicycles*	18,030
Avg. bicycles per household	1.34
Avg. bicycles per capita	0.58
Avg. adult bicycles per adult	0.54
% of households with at least one adult bicycle	52%
% of households with children with at least one children's bicycle	72%

*Working children's bicycles that have been used in the past year.

Figure 21. Map of Proportion of Households with at Least One Adult Bicycle by Focus Area
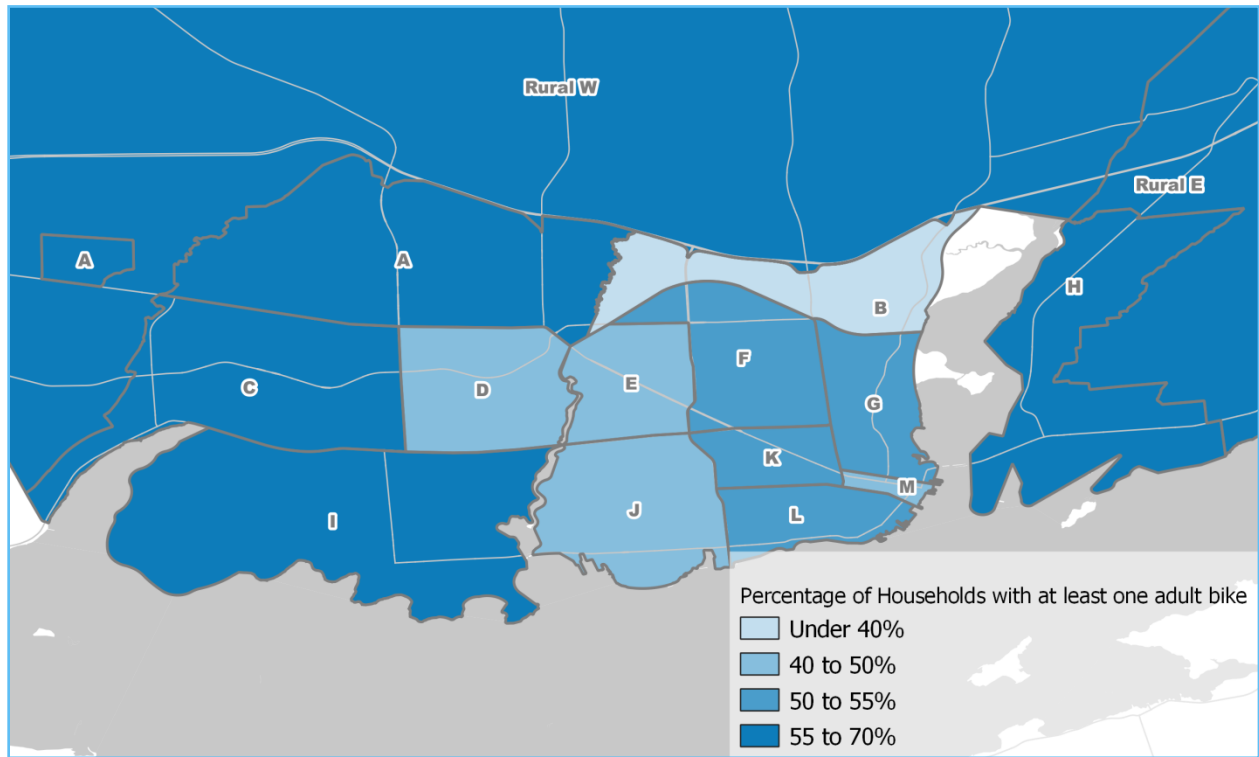
Table 14. Bicycle Access by Focus Area

	Focus Area A	Focus Area B	Focus Area C	Focus Area D	Focus Area E	Focus Area F*	Focus Area G	Focus Area H	Focus Area I	Focus Area J	Focus Area K	Focus Area L	Focus Area M*	Rural Area West*	Rural Area East*
Total households	4,620	3,350	7,140	3,780	3,610	2,750	4,750	3,650	4,620	5,890	5,180	4,220	1,360	2,150	2,310
Population in households	12,530	7,650	18,260	8,600	7,260	5,390	9,450	9,260	11,350	11,930	11,310	10,350	1,980	5,500	6,040
Hhlds. with children <18 yrs	1,880	1,040	2,020	950	640	400	660	1,150	1,260	1,040	620	360	10	540	590
Total bicycles	7,900	3,490	11,540	4,240	3,640	2,770	5,140	6,960	8,110	5,660	5,650	4,970	870	4,100	4,430
Adult bicycles	5,320	2,190	8,770	2,980	2,770	2,090	4,590	5,140	6,110	4,510	5,180	4,340	870	3,080	3,500
Children's bicycles**	2,580	1,300	2,770	1,260	870	680	550	1,820	2,000	1,150	470	630	0	1,020	930
Avg. bicycles per household	1.71	1.04	1.62	1.12	1.01	1.01	1.08	1.91	1.76	0.96	1.09	1.18	0.64	1.91	1.92
Avg. bicycles per capita	0.63	0.46	0.63	0.49	0.50	0.51	0.54	0.75	0.71	0.47	0.50	0.48	0.44	0.75	0.73
Avg. adult bicycles per adult	0.57	0.38	0.59	0.43	0.45	0.44	0.55	0.73	0.68	0.44	0.50	0.45	0.44	0.69	0.70
% of households with at least one adult bicycle	60%	37%	57%	44%	44%	54%	51%	66%	57%	45%	51%	51%	46%	58%	65%
% of households with children with at least one children's bicycle	68%	64%	79%	73%	83%	83%	58%	77%	75%	65%	39%	83%	0%	91%	83%

*Asterisk indicates that results for the given Focus Area are to be interpreted with caution due to modest survey sample sizes (n<150)

** Working children's bicycles that have been used in the past year.

3.6   Highlighted Household Statistics by Focus Area

Table 15 provides a summary of household-level statistics by Focus Area. Readers are reminded that all students living on campus are excluded. All statistics are based on a survey sample expanded to represent the population and should be considered estimates. Shading has been used to highlight areas with high and/or low values.

Table 15. Key Household Statistics by Focus Area

	Area A	Area B	Area C	Area D	Area E	Area F*	Area G	Area H	Area I	Area J	Area K	Area L	Area M*	Rural West*	Rural East*
Survey sample size (n)	276	178	402	218	195	148	283	240	275	368	305	256	77	116	128
Households	4,620	3,350	7,150	3,780	3,610	2,750	4,750	3,650	4,620	5,900	5,180	4,220	1,350	2,150	2,310
% apartments	5%	30%	15%	29%	48%	44%	53%	19%	13%	59%	53%	48%	87%	3%	0%
% seasonal student households	0%	1%	0%	3%	2%	3%	8%	1%	1%	7%	27%	33%	41%	0%	1%
% couple or single parent with children	46%	36%	39%	35%	20%	21%	20%	39%	36%	21%	12%	12%	6%	34%	44%
Population in Pvt. Dwellings	12,530	7,650	18,260	8,600	7,260	5,390	9,450	9,260	11,350	11,930	11,310	10,350	1,980	5,500	6,040
% seasonal students	0%	1%	1%	2%	2%	4%	13%	0%	2%	9%	39%	47%	44%	0%	0%
Avg. household size	2.71	2.28	2.56	2.28	2.01	1.96	1.99	2.54	2.46	2.03	2.18	2.45	1.46	2.56	2.61
% with hhld. income <$30K	6%	41%	8%	10%	18%	35%	44%	5%	11%	34%	51%	39%	63%	6%	4%
% with hhld. income >$80K	57%	15%	55%	43%	24%	17%	19%	60%	57%	22%	14%	33%	11%	65%	59%
Vehicles	8,040	3,830	12,810	5,830	4,140	2,990	3,940	6,040	7,330	6,010	4,360	3,780	530	4,820	5,430
% electric + hybrid	2%	0%	2%	2%	7%	0%	5%	2%	4%	2%	7%	3%	2%	3%	3%
% of hhds at least 1 veh	98%	73%	94%	92%	81%	75%	61%	98%	93%	75%	65%	67%	32%	96%	100%
% hhlds. with off-street parking	100%	96%	99%	97%	93%	94%	81%	97%	98%	92%	89%	78%	39%	95%	100%
Avg. off-street parking / hhld.	2.75	2.88	3.04	2.17	1.88	2.13	1.61	2.33	3.02	1.95	1.87	1.72	0.63	5.68	5.75
Bicycles	7,900	3,490	11,540	4,240	3,640	2,770	5,140	6,960	8,110	5,660	5,650	4,970	870	4,100	4,430
Avg. bicycles per capita	0.63	0.46	0.63	0.49	0.50	0.51	0.54	0.75	0.71	0.47	0.50	0.48	0.44	0.75	0.73
Avg. adult bicycles per adult	0.57	0.38	0.59	0.43	0.45	0.44	0.55	0.73	0.68	0.44	0.50	0.45	0.44	0.69	0.70
% of hhlds. with at least one adult bicycle	60%	37%	57%	44%	44%	54%	51%	66%	57%	45%	51%	51%	46%	58%	65%
% of hhlds. with children with at least one children's bicycle	68%	64%	79%	73%	83%	83%	58%	77%	75%	65%	39%	83%	0%	91%	83%

* Interpret the results for Focus Areas with smaller sample sizes with caution.

Seasonal students = post-secondary students living in Kingston April through September. Seasonal student household = household of only seasonal students (no permanent residents at all). A number of seasonal students also live in permanent households (sometimes with post-secondary student roommates who are live in Kingston year-round).

3.7   Age Distribution

The age profile of Kingston residents is presented in **Figure 22**, based on Census 2016 distributions scaled up to estimated 2019 levels and survey data on the ages of post-secondary students who are seasonal residents from September to April. The age distributions in this section, and in all of the person-level demographics that follow, are based on total population including seasonal post-secondary students living both on campus and off-campus.

The age profile illustrates the large youth population associated with enrolments at the three major post-secondary institutions during the fall months. The dark blue bars illustrate the total population during May (the month of the Census). Even in the summer months, the youth population has a relatively large share due to the portion of post-secondary students who stay over this period of time to work or because it is their original home.

The profile below also reveals a 'bubble' of older population in the 50-64 age bracket. As this population segment ages, there may be implications for changes in travel patterns and provision of services (assuming this population segment remains in Kingston and does not retire elsewhere).

Figure 22. 2019 Population by Age (Based on 2016 Census Statistics Projected to 2019)
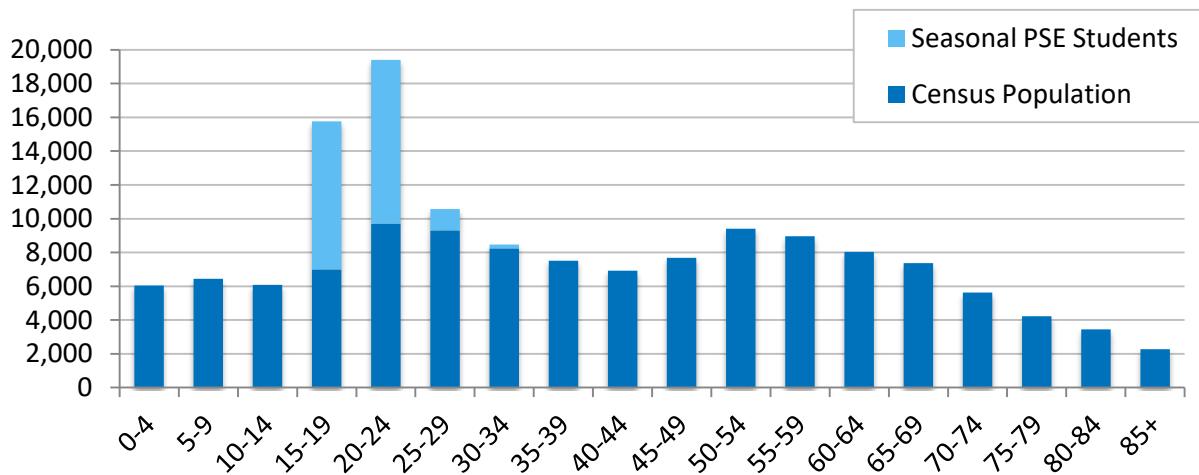
Sources: 2016 Census Profile scaled to 2019 total population, survey results scaled to compensate for any under-representation of on-campus residents at certain institutions.

Table 16 summarizes the median age and age distributions by sub-area and Focus Area as represented in the survey data. Shading highlights higher-than-average proportions of a given age range. Figure 23 and Figure 24 on the next page map these statistics by Focus Area.

The figures reveal how population distribution in the City is very much associated with place.

- Focus Areas K, L, and M have the lowest average ages, with more than 50% of residents being between the ages of 15 and 24.
- Areas A, B, and H have proportionately more families than other areas, with higher proportions of children under 15 years of age as well as higher proportions of adults 25-44 years of age.
- The rural areas have higher proportions of people aged 45 to 64, as do Focus Areas C, E, F, and I.
- Areas C, D, E, I, J, and the rural areas have proportionately more people of retirement age than other areas.

Table 16. Age Distributions by Focus Area

	Median Age	Average age	% <15 yrs	% 15-24 yrs	% 25-44 yrs	% 45-64 yrs	% 65+ yrs
City of Kingston	35	38.7	13%	22%	24%	24%	16%
Urban Area	34	38.2	13%	23%	24%	23%	16%
Sub-Areas							
Central	28	36.3	10%	33%	23%	19%	14%
West	42	40.9	17%	12%	25%	28%	19%
East	37	37.4	21%	10%	30%	25%	14%
Rural	49	44.3	14%	12%	17%	38%	20%
Focus Areas							
Focus Area A	36	36.8	21%	11%	30%	25%	12%
Focus Area B	34	37.4	20%	13%	28%	24%	14%
Focus Area C	44	42.2	15%	13%	22%	30%	20%
Focus Area D	41	41.5	15%	12%	27%	25%	20%
Focus Area E	44	43.8	14%	11%	26%	27%	22%
Focus Area F	37	40.6	12%	14%	30%	29%	15%
Focus Area G	33	38.0	10%	24%	29%	25%	13%
Focus Area H*	37	37.4	21%	10%	30%	25%	14%
Focus Area I	45	42.9	16%	13%	21%	28%	23%
Focus Area J	32	38.6	10%	27%	24%	21%	18%
Focus Area K	23	31.6	6%	50%	21%	14%	9%
Focus Area L*	21	30.4	4%	63%	12%	9%	11%
Focus Area M	24	33.4	0%	51%	31%	7%	12%
Rural Area West	48	44.5	14%	12%	18%	37%	20%
Rural Area East	49	44.2	14%	12%	16%	39%	19%

*Survey data may somewhat under-represent youth aged 15-25 years in areas L and H due under-representation of students living on-campus.

Figure 23. Map of Age Distributions by Focus Area

Age Groups
- 0-14 years
- 15-24 years
- 25-44 years
- 45-64 years
- 65+ years
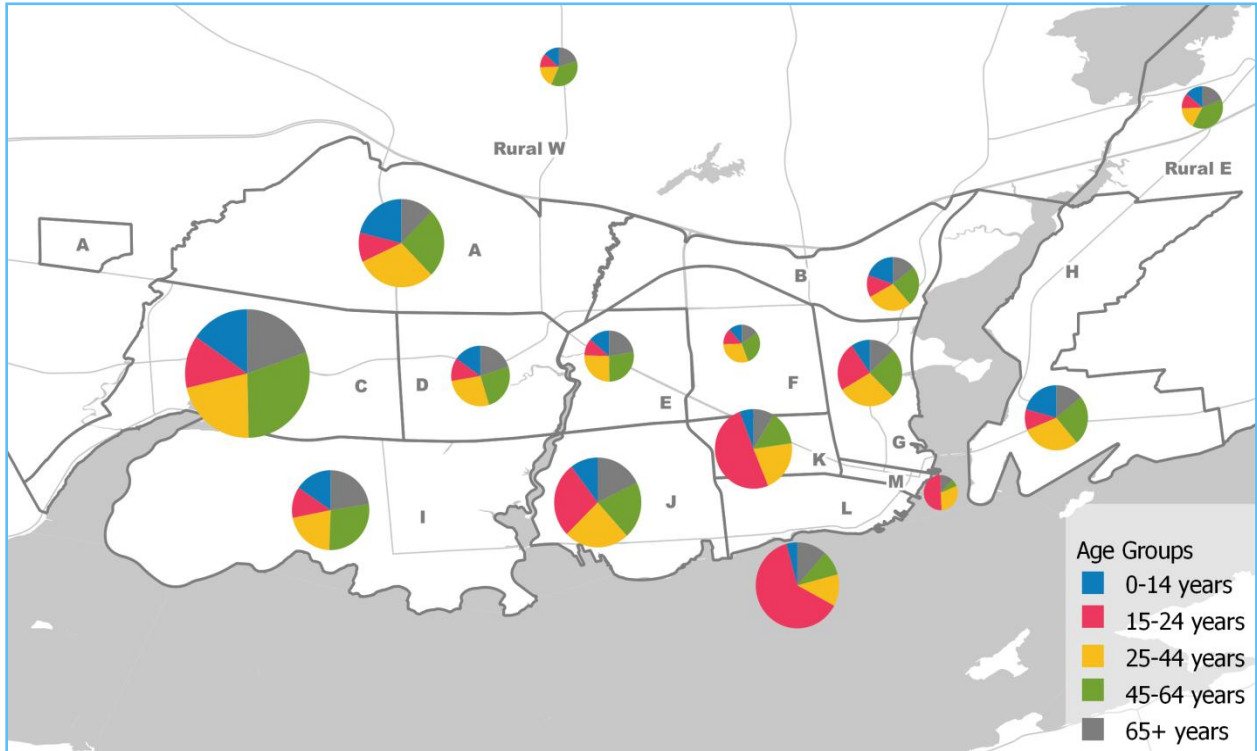
Figure 24. Map of Median Age by Focus Area

Median Age
- 20 - 32
- 32 - 36
- 36 - 37
- 37 - 45
- 45 - 49
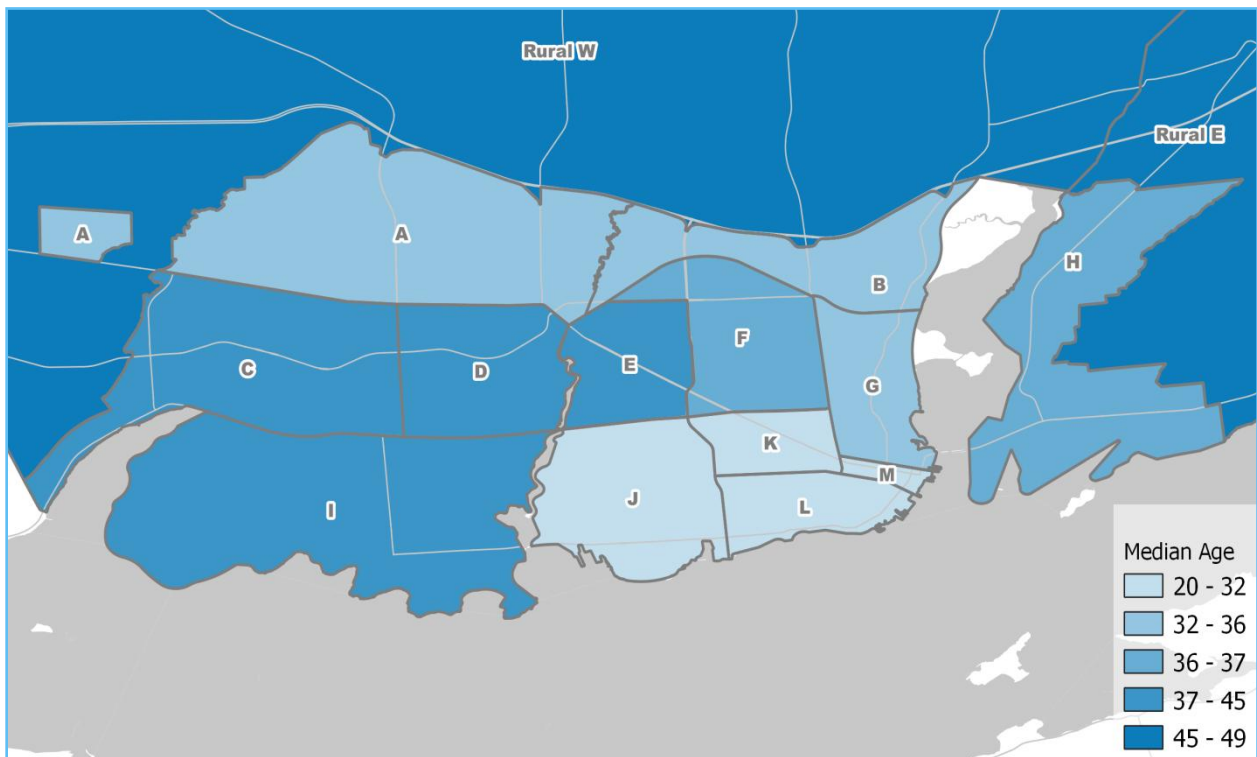
3.8   Licensed Drivers

Overall, 86% of the population 16+ years of age holds a driver's licence, about 109,500 people in total. **Table 17** presents the proportion of licensed drivers by sub-area.

Table 17. Licensed Drivers

	City of Kingston	Urban Area	Central	West	East	Rural
Population 16+ years of age	119,260	109,500	60,840	41,380	7,280	9,760
Persons with driver's licences	103,080	93,990	50,040	37,170	6,790	9,090
% licensed drivers	86%	86%	82%	90%	93%	93%

Figure 25 presents the distributions of driver's licences by age group. Overall, 86% of women and 88% of men hold driver's licences. Women over the age of 75 have distinctly lower levels of licensing than men. The slight differences by gender for other age groups may be within the range of sampling error, suggesting that historical gender disparity may no longer be as pronounced among younger generations.

Figure 25. Proportion of Population with Driver's Licence by Age by Gender
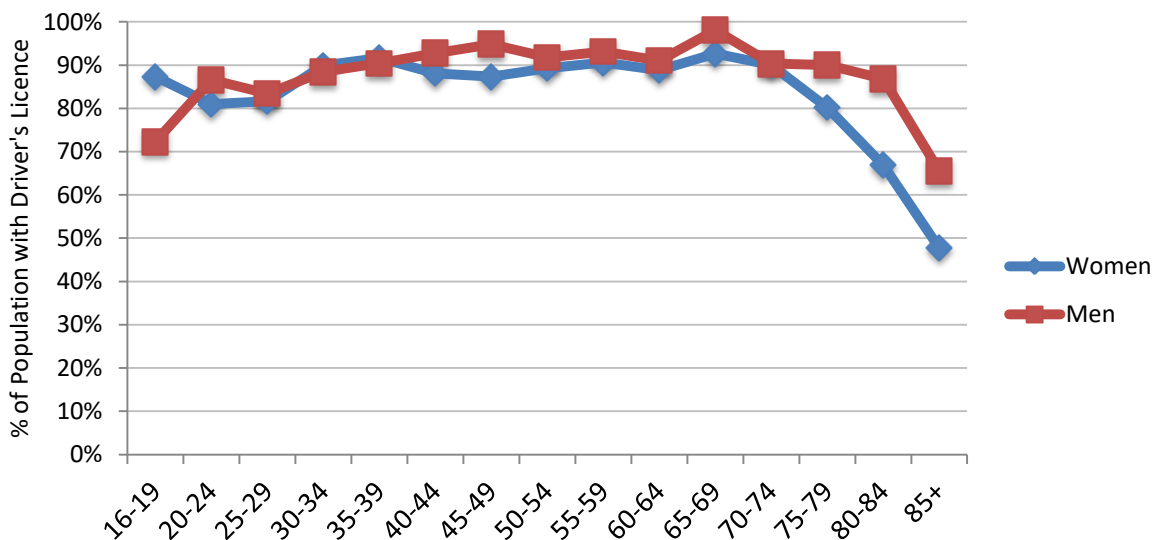
3.9   Transit Pass Holders

One-third of the population 15+ years of age reported having a transit pass, about 39,600 people in total. (Children under the age of 14 ride on Kingston Transit buses for free.) This high incidence is driven by the large number of post-secondary students at Queen's University and St. Lawrence College whose transit passes are paid for by their student fees, as evidenced by the higher incidence in the Focus Areas that include or are proximate to these institutions (Areas J, K, L, and M), as detailed in **Table 1** and mapped in **Figure 26**. All public high school students in Kingston are provided youth transit passes, which may also contribute to the overall incidence in the population. It may be noted that a portion of those who said no to the survey question on this topic were Queen's and St. Lawrence students; this may be due to students who are either unaware that their student card can be used as a transit pass, have opted out of the program, or use it so little that they do not consider themselves to have a pass. Table 18 presents the proportion of population 15+ years by sub-area and Focus Area. Areas with lower- and higher-than-average proportions of transit pass holders are highlighted with shading.

Table 18. Transit Pass Holders by Focus Area

	Population 15+ years of age	Persons reporting having a transit pass	% with transit pass
City of Kingston	120,990	39,570	33%
Urban Area	111,030	38,540	35%
Sub-Areas			
Central	61,480	28,170	46%
West	42,220	8,560	20%
East	7,340	1,810	25%
Rural	9,960	1,020	10%
Focus Areas			
Focus Area A	9,880	1,790	18%
Focus Area B	6,140	1,980	32%
Focus Area C	15,460	2,820	18%
Focus Area D	7,290	1,510	21%
Focus Area E	6,260	1,840	29%
Focus Area F	4,760	1,610	34%
Focus Area G	8,550	3,380	40%
Focus Area H	7,340	1,810	25%
Focus Area I	9,590	2,450	26%
Focus Area J	11,450	5,050	44%
Focus Area K	10,650	6,060	57%
Focus Area L	11,700	6,950	59%
Focus Area M	1,980	1,270	64%
Rural Area West	4,760	380	8%
Rural Area East	5,200	650	13%

Figure 26. Map of Transit Pass Incidence by Focus Area (% of Total Population 15+)
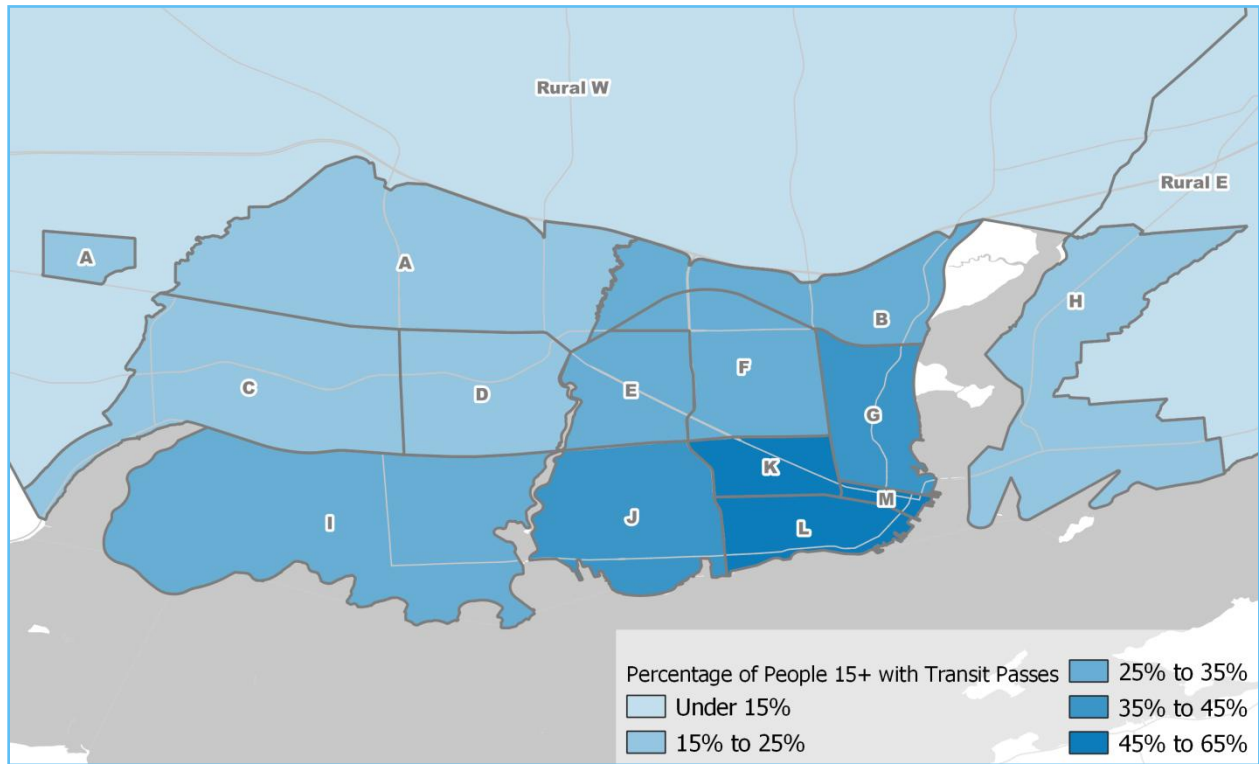
The pie chart below (**Figure 27**) presents the breakdown of transit pass holders by pass type as a percentage of total population 15+ years of age. Survey respondents were asked only if the household member had a valid transit pass; the type of transit pass held has been inferred by examination of post-secondary student status and age. These figures are survey estimates and have not been validated against official counts of purchased monthly, weekly, and commuter passes. Also, the number and percentage of Queen's University and St. Lawrence College student passes from the survey responses does not necessarily match enrolments due to some respondents not considering themselves to have a transit pass (for reasons discussed on the preceding page), and it may also be noted that not all students who have a transit pass necessarily use their pass.

Figure 27. Inferred Transit Pass Type (% of Total Population 15+)
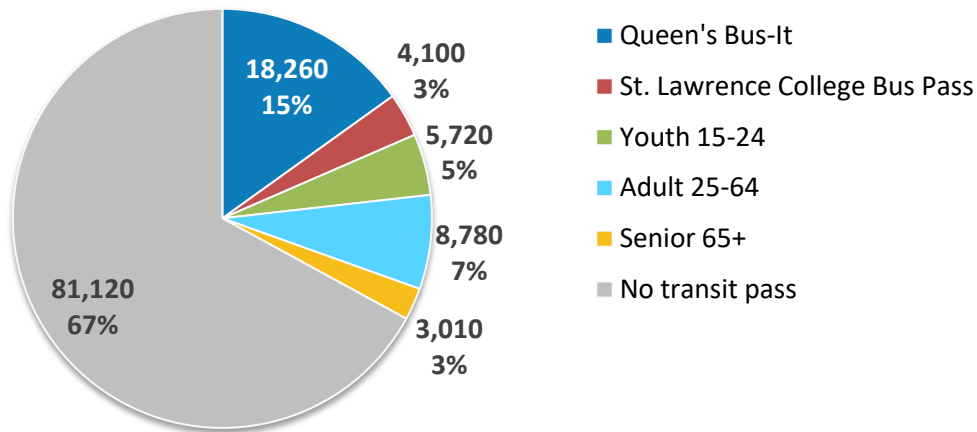
3.10 K-12 and Post-Secondary School Enrolments

Table 19 presents figures on the number of students by school type. It is important to note that all numbers in the charts are based on a survey sample expanded to represent the majority of the population. All estimates should be interpreted as approximate.[12] **Over one-third of the population in the fall-winter period are students, with 12% being K-12 students, and 23% being post-secondary students.**

Table 20 outlines the number of students attending each of the three main public post-secondary educational institutions in Kingston, noting the number accounted for by students living on campus. The survey results somewhat under-represent the number of students living on-campus but represent all of the 24,060 students at these institutions who live off-campus. Beyond these three institutions, another 600 students attend other post-secondary institutions in the area, including private training institutions.

Table 19. Students by Type

	Population	% of Population
Total Population	139,580	100.0%
Total Students	48,860	35.0%
K-12 students	17,110	12.3%
Full-Time PSE/other	29,370	21.0%
Part-Time PSE/other	2,380	1.7%
PSE/other – breakdown		
College or university	31,080	22.3%
Alternate, adult basic education, or other	350	0.3%
Online / distance learning*	480	0.3%

PSE = Post Secondary Education; counts scaled to account for under-representation of students living on campus.
K-12 = Kindergarten to Grade 12
*includes some middle or high school students taking online/distance learning.

Table 20. Post-Secondary School Enrolments

	2019 Enrolments*	Students Living On-Campus from Residence Capacities	Students Living On-Campus Represented by Survey	Students Living Off-Campus Represented by Survey	Total Students Represented by Survey
Queen's University	24,220	4,720	2,100	19,420	21,520
St. Lawrence College	5,030	600	600	4,440	5,040
Royal Military College	1,230	1,050	0	200	200
Total	30,480	6,370	2,700	24,060	26,760

*Sources: Queen's University 2019-20 Enrolment Report; St. Lawrence College 2019-20 Annual Report; Royal Military College.

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[12] The K-12 survey counts have not been validated against actual school enrolment figures, although may be expected to be within a reasonable range given that the survey data were weighted by age distribution.

3.11 Employed Labour Force

The pie chart below (**Figure 28**) summarizes the employment status of the surveyed population. In total, 61,850 residents of the city are employed (46,880 full-time; 14,970 part-time). Overall, 44% of the population is employed, 3% reported being unemployed, and 18% reported being retired. Another 21% were eligible to be part of the labour force (15 years of age or older) but had other statuses, the majority of whom are students who do not work, while 13% are under the age of 15. **Table 21** presents employment by sub-area. As might be expected, the Central sub-area has lower rates of full-time employment, due to the high concentration of post-secondary students. **Table 22** (following page) details employment status taking into consideration student status, showing that many students hold part-time jobs while attending school.

Figure 28. Employment Status (% of Population)
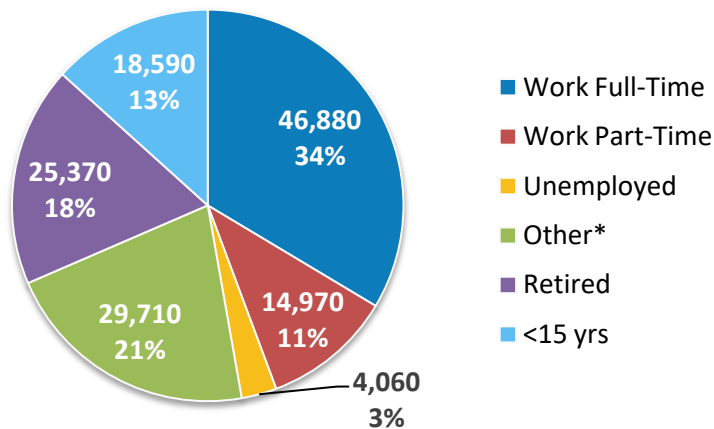
*Other includes post-secondary and high school students aged 15+ years who are not employed

Table 21. Employment Status by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Population	139,580	128,040	68,030	50,750	9,260	11,540
Work Full-Time	34%	33%	26%	40%	44%	41%
Work Part-Time	11%	11%	12%	9%	8%	11%
Unemployed	3%	3%	4%	2%	2%	2%
Other*	21%	22%	33%	10%	9%	10%
Retired	18%	18%	15%	21%	17%	23%
<15 yrs	13%	13%	10%	17%	21%	14%
# of Full-Time Workers	46,880	42,200	17,830	20,300	4,070	4,680
# of Part-Time Workers	14,970	13,690	8,280	4,690	720	1,280

*Other includes post-secondary and high school students aged 15+ years who are not employed.

Table 22. Detailed Occupation Status

	Expanded Survey Counts	% of Total Population	% of Pop. 15+ Years (eligible for labour force)
Total Population	139,580	100.0%	
Population 15+ years of age	120,990	86.7%	100.0%
Work Full-Time	45,710	32.7%	37.8%
Work Part-Time	9,610	6.9%	7.9%
Student Full-Time	21,000	15.0%	17.4%
Work Full-Time / Student Full-Time	480	0.3%	0.4%
Work Part-Time / Student Full-Time	4,250	3.0%	3.5%
Student Part-Time	1,480	1.1%	1.2%
Work Full-Time / Student Part-Time	690	0.5%	0.6%
Work Part-Time / Student Part-Time	250	0.2%	0.2%
Retired	25,370	18.2%	21.0%
Unemployed	4,060	2.9%	3.4%
Other	3,630	2.6%	3.0%
15+ High School Student	3,610	2.6%	3.0%
15+ High School Student Works Part-Time	870	0.6%	0.7%
Not in labour force 5-15 yrs (most in school)	12,570	9.0%	n/a
Not in labour force 0-4 yrs	6,020	4.3%	n/a

3.11.1 Place of Work

Over four-fifths (83%) of workers who reside in Kingston work at a usual place of work outside their home (**Figure 29**). Another 9% work from home and 8% have no fixed work place address (e.g., plumber, travelling salesperson, commercial driver, etc.). Working from home or on the road / at varying worksites is more prevalent amongst rural residents, with only 74% having a usual workplace (**Table 23**).

Figure 29. Workplace Location (% of Workers)

- Usual place of work
- Work from home
- No fixed workplace address
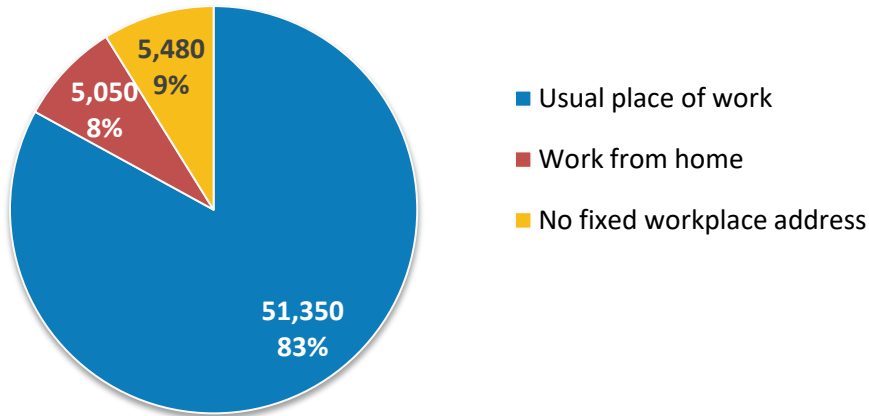
Table 23. Distribution of Workers' Places of Residence and Places of Work by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Total Workers	61,870	55,910	26,110	25,010	4,790	5,960
Usual place of work	83%	84%	84%	83%	87%	74%
Work from home	8%	8%	7%	8%	9%	12%
No fixed workplace address	9%	8%	9%	9%	4%	14%

3.11.2 Place of Work by Focus Area

Table 24 presents the distribution of workers by place of residence and place of work. The ratio of workers to jobs in each Focus Area is mapped in **Figure 30**. For the purpose of this analysis, respondents with no fixed workplace have been coded to their home Focus Area, although for many it is likely that their work spans many areas of the city. It is important to note that the distribution of places of work does not include jobs held by residents who live outside the study area (for example, a resident of Gananoque who works in Kingston). Nevertheless, the survey captures the majority of employment located in Kingston and provides an understanding of the concentrations of jobs and where workers live.

The survey results give rise to the following observations:

- Focus Area L, within which Queen's University Main Campus and Kingston General Hospital are located, accounts for 20% of all jobs held by residents of Kingston, and is a significant net attractor of commute trips.
- Focus Area M (Downtown) is also a significant net attractor of work commutes, with a small population of workers (2% of the total) but accounting for 8% of jobs, while Focus Area F is also a net attractor of work commutes, with 6% of jobs and 4% of the working population.
- Focus Areas G, and H each account for 8% of jobs, but do not have particularly notable ratios of jobs to workers (about on par).

Focus Areas with the lowest ratios of jobs to workers (0.5 or lower) include the following:

- Area C, in the western part of the City houses 15% of workers but only 7% of jobs.
- Area E, Rural Area West and Rural Area East are also notable net generators of commutes from home to another Focus Area.

A number of other areas within the City are net generators of commutes from home, although with at least half as many jobs as workers living in the community, and may be considered part of the commuter shed (Areas A, B, D, I, J, and K).

Transportation planners and urban planners may consider the distribution of jobs and workers when undertaking land use planning or when planning initiatives to promote walking, cycling, transit, or car pooling.

Table 24. Distribution of Workers' Places of Residence and Places of Work

	Workers (by place of residence)	%	Jobs† (workers by place of work)	% of Jobs†	Ratio of Jobs to Workers
City of Kingston	61,870	100%	57,630	93%	0.93
Outside Kingston	n/a	n/a	4,170	7%	n/a
Urban Area	55,910	90%	55,050	89%	0.98
Sub Areas					
Central	26,110	42%	34,860	56%	1.34
West	25,010	40%	15,190	25%	0.61
East	4,790	8%	5,000	8%	1.04
Rural	5,960	10%	2,590	4%	0.43
Focus Areas					
Focus Area A	6,390	10%	4,930	8%	0.77
Focus Area B	2,950	5%	2,580	4%	0.87
Focus Area C	9,110	15%	4,580	7%	0.5
Focus Area D	4,280	7%	2,870	5%	0.67
Focus Area E	3,260	5%	1,120	2%	0.34
Focus Area F	2,470	4%	3,910	6%	1.58
Focus Area G	4,240	7%	4,800	8%	1.13
Focus Area H	4,790	8%	5,000	8%	1.04
Focus Area I	5,230	8%	2,800	5%	0.54
Focus Area J	4,960	8%	2,840	5%	0.57
Focus Area K	3,840	6%	2,170	4%	0.57
Focus Area L	3,450	6%	12,350	20%	3.58
Focus Area M	930	2%	5,090	8%	5.47
Rural Area West	2,810	5%	1,120	2%	0.4
Rural Area East	3,150	5%	1,460	2%	0.46
Loyalist County (west external travel area)	n/a	n/a	1,170	2%	n/a
South Frontenac County (north external)	n/a	n/a	370	1%	n/a
Leeds & Gananoque (east external)	n/a	n/a	450	1%	n/a
Frontenac Islands (south external)	n/a	n/a	30	0%	n/a
External to Travel Area	n/a	n/a	2,160	3%	n/a

Blue shading of percentages highlights areas with a greater share of workers or jobs.

Blue or pink shading in the right-hand column highlights areas with greater or lesser jobs-to-workers ratios.

† The expanded estimates of jobs should not be taken to be definitive. In addition to jobs captured by the survey, these counts cannot account for jobs located in Kingston held by workers who live outside the survey area.

Figure 30. Map of Ratio of Jobs to Workforce by Focus Area
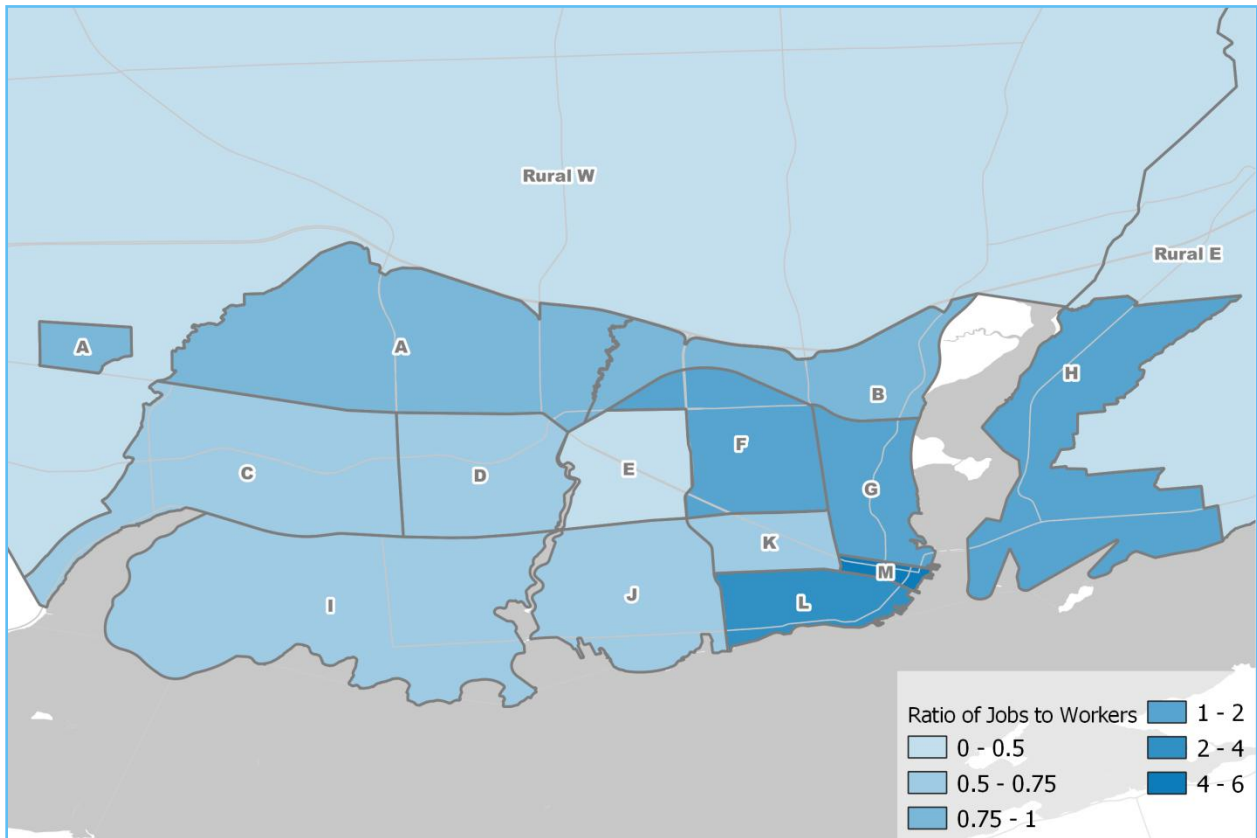
3.12 Parking at Commute Destination

3.12.1 Parking at Work

Overall, 69% of workers with a fixed workplace outside the home use parking at work (**Table 25**). This breaks out into 55% of workers who use free parking and 14% who pay for parking at work. The remainder of workers either do not drive to work or park somewhere other than work.

The use of parking at work varies considerably by Focus Area, as does the percentage of workers who pay for parking at work. About one-third of workers with jobs in Focus Area L (which includes Queen's University and Kingston General Hospital) and Focus Area M (Downtown) pay for parking at work, with few others having access to free parking (10% and 14% respectively). Focus Area J appears to have a mix of workers who pay for parking at work (45%) and who use free parking at work (31%). Most other Focus Areas have high incidence of parking at work with few having to pay for it.

Table 25. Use of Free and Pay Parking at Work

Job Location	Workers with Usual Workplace Outside the Home	% of Workers who Use Parking at Work	% of Workers who Use Free Parking at Work	% of Workers who Pay for Parking at Work
City of Kingston	51,290	69%	55%	14%
External to Kingston	4,170	94%	90%	4%
Urban Area	46,060	67%	51%	16%
Sub-Areas				
Central	30,670	59%	35%	23%
West	11,000	81%	81%	0%
East	4,390	88%	88%	0%
Rural	1,060	85%	85%	0%
Focus Areas				
Focus Area A	3,840	81%	80%	1%
Focus Area B	2,040	63%	63%	0%
Focus Area C	2,920	83%	83%	0%
Focus Area D	2,300	78%	78%	0%
Focus Area E	850	75%	75%	0%
Focus Area F	3,210	76%	76%	0%
Focus Area G	4,080	80%	66%	14%
Focus Area H	4,390	88%	88%	0%
Focus Area I	1,940	81%	81%	0%
Focus Area J	2,230	77%	45%	31%
Focus Area K	1,550	73%	63%	10%
Focus Area L	11,830	45%	10%	35%
Focus Area M	4,870	46%	14%	32%
Rural Area West	410	93%	93%	0%
Rural Area East	640	80%	80%	0%

3.12.2 Parking at School

Overall, 15% of students who are 16 years of age or older (eligible to possess a driver's licence) park at school (**Table 26**). This breaks down into 5% who park for free and 10% who pay for parking at school.

Amongst secondary students eligible to hold a driver's licence, almost one in ten drives to school and parks at school for free. The survey results also suggest that 8% of Queen's students attending classes at the main campus park at school, with 4% of them paying for parking at school, while 40% who commute to West Campus pay for parking at school, with 34% paying to do so. One in three St. Lawrence college students use parking at school and pay for it. These results should be interpreted with some caution due to the small sample sizes for some sub-samples.

Table 26. Parking at School (Students 16+ Years of Age)

	Students 16+ Years of Age	% of Students 16+who Use Parking at School	% of Students 16+ who Use Free Parking at School	% of Students 16+ who Pay for Parking at School
City of Kingston	30,890	15%	5%	10%
Urban Area	29,820	15%	5%	10%
Sub-Areas				
Central	30,670	59%	35%	23%
West	11,000	81%	81%	0%
East	4,390	88%	88%	0%
Rural	1,060	85%	85%	0%
Focus Areas with sufficient data to report				
Focus Area C	710	25%	25%	0%
Focus Area G*	400	6%	6%	0%
Focus Area H*	390	40%	40%	0%
Focus Area J	6,790	34%	5%	29%
Focus Area L	20,820	8%	4%	4%
Focus Area C*	710	25%	25%	0%
Focus Area G	400	6%	6%	0%
School Level / Post-Secondary Campus				
Secondary Schools	2,730	11%	11%	0%
Queen's University (Main Campus)	20,080	8%	4%	4%
Queen's University (West Campus)*	1,440	40%	6%	34%
St. Lawrence College	5,040	31%	2%	29%
RMC*	200	66%	66%	0%

* Results for subgroups marked with an asterisk should be interpreted with caution due to small sample sizes.

3.13 Highlighted Demographics by Focus Area

Table 27 provides a summary of demographic (person-level) statistics by Focus Area. For these summaries, surveyed students living on campus are included in the calculation of all statistics (unlike the household-level summary table earlier in this report, Table 15).

The statistics presented in the table include expanded population, worker, job and student counts, as well as age distributions, proportions of eligible population with driver's licences and transit passes, employment statuses, and selected work-related statistics. To provide an accurate picture of the total number of students living in each area, the counts of post-secondary students by Focus Area have been adjusted to reflect actual counts of students living on campus (for which there is some under-representation in the survey results).

All statistics are based on a survey sample expanded to represent the population and should be considered as estimates. Shading has been used to highlight areas with high and/or low values.

Table 27. Key Demographic Statistics by Focus Area

	Area A	Area B	Area C	Area D	Area E	Area F	Area G	Area H	Area I	Area J	Area K	Area L	Area M	Rural West	Rural East
Sample Size (n Person Records)	651	388	907	438	384	267	541	565	610	736	615	590	119	289	327
Population	**12,530**	**7,650**	**18,260**	**8,600**	**7,260**	**5,390**	**9,450**	**9,260**	**11,350**	**11,930**	**11,310**	**10,350**	**1,980**	**5,500**	**6,040**
Median age	36	34	44	41	44	37	33	37	45	32	23	21	24	48	49
% of population <15 yrs	21%	20%	15%	15%	14%	12%	10%	21%	16%	10%	6%	4%	0%	14%	14%
% of population 15-24 yrs	11%	13%	13%	12%	11%	14%	24%	10%	13%	27%	50%	63%	51%	12%	12%
% of population 25-44 yrs	30%	28%	22%	27%	26%	30%	29%	30%	21%	24%	21%	12%	31%	18%	16%
% of population 45-64 yrs	25%	24%	30%	25%	27%	29%	25%	25%	28%	21%	14%	9%	7%	37%	39%
% of population 65+ yrs	12%	14%	20%	20%	22%	15%	13%	14%	23%	18%	9%	11%	12%	20%	19%
% licensed drivers (of ages 16+)	92%	72%	91%	88%	81%	76%	78%	93%	87%	81%	84%	93%	91%	94%	92%
% with transit pass (of ages 15+)	18%	32%	18%	21%	29%	34%	40%	25%	26%	44%	57%	59%	64%	8%	13%
% employed	51%	39%	50%	50%	45%	46%	45%	52%	46%	39%	34%	28%	47%	51%	52%
% retired	16%	18%	23%	23%	25%	18%	15%	17%	24%	18%	9%	11%	10%	22%	23%
% unemployed	4%	8%	2%	2%	3%	6%	3%	2%	2%	3%	3%	2%	0%	2%	1%
Workers living in area	**6,390**	**2,950**	**9,110**	**4,280**	**3,260**	**2,470**	**4,240**	**4,790**	**5,230**	**4,960**	**3,840**	**3,450**	**930**	**2,810**	**3,150**
% part-time workers	15%	24%	19%	18%	21%	30%	31%	15%	23%	31%	35%	45%	41%	21%	23%
% with usual places of work	83%	82%	82%	86%	92%	71%	83%	87%	83%	88%	84%	85%	77%	75%	74%
Jobs (places of work) in area	**4,930**	**2,580**	**4,580**	**2,870**	**1,120**	**3,910**	**4,800**	**5,000**	**2,800**	**2,840**	**2,170**	**12,350**	**5,090**	**1,120**	**1,460**
Ratio of Jobs to Workers	0.77	0.87	0.50	0.67	0.34	1.58	1.13	1.04	0.54	0.57	0.57	3.58	5.47	0.40	0.46
Jobs at usual (fixed) place of work	**3,840**	**2,040**	**2,920**	**2,300**	**850**	**3,210**	**4,080**	**4,390**	**1,940**	**2,230**	**1,550**	**11,830**	**4,870**	**410**	**640**
% at those jobs who park at work	81%	63%	83%	78%	75%	76%	80%	88%	81%	77%	73%	45%	46%	93%	80%
% who pay for parking at work	1%	0%	0%	0%	0%	0%	14%	0%	0%	31%	10%	35%	32%	0%	0%
K-12 students living in area	**2,360**	**1,240**	**2,700**	**1,250**	**830**	**490**	**740**	**1,600**	**1,750**	**1,160**	**650**	**590**	**10**	**870**	**870**
Post-secondary students in area	**560**	**620**	**1,540**	**450**	**780**	**640**	**2,410**	**1,810***	**780**	**3,670**	**5,940**	**10,300***	**1,150**	**90**	**330**

Interpret results for Focus Areas with smaller sample sizes with caution. Total jobs includes 'work from home' and no fixed workplace (assigned to home area). Usual place of work = usual fixed place of work outside the home. *For this table, the expanded survey counts of the number of post-secondary students living in Focus Areas H and L have been increased to compensate for the under-representation of students living on campus at the RMC and Queen's University (by 1,050 and 2,620 on-campus residents respectively).

4   Daily Travel Characteristics

This chapter of the report presents findings related to the characteristics of trips made during the survey period. The details of these trips were collected from household members who were 5 years of age or older. Survey participants were asked to provide information on the trips they made on the last weekday – for example, if a participant was completing the survey on a Wednesday, they would have been prompted to provide information about the trips that they took the day prior (Tuesday).

Key trip characteristics captured by the survey include the time of departure, mode(s) of travel used, purpose of the trip (activity at the destination location), and the specific location of each trip's origin and destination. For the purposes of this survey, a trip is defined as a journey from one location to another for a single purpose. This may involve more than one mode of travel, such as in the case of driving to a Park & Ride trip, or walking from a transit stop to a destination more than 100 metres away.

This chapter is generally organized as follows:

- The first section looks at trends in total trips and trip rates (average daily trips per person or per household). (**4.1**)
- This is followed by a section examining the trip volumes and trip rates for different household and demographic characteristics. (**4.2**)
- The next section presents a profile of trips by hour of day, illustrating the AM Peak and extended PM Peak periods. (**4.3**)
- The next two sections present key survey results on trips by mode of travel and by purpose, looking more closely at these measures from a variety of perspectives and cross-sections. (**4.4**, **4.5**)
- The final sections in this chapter closely examine the characteristics of trips made using specific modes, including walking, cycling, transit and motor vehicles. This includes analysis of straightl-line and estimated actual trip distances, as well as identification of the proportions of motorized trips that are within a theoretically 'walkable' or 'bikeable' distance. (**4.6**, **4.7**, **4.8**, **4.9**, **4.10**)

Chapter 5 of this report will examine travel destinations, including the extent to which trips in each community are internalized, the trip volumes and characteristics of trips to institutional and commercial places of interest (special generators), and origin-destination matrices. (**5.1**, **5.2**, **5.3**)

As with the results in Chapter 3, the expanded survey results should be understood to be estimates based on surveys with a sample of the population that the results represent. When presenting expanded survey data on estimated trip volumes, the results are often rounded to the closest 10, so as not to give an undue impression of precision. Sometimes expanded trip counts for individual categories may not appear to sum to the survey total across all categories due to rounding. A number of the statistics reported have been computed using the unrounded expanded counts; attempts to reproduce these statistics using the rounded trip counts may not always provide the same result.

4.1 Total Trips and Trip Rates

Over the course of a typical 24-hour fall day, residents of the study area make a total of 398,600 trips (**Table 28**). **On average, each household makes 6.43 trips each day, while each person over the age of five makes 2.98 trips each day.** The household trip rates vary considerably by sub-area geography, although this is likely a function of the differing household sizes. Person trip rates are generally comparable by sub-area, with minor variations (residents in the West making slightly more trips per day, while those in the East and Rural making slightly fewer trips on average).

The number of daily trips and trip rates are broken out by geography in **Figure 31**. The residents of Area C, being the most populous Focus Area, generate the greatest number of daily trips, over 53,000 per day, although their trips rates are on par with the average for the rest of the city. Area I and K have person trip rates that are notably higher than average.

Table 28. Daily Trips and Trip Rates by Sub-Area

	City of Kingston	Urban Area	Central	West	East	Rural
Households	62,030	57,570	33,770	20,160	3,650	4,450
Total Persons 5+ Years of Age	133,560	122,410	65,620	48,130	8,660	11,150
Total Trips	398,600	366,720	194,410	147,620	24,690	31,880
Household Trip Rate	6.43	6.37	5.76	7.32	6.77	7.16
Person Trip Rate	2.98	3.00	2.96	3.07	2.85	2.86

Figure 31. Total Daily Trips and Person Trip Rates by Focus Area of Residence
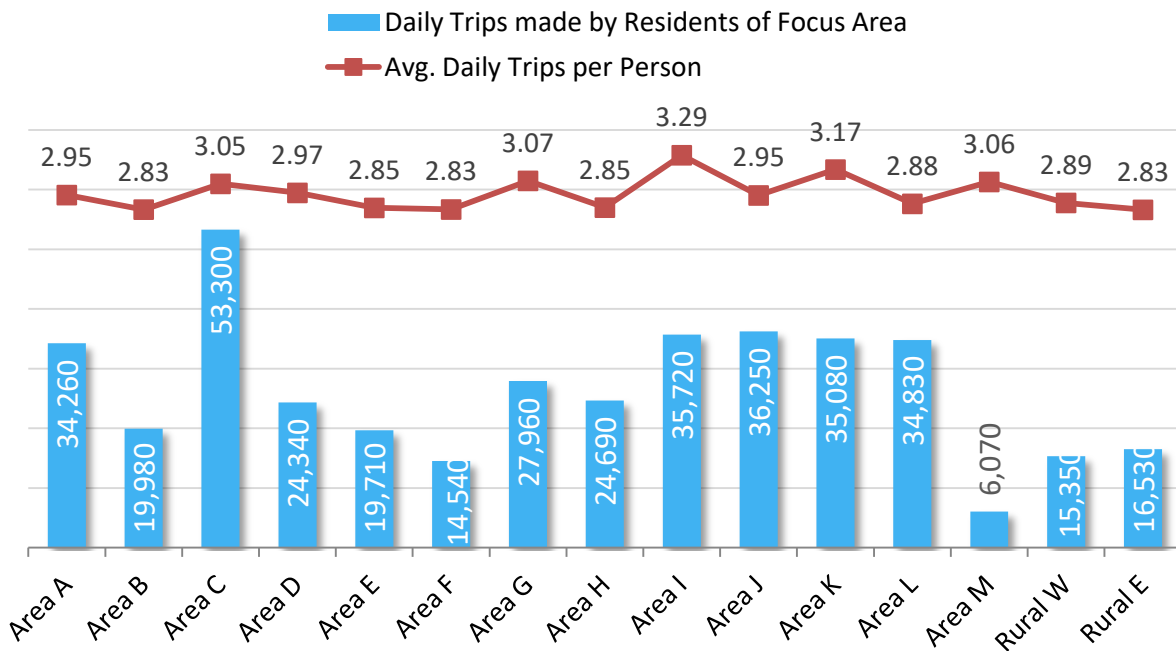
4.2   Trip Rates by Selected Characteristics

4.2.1   Trip Rates by Household Characteristics

The following table demonstrates the relationship of household characteristics to trip rates (**Table 29**). As dwelling type, household income and vehicle ownership all have a correlation to household size, the household trip rates vary considerably by category. While this is useful for modelling purposes, the results of the person trip rates may be more insightful in understanding these differences. There are only small variations in trip rates by household size, with those living in one-person or four-person households making 0.2 additional trips per day on average compared to those in three-person or five-person households. **The highest average person trip rates are for residents living in houses, those with household incomes of $125,000 or more, and those with access to at least one private vehicle. The lowest trip rates can be observed for residents of apartments or condominiums with five or more storeys, those with household incomes of less than $50,000, and those with no private vehicles.**

Table 29. Total Daily Trips and Trip Rates by Household Characteristics

Household Characteristic	Trips	Household Trip Rate	Person Trip Rate
Survey Total	398,600	6.43	2.98
By Household Size			
1 person	65,220	3.09	3.09
2 people	124,230	5.88	2.95
3 people	67,850	8.06	2.90
4 people	83,270	11.44	3.09
5+ people	58,040	14.24	2.91
By Dwelling Type			
House	222,070	7.98	3.09
Apartment 5+ storeys	39,540	4.13	2.69
Apartment <5 storeys	47,290	4.69	2.99
Other Ground-Oriented	82,120	6.91	2.89
Student Residence	7,580	n/a	2.81
By Household Income			
Less than $30K	66,210	4.83	2.71
$30K to <$50K	43,770	4.82	2.66
$50K to <$80K	69,190	6.02	2.92
$80K to <$125,000	73,960	7.61	3.13
$125,000 or more	94,970	9.97	3.50
Unknown	50,500	5.94	2.77
By Household Type			
Couple without children	98,040	6.20	2.99
Couple with children	150,440	10.80	3.27
Single parent with children	23,570	7.61	3.11
Extended family / other complex hhld	23,490	7.44	2.30
Roommates	37,960	7.69	2.40
Single person	57,680	3.13	3.13
By Vehicle Ownership			
No household vehicles	51,990	3.94	2.56
At least one vehicle	346,610	7.10	3.06

4.2.2 Trip Rates by Demographic Characteristics

The next table demonstrates the relationship of demographic characteristics to trip rates (**Table 30**).

Residents who are currently employed have the highest trip rates (3.49 daily trips per full-time worker on average, and 3.31 per part-time worker). Amongst adults, retirees have the next highest trip rate at 2.61 trips per day. Students tend to have lower trip rates at all levels of education. Within this group, K-12 students take slightly more trips than full-time post-secondary students. On average, women have marginally higher daily trip rates than men (3.03 vs. 2.93). By age group, trip rates are highest for those between the ages of 35 and 44, and lowest for youth. Results by age group are explored further on the following page.

Table 30. Total Daily Trips and Trip Rates by Demographic Characteristics

	Daily Trips	Person Trip Rate
Survey Total	398,600	2.98
By Employment Status		
Work Full-Time	163,510	3.49
Work Part-Time	49,620	3.31
Unemployed	8,510	2.10
Other (includes students 15+ who do not work)	76,270	2.57
Retired	66,310	2.61
Not applicable (5-14 yrs)	34,380	2.73
By Student Status		
Not a student	276,460	3.13
K-12 student	46,750	2.75
PSE Full-time	68,440	2.68
PSE Part-time	5,900	2.63
Other / online	1,050	2.50
Gender		
Male	187,620	2.93
Female	210,980	3.03
Age Group		
05 to 14	34,380	2.73
15 to 24	80,620	2.58
25 to 34	57,710	3.08
35 to 44	53,890	3.71
45 to 54	60,790	3.57
55 to 64	52,120	3.09
65 to 74	36,130	2.84
75 to 84	19,540	2.55
85+	3,430	1.56

Figure 32 illustrates the relationship between age and trip rates by five-year age group. Kingston residents between the ages of 15 to 19 makes the fewest average trips per day (2.49) with examination of the data revealing that it is somewhat higher for those aged 15 to 17 (2.80) and lowest for those aged 18 to 19 (2.30). Trip rates then rise steadily with age, peaking at ages 35 to 39. This result is to be expected, as this is often a stage of life in which residents are working more consistently and may be raising children, which often involves several passenger trips to and from school and other activities.

Another interesting pattern emerges when looking at trip rates by age and gender (**Figure 33**). This is plotted on a ten-year age range to maintain robust sample sizes. Women appear to have higher trip rates than men from age five through 34, equalize between 35 and 54, and drop below men after the age of 55.

Figure 32. Trip Rate by Age (5-Year Age Groups)
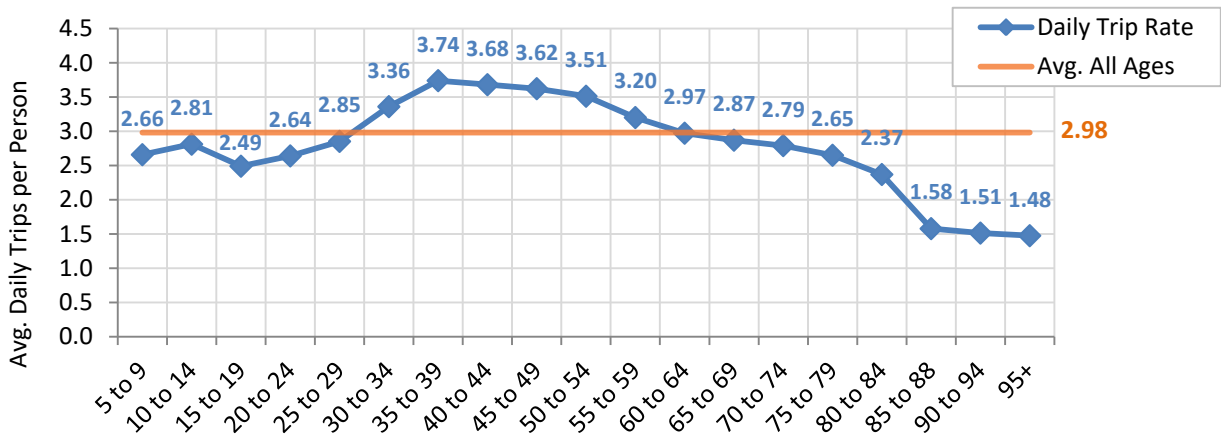
Figure 33. Trip Rate by Gender by Age (10-Year Age Groups)
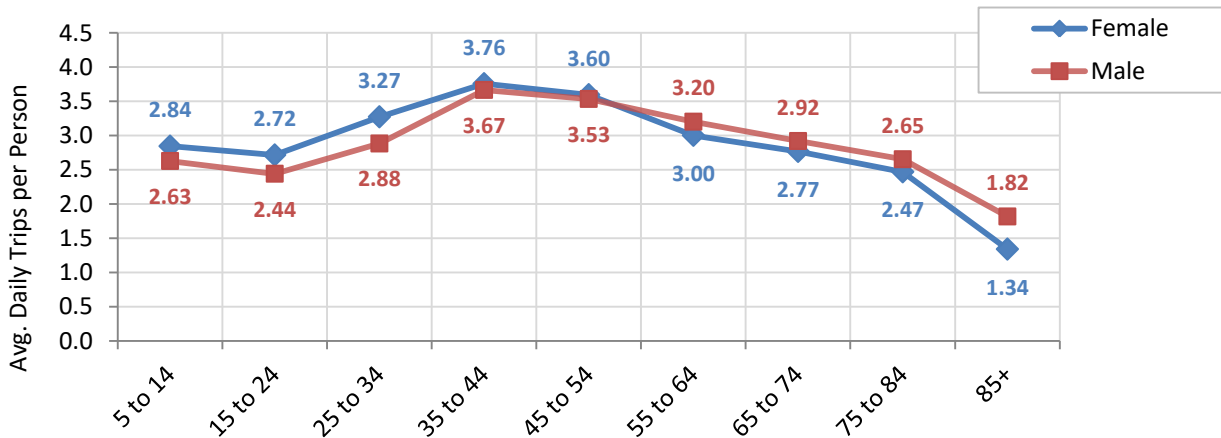
Survey respondents who indicated non-binary gender or who refused to say were randomly assigned to one gender or another.

4.3 Trips by Start Hour

4.3.1 Profile of Trips by Start Hour

The distribution of trips made by Kingston residents by trip start hour (**Figure 34**, **Table 31**) shows a pattern with a shorter peak period in the morning and a longer afternoon peak period. The morning peak hour is from 8 AM to 9 AM, with 40,700 trips departing in that hour, while the afternoon peak hour is from 4 PM to 5 PM with the same volume of trips. Examining the data more closely revealed a concentrated **1.5-hour AM Peak period between 7:30 AM and 9 AM** accounting for about 15% of all daily trips and a **longer 2.5-hour PM Peak period between 3 PM and 5:29 PM** with 25% of all trips. The West and East sub-areas show proportionately more trips in the PM Peak period, likely due to demographic differences (fewer post-secondary students, more full-time workers, more families with children).

Figure 34. Trip by Start Hour
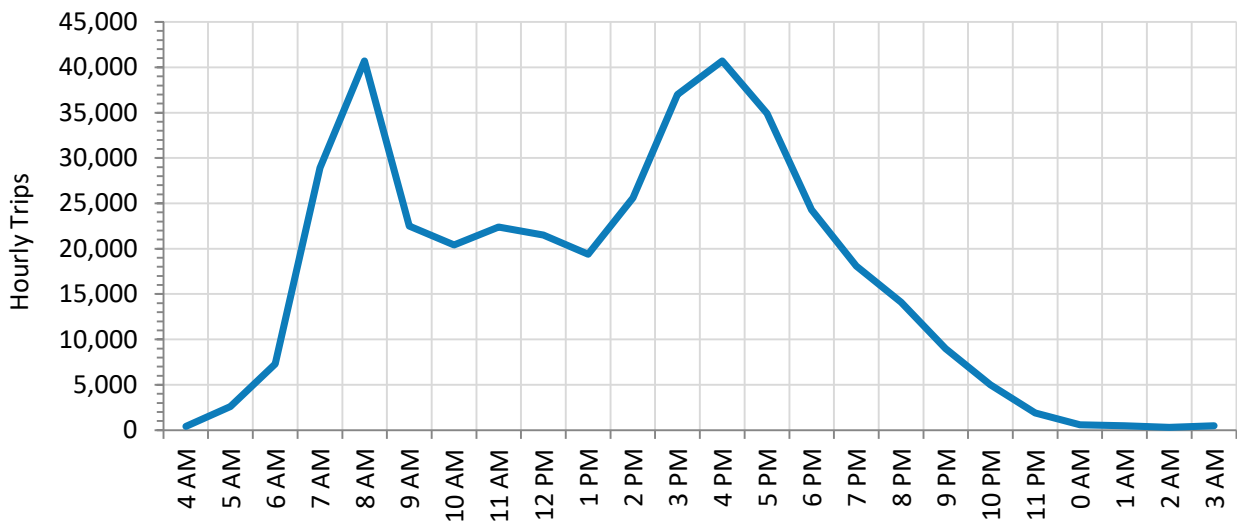
Table 31. Trips by Peak Period

	City of Kingston	Central	West	East	Rural
24-Hour Total	398,600	194,410	147,620	24,690	31,880
AM Peak: 7:30-8:59 AM (1.5 hrs)	58,790	26,900	23,220	3,960	4,710
Inter-Peak: 9:00 AM-14:59 PM (6 hrs)	131,730	68,740	44,970	7,080	10,950
PM Peak: 3:00 PM-5:29 PM (2.5 hrs)	97,890	43,510	39,540	6,980	7,870
Evening to Early AM: 5:30 PM-6:59 AM (13.5 hrs)	110,190	55,260	39,900	6,670	8,350
% of 24-Hour Total					
AM Peak	15%	14%	16%	16%	15%
Inter-Peak	33%	35%	30%	29%	34%
PM Peak	25%	22%	27%	28%	25%
Evening to Early AM	28%	28%	27%	27%	26%

4.3.2   Trips by Start Hour by Employment Status

The graphs below (**Figure 35**) highlight the distinct differences in the travel patterns of workers and non-workers. The first graph presents the total number of trips made in each hour. The second graph normalizes the volumes as a percentage of daily trips made by each population subgroup to further highlight the differences in the hourly travel patterns. Later sections of this report will explore the trip purposes behind these hourly patterns (Section 4.4.7, page 106) as well as mode shares by time of day (Section 4.5.2, page 114).

Non-workers undertake steady volumes of trips between 8 AM and 4 PM, with a modest peak at 11 AM, and an earlier start to the drop off of trip-making as the late afternoon and evening progress.

Workers have more tightly defined peak periods for travel in the morning and late afternoon, with inter-peak volumes similar to or a slightly less than those for non-workers, although much lower as a proportion of daily trips made. Workers also make more trips in the evening, both in terms of the number of trips and proportion of daily travel.

Figure 35. Trips by Start Hour by Work Status
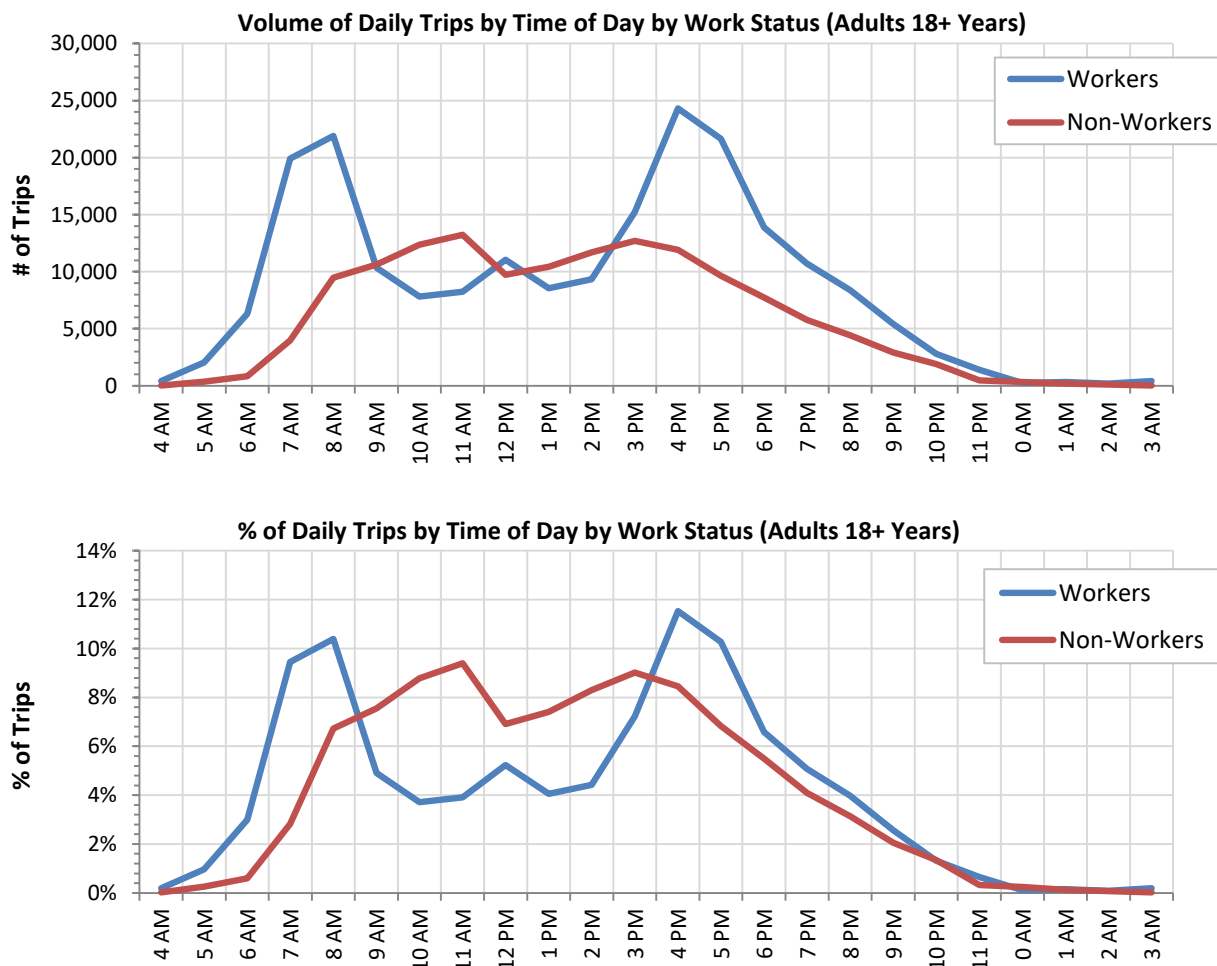
4.3.3   Trips by Start Hour by Gender and Employment Status

This section of the report provides a gender-based analysis of the pattern of trips by start hour. The first graph in **Figure 36** illustrates the slightly higher volume of trips made women by time of day. Overall, women account for 54% of all daily trips. Women also have a slightly different profile from men in terms of the start of both the AM Peak (slightly later) and the PM Peak (earlier).

The second graph in **Figure 36** breaks out the results into workers and non-workers who are 18+ years of age, filtering out any trips made by school-aged children. The third graph normalizes these findings to the proportion of total trips made by each population sub-group, revealing that workers of both genders have very similar trip profiles by time of day. One minor variation to note includes the finding that women who work take slightly more of their daily trips in the PM peak hour (4:00 PM) compared to men who work. Additionally, women who do not work appear to have a later AM Peak hour (11:00 AM) compared to men who do not work (10:00 AM).

Figure 36. Trips by Start Hour by Gender
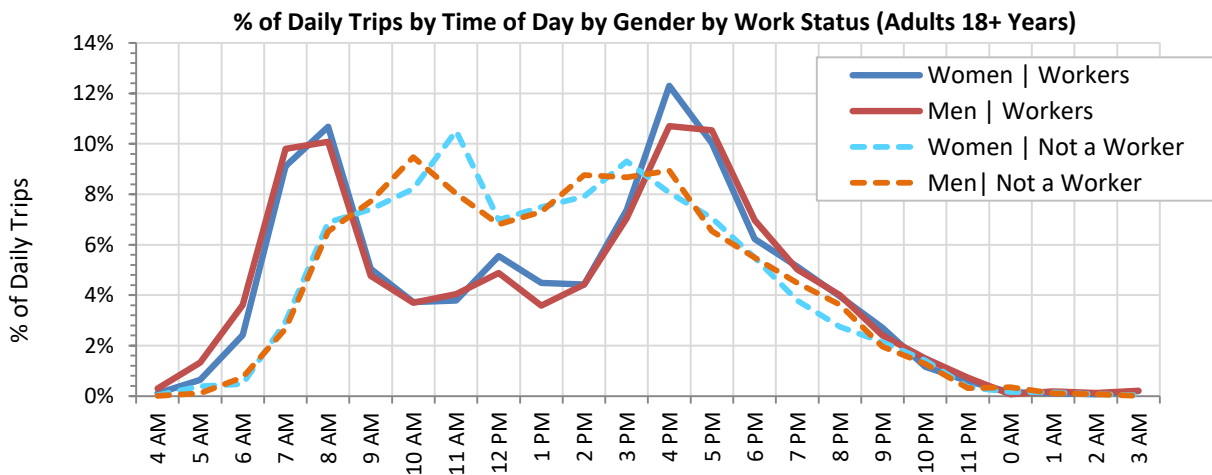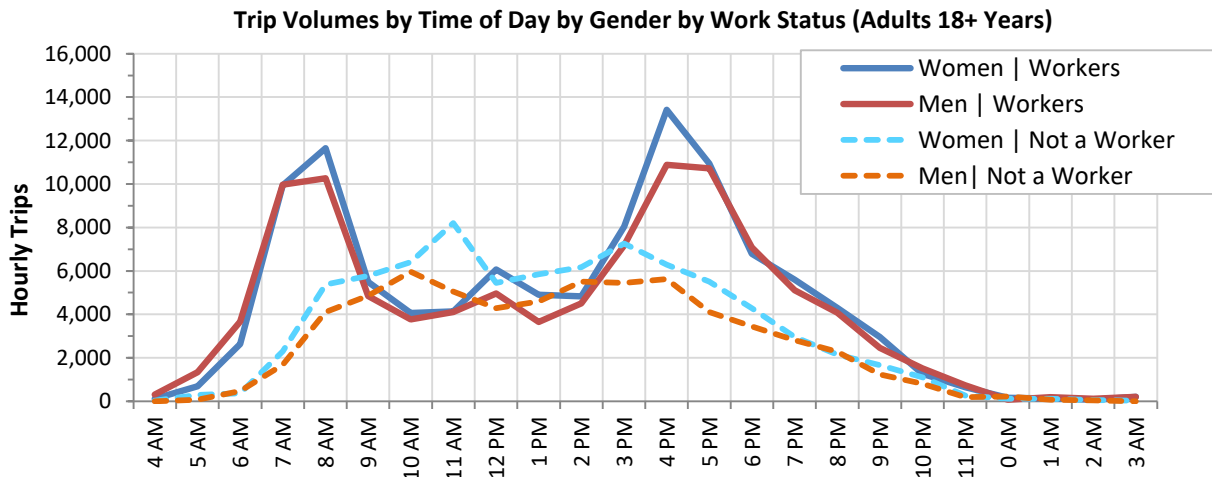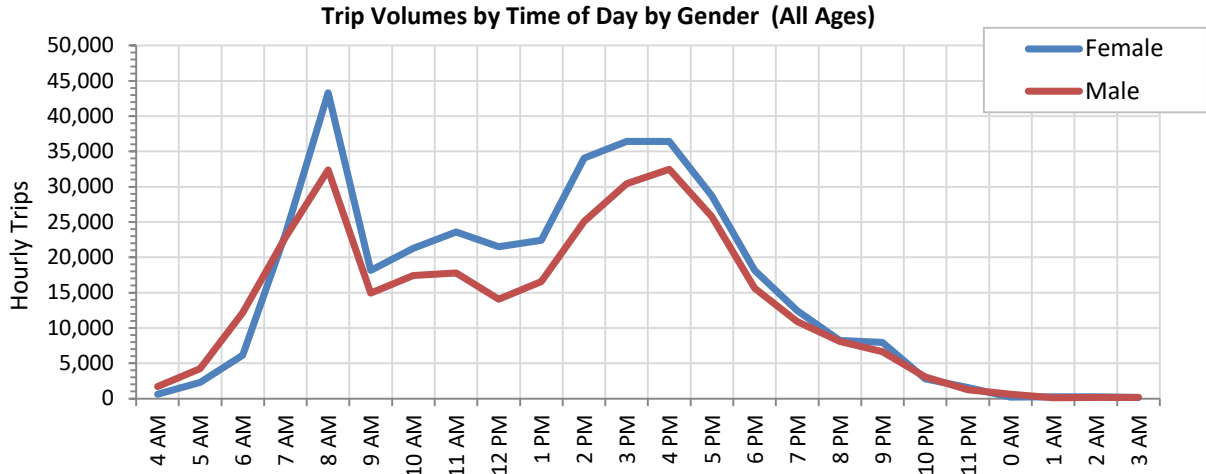
Trip Volumes by Time of Day by Gender (All Ages)

Trip Volumes by Time of Day by Gender by Work Status (Adults 18+ Years)

% of Daily Trips by Time of Day by Gender by Work Status (Adults 18+ Years)

Survey respondents who indicated non-binary gender or who refused to say were randomly assigned to one gender or another.

4.4   Primary Mode

The chart below (**Figure 37**) outlines the mode shares of weekday trips made by Kingston residents, based on the primary mode of the trip.[13] **Table 32** on the following page provides a detailed breakdown of mode use, breaking out walking trips and other modes into the individual survey categories.

Just over half (51.4%) of all daily trips are driving trips (almost 205,000 trips per day), with auto passenger trips representing 14.6% of all trips. The transit mode share is 8.0%, representing almost 32,000 daily trips. Walking accounts for almost one-fifth (18.0%) of trips, while cycling trips account for 3.7%.

The reliance on walking, cycling, and transit demonstrated in the split is influenced by the large numbers of post-secondary students in Kingston, with many Queen's University students living within walking distance of campus and downtown conveniences, and both St. Lawrence and Queen's students having access to transit during the school term as part of their student fees. Kingston Transit ridership has grown significantly in recent years as a result of the introduction of Express routes beginning in 2013, free transit for children 14 and under and passes for all local high school students, extended Sunday and holiday service, and expanded employer Transpass programs. The significant walking and bicycle share splits are supported by recent investments in active transportation infrastructure.

Figure 37. Daily Mode Shares
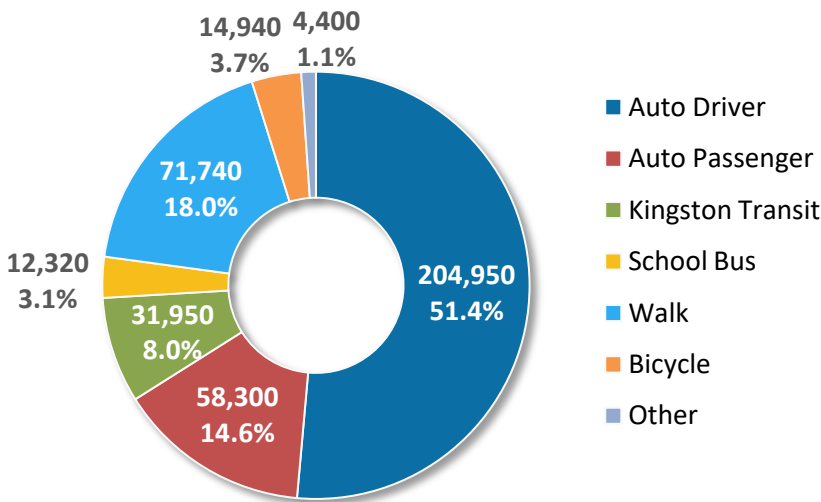
Walk includes both walking and rolling (skateboard, longboard, roller-blade, or mobility device).
Other includes taxi, motorcycle, low speed motor vehicle (moped, limited-speed motorcycle, e-scooter), ferry, and inter-city modes (coach bus, VIA Rail, airplane).

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[13] A trip may entail more than one mode of travel (such as Park & Ride trips). In such instances, the primary mode was assigned based on the following hierarchy (with transit, at the top of the hierarchy, always being assigned if a trip involved transit and another mode): transit, school bus, auto driver, auto passenger, other, bicycle, walked. Generally speaking, the primary mode assigned to a multi-mode trip is usually the mode by which the greatest distance would be travelled. The 'other' mode classification includes motorcycle, taxi, intercity bus, Kingston Access Bus (KAB) or shuttle bus.

Table 32. Detailed Trip Estimates by Mode of Travel

Mode	Expanded Trips	Mode Share (%)
Total Daily Trips	**398,600**	**100%**
Auto driver	204,950	51.4%
Auto passenger	58,300	14.6%
Kingston Transit	31,950	8.0%
School Bus (e.g., yellow bus)	12,320	3.1%
Bicycle (incl. pedal-assist e-bikes)	14,940	3.7%
Walk (and roll)	71,740	18.0%
Walked (incl. jogging)	70,320	17.6%
Rolled (incl. skateboard, roller-blades, scooter, mobility device, longboard)	1,270	0.3%
Other	4,400	1.1%
Kingston Access Bus (KAB)	780	0.2%
Taxi	2,000	0.5%
Low speed motor vehicle (incl. moped, limited-speed motorcycle, scooter-style e-bike)	70	0.0%
Intercity coach bus (e.g., Greyhound, Megabus)	20	0.0%
Motorcycle	660	0.2%
VIA Rail	440	0.1%
Airplane	210	0.1%
Other	220	0.1%

4.4.1 Mode Shares by Sub-Area and Focus Area

Figure 38 presents mode shares for the sub-areas, with a comparison against the findings for those residing within the urban boundary (as defined by the Official Plan). **Figure 39** presents mode shares for individual Focus Areas, while **Figure 40** through **Figure 43** map automobile (combining driver and passenger mode shares), transit, bicycle and walk mode shares by Focus Area. The Central sub-area shows relatively low automobile mode shares (37% driver, 12% passenger), while walking comprises a substantial portion of the mode share (30%) comparatively, followed by transit at 11% and cycling at 6%. The substantial walk mode share is especially evident for residents of Focus Areas G, K, L, and M, with their proximity to both the university and downtown businesses. As might be expected, the highest auto driver mode shares are evident in the Rural areas. Residents of the East sub-area reported less reliance on automobile travel than their counterparts residing in the West sub-area.

Figure 38. Daily Mode Shares for Urban Area and by Sub-Area of Residence
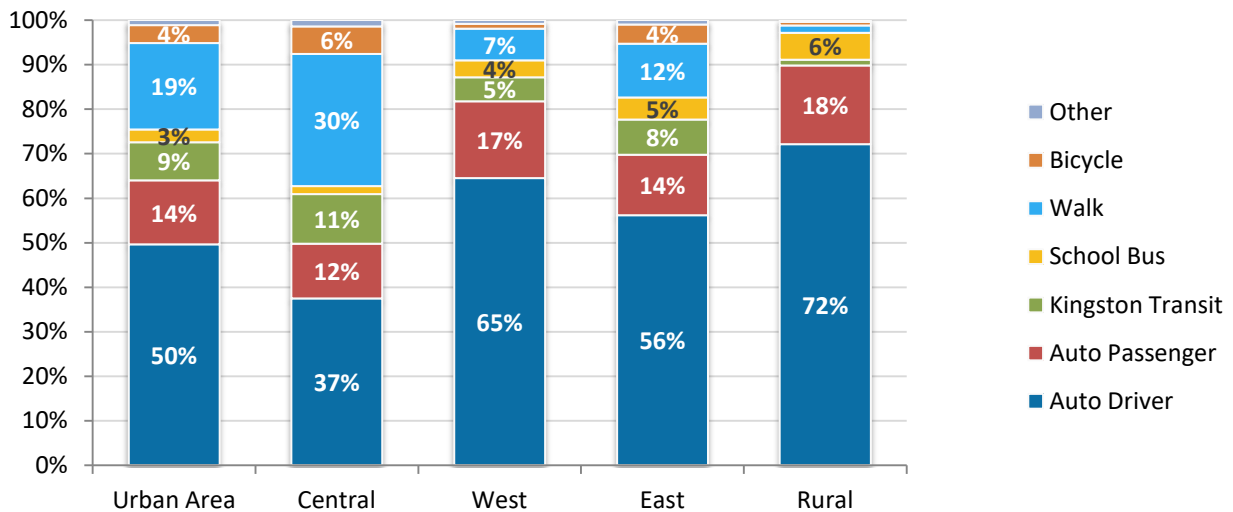
Figure 39. Daily Mode Shares by Focus Area of Residence
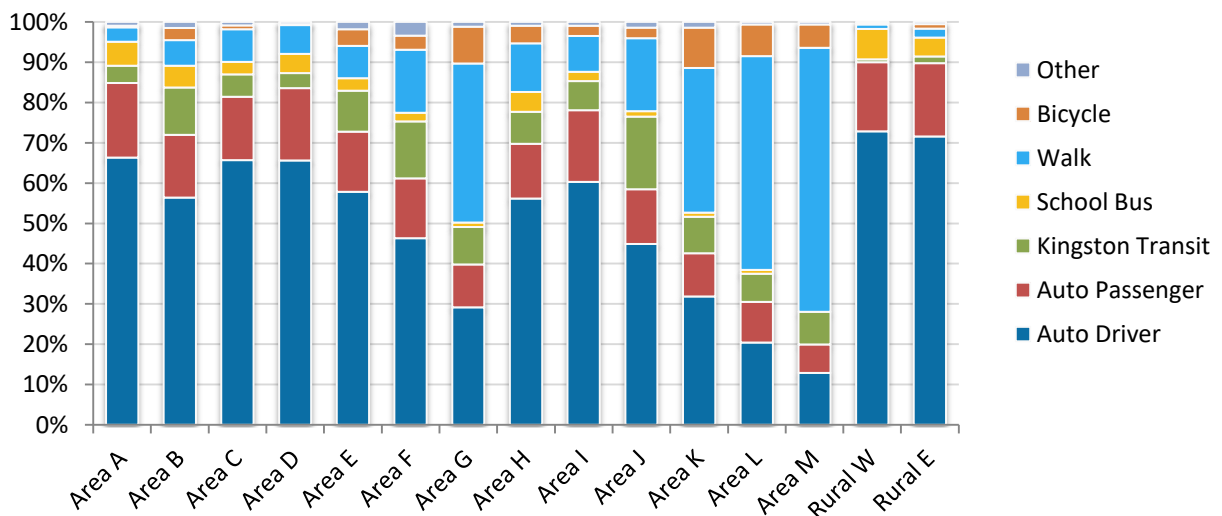
Figure 40. Map of Auto (Driver + Passenger) Mode Shares by Focus Area of Residence

Percentage of all trips by Automobile (Driving or Passenger)
- 18% to 35%
- 35% to 45%
- 45% to 65%
- 65% to 75%
- 75% to 90%
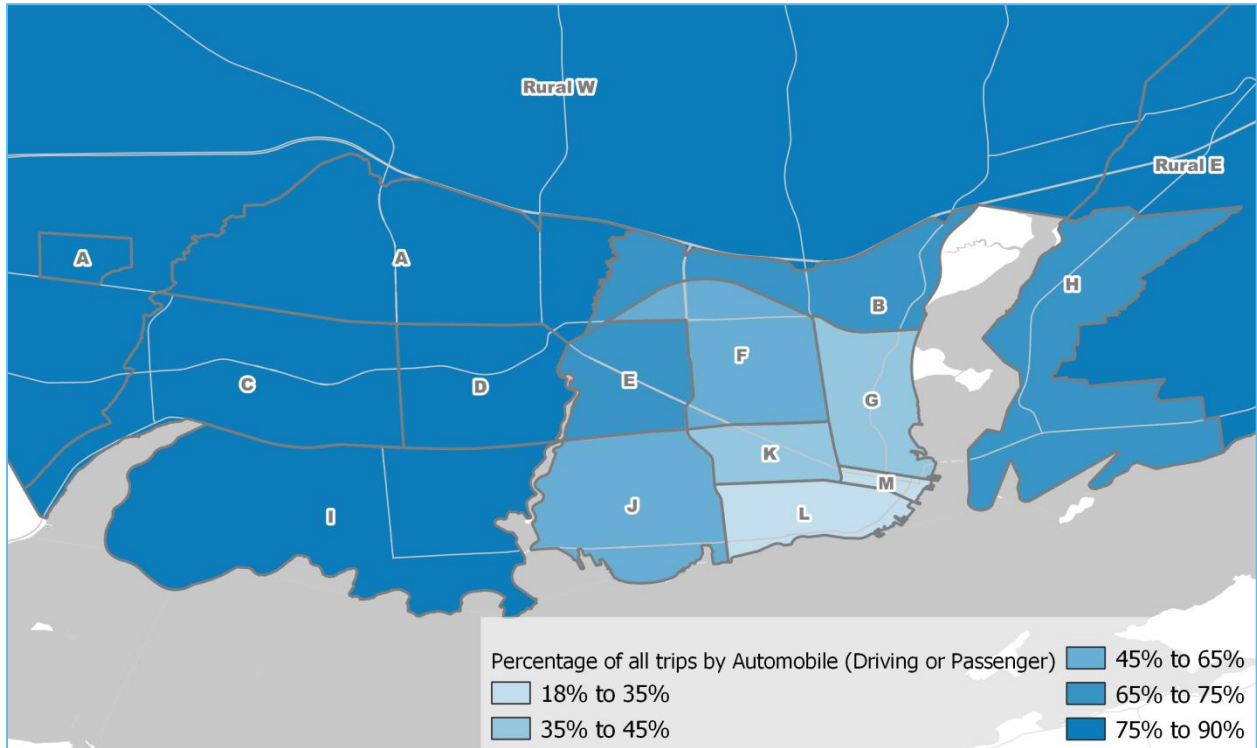
Figure 41. Map of Transit Mode Shares by Focus Area of Residence

Percentage of all trips by Kingston Transit
- 0% to 3.5%
- 3.5% to 6.5%
- 6.5% to 9.5%
- 9.5% to 12.5%
- 12.5% to 18.5%
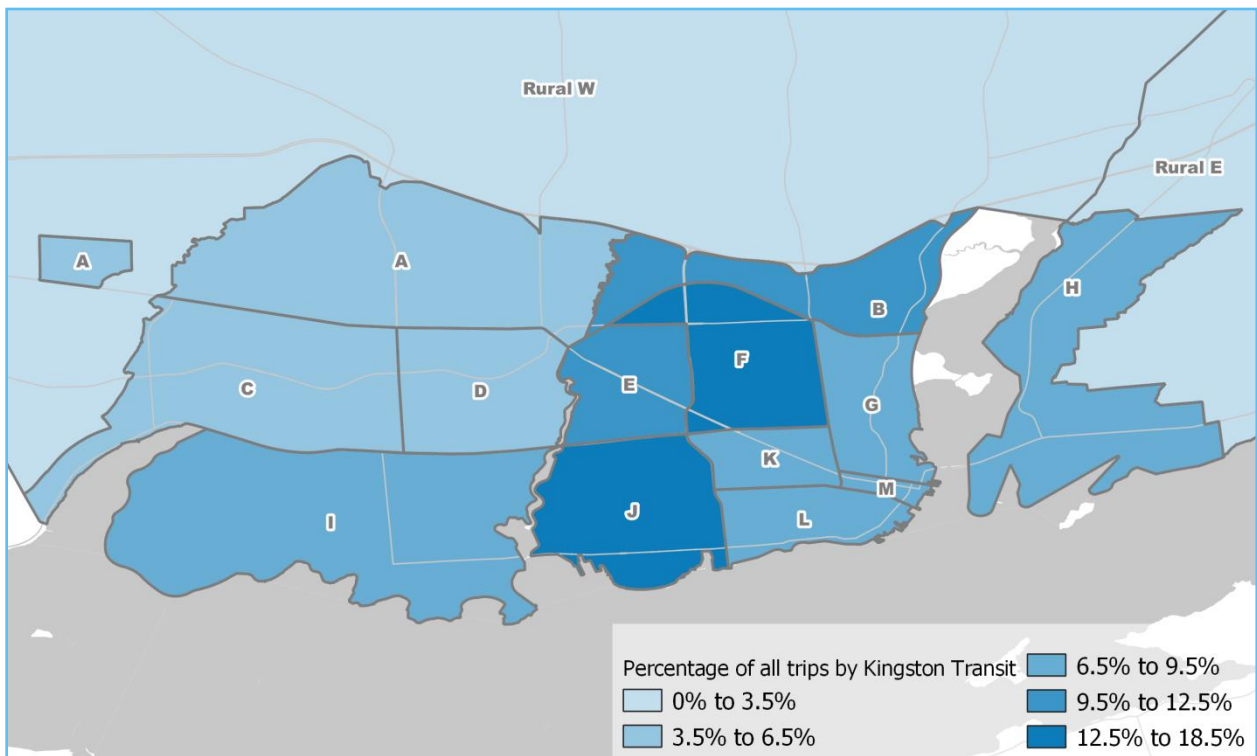
Figure 42. Map of Cycling Mode Shares by Focus Area of Residence

Percentage of all trips by Cycling
- 0% to 1.5%
- 1.5% to 3.5%
- 3.5% to 5.5%
- 5.5% to 7.5%
- 7.5% to 10.5%
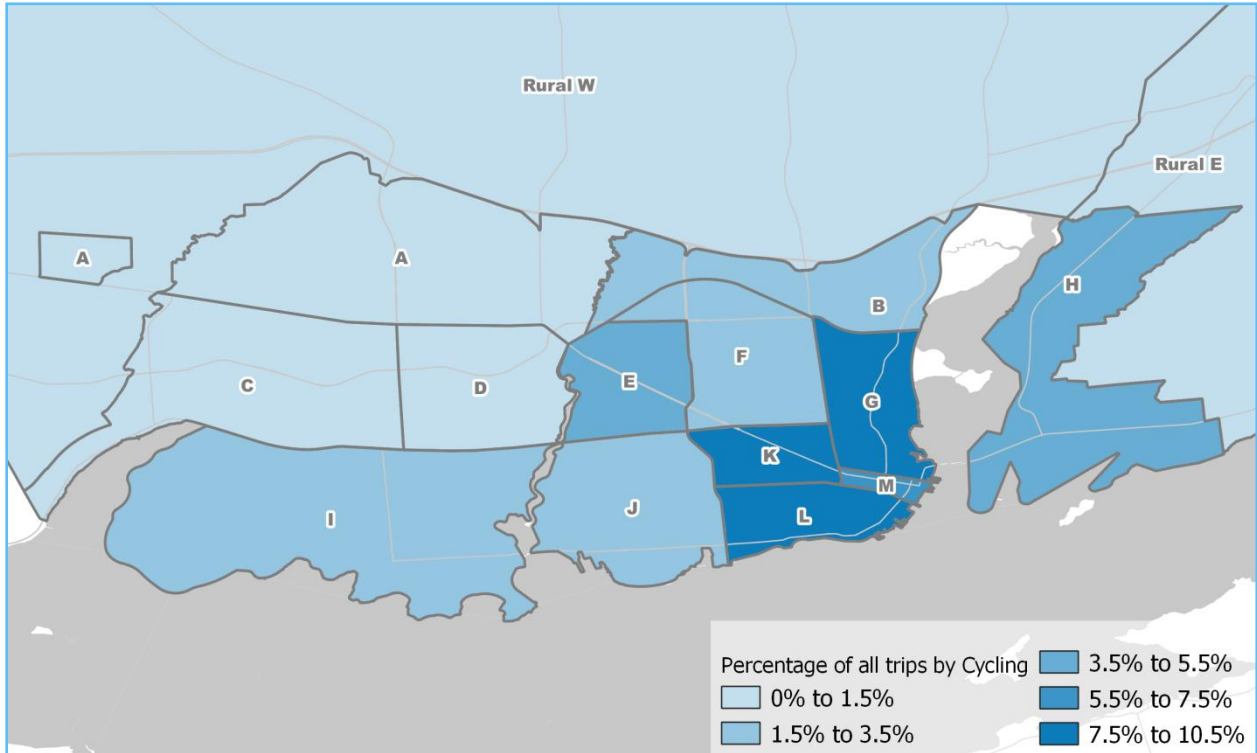
Figure 43. Map of Walk Mode Shares by Focus Area of Residence

Percentage of all trips by Walking
- 1% to 5%
- 5% to 10%
- 10% to 20%
- 20% to 40%
- 40% to 70%
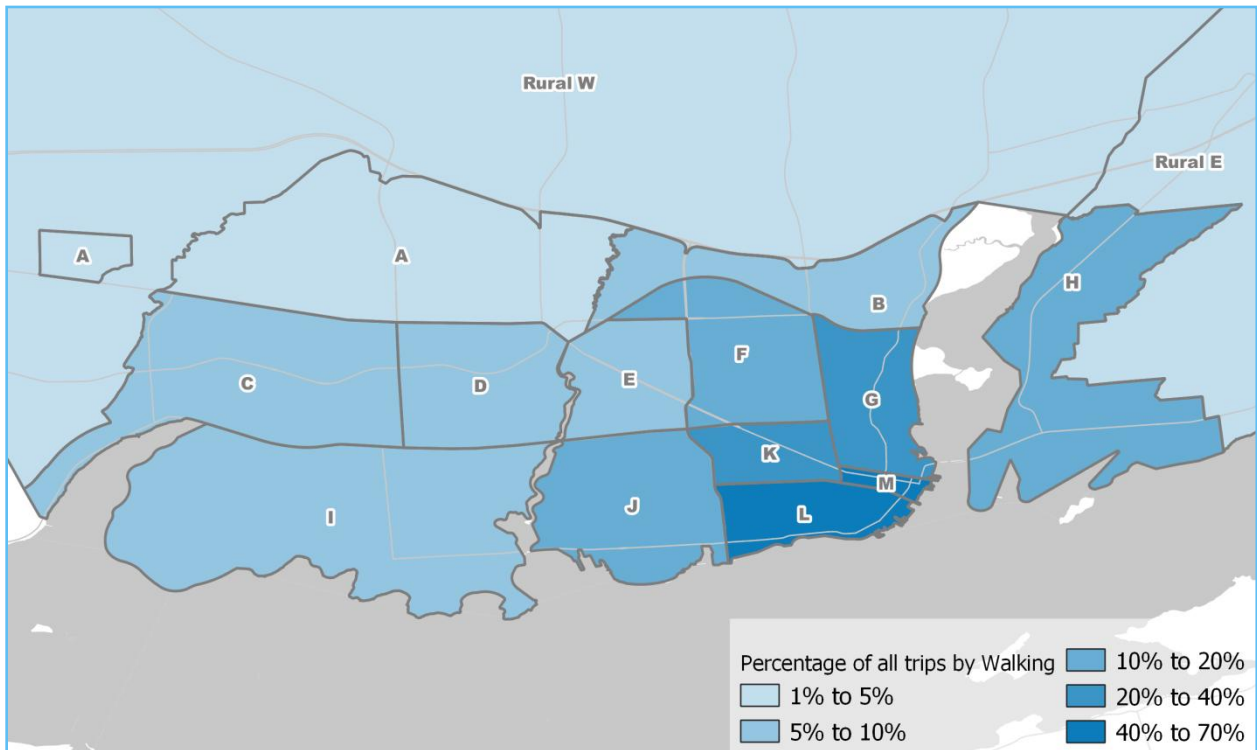
Table 33 details the mode share information presented by sub-area and Focus Area in the preceding charts and maps.

Table 33. Mode Shares by Sub-Area and Focus Area of Residence

	City of Kingston	Urban Area	Central	West	East	Rural	Area A	Area B	Area C	Area D
Total Trips	398,600	366,720	194,410	147,620	24,690	31,880	34,260	19,980	53,310	24,340
Auto Driver	51.4%	49.6%	37.5%	64.5%	56.2%	72.1%	66.3%	56.4%	65.7%	65.6%
Auto Passenger	14.6%	14.4%	12.3%	17.3%	13.6%	17.7%	18.6%	15.6%	15.7%	18.0%
Kingston Transit	8.0%	8.6%	11.1%	5.4%	7.9%	1.3%	4.3%	11.7%	5.6%	3.8%
School Bus	3.1%	2.8%	1.8%	3.8%	5.0%	6.1%	6.0%	5.5%	3.1%	4.7%
Walk	18.0%	19.4%	29.7%	7.1%	12.1%	1.7%	3.6%	6.3%	8.1%	7.2%
Bicycle	3.7%	4.0%	6.2%	1.1%	4.3%	0.8%	0.4%	3.0%	1.0%	0.2%
Other	1.1%	1.2%	1.4%	0.9%	1.0%	0.4%	1.0%	1.6%	0.9%	0.5%

	Area E	Area F	Area G	Area H	Area I	Area J	Area K	Area L	Area M	Rural W	Rural E
Total Trips	19,710	14,540	27,960	24,690	35,720	36,250	35,080	34,830	6,070	15,350	16,530
Auto Driver	57.8%	46.3%	29.2%	56.2%	60.2%	44.9%	31.9%	20.4%	12.9%	72.7%	71.6%
Auto Passenger	15.0%	14.9%	10.6%	13.6%	17.9%	13.6%	10.7%	10.1%	7.1%	17.1%	18.2%
Kingston Transit	10.2%	14.2%	9.3%	7.9%	7.2%	18.0%	9.1%	6.9%	8.1%	0.7%	1.7%
School Bus	3.1%	2.1%	1.1%	5.0%	2.3%	1.3%	1.0%	1.0%	0.0%	7.6%	4.7%
Walk	8.0%	15.6%	39.5%	12.1%	8.9%	18.2%	35.8%	53.0%	65.6%	1.1%	2.2%
Bicycle	4.2%	3.5%	9.1%	4.3%	2.5%	2.6%	10.0%	7.9%	5.8%	0.5%	1.1%
Other	1.8%	3.4%	1.2%	1.0%	1.0%	1.4%	1.5%	0.6%	0.7%	0.2%	0.6%

4.4.2 Sustainable and Active Mode Shares

Aggregating the figures for sustainable and active modes provides another perspective on mode shares (Table 34). As indicated, almost half (49%) of all trips made by residents of the Central sub-area are made via sustainable modes (transit, school bus, walking or cycling), with 36% of all trips being via active modes (walking or cycling). As might be expected, sustainable and active mode shares are lowest in the rural sub-area. The East fares relatively well, with almost one-quarter of all trips being made by sustainable modes.

Table 34. Sustainable and Active Mode Shares

	City of Kingston	Urban Area	Central	West	East	Rural
Sustainable (Transit + School Bus +Walk + Bike)	32.9%	34.9%	48.8%	17.4%	29.3%	9.8%
Active (Walk + Bike)	21.7%	23.4%	35.9%	8.2%	16.4%	2.4%

4.4.3 Mode Shares by Age Group

The following two tables detail travel mode shares by age group (**Table 35**), and estimated volumes of trips by mode (**Table 36**). The shares for selected modes are illustrated in **Figure 44**. Sustainable and active mode share subtotals are presented in **Figure 45**. For **Table 36**, it should be noted that the trip volumes presented are estimated volumes based on weighted survey data, not exact counts. Furthermore, people living in collective dwellings were not surveyed, so the results for older age groups are based on those living independently rather than in collective dwellings (assisted living or care homes). Residents have been grouped into 5-year age ranges for those under 25 to better illustrate the rapid changes in modal trends during this period of transition, and 10-year ranges for those over 25.

The survey results show the following:

- Auto reliance increases with age, representing just over one-quarter of trips for those 20 to 24 years of age, doubling for those 24 to 34 years of age, and plateauing above age 35 with fluctuations between 68% to 72% until age 84.

- Auto passenger reliance is highest amongst children (53% for those 5 to 9 years, and 38% for those 10 to 14 years) and the elderly (32% for those 85+ years of age).

- Transit mode shares are highest for youth between the ages of 15 and 24 (18%-19%) and still relatively robust for residents 25 to 34 (11%), but drop to 5% or less for those over the age of 35. Kingston residents 65 to 74 years of age are least likely to take transit. Interestingly, there is an increase in transit use amongst those 75 to 84 years, before a decline again after age 85. These reasons for this are not clear from the survey data, but one may speculate that the increase at age 75 may have to do with some residents switching to transit if their health does not allow them to walk or cycle as far as they used to or if they cannot or prefer not to drive.[14]

- Walking mode shares are also highest amongst those 15 to 24 years of age (39%-40%). Above the age of 35, fewer than 12% of all trips are made by walking.

- Cycling mode shares are highest for children 10 to 14 years of age (7%), but drop to 2% for those 15 to 19 years and increase again to 6% for those 20 to 24, after which there is a gradual decline in cycling with age. The apparent drop for those 15-19 years of age may be influenced by transitions from grade school to secondary school (with secondary school students gaining access to free youth transit passes) and by the large numbers of post-secondary students in this age group. Many post-secondary students may live close to their educational institution, especially in their first or second year of enrolment, and may not bring bicycles to the City (particularly those living in residence on campus where it may be more difficult to store a bicycle). Overall, putting together walking and cycling mode shares, 15 to 19 year olds have the second highest combined active mode share (42%), second only to 20 to 24 year olds.

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[14] The increase would not be due to an increase in use of the Kingston Access Bus service, as this mode of transportation is grouped under 'Other Mode' rather than with trips via Kingston Transit buses.

Table 35. Mode Shares by Age Group

Age	Total Trips	Auto Driver	Auto Passenger	Transit Bus	School Bus	Walked	Bicycle	Other
Survey Total	398,600	51%	15%	8%	3%	18%	4%	1%
5 to 9 years	17,050	-	53%	1%	24%	19%	3%	0%
10 to 14 years	17,330	-	38%	5%	30%	20%	7%	1%
15 to 19 years	31,600	9%	20%	19%	8%	40%	2%	1%
20 to 24 years	49,020	27%	10%	18%	0%	39%	6%	1%
25 to 34 years	57,710	53%	10%	11%	0%	20%	5%	2%
35 to 44 years	53,890	69%	9%	5%	0%	12%	5%	1%
45 to 54 years	60,790	71%	9%	5%	0%	10%	4%	2%
55 to 64 years	52,120	72%	11%	4%	0%	9%	3%	1%
65 to 74 years	36,130	71%	15%	2%	0%	9%	2%	1%
75 to 84 years	19,540	68%	18%	6%	0%	8%	0%	1%
85+ years	3,430	53%	32%	2%	0%	10%	0%	3%

Table 36. Estimated Daily Volume of Trips by Mode by Age Group

Age	Total Trips	Auto Driver	Auto Passenger	Transit Bus	School Bus	Walked	Bicycle	Other
Survey Total	398,600	204,950	58,300	31,950	12,320	71,740	14,940	4,400
5 to 9 years	17,050	-	8,960	100	4,140	3,310	490	60
10 to 14 years	17,330	-	6,590	800	5,230	3,410	1,190	110
15 to 19 years	31,600	2,930	6,400	6,120	2,660	12,550	660	270
20 to 24 years	49,020	12,980	4,970	8,840	40	18,900	2,910	380
25 to 34 years	57,710	30,720	5,490	6,140	190	11,390	2,910	860
35 to 44 years	53,890	37,020	4,740	2,740	0	6,400	2,400	590
45 to 54 years	60,790	43,000	5,720	2,910	10	5,840	2,180	1,130
55 to 64 years	52,120	37,640	5,590	2,320	10	4,700	1,490	380
65 to 74 years	36,130	25,570	5,310	830	20	3,380	640	380
75 to 84 years	19,540	13,280	3,430	1,090	0	1,500	70	160
85+ years	3,430	1,820	1,100	70	0	360	0	80

Figure 44. Selected Mode Shares by Age Range

Auto Driver

Auto Passenger

Kingston Transit

Walk

Bicycle
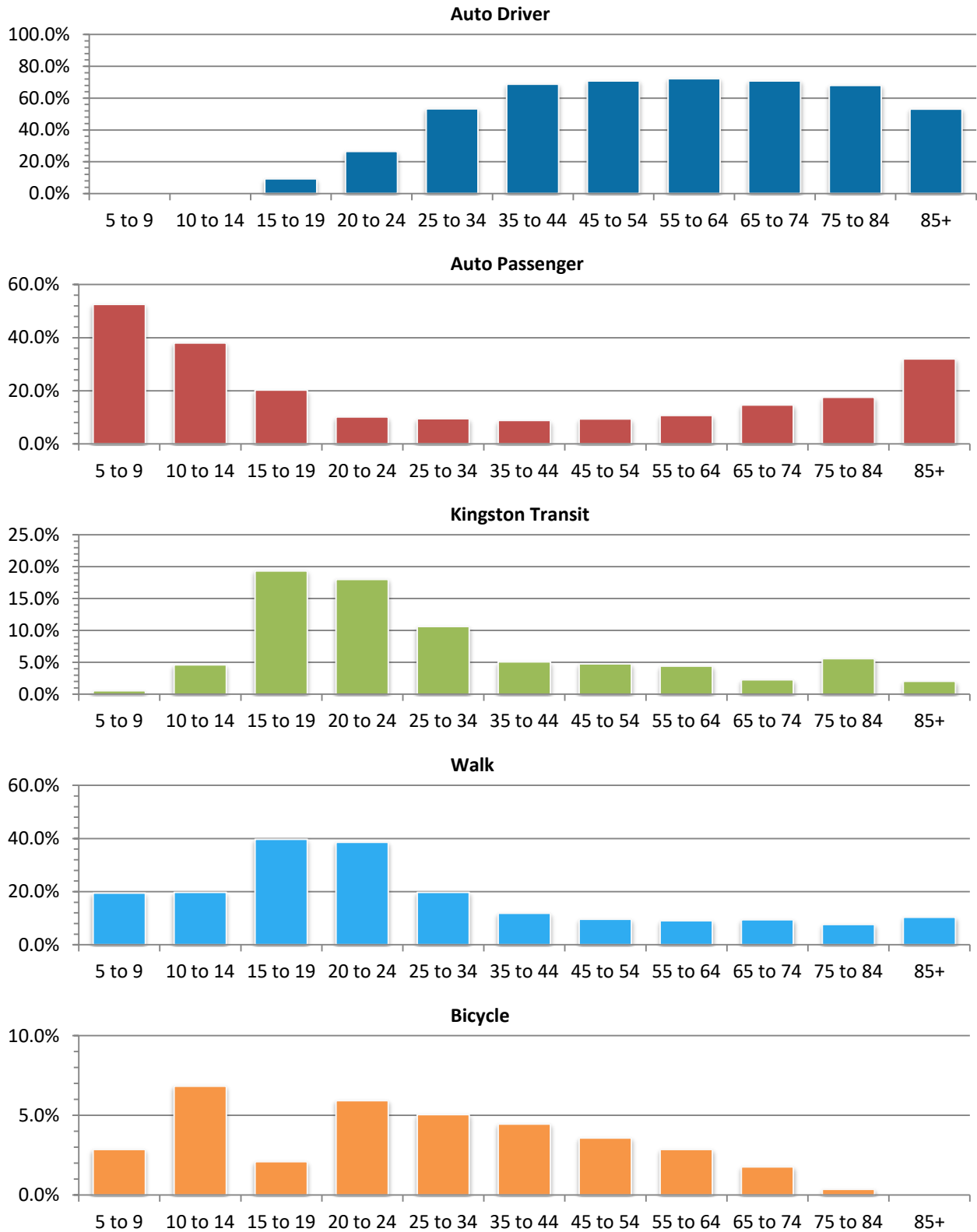
Figure 45. Sustainable and Active Mode Shares by Age Range

Sustainable (Kingston Transit + School Bus + Walk + Bicycle)

Active (Walk + Bicycle)
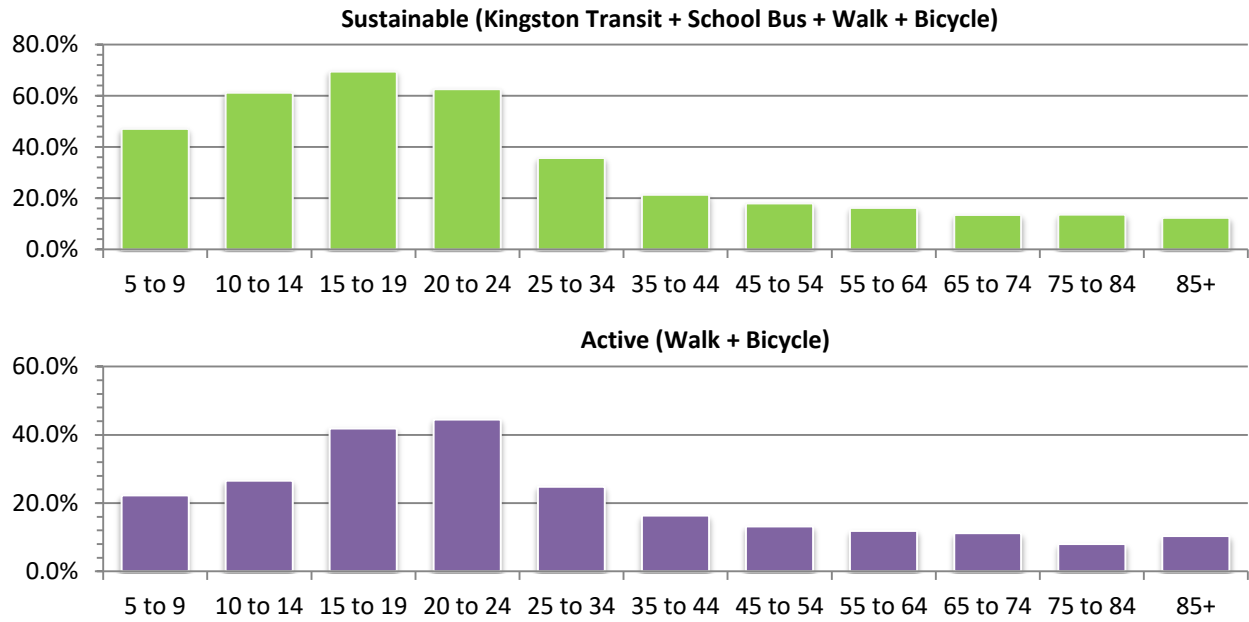
4.4.4 Mode Shares by Gender

The survey results reveal gender differences in terms of mode use (**Figure 46**).

- While women appear to drive somewhat less than men (49.5% vs. 53.6%) they are more likely to be passengers (17.8% vs. 11.0%) and therefore have a slightly larger overall share of automobile-based trips (67.3% vs. 64.6%).
- Women and men make nearly equivalent amounts of walking trips, but women make half as many cycling trips compared to men (2.5% vs. 5.1%).
- Women are slightly more frequent users of transit (8.3% vs. 7.7%)

As the population's work and family roles continue to evolve, it may be interesting to track changes in mode shares by gender in future cycles of this survey.

Figure 46. Mode Shares by Gender
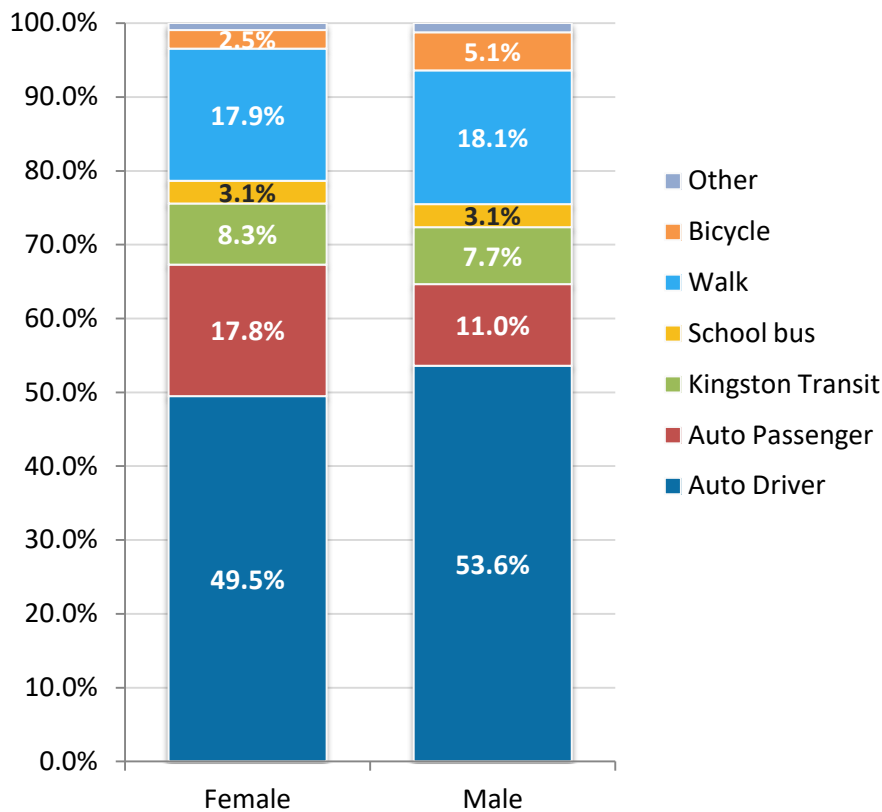
4.4.5　Mode Shares for Other Demographic Characteristics

Figure 47 and **Figure 48** present mode shares by work status and student type. As indicated, drive mode shares are highest for full-time workers (71%) and retired people (68%), who also have the lowest walk shares (10% and 9% respectively). Of note, while other modes fluctuate by employment status, bicycle mode shares are fairly equivalent for all employment statuses (4%-5%) except retired (1%). Reliance on transit is highest amongst full-time post-secondary students (21%), who also have the highest walk mode shares (41%), while trips made by part-time post-secondary students have a 14% transit mode share. K-12 students rely most on auto passenger (43%) and school bus (26%) trips. One-tenth of trips by part-time workers and the unemployed are by transit.

Figure 47. Mode Shares by Employment Status
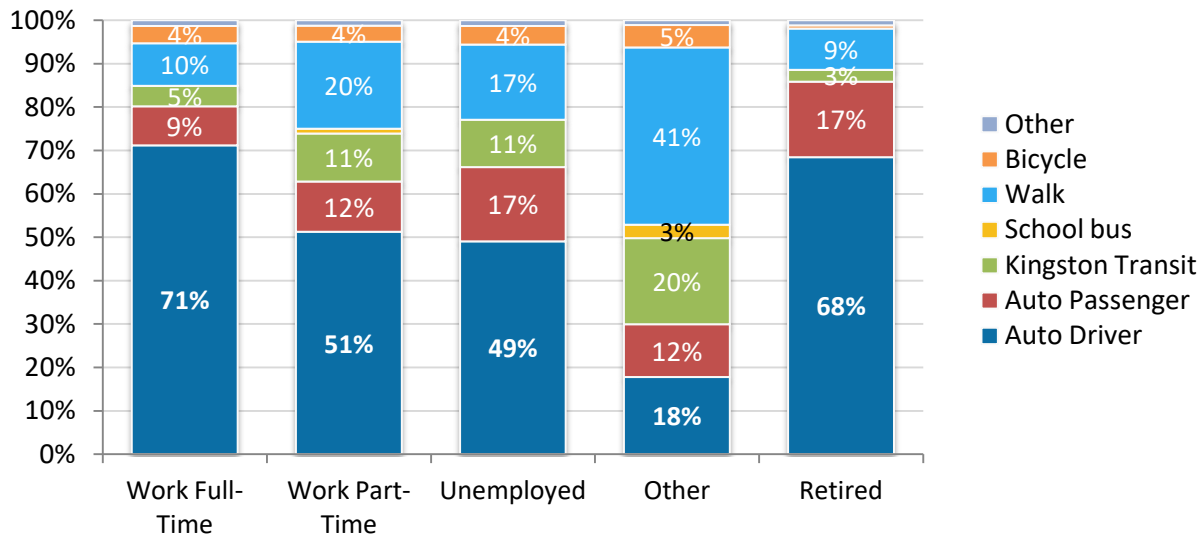
Population 15+ years (eligible for labour force). Other includes PSE and K-12 students 15+ who do not work.

Figure 48. Mode Shares by Student Status
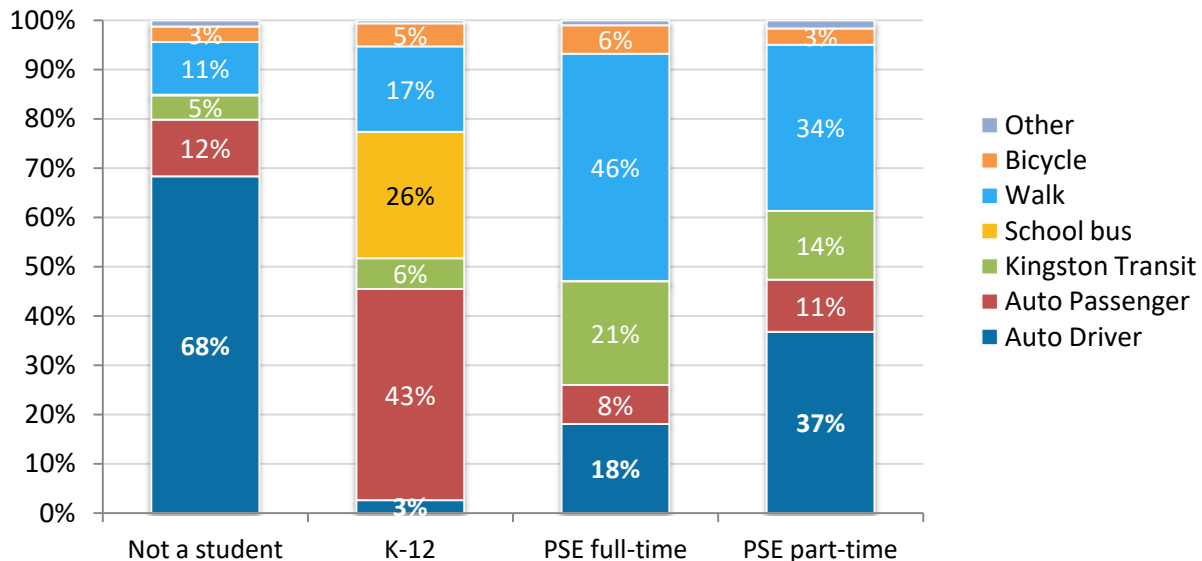
4.4.6   Mode Shares for Household Characteristics

Figure 49 illustrates the relationship between mode share and dwelling type. For private dwellings:

- Auto driver mode shares are highest for residents living in houses (60%), and decrease as dwelling density increases (48% for other ground-oriented; 31% for apartments with fewer than five storeys), but rises again for people in apartment or condominium buildings with five or more storeys (46%) perhaps due to the different demographics of people living in such dwellings and/or the proximity of these dwellings to nearby amenities.
- Walk shares are greatest amongst those living in apartments with fewer than five storeys (36%), as are transit shares (16%) and bicycle shares (6%), the latter suggesting that bicycle storage may be an important consideration for such dwelling types.
- Over two-thirds of trips made by post-secondary students living in residence are walking trips, with the next largest mode share being transit (23%).

Figure 49. Mode Shares by Dwelling Type
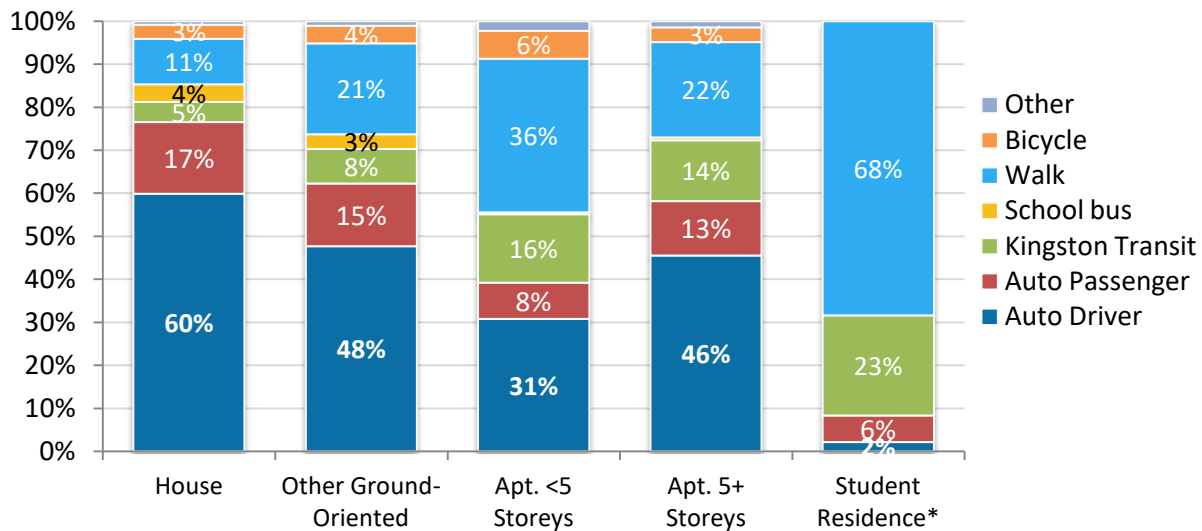
*Results for people living in student residences should be interpreted with caution due to small sample size (n<95 trips).

The charts below present mode shares by household income (**Figure 50**) and household type (**Figure 51**). Only 23% of trips made by people in households with incomes of less than $30,000 are as drivers. Those with lower incomes also rely most on transit (under $30,000 per year, 20%; $30-$50,000: 13%). As income rises, reliance on vehicles increases (for both auto driver and auto passenger trips), while walking and transit use declines. Cycling mode shares fluctuate slightly by income (a low of 3% for household incomes of $30-$50,000 and a high of 5% for $125,0000 or more). Households with children have school bus mode shares and higher auto passenger shares reflecting the trips of children in those households. Large numbers of those with lower incomes and in one-person and roommate households are post-secondary students, influencing these mode shares.

Figure 50. Mode Shares by Household Income
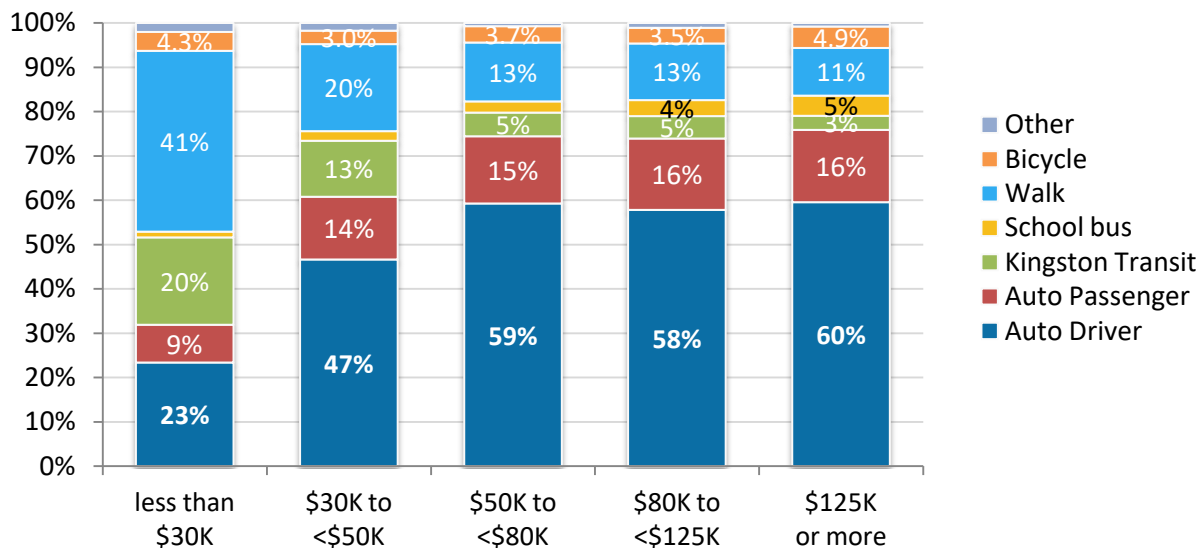
Excludes households which declined to answer the question on income.

Figure 51. Mode Shares by Household Type
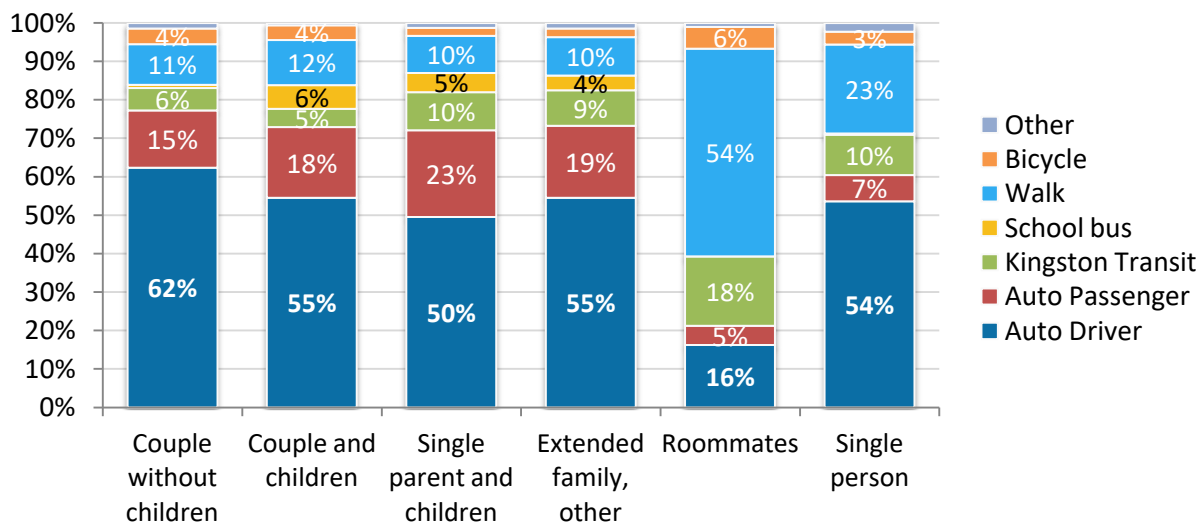
Includes trips made by all household members over the age of 5.

4.4.7 Trip Mode by Start Hour

The hourly distribution of trips by mode is presented in **Figure 52** and **Table 37.**

Auto driver trips greatly increase beginning at 7 AM (15,900 in the hour beginning at 7 AM, rising to 18,900 trips in the 8 AM hour). These volumes subside between 9 AM and 2 PM, with trips rising again at 3 PM (16,200) to a peak between 4 PM and 5 PM (22,000) and remaining relatively high between 5 PM and 6 PM hour (19,000). Auto passenger trips peak in the morning at 8AM and again between 3 PM and 6 PM, likely associated with K-12 school drop-offs and pick-ups.

Transit mode shares are the greatest between 7 AM and 8 AM and between 3 PM and 6 PM, with between 2,500 and 3,600 transit trips per hour in these periods.

Walking trip and cycling trip volumes are the greatest between 8 AM and 9 AM (9,140 walk trips; 1,900 cycling trips) and between 3 PM and 5 PM for walking trips (6,990 to 7,050 walk trips per hour) and between 3 PM and 6 PM for cycling trips (1,500 to 1,650 cycling trips per hour).

Figure 52. Trips by Mode by Start Hour
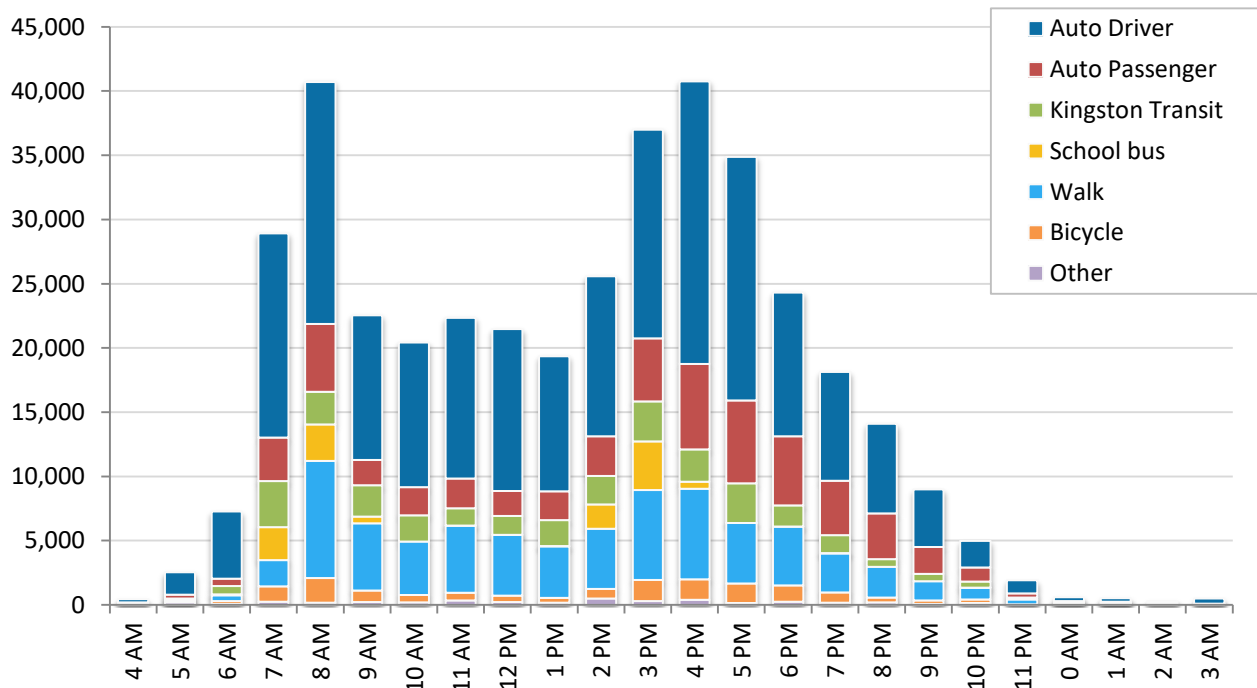
Table 37. Mode Shares by Trip Start Hour and by Peak Period

Depart Hour	Trips	Auto Driver	Auto Passenger	Kingston Transit	School bus	Walk	Bicycle	Other
4 AM	450	56%	19%	-	-	21%	4%	-
5 AM	2,550	68%	12%	2%	-	5%	4%	8%
6 AM	7,270	72%	8%	9%	1%	6%	3%	1%
7 AM	28,930	55%	12%	12%	9%	7%	4%	1%
8 AM	40,720	46%	13%	6%	7%	22%	5%	0%
9 AM	22,540	50%	9%	11%	2%	23%	4%	1%
10 AM	20,430	55%	11%	10%	-	20%	3%	1%
11 AM	22,350	56%	10%	6%	0%	23%	3%	2%
12 PM	21,470	59%	9%	7%	0%	22%	2%	1%
1 PM	19,370	54%	12%	10%	0%	21%	2%	1%
2 PM	25,580	49%	12%	9%	7%	18%	3%	2%
3 PM	36,980	44%	13%	8%	10%	19%	4%	1%
4 PM	40,750	54%	16%	6%	1%	17%	4%	1%
5 PM	34,880	54%	19%	9%	0%	14%	4%	0%
6 PM	24,310	46%	22%	7%	0%	19%	5%	1%
7 PM	18,140	47%	23%	8%	0%	17%	4%	1%
8 PM	14,100	50%	25%	4%	-	17%	3%	1%
9 PM	8,990	50%	23%	6%	-	17%	3%	1%
10 PM	4,990	41%	22%	10%	0%	18%	6%	3%
11 PM	1,910	52%	17%	8%	-	19%	1%	2%
12 AM	590	48%	12%	2%	-	21%	-	17%
1 AM	520	50%	10%	3%	-	21%	2%	14%
2 AM	290	40%	20%	-	-	23%	6%	11%
3 AM	490	79%	9%	-	-	3%	4%	5%

By Peak Period

	Trips	Auto Driver	Auto Passenger	Kingston Transit	School bus	Walk	Bicycle	Other
AM Peak	58,790	48%	13%	8%	8%	18%	5%	1%
Inter-Peak	131,730	54%	10%	9%	2%	21%	3%	1%
PM Peak	97,890	51%	15%	7%	4%	17%	4%	1%
Other	110,190	52%	20%	8%	1%	15%	4%	1%

0% = <0.5%. Dashes (-) indicate no observations reported at all.

AM Peak: 7:30-8:59 AM (1.5 hrs). Inter-Peak: 9:00 AM-14:59 PM (6 hrs)

PM Peak: 3:00 PM-5:29 PM (2.5 hrs). Other (Evening to Early AM): 5:30 PM-6:59 AM (13.5 hrs)

4.4.8   Frequency of Active Mode Trips by Season (Residents Aged 16+ Years)

Survey respondents were asked how frequently they bicycle, walk, or jog/roll at the time of the survey (Fall), during Winter, and during Summer. The reported frequency of use in Summer is presented in two variations: the survey total including seasonal post-secondary students who have been identified to be mostly residing in Kingston only from September to April (to provide insight into human behaviour) and the subset of respondents who are permanent residents, excluding the 20,000 post-secondary students who are not likely to be present after the Winter school semester (to provide insight into the travel patterns of the population present in the summer). Post-secondary students who were captured as a permanent residents living in Kingston in May are included in this latter analysis.

There are two important considerations to keep in mind when interpreting the survey results. First, the results in this section are based on self-reported frequency (stated use) and, unlike other sections in this chapter, are not based on actual travel reported on the travel day (revealed use). Second, the question was only asked of the primary survey respondent, and is thus limited to respondents 16+ years of age, those eligible to fill out the survey on behalf of their household, and may not necessarily be representative of the entire population if the characteristics and active mode habits of the primary respondent differ from other household members.

Figure 53, Figure 54, and Figure 55 illustrate the results for each of the active modes examined, while Table 38 further details this information. Overall, 14% of respondents reported making a cycling trip at least once per week in the fall, with this dropping to 4% in the winter, and rising to 20% in the summer (or 17% for the population who reside in Kingston in the summer).

Walking is less affected by seasonality, with 55% of respondents making a walking trip at least once per week in the fall, 48% in the winter, and 59% in the summer (46% for summer residents in Kingston). From a public health perspective, it is interesting to note that at least 41% of the population over 16 years of age either never makes walking trips or does so only rarely, even in the summer. It may be noted that respondents were asked "how frequently do you typically walk to a destination", so it is possible that some respondents who answered that they never walk to a destination may actually take walks without a destination for exercise or recreation.

Jogging or rolling trips are undertaken by only a small percentage of the population at any time of year: 2.9% in the fall, dropping to 1.3% in the winter, and increasing to 3.7% in the summer months (2.5% for permanent residents).

Figure 53. Bicycling Frequency by Season
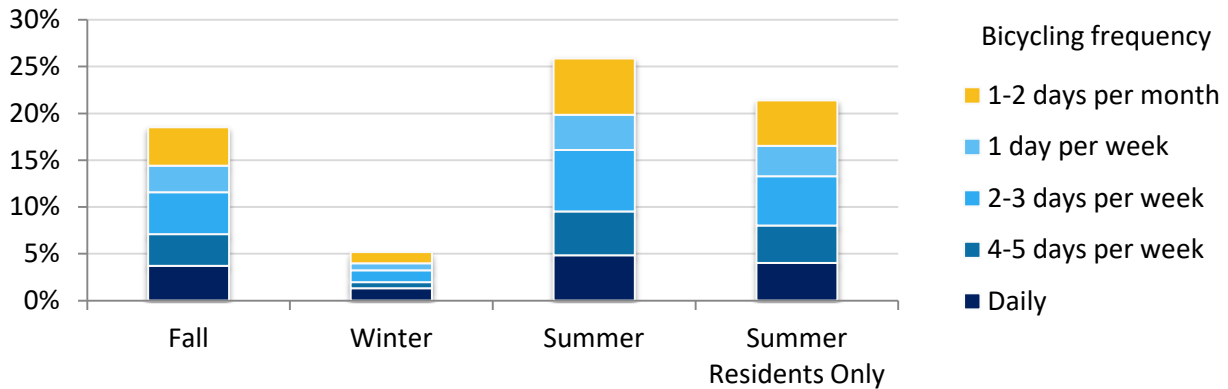
Summer Residents Only: excludes post-secondary students who are Fall-Winter residents.
Question was asked of a subsample of surveyed residents 16+ years of age.

Figure 54. Walking Frequency by Season
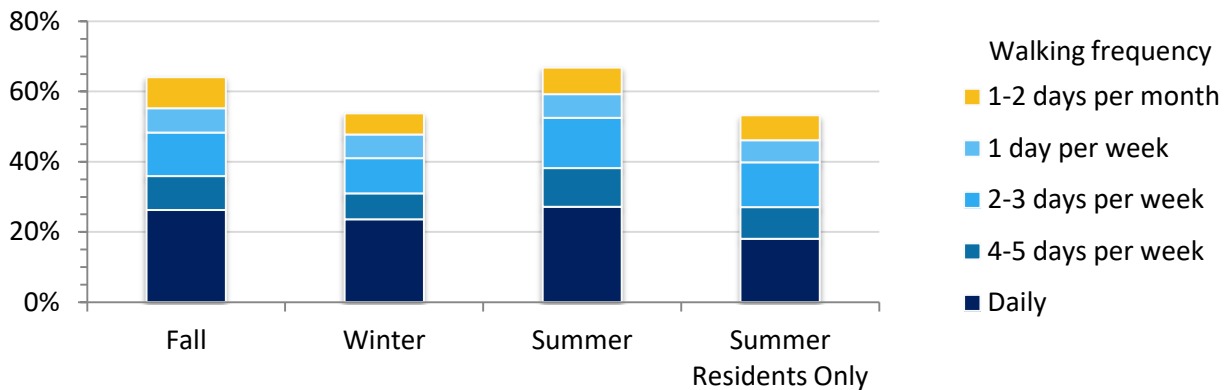
Summer Residents Only: excludes post-secondary students who are Fall-Winter residents.
Question was asked of a subsample of surveyed residents 16+ years of age.

Figure 55. Jogging or Rolling Frequency by Season
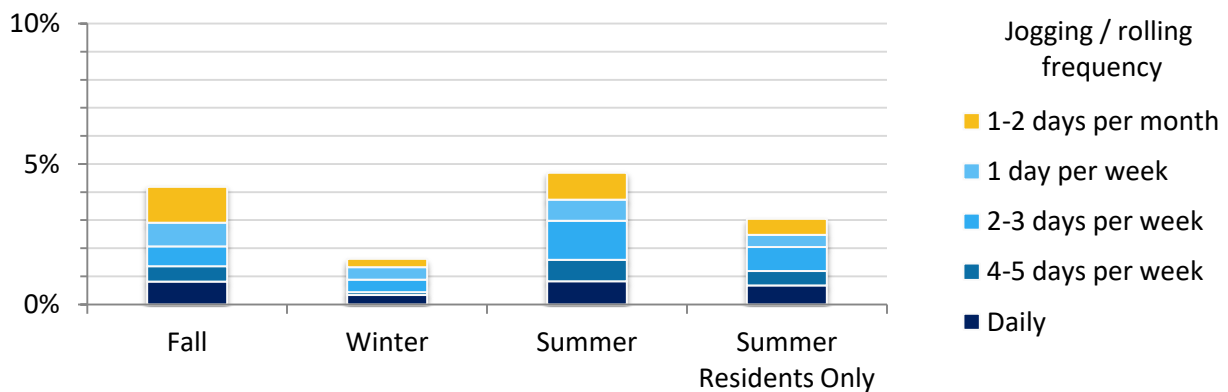
Summer Residents Only: excludes post-secondary students who are Fall-Winter residents.
Rolling includes travel via skateboard, rollerblades, scooter, mobility device, or longboard.
Question was asked of a subsample of surveyed residents 16+ years of age.

Table 38. Reported Frequency of Active Mode Trips by Season

Biking	Fall	Winter	Summer	Summer Residents Only
Daily	3.7%	1.3%	4.8%	4.0%
4-5 days/week	3.4%	0.7%	4.7%	4.0%
2-3 days/week	4.5%	1.3%	6.5%	5.3%
1 day/week	2.8%	0.7%	3.8%	3.2%
1-2 days/month	4.1%	1.2%	6.0%	4.9%
Very rarely	12.4%	6.4%	10.5%	9.6%
Never	69.1%	88.5%	63.6%	54.3%
At least once per week	14.4%	4.0%	19.9%	16.5%
Differs from Fall		25.8%	19.9%	18.0%

Walking	Fall	Winter	Summer	Summer Residents Only
Daily	26.3%	23.6%	27.1%	18.1%
4-5 days/week	9.6%	7.4%	11.0%	9.0%
2-3 days/week	12.4%	10.0%	14.3%	12.8%
1 day/week	7.0%	6.7%	6.7%	6.3%
1-2 days/month	8.8%	6.1%	7.5%	7.1%
Very rarely	14.7%	15.9%	13.0%	12.4%
Never	21.3%	30.3%	20.2%	19.4%
At least once per week	55.2%	47.7%	59.2%	46.1%
Differs from Fall	100.0%	28.9%	21.1%	20.8%

Jogging or Rolling	Fall	Winter	Summer	Summer Residents Only
Daily	0.8%	0.3%	0.8%	0.7%
4-5 days/week	0.5%	0.1%	0.8%	0.5%
2-3 days/week	0.7%	0.4%	1.4%	0.9%
1 day/week	0.8%	0.4%	0.7%	0.4%
1-2 days/month	1.3%	0.3%	1.0%	0.6%
Very rarely	2.1%	1.4%	2.1%	1.8%
Never	93.7%	97.0%	93.3%	80.6%
At least once per week	2.9%	1.3%	3.7%	2.5%
Differs from Fall		4.6%	2.8%	2.1%

Summer Residents Only: excludes seasonal post-secondary students who reside in Kingston only from September to April.

Rolling includes travel via skateboard, rollerblades, scooter, mobility device, or longboard.

Question was asked of a subsample of surveyed residents 16+ years of age.

4.4.9   Mode Shares for Permanent Residents (Summer Residents)

Figure 56 presents the overall mode share compared to the mode share for just the subpopulation of permanent residents, with the mode shares for the portion of the post-secondary population that is seasonal (those who do not live in Kingston in May 2019).

The dominant mode for seasonal student residents is walking, with a 62% mode share, with transit being the next most used mode (17% mode share), followed by driving at only 10% of trips. Post-secondary students were asked to exclude trips made entirely on campus, so these figures are based on off-campus trips. Removal of the trips by seasonal student residents reduces the number of daily trips by 41,000, and permanent residents' mode shares are revealed as having a notably higher driving mode share (at 56%) and a notably lower walking mode share (at 13%) compared to the overall survey result.

This analysis may provide a general idea of what the mode shares could be like in late Spring and Summer. It should be noted, however, that the mode shares of permanent residents are more likely to be indicative of travel patterns in May and June after seasonal post-secondary student residents have left for the summer but before the K-12 school session ends. The mode shares may also be affected by seasonal mode choices as discussed in the preceding sections (with an increase in cycling and jogging/rolling trips), as well as by permanent residents' vacation travel (whether to local destinations such as summer homes or campsites or extended absences from the City for travel further afield), and the absence of the portion of permanent residents who obtain employment outside the City in the summer months.

Figure 56. Fall 2019 Mode Shares for Permanent vs. Seasonal PSE Student Residents
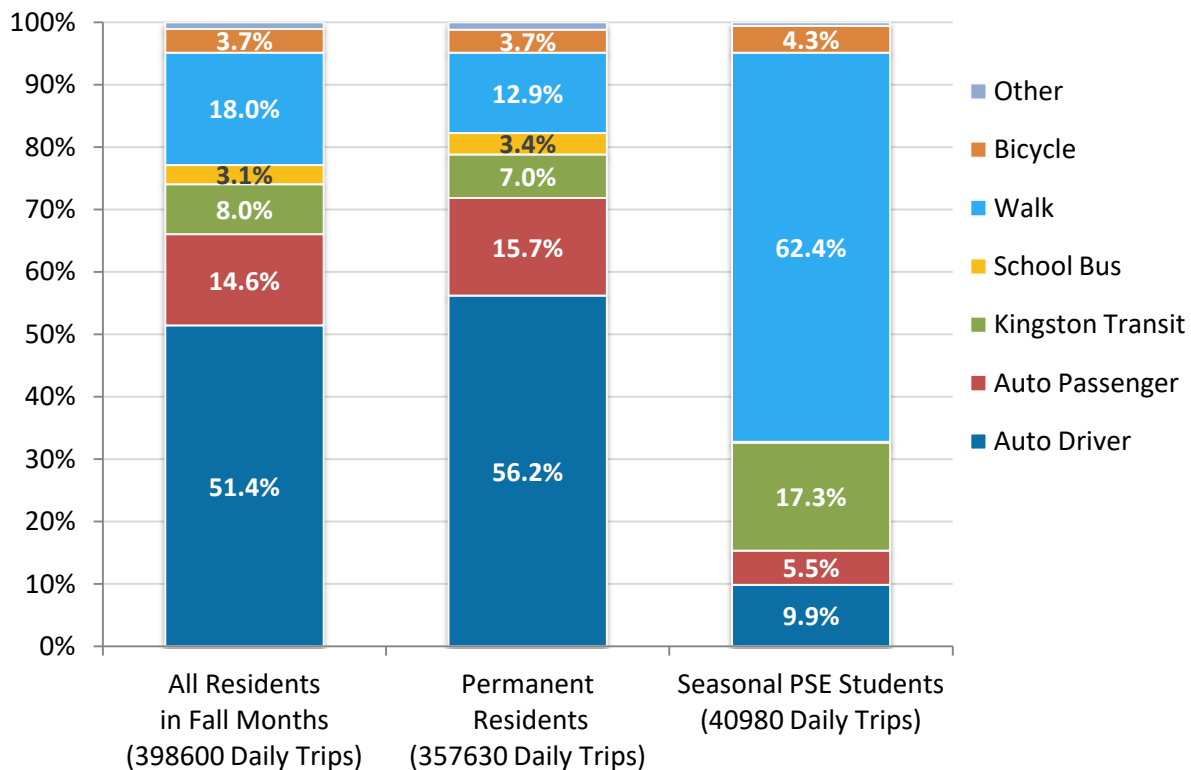
4.5   Trip Purpose

Trip purposes based on the activity at the trip destination are broken out in **Figure 57** and **Table 39**.

- Overall, commuting and serve-passenger (passenger drop-off or pick-up) destinations sum to about 31% of all trips (with many of the drop-off/pick-up trips being commute-related in that they are school trips or work trips for passengers being served). Just under 14% of these trips are to a usual workplace (almost 11%) or are work-related (almost 4%). The proportion of trips to post-secondary school (almost 6%) is greater than that of trips to K-12 school (4%), reflecting the large university/college population.
- Shopping and trips for personal business (banking, medical appointments, etc.) together account for 16% of all trips.
- Trips for recreation and social purposes account for about 10% of all trips, while trips to restaurants and coffee shops (whether for dine-in or take-out) account for another 4%.
- Of the total, 38% of trips are returning home from these various destinations.

Figure 57. Trip Purposes
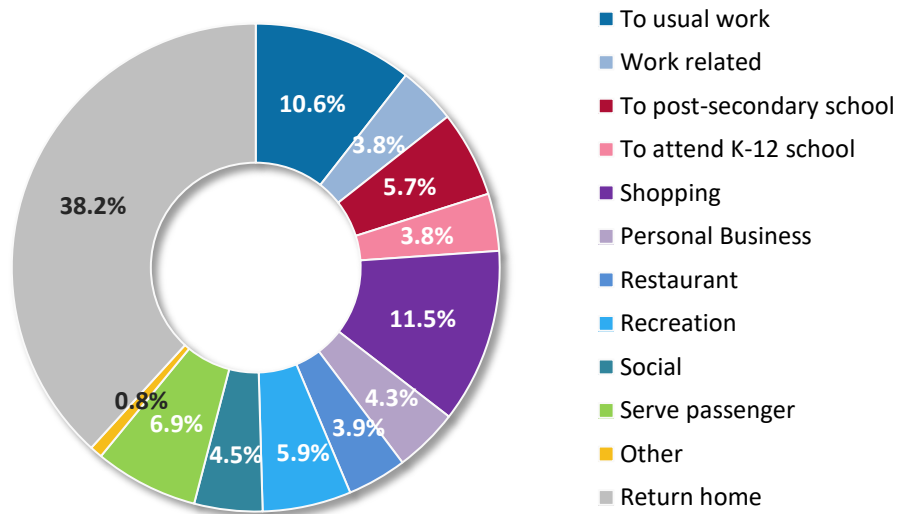
Work-related may include business errands, meetings, or trips to worksites for workers without a usual workplace.
Serve passenger: drop off or pick up a passenger, or escort someone to a destination (e.g., walk child to school).

Table 39. Trip Purposes (Trips and % of Trips) – by Place of Residence

	Total	To usual work	Work related	To post-secondary school	To K-12 school	Shopping	Personal Business	Restau-rant	Rec-reation	Social	Serve pass-enger	Other	Return home
Daily Trips													
Total	398,600	42,070	15,290	22,790	15,140	46,030	17,050	15,710	23,420	17,990	27,420	3,330	152,360
Urban Area	366,720	38,350	13,560	22,340	13,620	42,090	15,620	14,300	21,530	16,460	25,180	3,140	140,550
Central	194,410	16,980	6,300	19,130	5,240	22,210	8,170	7,580	10,800	9,410	11,210	1,560	75,820
West	147,620	17,820	6,350	2,600	6,770	17,400	6,800	5,760	9,320	6,190	12,280	1,320	55,020
East	24,690	3,550	910	610	1,610	2,480	640	960	1,410	860	1,690	260	9,710
Rural	31,880	3,730	1,730	450	1,520	3,940	1,440	1,410	1,890	1,540	2,240	190	11,810
% of Trips													
Total	398,600	10.6%	3.8%	5.7%	3.8%	11.5%	4.3%	3.9%	5.9%	4.5%	6.9%	0.8%	38.2%
Urban Area	366,720	10.5%	3.7%	6.1%	3.7%	11.5%	4.3%	3.9%	5.9%	4.5%	6.9%	0.9%	38.3%
Central	194,410	8.7%	3.2%	9.8%	2.7%	11.4%	4.2%	3.9%	5.6%	4.8%	5.8%	0.8%	39.0%
West	147,620	12.1%	4.3%	1.8%	4.6%	11.8%	4.6%	3.9%	6.3%	4.2%	8.3%	0.9%	37.3%
East	24,690	14.4%	3.7%	2.5%	6.5%	10.0%	2.6%	3.9%	5.7%	3.5%	6.9%	1.1%	39.3%
Rural	31,880	11.7%	5.4%	1.4%	4.8%	12.3%	4.5%	4.4%	5.9%	4.8%	7.0%	0.6%	37.0%

Work-related: business errands, meetings, or trips to worksites for workers without a usual workplace.

Serve passenger: drop off or pick up a passenger, or escort someone to a destination (e.g., walk child to school).

4.5.1 Daily Number of People with Work Commutes

Table 40 presents the information on the proportion of workers who made a work-related trip on their travel day. It also provides insight on those who did not travel for work. **On any given weekday, four out of five (81%) full-time workers make at least one work trip, while 4% work from home or telecommute.** The remainder either did not work or were out of town on business. Amongst part-time workers, only 43% travel for work, with 8% working from home or telecommuting. As work arrangements evolve in terms of telework and self-employment, this will provide a useful baseline for future surveys.

Table 40. Workers with at Least One Work Trip, Reasons for Not Working

	Full-Time	Part-Time	Total Workers
Workers	46,880	15,090	61,970
Went to work or had work related trip	38,020	6,500	44,520
% of workers	81%	43%	72%
Did not travel to work	8,860	8,490	17,350
% of workers	19%	56%	28%
Worked from home / telecommuted	4%	8%	5%
Out of town / away on business	3%	2%	2%
Sick/ill or caring for other sick/ill household member	1%	1%	1%
Other reason	3%	5%	4%
Not scheduled / did not work	8%	40%	15%

4.5.2 Trip Purpose by Start Hour

Figure 58 provides another view of daily trips, illustrating the distribution of trip purposes by time of day (by one-hour interval based on the time of departure). Some trip purposes have been grouped together to simplify the categories displayed in the chart.

As can be expected, there is a concentrated AM peak dominated by commute trips to work and school, as well as related trips to drop off passengers, ending by 9 AM. Other kinds of trip purposes such as shopping and personal business begin to increase to a peak by 10 AM, then remain relatively constant between 11 PM and 5PM. The longer PM peak, which starts to build mid-afternoon, is dominated by return-home trips, but with notable proportions of trips with pick-up/drop-off, shopping/personal business and social/recreational purposes.

Figure 58. Trips by Grouped Purposes by Trip Start Hour
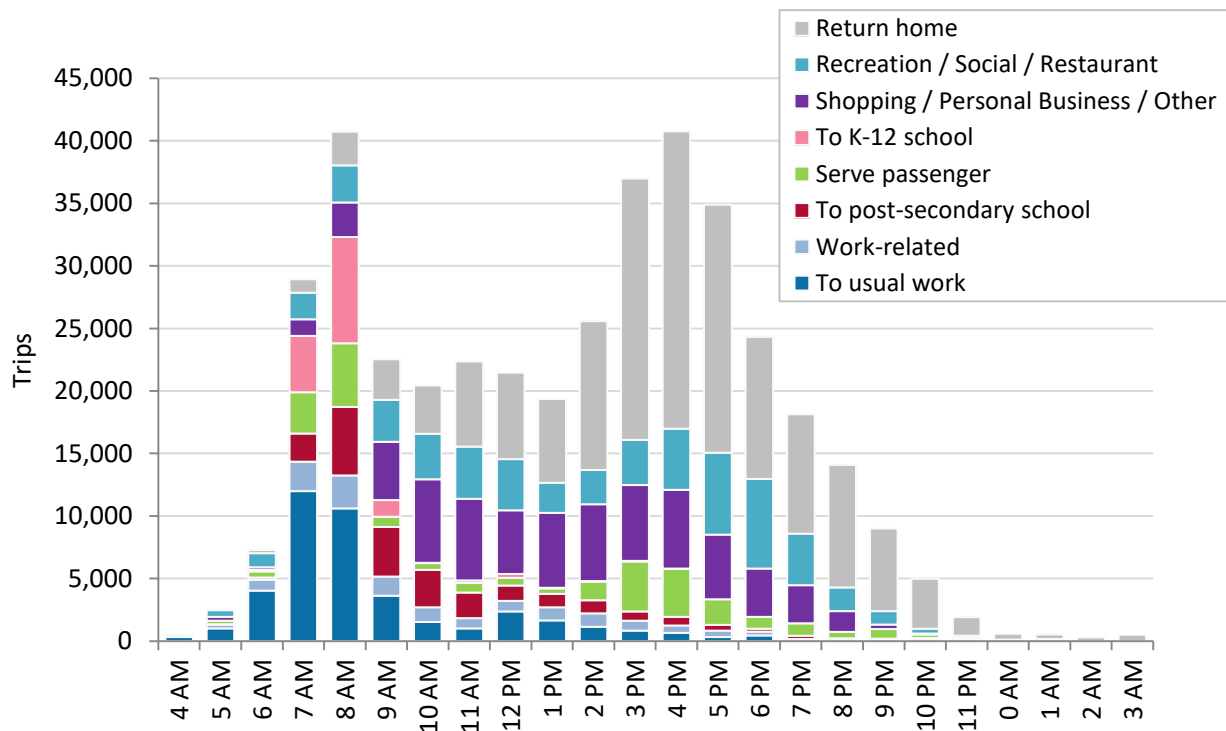
Work-related may include business errands, meetings, or trips to worksites for those without a usual workplace.
Serve passenger: drop off or pick up a passenger, or escort someone to a destination (e.g., walk child to school).

4.5.3 Mode Shares by Trip Purpose

Mode shares and volumes by trip purpose are presented in the following two tables (**Table 41**, **Table 42**) and illustrated in **Figure 59**.

- **The survey results illustrate the predominance of driving as a travel mode for work commutes (67% more share), while the modest auto passenger share (7%) infers that most work commutes are taking place as single-occupancy vehicle trips (albeit with some work journeys involving trips to drop off or pick up children from school before or after work).**

- Trips for shopping and personal business also have majority driving mode shares (64%, and 59% respectively), but with notable auto passenger mode shares (15%, 19%) I.e., the auto trips for these purposes are likely to have higher vehicle occupancy than auto trips for commute purposes.

- Transit comprises about one-quarter (26%) of post-secondary school commutes, with walking being the predominant mode (52% of trips to post-secpondary instutions) and driving accounting for 11%. **Of note, travelling to one of Kingston's three major post-secondary institutions is the single most common use of Kingston Transit.** 5,800 out of almost 32,000 daily transit trips are for the purposes of traveling to a post-secondary institution, with presumably a similar number of associated return-home trips**.**

- Bicycle mode shares are highest for post-secondary commutes (6.7%), work commutes (5.2%) and trips to destinations for recreational activities (5.6%).

- Of trips to attend K-12 school, 38% are school bus trips, with 27% via auto passenger (e.g., parents driving children to school)and almost 7% via transit bus.

- Auto passenger mode shares are also high for restaurant, recreation, and social trips, ranging from 20% to 25%, compared to drive mode shares of 48% to 50%, indicating higher auto occupancy for trips for these purposes.

Table 41. Mode Shares by Trip Destination Purpose

Trip Purpose	Total Trips	Auto Driver	Auto Passenger	Kingston Transit	School Bus	Walked	Bicycle	Other
Total Trips	398,600	51%	15%	8%	3%	18%	4%	1%
To usual work	42,070	67%	7%	9%	0%	11%	5%	1%
Work related	15,290	75%	5%	5%	1%	9%	3%	3%
To post-secondary school	22,790	11%	4%	26%	0%	52%	7%	1%
To K-12 school	15,140	2%	27%	7%	38%	22%	4%	1%
Shopping	46,030	64%	15%	5%	0%	13%	2%	1%
Personal Business	17,050	59%	19%	8%	0%	11%	2%	2%
Restaurant	15,710	50%	20%	5%	0%	25%	1%	1%
Recreation	23,420	48%	25%	5%	1%	16%	6%	1%
Social	17,990	48%	23%	6%	1%	18%	4%	1%
Serve passenger	27,420	76%	12%	2%	1%	8%	1%	0%
Other	3,330	23%	14%	13%	8%	26%	4%	13%
Return home	152,360	49%	15%	9%	4%	19%	4%	1%

Work-related: business errands, meetings, or trips to worksites for workers without a usual workplace.

Serve passenger: drop off or pick up a passenger, or escort someone to a destination (e.g., walk child to school).

Table 42. Estimated Daily Volume of Trips by Mode by Trip Destination Purpose

Trip Purpose	Total Trips	Auto Driver	Auto Passenger	Kingston Transit	School Bus	Walked	Bicycle	Other
Total Trips	398,600	204,950	58,300	31,950	12,320	71,740	14,940	4,400
To usual work	42,070	27,970	3,030	3,840	10	4,580	2,170	480
Work related	15,290	11,500	790	690	120	1,320	390	480
To post-secondary school	22,790	2,510	870	5,800	30	11,880	1,540	170
To K-12 school	15,140	270	4,090	990	5,800	3,260	620	110
Restaurant	46,030	29,460	6,780	2,500	0	6,020	990	280
Recreation	17,050	9,970	3,170	1,420	40	1,840	340	270
Social	15,710	7,820	3,090	730	0	3,860	110	90
Shopping	23,420	11,140	5,900	1,140	160	3,620	1,300	160
Personal Business	17,990	8,610	4,100	990	90	3,300	690	220
Serve passenger	27,420	20,760	3,370	460	220	2,290	280	40
Other	3,330	770	450	430	250	860	120	440
Return home	152,360	74,180	22,660	12,960	5,600	28,910	6,400	1,660

Work-related: business errands, meetings, or trips to worksites for workers without a usual workplace.

Serve passenger: drop off or pick up a passenger, or escort someone to a destination (e.g., walk child to school).

Figure 59. Mode Shares by Trip Destination Purpose
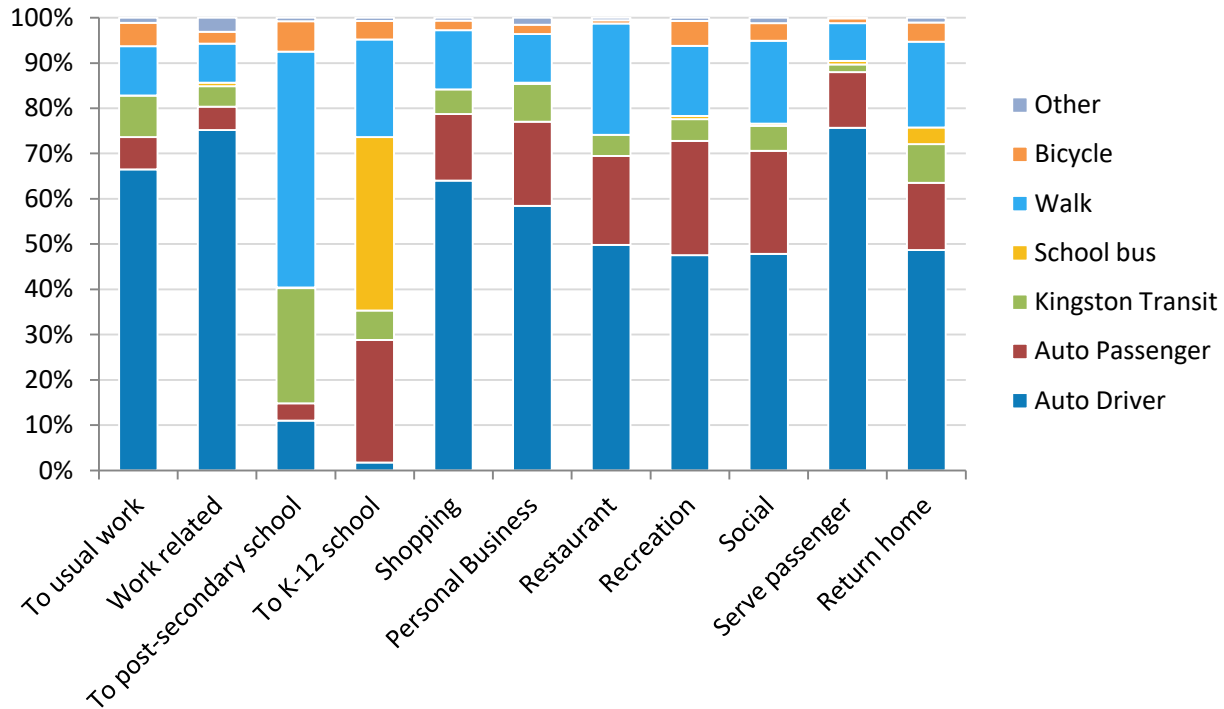
4.5.4 Home-Based Trip Purposes

The preceding sections examine trip purposes in terms of the reporting destination activity. It can also be useful to examine trips in terms of an overall purpose as identified from looking at both the origin and the destination. The following four 'home-based purpose' categories take into account both the origin and destination location or purpose: home-based work (HBW), home-based school (HBS), home-based other (HBO), and non-home-based (NHB). These categories (or ones similar to them) are often used in the development of transportation models. **Table 43** presents the trip distributions.

Overall, HBW trips account for 18% of all trips, while HBS accounts for almost the same magnitude (almost 17%). The largest category is HBO trips at 43%, followed by NHB (the trips between destinations away from home) at 23%. Residents of the Central sub-area have an equivalent number of HBW trips as in the West sub-area (about 30,600 and 29,200 respectively), even though the percentage of residents' trips is lower (16% vs. 20%). The Central sub-area has the most HBS trips both numerically (41,000) and proportionately (21% of total), reflecting the travel habits of the student population in the area.

Table 43. Home-Based Trip Purposes – by Place of Residence

Expanded Trips	City of Kingston	Urban Area	Central	West	East	Rural
Total Trips	**398,600**	**366,720**	**194,410**	**147,620**	**24,690**	**31,880**
HBW	72,770	65,930	30,580	29,210	6,140	6,850
HBS	63,270	60,330	41,060	15,750	3,520	2,940
HBO	169,750	155,990	80,930	65,310	9,750	13,760
NHB	92,810	84,470	41,840	37,360	5,270	8,340
% of Trips						
HBW	18.3%	18.0%	15.7%	19.8%	24.9%	21.5%
HBS	15.9%	16.5%	21.1%	10.7%	14.3%	9.2%
HBO	42.6%	42.5%	41.6%	44.2%	39.5%	43.1%
NHB	23.3%	23.0%	21.5%	25.3%	21.4%	26.2%

HBW = home-based work/work-related. HBS = home-based school (K-12 or PSE). HBO = home-based other.

NHB = non-home-based.

Looking at the trips for different home-based purposes by hour across the day (**Figure 60**) reveals a more complete picture of travel patterns, as the return-home trips are categorized by the previous activity (at the trip origin).

- The survey results show a morning peak in HBW trips in the hour starting at 7 AM and an afternoon peak in the hour starting at 4 PM, with a considerable volume in the 5 PM hour also.

- HBS trips peak at 8 AM and again at 3 PM.

- HBO trips also peak at 8AM in the morning, then are relatively steady throughout the day, peaking again across two hours from 4 PM to 6 PM. A portion of the HBO trips during the morning and afternoon peaks may be part of work and school commutes if the trip includes a stop along the way for another purpose in between home and the commute destination.

- Non home-based trips are spread throughout the daytime, building from 8 AM through to a peak in the 4 PM hour and slowing down thereafter. A portion of NHB trips may be the result of trips made between work (or school) and another activity (e.g., an HBO trip to a coffee shop may be followed by an NHB trip to work, as part of an overall trip chain from home to work).

Figure 60. Home-Based Trip Purposes by Time of Day
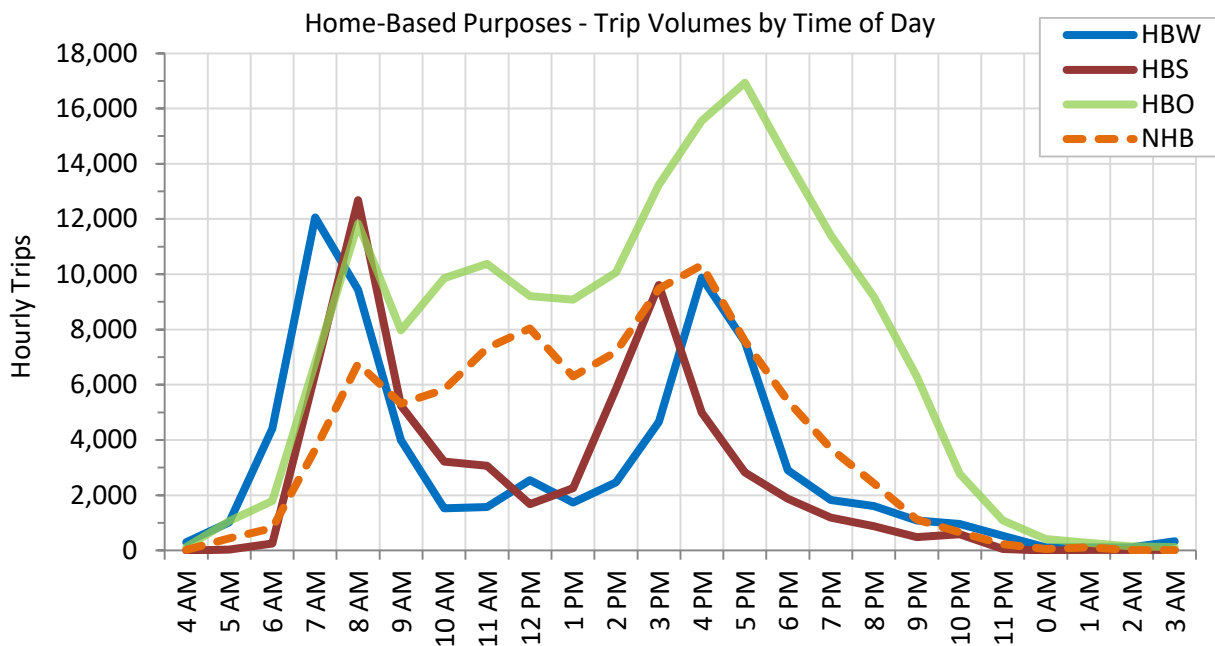
HBW = home-based work/work-related. HBS = home-based school (K-12 or PSE). HBO = home-based other. NHB = non-home-based.

Figure 61 provides a breakdown of just the HBO trips into HBPass (Home-Based Serve Passenger (pick-up or drop off trips)); HBShopPers (Home-Based Shopping and Personal Business); and HBRecSoc (Home-Based Recreational, Social, and Restaurant trips).

This breakdown reveals that home-based trips to serve passengers peak in the morning in unison with the school trips shown in Figure 36, picking up again between 3 PM and 5 PM with modest levels across the early evening. The majority of shopping and personal business related trips that involve a departure from or return to home are spread relatively evenly from 10 AM to 5 PM. Social, recreational, and restaurant trips have modest volumes from the morning through to early afternoon. Beginning at 4 PM, HBRecSoc trips rise to a peak at 6 PM, and then decline steadily.

Figure 61. Breakdown of Home-Based Other (HBO) Purposes by Time of Day
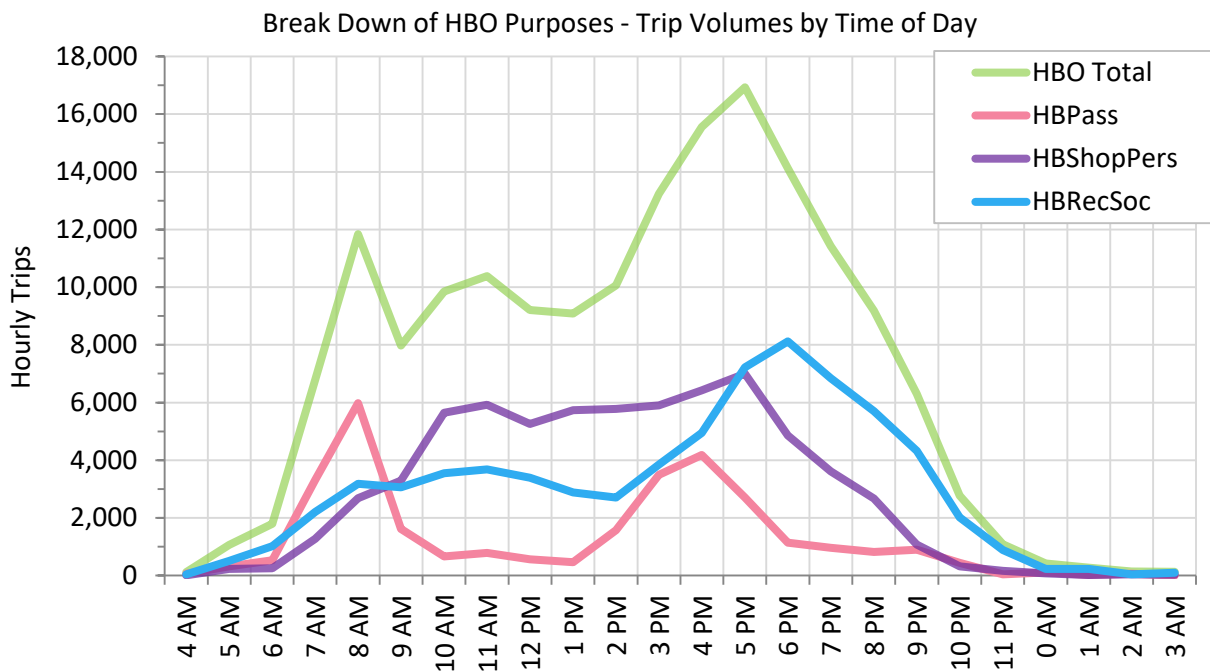
Break Down of HBO Purposes - Trip Volumes by Time of Day

HBO = home-based other. HBPass = home-based serve passenger (pick up or drop off someone else).
HBShopPers = shopping, personal business (medical appointment, banking, personal care, etc.), other
HBRecSoc = recreation, social outing, restaurant (whether eat-in or take out)
Chart excludes HBW, HBS, and NHB trips (see previous chart).

Table 1 and Figure 62 break out the mode shares for the various home-based trip purposes. The results for home-based purposes are very similar to those provided earlier by detailed destination purpose. Of note, non-home-based (NHB) trip purposes have a higher auto driver mode share than the average, which is likely because use of an automobile can facilitate making trips for other purposes while away from home and because some NHB trips are the result of making stops along the way to or from work, which also has a higher auto driver mode share.

Table 44. Home-Based Trip Purpose Mode Shares

	Trips	Auto Driver	Auto Passenger	Kingston Transit	School bus	Walk	Bicycle	Other
Total Trips	398,600	51%	15%	8%	3%	18%	4%	1%
HBW	72,770	66%	7%	10%	0%	10%	6%	1%
HBS	63,270	6%	11%	18%	17%	41%	6%	1%
HBO	169,750	57%	19%	5%	0%	15%	3%	1%
HBPass	30,740	74%	11%	1%	0%	12%	2%	0%
HBShopPers	68,260	59%	17%	8%	0%	13%	2%	1%
HBRecSoc	70,750	48%	25%	5%	0%	17%	4%	1%
NHB	92,810	61%	15%	5%	1%	15%	2%	1%

Figure 62. Home-Based Trip Purpose Mode Shares
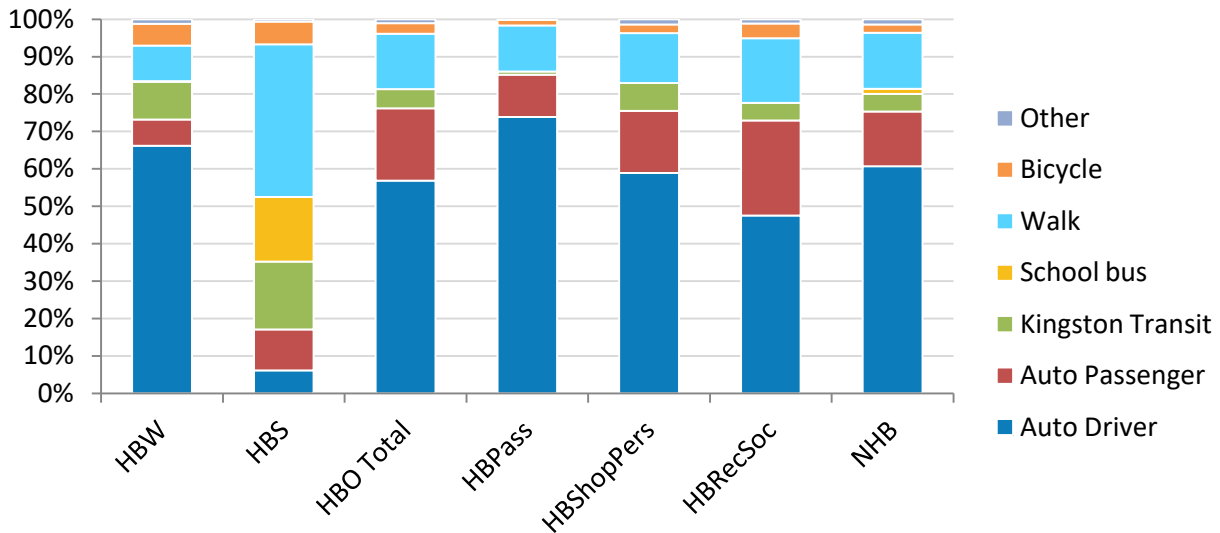
HBO = home-based other. HBPass = home-based serve passenger (pick up or drop off someone else).
HBShopPers = shopping, personal business (medical appointment, banking, personal care, etc.), other
HBRecSoc = recreation, social outing, restaurant (whether eat-in or take out)
Chart excludes HBW, HBS, and NHB trips (see previous chart).

4.6   Vehicle Occupancy

The survey asked respondents who reported auto driver trips to indicate the total number of occupants in the vehicle, including the driver. The survey results for the study area are reported in **Figure 63** and **Table 45.**

Just over seven out of ten vehicular trips (72%) are in single-occupant vehicles (SOVs). One-fifth are in two-person high-occupancy vehicles (HOV-2), while 7% had three or more occupants (HOV-3+). The average number of vehicle occupants is 1.37. Vehicle occupancy is highest amongst residents of the Central sub-area, and lowest amongst East and Rural residents.

Figure 63. Vehicle Occupancy

- 1 occupant (SOV)
- 2 occupants (HOV-2)
- 3 or more occupants (HOV-3+)
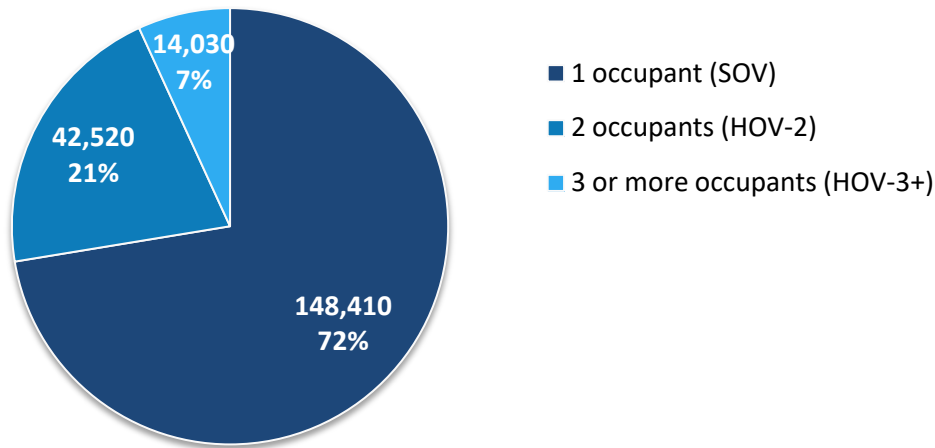
Table 45. Vehicle Occupancy – by Place of Residence

	City of Kingston	Urban Area	Central	West	East	Rural
Auto Driver Trips	204,950	181,960	72,860	95,220	13,880	22,990
1 occupant (SOV)	72%	72%	70%	73%	77%	77%
2 occupants (HOV-2)	21%	21%	23%	21%	17%	17%
3 or more occupants (HOV-3+)	7%	7%	7%	7%	6%	6%
Average Vehicle Occupancy	1.37	1.38	1.41	1.36	1.31	1.32

4.7   Transit Trips

Table 46 provides information on transit trips made. The survey results suggest that in the fall of 2019, almost 32,000 transit trips were made each weekday, and, when taking into account transfers, over 36,370 bus boardings. It may be noted that these figures do not necessarily match Kingston Transit fare counts, as boardings by Queen's University and St. Lawrence College students using their student ID as a boarding pass may not always be captured despite the best efforts of transit operators.

Overall, 13% of trips required a transfer, however, two-thirds of transit users living in the Rural sub-area reported having to make a transfer, although the results for this sub-area should be interpreted with caution due to a small sample of transit trips made by residents of this area.

Overall, about 6% of transit trips were accessed using a mode other than walking at one end of the trip. About 3% were drive-access transit trips ('park & ride'), with this percentage being higher for residents of West, East and Rural sub-areas (9%, 7%, 18% respectively). Auto passenger ('kiss and ride'), bicycle, and other access modes each accounted for about 1% of all transit trips.

A closer examination of the data suggests that up to 500 drive-access-transit trips park at official Park & Ride locations each day. When considering both directions of travel, there are likely about 250 drivers who use these facilities. Another 500 drive-access-transit trips did not make use an official Park & Ride location. The survey results on Park & Ride use should be interpreted with caution due to the small sample of drive-access-transit trips captured in the survey (n=48 trip records in the survey data set representing 1,000 drive-access transit trips).

Table 46. Number of Bus Routes Taken, Transit Access Mode

	City of Kingston	Urban Area	Central	West	East	Rural
Transit Trips	31,950	31,560	21,660	7,940	1,950	400
Boardings	36,370	35,700	24,120	9,410	2,170	670
Avg. Boardings per Transit Trip	1.14	1.13	1.11	1.19	1.11	1.68
# of buses taken (% of trips)						
1 route (no transfers)	86.6%	87.3%	89.0%	82.3%	88.7%	32.2%
2 routes (1 transfer)	13.0%	12.3%	10.7%	16.8%	11.3%	67.8%
3 routes (2 transfers)	0.4%	0.4%	0.3%	0.8%	0.0%	0.0%
Transit Access Mode						
Walk-Access Transit (WAT)	93.8%	94.2%	96.6%	88.4%	91.3%	57.2%
Drive-Access Transit (DAT)	3.3%	3.1%	0.8%	8.5%	7.4%	18.1%
Drive-Access Transit - Passenger (DAT-P)	1.1%	0.9%	0.5%	2.3%	0.8%	17.1%
Bicycle-Access Transit	0.9%	0.8%	1.0%	0.8%	0.0%	2.8%
Other Access Mode	0.9%	0.8%	1.1%	0.1%	0.5%	4.8%

WAT = both transit access and egress mode were walking (or bus stop was right at trip origin and/or destination).
DAT = at least one end of the transit trip had access or egress mode of auto driver or motorcycle.
DAT-P = at least one end of the transit trip had access or egress mode of auto passenger, and did not have auto driver at the other end.
Other Access = at least one end of the transit trip had access or egress mode of taxi, Kingston Access Bus (KAB), school bus, moped, or other mode, and did not have auto driver or auto passenger at the other end.
Bicycle Access = at least one end of the transit trip had access or egress mode of bicycle, and did not have auto driver, auto passenger, or another mode other than walking at the other end.

4.8   Straight-Line Trip Distances

4.8.1   Average Straight-Line Trip Distance

Mean trip distances are presented below (**Table 47**). In this analysis, trip distance was calculated as the straight-line distance between origin and destination (not actual distance travelled on streets).

Work trips are longest, with an average straight-line distance from home to work of 7.2 km. School trips are shortest (2.5km). Home-based other and non-home based trips are equivalent at 4.6 km on average.

The average auto driver trip is 6.4 km, with auto passenger trips 5.5 km. Transit trips average 3.8 km and school bus trips 4.1 km. The average cycling trip is 1.9 km, and the average walking trip is 700 m.

Table 47. Average Straight-Line Trip Distance (km) by Home-Based Trip Purpose and Mode

Purpose	Auto Driver	Auto Passenger	Kingston Transit	School bus	Walk	Bicycle	Other	Total
HBW	9.1	5.5	4.7	-	1	2.5	5.4	**7.2**
HBS	6.4	3.2	3.4	4.2	0.8	1.6	3.4	**2.5**
HBO	5.4	6.2	3.7	-	0.7	1.7	4.7	**4.6**
NHB	5.7	5.1	3.2	3.3	0.7	1.8	5.7	**4.6**
Total	**6.4**	**5.5**	**3.8**	**4.1**	**0.7**	**1.9**	**4.9**	**4.8**

HBW=home-based work, HBS=home-based school, HBO=home-based other, NHB=non-home based.
Distances of >100 km for inter-city travel were excluded (the top 1.0% of all trip distances), so as not to overly skew averages.

4.8.2   Distribution of Straight-Line Distances by Mode and Purpose

When broken out by mode, the distributions of trip distances have similar patterns (**Figure 64**), with the exception of walking and cycling, mainly because most people will opt for another mode once a certain distance is reached. Three quarters (76%) of all walking trips have a straight-line distance of within 1 km, and three-quarters (74%) of all cycling trips have a straight-line distance of within 2 km. Trips to post-secondary school, K-12 school, and restaurants tend to be shorter than those made for other purposes (**Figure 66**).

Figure 64. Trip Straight-Line Distances by Mode

76%

<<1 km ■1 km ■2 km ■3 km ■4 km ■5 km ■6 km ■7 km ■8 km ■9 km ■10 km ■11 km ■12+ km
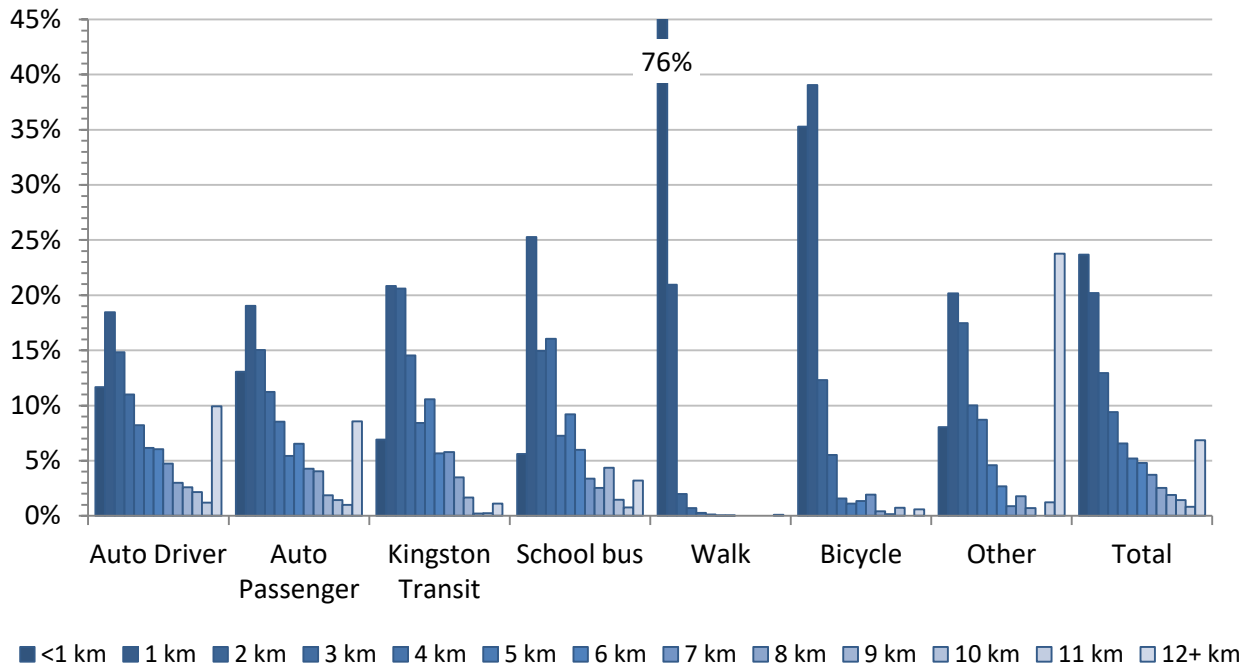
1km = at least 1km but less than 2km, etc.

Figure 65. Trip Straight-Line Distances by Specific Destination Purpose

<<1 km ■1 km ■2 km ■3 km ■4 km ■5 km ■6 km ■7 km ■8 km ■9 km ■10 km ■11 km ■12+ km
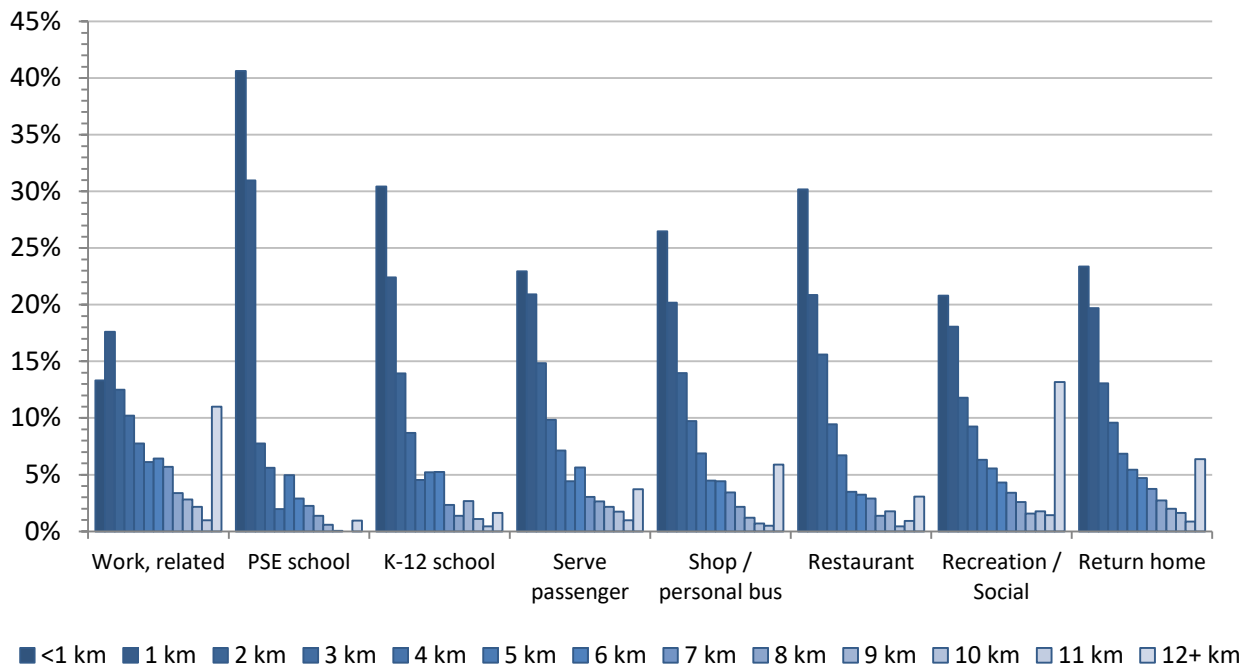
1km = at least 1km but less than 2km, etc.

4.8.3 Total Person-Kilometres Travelled (Straight-Line Distance)

The aggregate distance traveled was calculated by summing the product of straight-line trip lengths for local trips by all residents, excluding inter-city trips of greater than 100 km. The result is the total straight-line person-kilometres (straight-line PKT), which is an indicator of the overall travel activity on the transportation network. It is important to note that these results only account for straight-line PKT for personal trips made by residents of the area on weekdays in fall 2019. The survey did not capture commercial trips or travel on weekends, which also contribute to PKT.

In total, residents of Kingston travel almost 1.9 million kilometres in the local area each day (1,878,300 km, cumulative straight-line distance). Auto driver trips account for 1,293,000 km, auto passenger trips 315,000 km, transit trips 119,900 km, and school bus trips 50,100 km. Amongst active modes, walking accounts for 53,600 km of travel daily, while cycling accounts for 28,500 km. When future surveys are conducted, these figures will serve as a useful baseline against which to track the impacts of changes to transportation infrastructure and policy, population growth, and evolving travel patterns on the demands placed on the transportation network.

Figure 66. Straight-Line Person-Km Travelled by Mode (Daily)
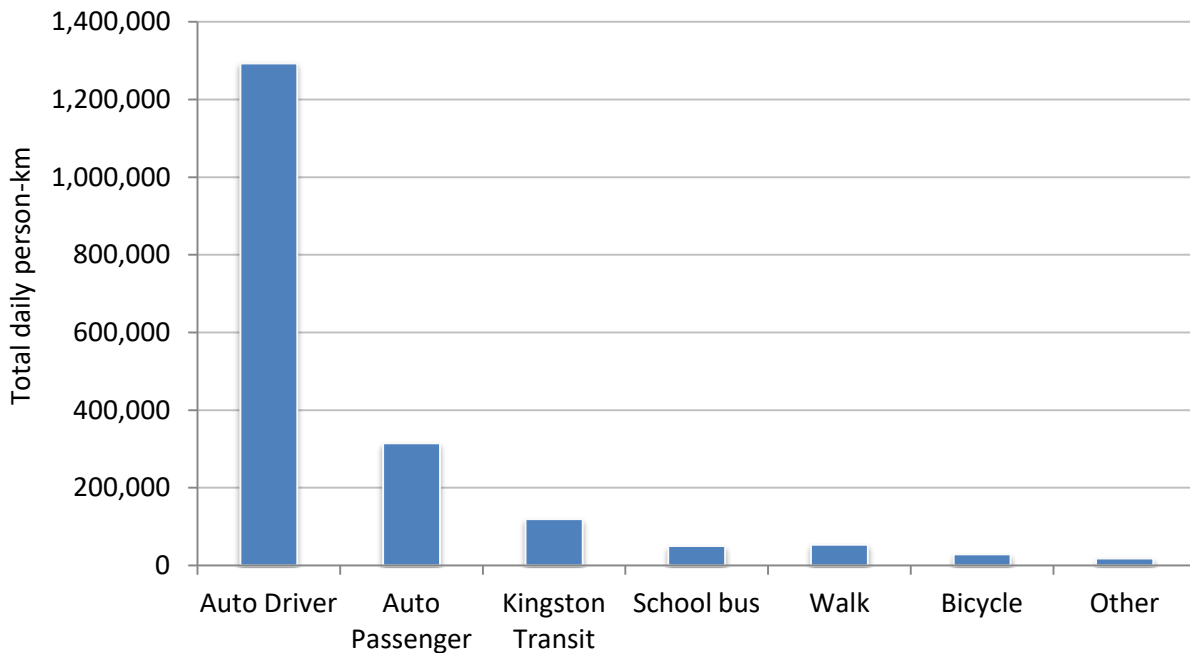
Excludes inter-city trips of >100 km.

4.9   Actual Trip Distance and Duration for Selected Modes

Trip origins, destinations, departure times, and modes of travel were processed via a Google API to determine the most likely actual distance travelled, based on Google's recommended route for that mode for that time of day.[15] The Google API also returns the estimated trip duration for the recommended route. These distances and durations could only be determined for certain types of trips (auto driver, auto passenger, transit, walking, and cycling). Results were not available for school bus trips or most of the modes aggregated as 'other modes' (intercity coach, air, rail, ferry or other uncommon modes). Results may not always have accounted for mixed-mode drive-access or bicycle-access transit trips or may be inaccurate for such trips, however, these trips make up a very small portion of overall trips.

The average actual trip distances and estimated actual PKT are presented in **Table 48** for auto driver, auto passenger, transit, walk, and bicycle trips. The results for automobile driver trips represent the actual vehicle-kilometres travelled (VKT), which may be of interest for vehicle emissions estimation.

- When taking into account the most likely route travelled, the average auto driver trip is 8.2 km (compared to 6.5 km straight-line distance) and almost 11 minutes in duration.
- Walk-access transit trips average 6.0 km (compared to 3.8 km straight line distance) and 26 minutes in duration (taking into account transfers, and walking to the boarding bus stop and from the alighting bus stop to the destination).
- The average cycling trip is 2.5 km and 8.5 minutes in duration
- The average walking trip is 900 m and about 10 minutes in duration.

The distributions of estimated actual trip distances and durations are illustrated in the charts in **Figure 67** and **Figure 68** (page 128). For most modes, at least three-quarters of all trips are less than 15 minutes in duration (auto driver 79%, auto passenger 81%, bicycle 87%, walk 73%). The duration estimates from the Google Map Directions API suggest that 19% of transit trips take less than 15 minutes, with another 46% taking 15 to 30 minutes, and the remaining 35% being 30 minutes or more, taking into account time for transfers and walking to and from bus stops. Examination of the data also revealed that 90% of walking trips are within 1.6 km (a 20-minute walk at average walking speed) and 90% of cycling trips are within 4.6 km (a 16-minute bike ride at average cycling speed). These 90th-percentile distances are used as the threshold for 'walkable' and 'bikeable' trips in Section **4.10** of this report.

Table 49 presents estimates for the total cumulative kilometers travelled each day by private vehicle (excluding commercial trips), walking, and bicycle. The results suggest that Kingston drivers, taken together, incur almost 1.7 million vehicle kilometres on roads within Kingston each weekday, or 433.6 million km per year on weekdays (with the annual estimate taking into account that a portion of residents in the fall are seasonal students who only reside in Kingston from September through April).

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[15] Distances returned by the Google Map Directions may differ from actual distance travelled, as the survey respondent may not have taken the same route recommended by Google for the time of day and typical driving conditions. Estimates were not returned for some multi-mode auto-transit trips or school bus trips. Missing Google distances for driving trips were imputed.

Pedestrians walk over 66,000 km per day or 15.4 million km per year on weekdays, while Kingston cyclists bike 36,700 km per day on roads, pathways, and trails, or 9.3 million km per year, excluding trips with no destination made solely with the purpose of exercise (which were not captured in the survey).

Table 48. Average Actual Trip Distance (Km) and Duration (Minutes) by Home-Based Trip Purpose and Mode – Selected Modes

Purpose	Auto Driver	Auto Passenger	Kingston Transit*	Walk	Bicycle	Other**
Average Trip Distance (km)						
HBW	11.5	7.5	7.2	1.3	3.3	7.2
HBS	8.6	4.5	5.8	1.0	2.1	3.3
HBO	7.2	8.1	5.7	0.8	2.3	6.5
NHB	7.2	6.4	5.1	0.8	1.8	9.6
Total	**8.2**	**7.3**	**6.0**	**0.9**	**2.5**	**7.0**
Purpose	Auto Driver	Auto Passenger	Kingston Transit*	Walk	Bicycle	Other**
Average Trip Duration (min)						
HBW	13.6	11.4	29.9	15.8	11.4	10.0
HBS	12.0	7.5	25.2	12.1	7.2	7.8
HBO	10.0	10.8	26.3	10.6	8.0	9.7
NHB	10.0	9.4	21.8	10.3	6.5	11.5
Total	**10.9**	**10.1**	**26.1**	**11.6**	**8.5**	**9.9**

HBW=home-based work, HBS=home-based school, HBO=home-based other, NHB=non-home based.

Distances of >100 km for inter-city travel were excluded (the top 1.0% of all trip distances), so as not to overly skew averages. Actual distance estimates not available for school bus trips.

*Transit distances and durations are for walk-access transit only. Transit trip durations may include time transferring between buses, and walking between bus stops and origin and/or destination.

**Other includes taxi and motorcycle trips only (excludes train, intercity coach bus, airplane, ferry, and other uncommon modes). Interpret with caution due to small sample sizes.

Table 49. Total Daily and Annual Weekday VKT, Walk PKT, and BKT from Estimates of Actual Trip Distances

	VKT (from Auto Driver Trips)	Walk PKT	Bicycle (BKT)
Total Daily Km	1,667,800	66,300	36,700
Cumulative Annual Km (weekdays only)	433,625,800	15,357,600	9,268,200

Distances of >100 km for inter-city travel were excluded (the top 1.0% of all trip distances) to limit the results to local travel in Kingston and the surrounding area.

Cumulative annual km calculated on the basis of 261 weekdays in the year 2019 for year-round residents, and 173 weekdays for seasonal students who do not live in Kingston between May and August.

VKT = Vehicle-Km Travelled, PKT = Person-Km Travelled, BKT = Bicycle-Km Travelled

Figure 67. Estimated Actual Trip Distances for Selected Modes

63%

Auto Driver | Auto Passenger | Kingston Transit | Walk | Bicycle

■<1 km ■1 km ■2 km ■3 km ■4 km ■5 km ■6 km ■7 km ■8 km ■9 km □10 km □11 km □12+ km

Est. Actual Distance Travelled
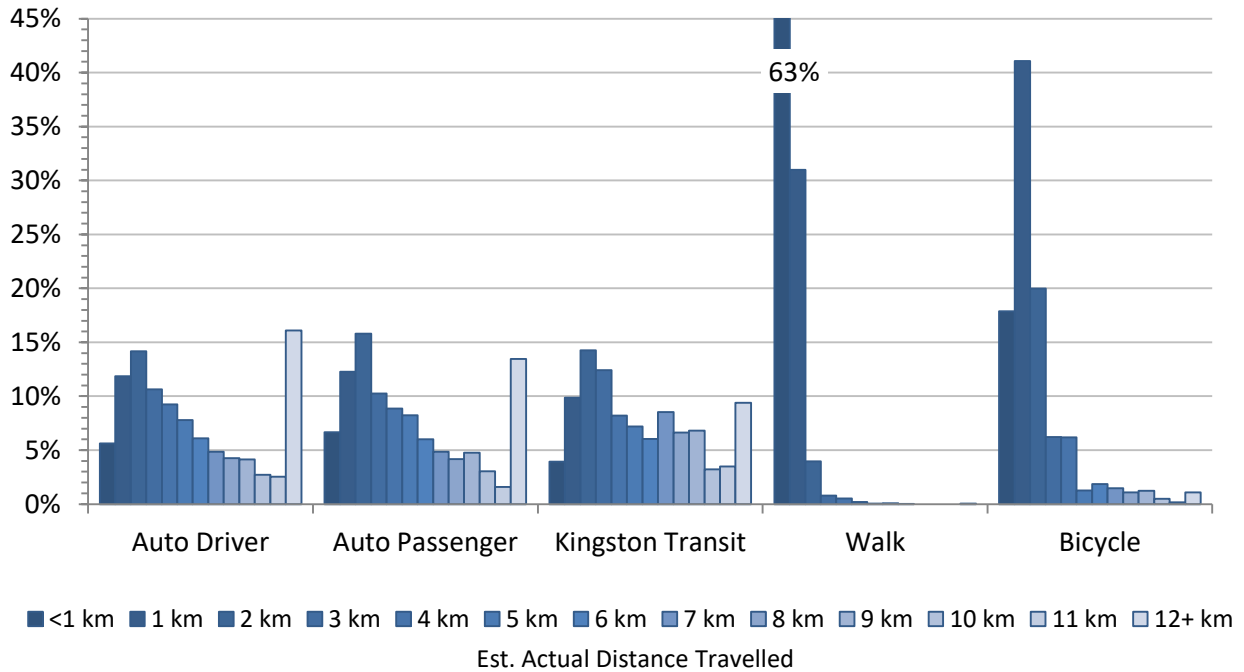
1km = at least 1km but less than 2km, etc. Transit trip distances are for walk-access transit only.

Figure 68. Estimated Trip Durations for Selected Modes

Auto Driver | Auto Passenger | Kingston Transit | Walk | Bicycle

■<5 mins ■5-10 min ■10-15 min ■15-20 min ■20-25 min ■25-30 min ■30-35 min ■35-40 min □40+ min
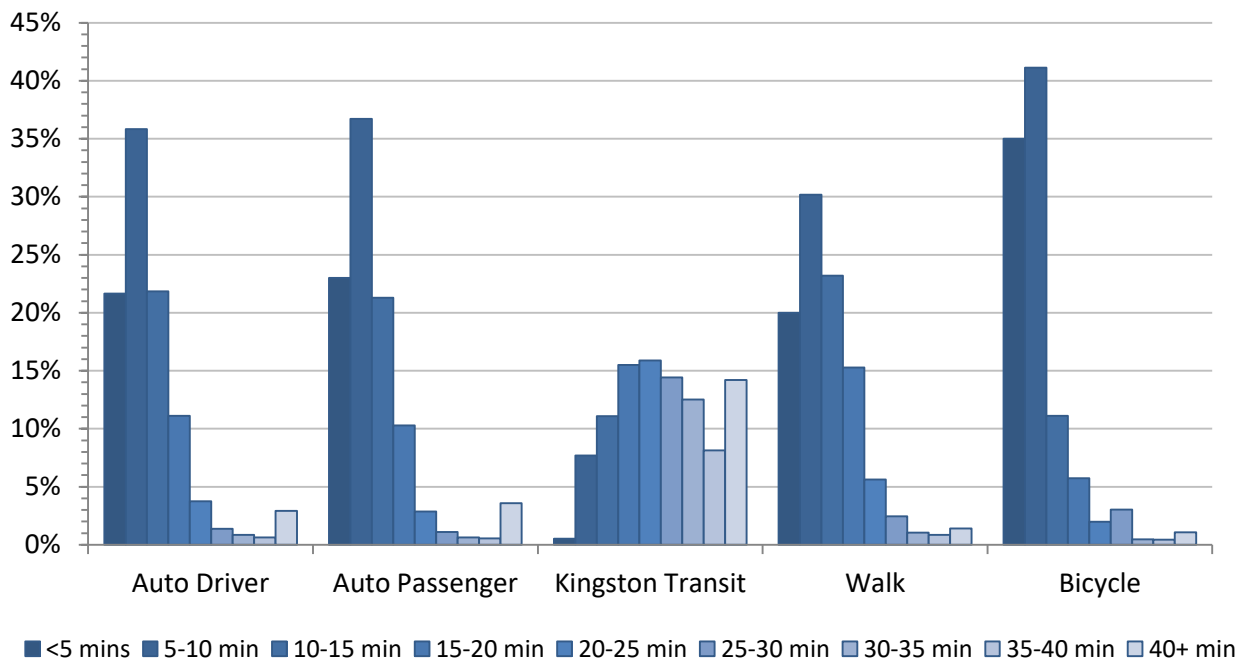
Transit trip durations are for walk-access transit only. Transit trip durations may include time transferring between buses, and walking between bus stops and origin and/or destination.

4.10 Bikeable and Walkable Trips

The surveyed trips were examined to determine the extent to which trips that were made using a motorized mode could have feasibly utilized an active mode instead (i.e. walking or cycling). The distance threshold for a "bikeable" trip was set at 4.6 km, based on the finding that 90% of reported cycling trips had an estimated actual cycling distance within this distance. The distance threshold for a "walkable" trip was set at 1.6 km, based on 90% of reported walking trips having an estimated actual distance on existing sidewalks and pathways within this threshold. For trips taken using motorized modes, the trip origin, destination, and time of day were processed via the Google API to determine the estimated actual cycling and walking distances via the suggested cycling and pedestrian routes. If the cycling or walking distance was found to be within the appropriate threshold, the trip was deemed bikeable or walkable for the purposes of this analysis.

It should be noted that this analysis does not take into account real or perceived barriers that may or may not have influenced the practicability of cycling or walking along a route of a given trip. These may include considerations involving the physical infrastructure in place to support active modes, the physical ability for an individual to make a trip using an active mode, and whether the trip involves the transport of larger cargo that would not be practical to transport on foot or a standard bicycle. Furthermore, trips may have been a part of a broader trip chain with longer travel times or distances that necessitated the use of a vehicle, which also factors into the choice of mode for non-home-based trips. Therefore, the number and proportion of walkable and bikeable trips should be considered an upper limit for the potential to shift these types of trips to active modes.

The results of this analysis are presented for each mode of travel below (**Table 50**). For each vehicular mode, the estimated number of bikeable or walkable trips is listed and expressed also as a percentage of all trips by the given vehicular mode and as a percentage of total trips. While the focus is on auto driver and auto passenger trips, all motorized modes are listed for reference. The bar chart on the next page (**Figure 69**) illustrates the portion of current mode shares that are considered to be bikeable or walkable.

There is considerable potential to shift automobile based mode shares to cycling. One half of auto driver trips, over 102,000 trips, are of a bikeable distance, as are 52% of auto passenger trips (30,000 bikeable trips). A smaller but still significant portion of automobile trips could be replaced by walking, with 15% of driving and 17% of passenger trips falling within the 1.6 km threshold (amounting to 31,000 walkable auto driver and 9,700 walkable auto passenger trips).

Table 50. Bikeable and Walkable Motorized Trips

| | Current Trips | Motorized Trips that are Bikeable and Walkable | | | | Mode Shares | | |
		Bikeable Trips	% of Trips of Given Mode	Walkable Trips	% of Trips of Given Mode	Current Mode Share	Bikeable Mode Share	Walkable Mode Share
Total Trips	398,600					100.0%		
Auto Driver	204,950	102,170	50%	31,020	15%	51.4%	25.6%	7.8%
Auto Passenger	58,300	30,200	52%	9,660	17%	14.6%	7.6%	2.4%
Kingston Transit	31,990	17,800	56%	4,270	13%	8.0%	4.5%	1.1%
School Bus	12,320	6,570	53%	1,110	9%	3.1%	1.6%	0.3%
Other	4,520	2,190	49%	610	13%	1.1%	0.6%	0.2%
Current Walk Trips	71,590					18.0%	n/a	18.0%
Current Bicycle Trips	14,940					3.7%	3.7%	n/a

Figure 69. Mode Shares Broken Out by Bikeability and Walkability
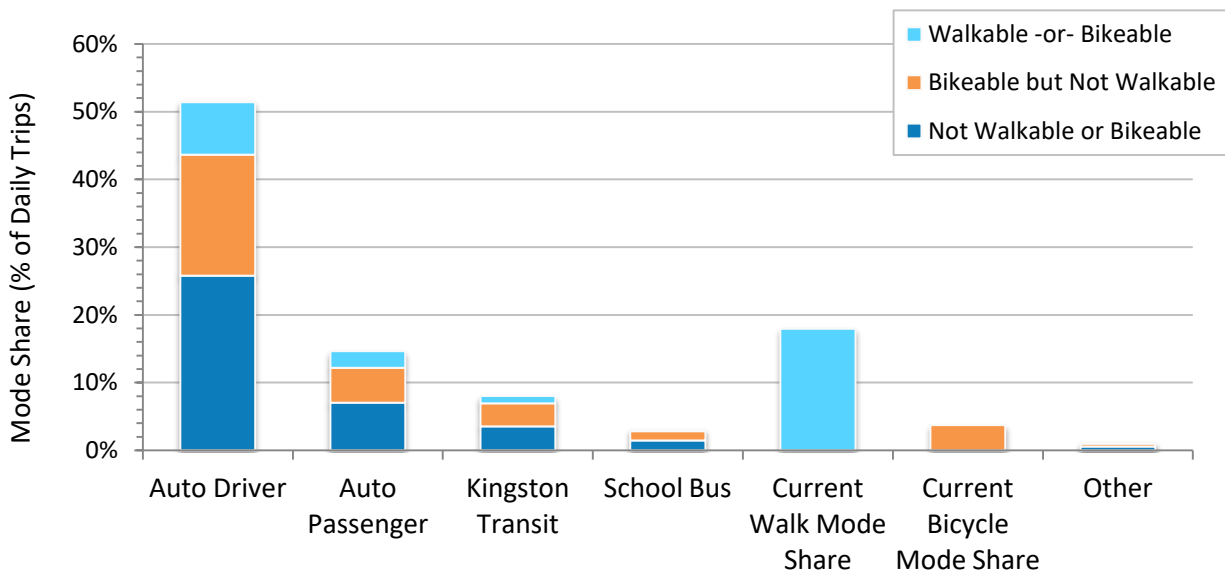
*Current Bicycle Mode Share may include some trips that are walkable. Only motorized modes were assessed for bikeability or walkability.

Table 51 highlights the number and proportions of auto driver trips made by residents of each Focus Area that are bikeable or walkable. The blue shading highlights the Focus Areas with the greatest potential for shifting to active modes based on the analysis. This table is based on the trips made by residents of each area, regardless of where those trips are made in Kingston. Section **5.4** contains analysis on bikeable and walkable motorized trips made by all residents from across Kingston that are to, from, and within the individual Focus Areas.

Table 51. Bikeable and Walkable Auto Driver Trips by Sub-Area and Focus Area of Residence

Place of Residence	Auto Driver Trips		Bikeability			Walkability		
	Auto Driver Trips	Auto Driver Mode Share	Bikeable Trips	% of Auto Driver Trips	Mode Shift Potential (% of Total Trips)	Walkable Trips	% of Auto Driver Trips	Mode Shift Potential (% of Total Trips)
City of Kingston	204,950	51%	102,170	50%	26%	31,020	15%	8%
Urban Area	181,960	50%	97,740	54%	27%	29,450	16%	8%
Central	72,860	37%	46,330	64%	24%	14,780	20%	8%
West	95,220	65%	45,680	48%	31%	12,880	14%	9%
East	13,880	56%	5,730	41%	23%	1,790	13%	7%
Rural	22,990	72%	4,430	19%	14%	1,560	7%	5%
Focus Area A	22,710	66%	10,600	47%	31%	2,800	12%	8%
Focus Area B	11,260	56%	5,140	46%	26%	1,730	15%	9%
Focus Area C	35,030	66%	17,760	51%	33%	5,230	15%	10%
Focus Area D	15,970	66%	7,930	50%	33%	2,250	14%	9%
Focus Area E	11,390	58%	7,420	65%	38%	2,050	18%	10%
Focus Area F	6,730	46%	4,720	70%	32%	1,260	19%	9%
Focus Area G	8,160	29%	5,300	65%	19%	1,870	23%	7%
Focus Area H	13,880	56%	5,730	41%	23%	1,790	13%	7%
Focus Area I	21,520	60%	9,400	44%	26%	2,600	12%	7%
Focus Area J	16,260	45%	10,040	62%	28%	2,910	18%	8%
Focus Area K	11,180	32%	8,370	75%	24%	2,980	27%	8%
Focus Area L	7,100	20%	4,990	70%	14%	1,870	26%	5%
Focus Area M	780	13%	350	44%	6%	110	14%	2%
Rural Area West	11,160	73%	2,320	21%	15%	810	7%	5%
Rural Area East	11,830	72%	2,110	18%	13%	750	6%	5%

* Assessment of bikeability and walkability based solely on trip distance without examination of connected trips, traveller demographics, or other factors that might affect actual bikeability or walkability.

5   Travel Destinations

This section provides more detail on where residents travel to and from.

5.1   Internalization of Travel by Focus Area

The chart to the right (**Figure 70**) examines internal travel. This is a measure of the accessibility of opportunities – work, school, shopping and so on – relative to a traveller's place of residence. The closer proximity of these activities to one's home can be more conducive to sustainable transportation alternatives to driving alone, especially walking and cycling. The trip counts do not capture all work and school commutes, only home-based work and school trips. I.e., the counts do not include trips to/from work or school that have been interrupted by a stop along the way for another purpose. Nevertheless, these statistics should still provide a good indicator of the extent to which commutes are internalized within a given Focus Area.

Focus Areas with the highest degree of internalization include Focus Area L (55%), which includes Queen's University and considerable student housing, Focus Area H (East End, 38%) and to a somewhat lesser extent Focus Areas B and C (22% and 25% respectively).

The urban areas with the least internalization of trips are Focus Areas E and K (9% and 7% respectively), which stands to reason as these are mainly residential areas with few commercial generators of trips.

On the following pages, **Figure 71** maps overall internalization by Focus Area, while **Table 52** summarizes internalization rates for HBW, HBS and HBO trip for residents of each Focus Area. Degrees of blue shading highlight areas with higher rates of internalization.

Figure 70. Internalization of Trips by Home Focus Area

Internalization of Trips Made by Residents

- Focus Area A: 16%
- Focus Area B: 22%
- Focus Area C: 25%
- Focus Area D: 19%
- Focus Area E: 9%
- Focus Area F: 12%
- Focus Area G: 15%
- Focus Area H: 38%
- Focus Area I: 23%
- Focus Area J: 20%
- Focus Area K: 7%
- Focus Area L: 55%
- Focus Area M: 19%
- Rural Area West: 11%
- Rural Area East: 4%
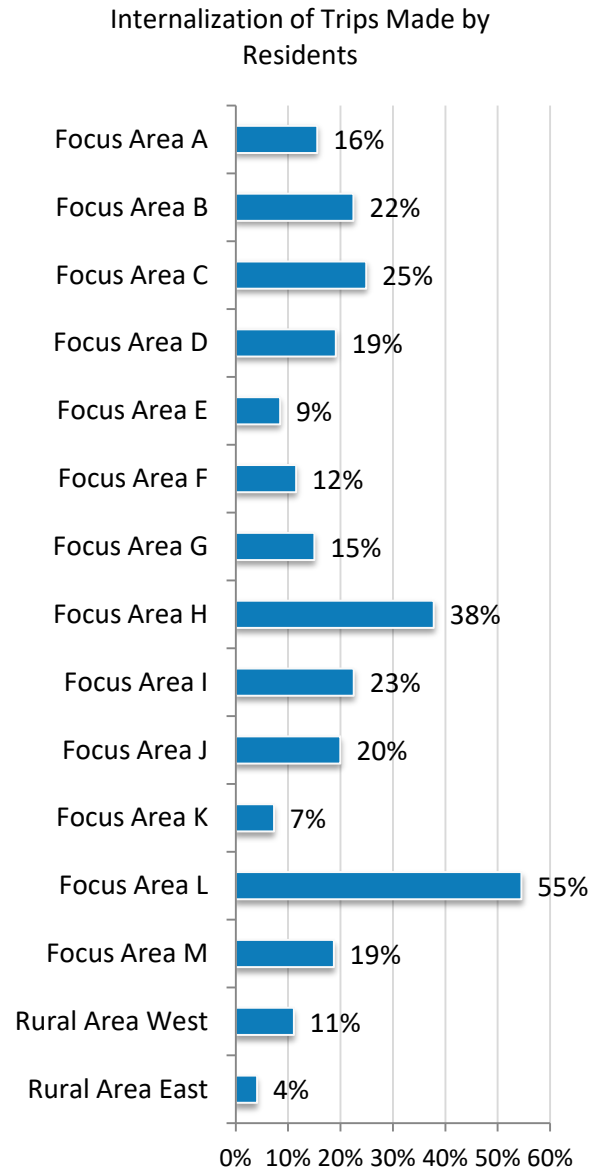
Figure 71. Map of Internalization of Travel by Home Focus Area
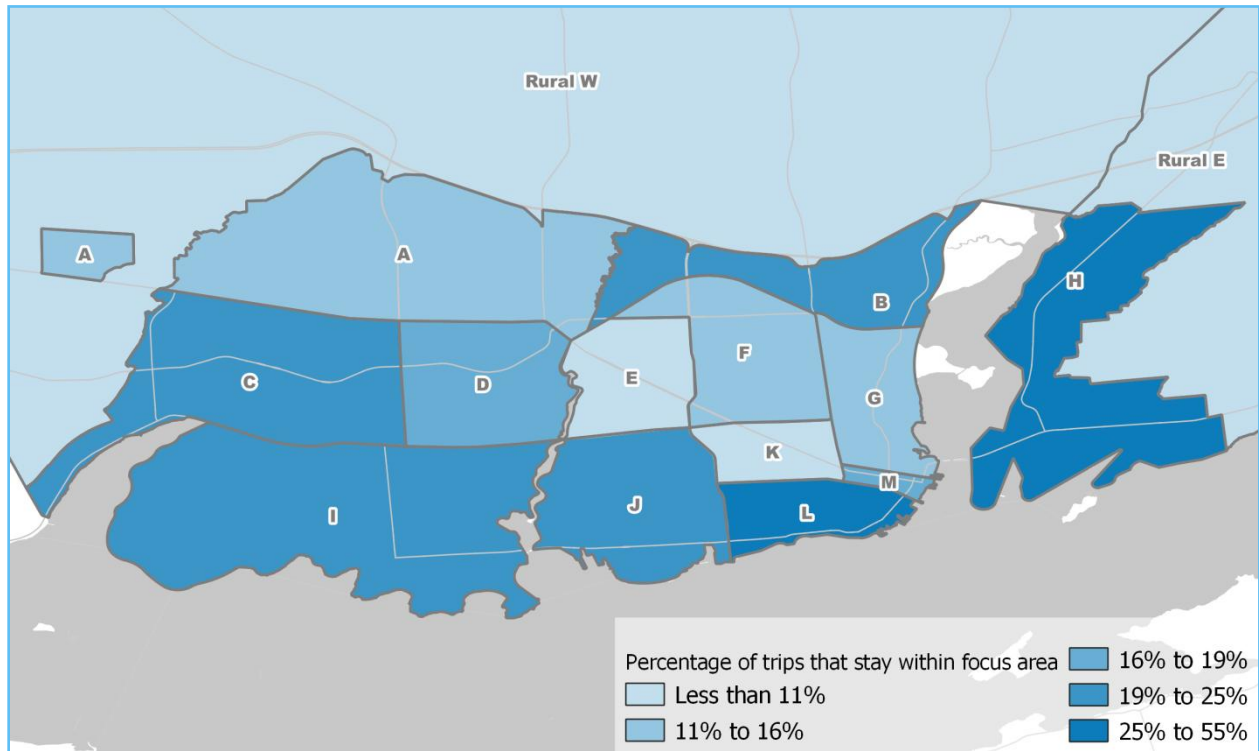
Table 52. Internalization of Trips by Home Focus Area for HBW, HBS and HBO purposes

	Total Trips Made by Residents of Area		HBW Trips Made by Residents of Area		HBS Trips Made by Residents of Area		HBO Trips Made by Residents of Area	
	Trips Made by Residents of Area	% of Residents' Trips Internal to Home Area	HBW Trips Made by Residents	% of HBW Trips Internal to Home Area	HBS Trips Made by Residents	% of HBS Trips Internal to Home Area	HBO Trips Made by Residents	% of HBO Trips Internal to Home Area
Focus Area A	34,260	16%	6,640	12%	3,870	15%	14,500	24%
Focus Area B	19,980	22%	3,380	14%	2,230	36%	8,450	33%
Focus Area C	53,300	25%	10,580	18%	5,830	49%	23,760	31%
Focus Area D	24,340	19%	5,740	16%	2,090	5%	10,620	31%
Focus Area E	19,710	9%	3,940	5%	2,630	10%	8,970	13%
Focus Area F	14,540	12%	2,700	10%	1,630	13%	7,180	16%
Focus Area G	27,960	15%	5,570	8%	3,710	11%	12,830	25%
Focus Area H	24,690	38%	6,140	37%	3,520	45%	9,750	44%
Focus Area I	35,720	23%	6,250	10%	3,960	56%	16,430	29%
Focus Area J	36,250	20%	5,870	13%	6,940	49%	15,770	18%
Focus Area K	35,080	7%	4,460	5%	9,980	<0.5%	13,470	17%
Focus Area L	34,830	55%	3,770	65%	11,970	91%	11,910	32%
Focus Area M	6,070	19%	890	13%	1,970	0%	2,350	41%
Rural Area West	15,350	11%	3,570	4%	1,380	27%	6,390	16%
Rural Area East	16,530	4%	3,280	4%	1,560	8%	7,360	6%

HBS, HBW and HBO trips include trips from home or returning to home. NHB trips are included in the total trips but not broken out separately.
'Internal' = both origin and destination are in the same Focus Area at the traveller's home.

5.2   Special Generators

Figure 72 maps selected 'special generators', or popular destinations that attract trips made by residents. **Figure 73** highlights the survey estimates of the daily volumes of trips destined to these locations (excluding trips within the boundaries of these generators). These trips account for 20% of all daily trip destinations, and 29% during the AM peak period, with Queen's University and the downtown attracting the greatest numbers of trips. Looking more broadly at all trips to, from, and within these generators, 43% of all daily trips involve these special generators (with trips to from or within these generators representing 35% of AM peak trips and 40% of PM peak trips).

Figure 72. Special Generator Locations
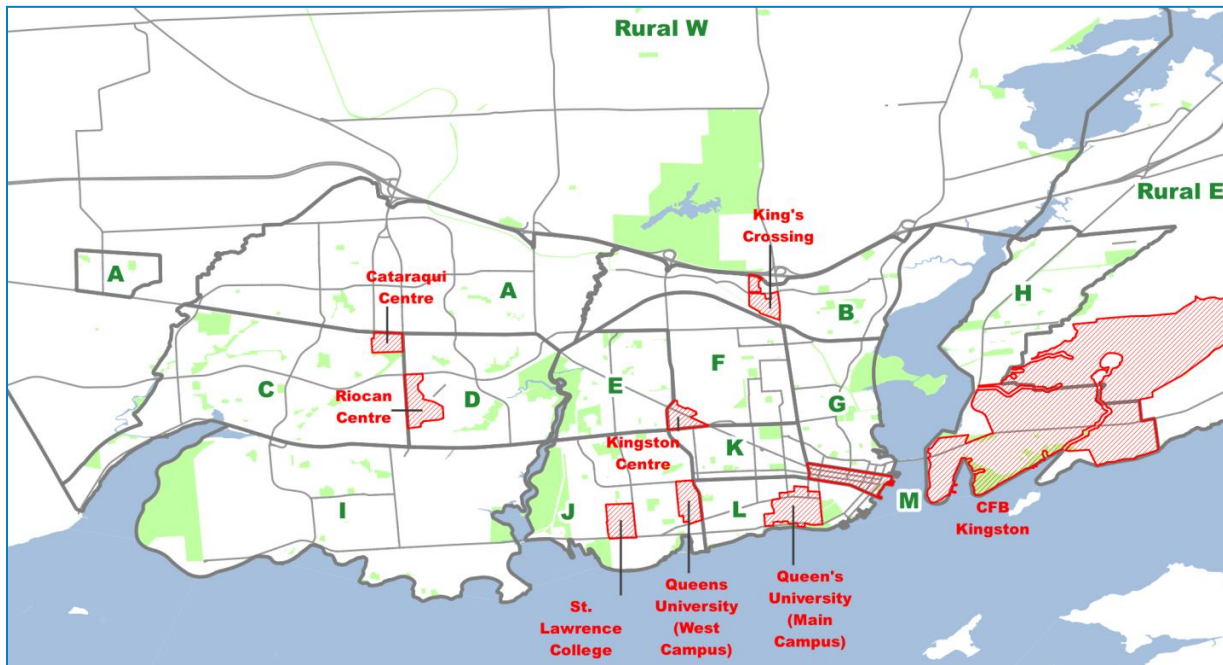
Figure 73. Daily (24-Hour) Trips Destined to Generators (from Origins Outside Generator Boundaries)
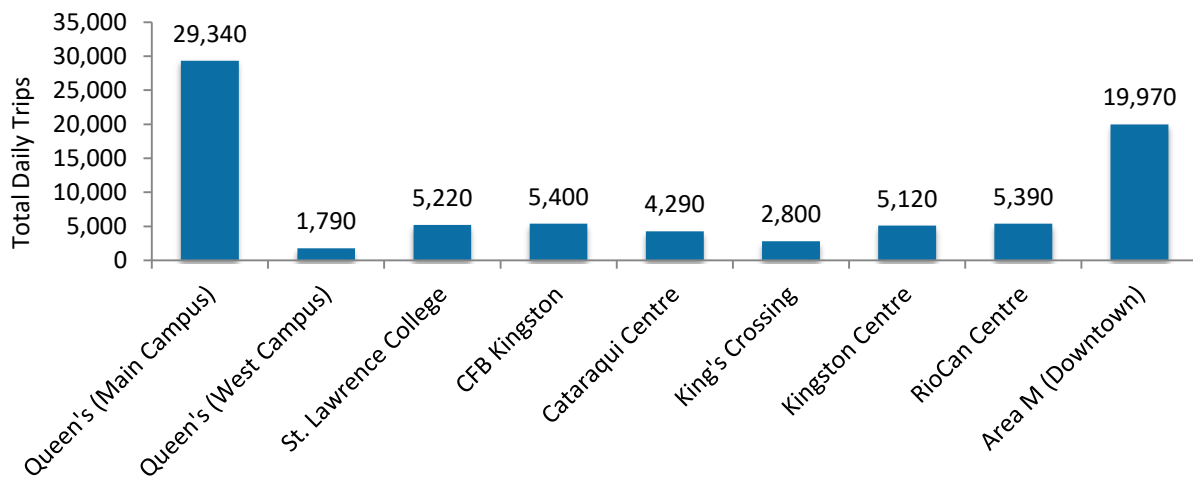
5.2.1 Special Generator Trip Volumes by Peak Period

Table 53 details the survey estimates of the flows of trips to and from each special generator by time of day. Again, these figures exclude trips made entirely within each generator (e.g., trips within the boundaries of Queen's campus). It may be noted that while a number of the generators have high AM Peak volumes, many of the commercial centres have lower AM Peak volumes as their operating hours often begin after the AM Peak is over; such locations tend to have higher Inter-peak and PM Peak volumes. These volumes to and from these generators are further illustrated in **Figure 74** and **Figure 75** on the following page.

Table 53. Daily Trips Destined to and Leaving from Special Generators by Time of Day

	24-Hour Total		AM Peak 7:30-8:59 AM (1.5 hrs)		Inter-Peak 9:00 AM-14:59 PM (6 hrs)		PM Peak 3:00 PM-5:29 PM (2.5 hrs)		Evening/ Overnight 5:30 PM-6:59 AM (13.5 hrs)	
	To	From	To	From	To	From	To	From	To	From
Queen's University (Main Campus)	29,340	29,350	9,160	880	12,220	7,070	2,880	10,950	5,080	10,440
Queen's University (West Campus)	1,790	1,820	340	80	620	850	380	430	460	460
St. Lawrence College	5,220	5,220	1,780	40	2,050	1,540	530	1,790	870	1,860
CFB Kingston	5,400	5,410	1,440	330	1,250	1,460	460	2,410	2,250	1,210
Cataraqui Centre	4,290	4,280	130	120	2,090	1,420	960	1,090	1,110	1,650
King's Crossing	2,800	2,800	140	80	1,280	1,010	750	780	630	930
Kingston Centre	5,120	5,060	390	120	2,690	2,200	1,170	1,480	880	1,270
RioCan Centre	5,390	5,330	180	60	2,530	1,760	1,210	1,290	1,470	2,230
Area M (Downtown)	19,970	19,880	3,050	1,370	8,270	6,980	3,290	5,210	5,360	6,320

Figure 74. Trips Destined to Special Generators by Time of Day

AM Peak 7:30-8:59 AM (1.5 hrs)   **Inter Peak 9:00 AM-14:59 PM (6 hrs)**
PM Peak 3:00 PM-5:29 PM (2.5 hrs)   **Evening thru Early AM 5:30 PM-6:59 AM (13.5 hrs)**
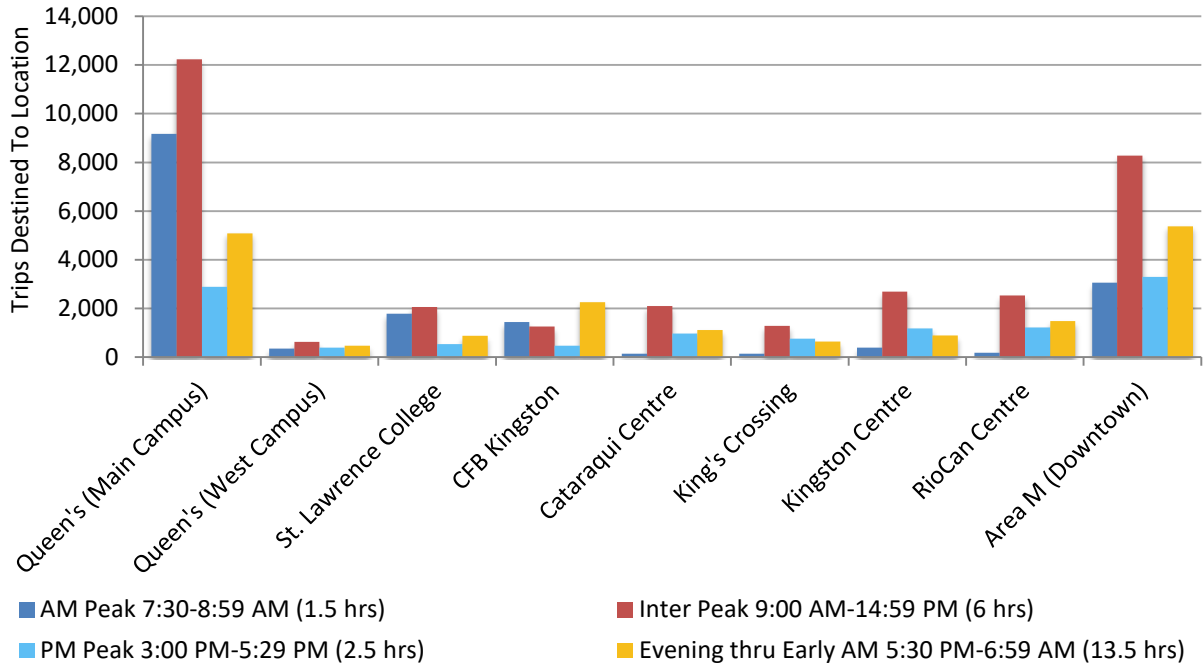
Figure 75. Trips Leaving Special Generators by Time of Day

AM Peak 7:30-8:59 AM (1.5 hrs)   **Inter Peak 9:00 AM-14:59 PM (6 hrs)**
PM Peak 3:00 PM-5:29 PM (2.5 hrs)   **Evening thru Early AM 5:30 PM-6:59 AM (13.5 hrs)**
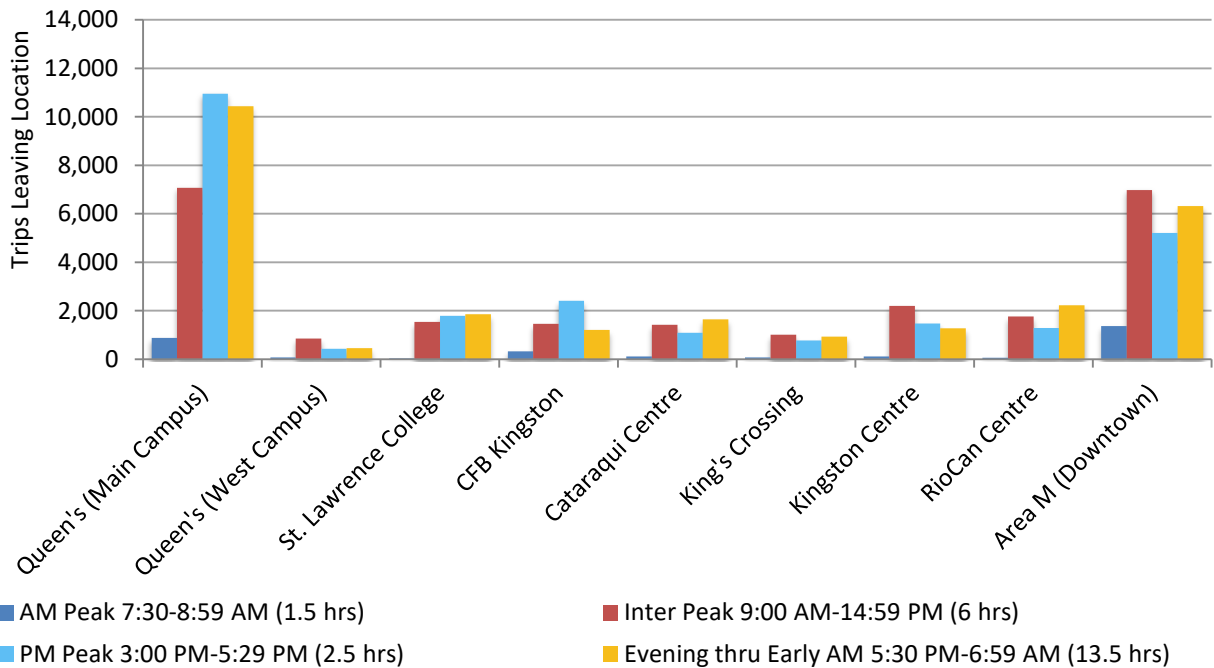
5.2.2 Special Generator Mode Shares

Analysis of the mode shares for trips to the special generators (**Figure 76**, **Figure 77**, and **Table 54**) reveals the following:

- The great majority of trips to Queen's University main campus are via sustainable modes (42% walking, 19% transit, and 9% cycling), with only one-quarter of such trips being via automobile, although given the size of the generator, this still amounts to over 6,600 auto driver trips.

- Trips to Queen's West Campus and St. Lawrence College show a high dependence on transit (49% and 36% mode shares respectively).

- Amongst commercial centres, three—Cataraqui Centre, Area M (Downtown), and Kingston Centre—appear to have at least one-tenth of trips via transit (19%, 13%, and 12% respectively).

- While the transit mode share for trips to Area M may appear to be modest at 13%, it may be noted that this represents 2,630 daily transit trips, making the downtown the second largest attractor of transit trips, between Queen's University being first at 5,500 daily transit trips to the main campus and St. Lawrence College being third, at 1,900 daily transit trips to the campus.

- Trips to CFB Kingston and the RioCan Centre show the greatest reliance on driving (71% and 70% mode share, respectively).

- Cycling mode shares are highest for Queen's campuses, with in the area of one in ten trips to campus via bicycle (9% for the main campus and 10% for West Campus), followed by St. Lawrence College, Kingston Centre, and Area M (all at 5%). Cataraqui Centre, King's Crossing and RioCan Centre all appear to attract only negligible proportions of cyclists, less than 1% of all trips to each of these generators.

Of note, examination of the data on trips made entirely within each special generator's boundary (excluded from the charts and tables) for Queen's main campus and Focus Area M, reveal that such internal trips are predominantly via walking, but for CFB Kingston, which has a very large geographic footprint, they are predominantly driving trips.

Figure 76. Mode Shares for Total Daily Trips Destined to Special Generators
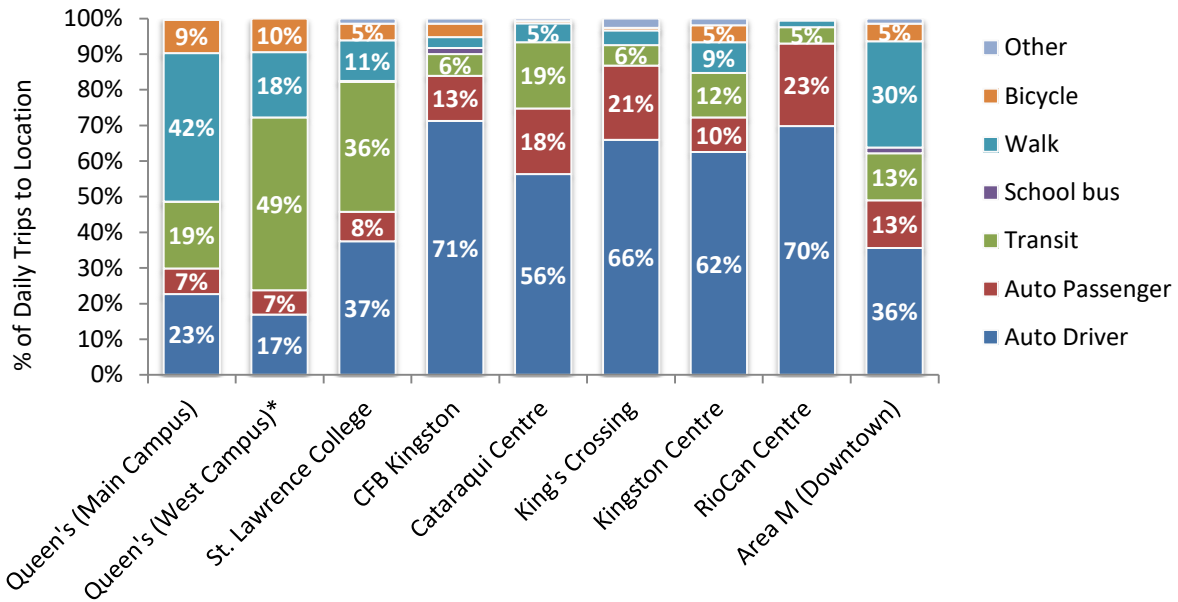
Figure 77. Mode Shares for AM Peak Trips Destined to Special Generators

AM Peak mode shares have been suppressed for some special generators due to lower trip volumes during the AM Peak period (7:30-8:59AM) and/or small sample sizes
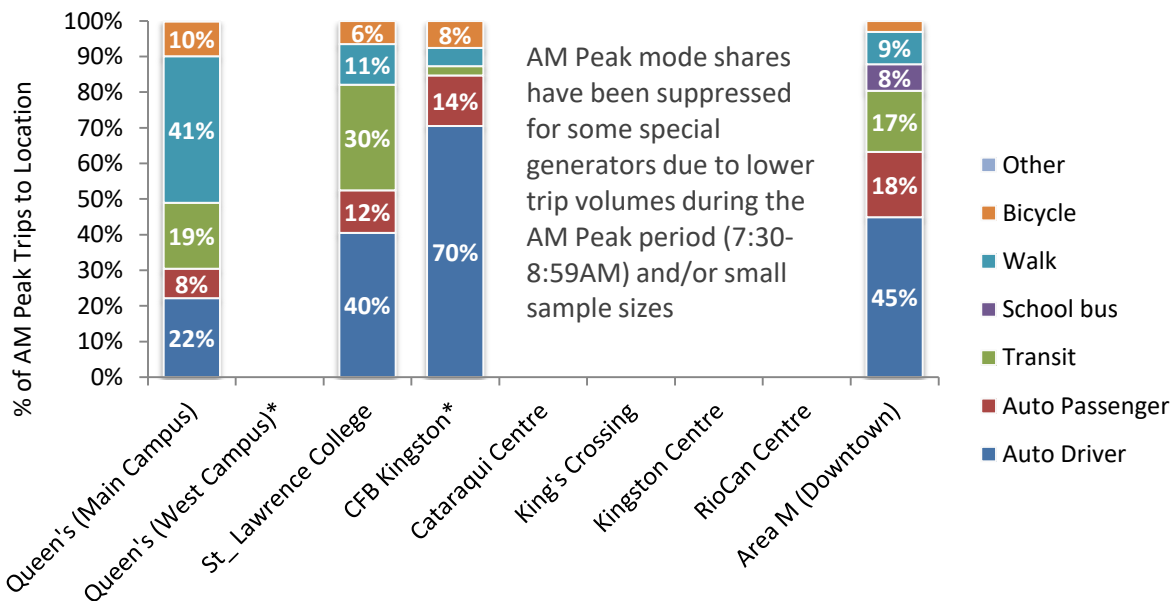
Table 54. Mode Shares for Trips Destined to Special Generators

	Queen's (Main Campus)	Queen's (West Campus)*	St. Lawrence College	CFB Kingston **	Cataraqui Centre	King's Crossing	Kingston Centre	RioCan Centre	Area M
Daily Trips									
Total Trips	29,340	1,790	5,220	5,400	4,290	2,800	5,120	5,390	19,970
Driver	23%	17%	37%	71%	56%	66%	62%	70%	36%
Passenger	7%	7%	8%	13%	18%	21%	10%	23%	13%
Transit	19%	49%	36%	6%	19%	6%	12%	5%	13%
School bus	0%	0%	0%	2%	0%	0%	0%	0%	2%
Walk	42%	18%	11%	3%	5%	4%	9%	2%	30%
Bicycle	9%	10%	5%	4%	1%	1%	5%	0%	5%
Other	0%	0%	1%	1%	1%	3%	2%	1%	1%
AM Peak									
Total Trips	9,160	340	1,780	1,440	130	140	380	180	3,050
Driver	22%	n/a	40%	70%	n/a	n/a	n/a	n/a	45%
Passenger	8%	n/a	12%	14%	n/a	n/a	n/a	n/a	18%
Transit	19%	n/a	30%	3%	n/a	n/a	n/a	n/a	17%
School bus	0%	n/a	0%	0%	n/a	n/a	n/a	n/a	8%
Walk	41%	n/a	11%	5%	n/a	n/a	n/a	n/a	9%
Bicycle	10%	n/a	6%	8%	n/a	n/a	n/a	n/a	3%

* Interpret results for Queen's University West Campus with caution due to small sample size (n=72 trip records).

* Interpret AM Peak results for CFB Kingston with caution due to modest sample size (n=84 trip records).

Excludes trips within the special generator boundaries (both origin and destination within boundary).

n/a = results suppressed due to small sample sizes.

5.2.3 Distributions of Origins of Trips to Special Generators

The tables that follow present origin-destination matrices identifying where trips destined to the special generators originate from, first for total daily trips to each generator (**Table 55**), then for AM Peak trips, excluding the commercial centres as volumes of trips to these generators do not begin until later in the day (**Table 56**), and finally for transit trips (**Table 57**). These tables focus on trips to the generator from outside the generator boundaries; for example, trips made entirely on Queen's main campus are not counted.

The tables are followed by a series of dot-density maps highlighting the distribution of origins of daily trips to these generators, including origins within the bounds of the generators (**Figure 78** through **Figure 85**). The maps show the clustering of trip origins near many of the generators as well as the spread of origins further away.

Table 55. Origin-to-Special Generator Matrix – Total Daily (24-Hour) Trips

Destination: Origin	Queen's University (Main Campus)	Queen's University (West)*	St. Lawrence College	CFB Kingston	Cataraqui Centre	King's Crossing	Kingston Centre	RioCan Centre	Area M
Total Daily Trips	**35,240**	**1,840**	**5,790**	**7,140**	**4,330**	**3,040**	**5,520**	**6,000**	**23,270**
Focus Area A	930	-	380	400	860	80	180	890	850
Focus Area B	570	10	230	210	60	880	260	130	990
Focus Area C	1,460	70	710	240	960	180	410	1,600	1,130
Focus Area D	1,010	30	400	220	690	90	320	1,140	770
Focus Area E	780	50	240	170	180	230	620	140	610
Focus Area F	810	5	250	40	110	410	620	150	1,160
Focus Area G	2,650	50	400	550	110	390	300	130	3,040
Focus Area H	820	5	250	3,110	70	120	80	50	1,050
Focus Area I	1,450	310	380	210	280	50	130	690	620
Focus Area J	2,660	200	1,590	100	320	20	800	390	1,130
Focus Area K	6,110	210	420	280	200	90	990	200	2,190
Focus Area L	12,590	820	180	540	170	150	380	160	5,330
Focus Area M	2,450	90	150	210	90	80	220	250	3,290
Rural Area West	360	-	50	120	90	130	50	-	340
Rural Area East	440	20	170	700	90	60	70	60	500
External Origins	160	-	-	40	70	100	80	50	280

*Interpret results for Queen's University West Campus with caution due to small sample size (n=72 trips).
External Origins = trips made by residents of Kingston. Residents of areas outside Kingston were not surveyed.
Results for Queen's University may under-represent the travel of students living on campus; Results for CFB Kingston do not represent the travel of students living on campus.

Table 56. Origin-to-Special Generator Matrix – AM Peak Trips (for Selected Generators with Sufficient Sample Sizes)

Destination: Origin	Queen's University (Main Campus)	St. Lawrence College	CFB Kingston	Area M (Downtown)
Total AM Peak Trips	**9,560**	**1,910**	**1,710**	**3,150**
Focus Area A	180	130	90	250
Focus Area B	270	90	60	330
Focus Area C	610	160	60	250
Focus Area D	360	150	20	200
Focus Area E	330	150	10	60
Focus Area F	210	90	-	210
Focus Area G	610	190	140	270
Focus Area H	250	70	730	150
Focus Area I	640	110	40	240
Focus Area J	750	480	20	200
Focus Area K	1,560	180	90	410
Focus Area L	2,870	40	30	250
Focus Area M	600	20	20	110
Rural Area West	80	5	70	210
Rural Area East	220	60	330	30
External Origins	10	-	-	-

External Origins = trips made by residents of Kingston. Residents of areas outside Kingston were not surveyed. Results for Queen's University may under-represent the travel of students living on campus; Results for CFB Kingston do not represent the travel of students living on campus.

Table 57. Origin-to-Special Generator Matrix – 24-Hour Transit Trips

Destination: Origin	Queen's University (Main Campus)	Queen's University (West)*	St. Lawrence College **	CFB Kingston	Cataraqui Centre**	King's Crossing **	Kingston Centre	RioCan Centre	Area M
Total Daily Transit Trips	**6,680**	**300**	**2,050**	**5,120**	**2,440**	**1,930**	**3,430**	**4,050**	**7,330**
Focus Area A	380	n/a	270	330	480	30	150	740	500
Focus Area B	270	n/a	40	190	30	410	180	100	430
Focus Area C	740	n/a	320	200	620	160	230	1,080	650
Focus Area 3D	690	n/a	280	210	440	80	190	680	410
Focus Area E	260	n/a	70	160	40	150	440	100	290
Focus Area F	270	n/a	50	30	80	290	350	70	600
Focus Area G	490	n/a	140	360	100	240	150	70	530
Focus Area H	390	n/a	40	2,400	60	100	80	40	510
Focus Area I	620	n/a	80	170	200	50	130	510	420
Focus Area J	570	n/a	310	40	90	20	400	180	460
Focus Area K	650	n/a	150	150	70	50	640	140	670
Focus Area L	340	n/a	80	280	30	130	240	130	740
Focus Area M	280	n/a	20	120	40	40	80	100	220
Rural Area West	240	n/a	40	120	90	100	50	-	270
Rural Area East	350	n/a	150	330	30	60	70	60	410
External Origins	150	n/a	-	40	60	30	60	50	230

*Results for Queen's University West Campus suppressed due to small sample size

**Interpret with caution due to modest sample sizes (n=between 100 and 150 trip records)

Results for Queen's University may under-represent the travel of students living on campus; Results for CFB Kingston do not represent the travel of students living on campus.

Figure 78. Origin Density of Trips to Queen's University

Origins of Trips to Queen's
- Queen's Main Campus
- Queen's West Campus

Each dot represents 10 origins. Placement is random within Census Dissemination Area
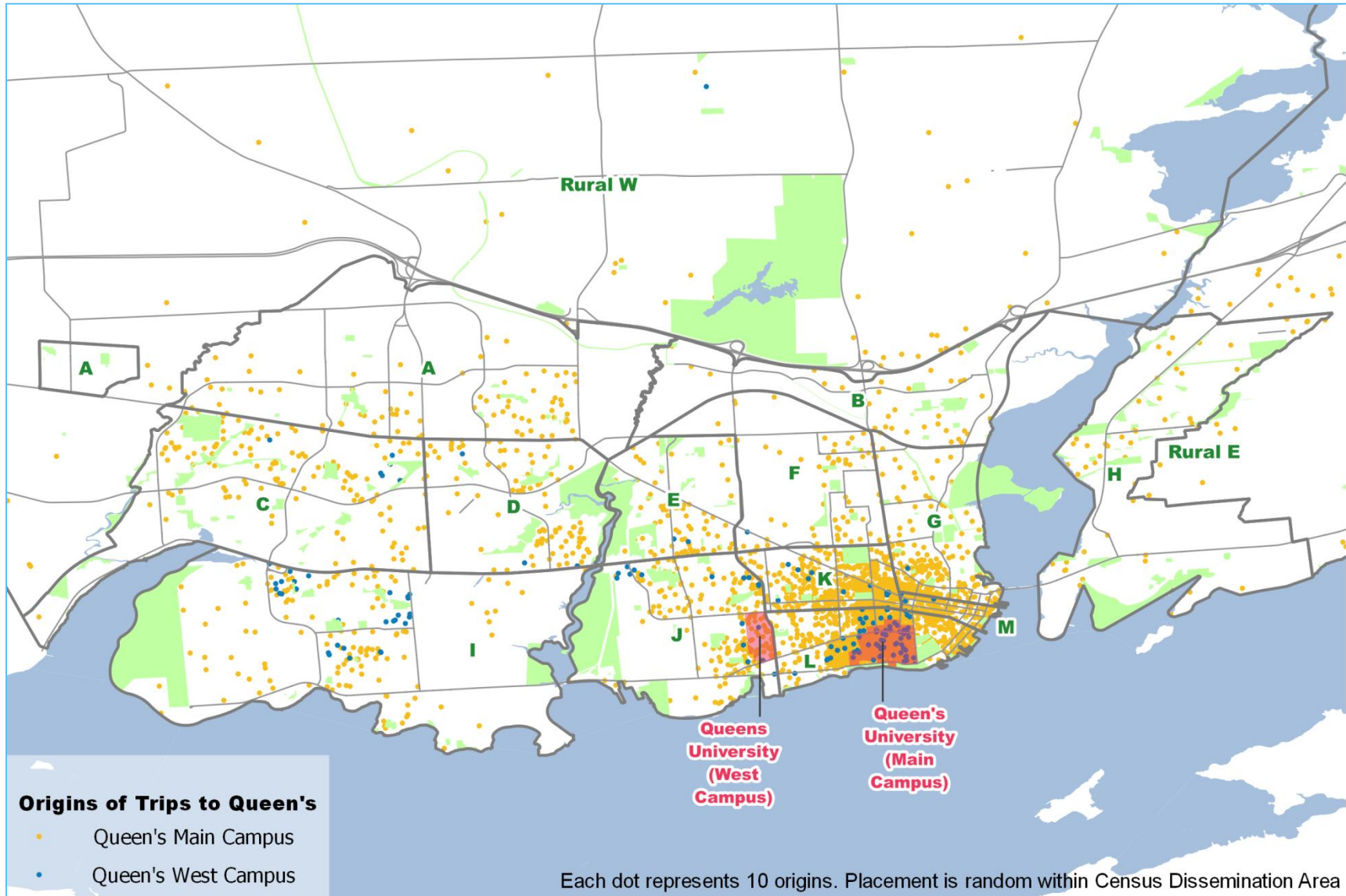
Figure 79. Origin Density of Trips to St. Lawrence College

Each dot represents 3 origins. Placement is random within Census Dissemination Area
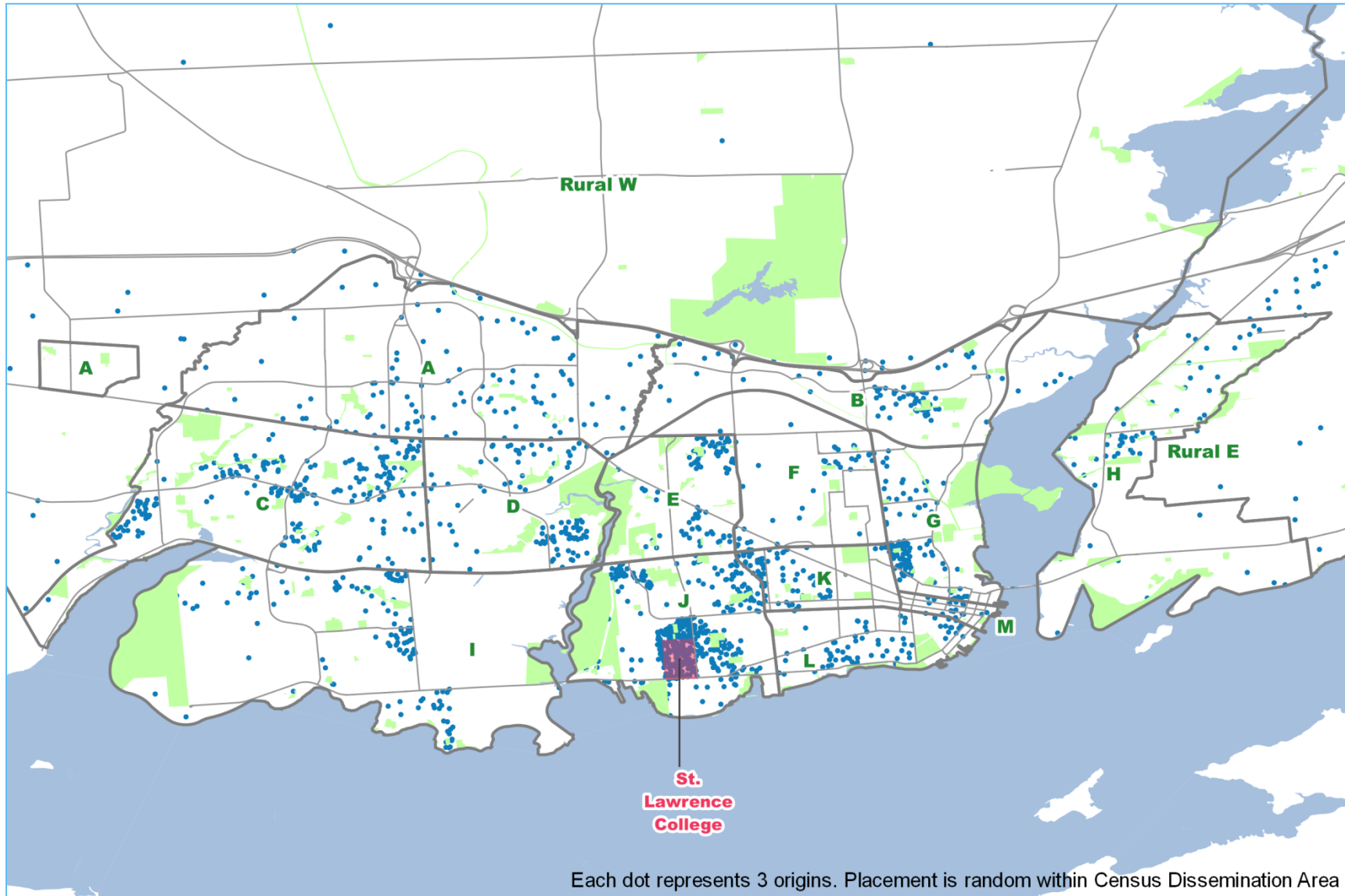
Figure 80. Origin Density of Trips to CFB Kingston

Each dot represents 3 origins. Placement is random within Census Dissemination Area
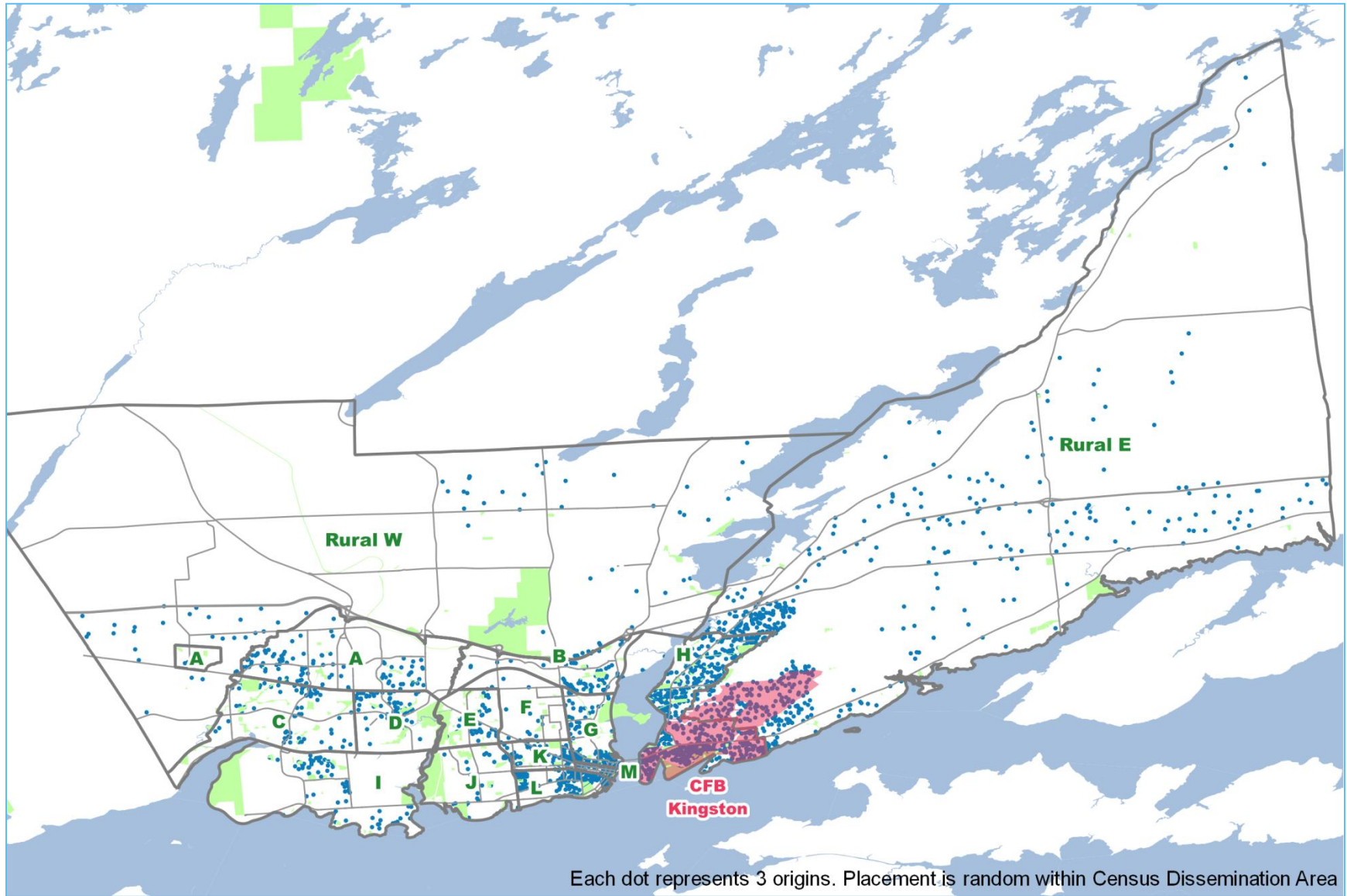
Figure 81. Origin Density of Trips to Cataraqui Centre

Each dot represents 3 origins. Placement is random within each Census Dissemination Area
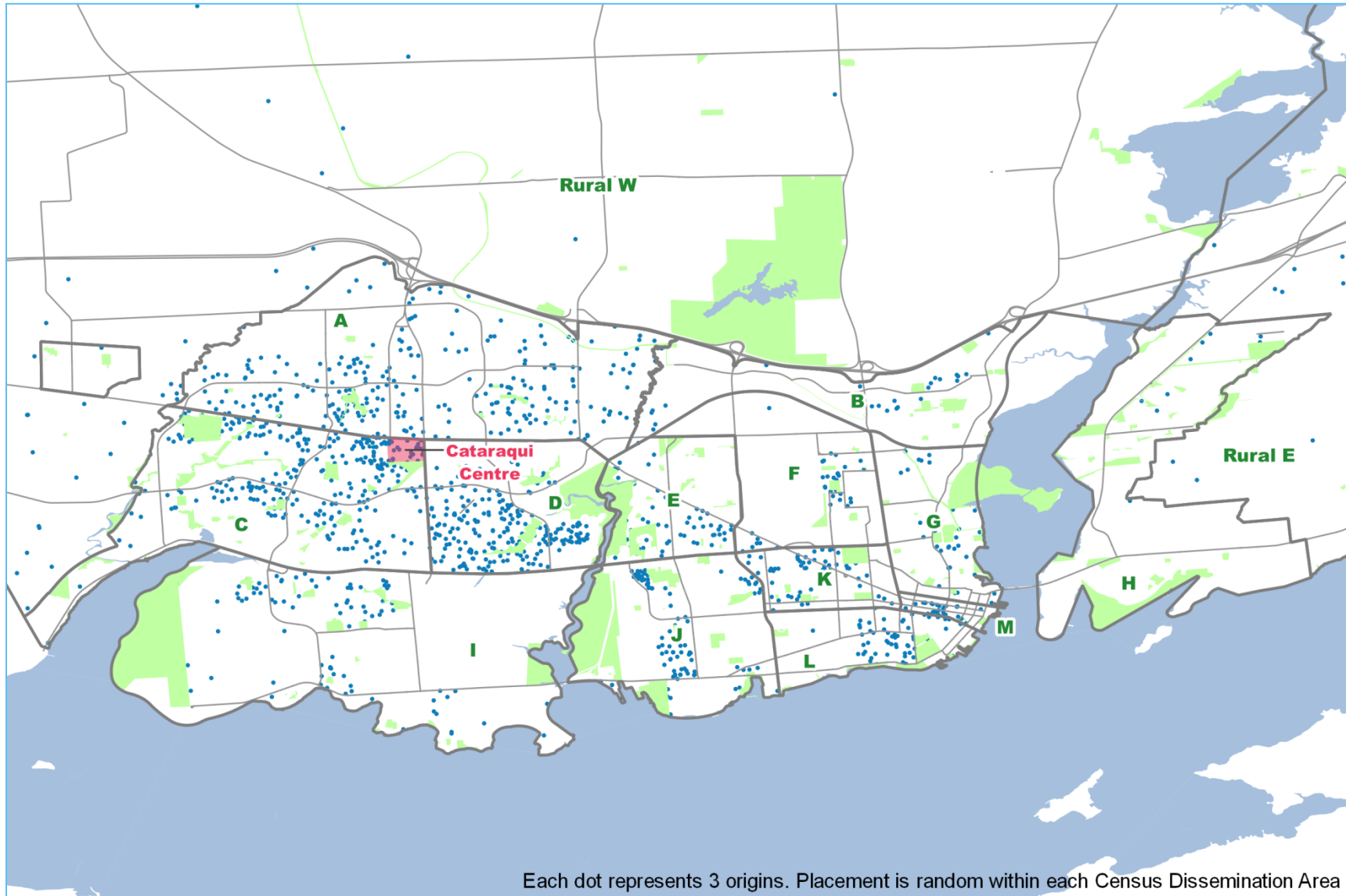
Figure 82. Origin Density of Trips to Kings Crossing

Each dot represents 3 origins. Placement is random within each Census Dissemination Area
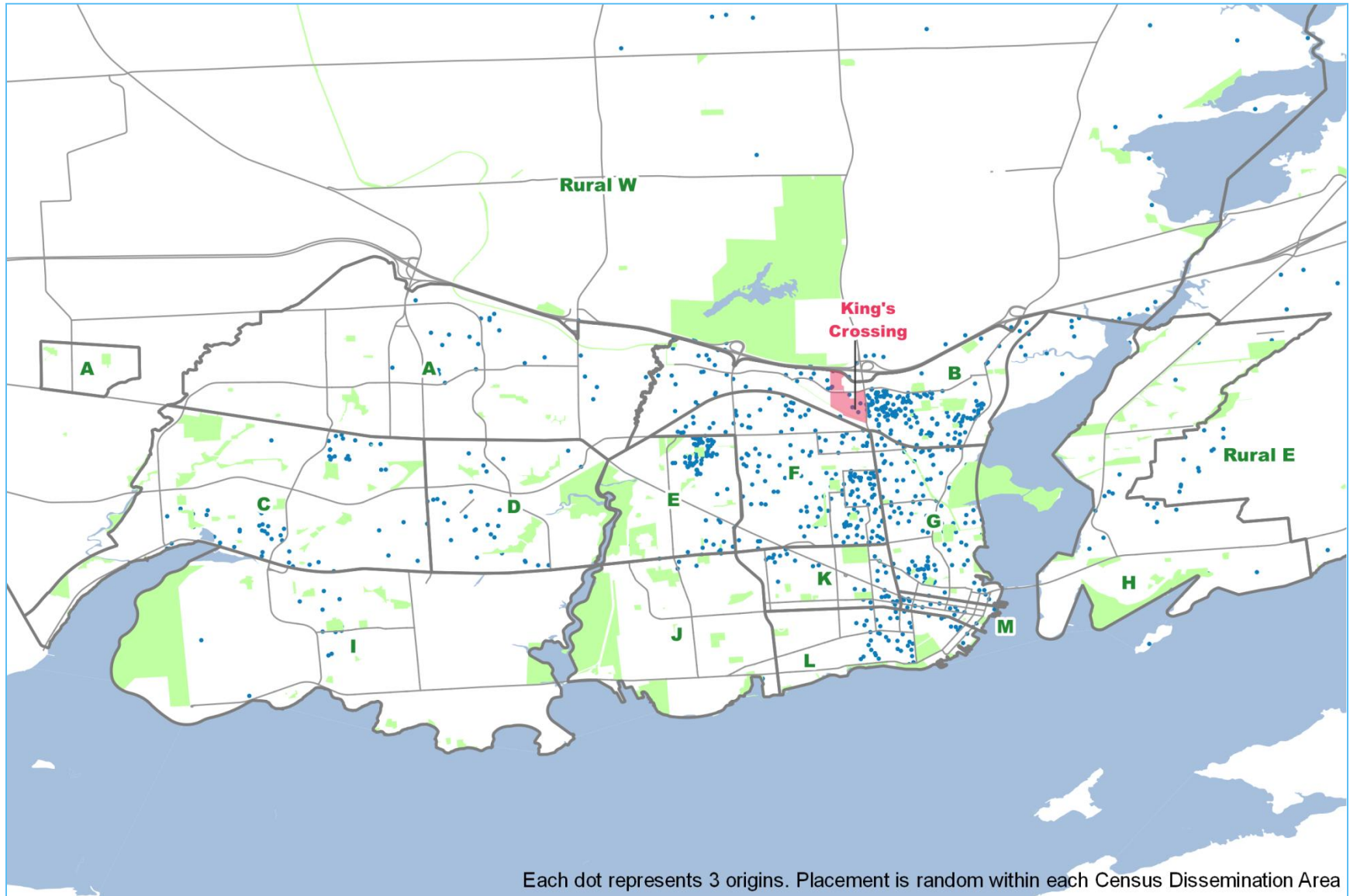
Figure 83. Origin Density of Trips to Kingston Centre

Each dot represents 3 origins. Placement is random within each Census Dissemination Area
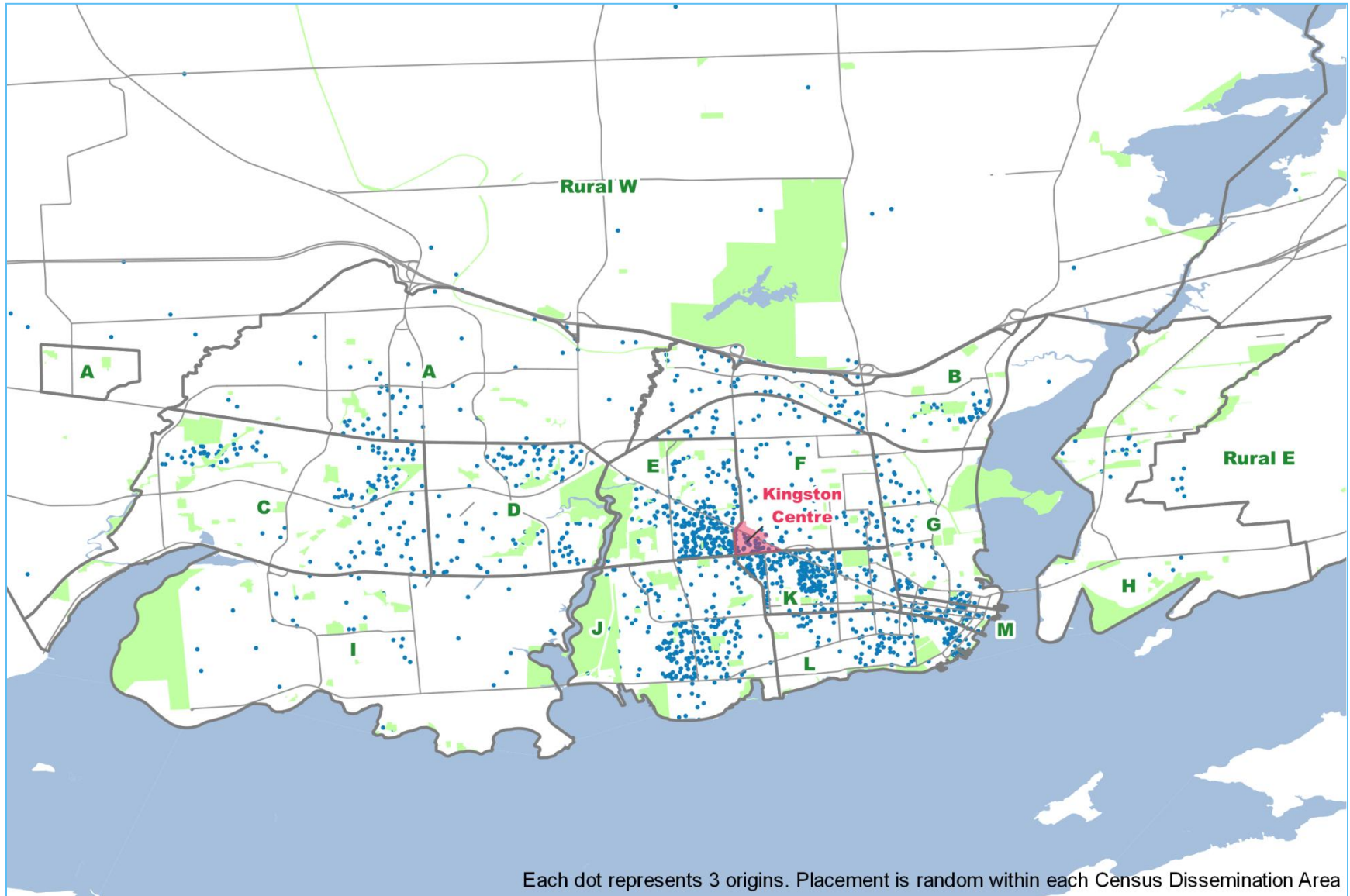
Figure 84. Origin Density of Trips to Riocan Centre

Each dot represents 3 origins. Placement is random within each Census Dissemination Area
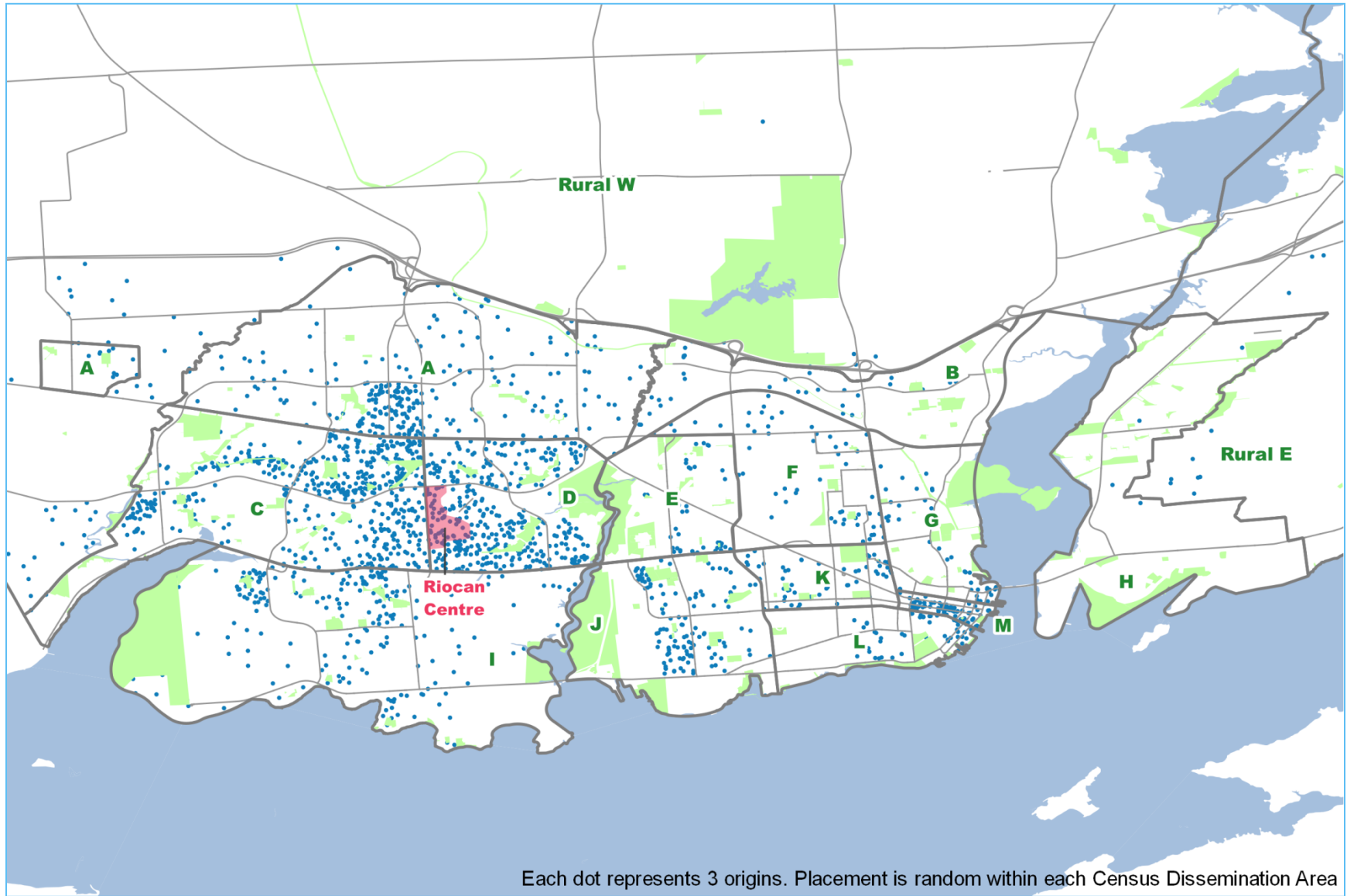
Figure 85. Origin Density of Trips to Focus Area M (Downtown Kingston)

Rural W

Rural E

A

B

H

C

D

E

F

G

K

M

L

I

J

Focus
Area
M
(Downtown)

Each dot represents 10 origins. Placement is random within each Census Dissemination Area
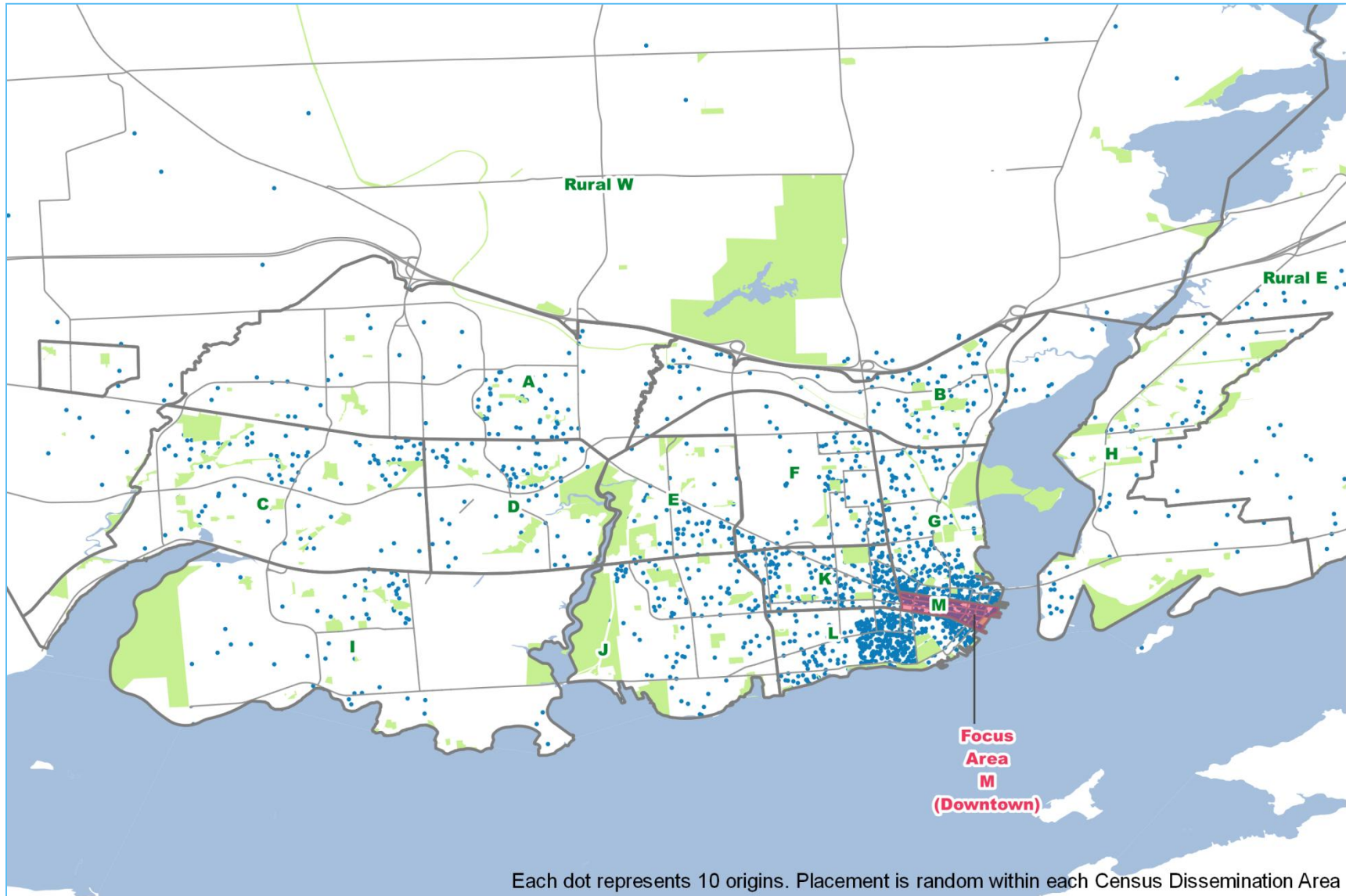
5.3   Origin-Destination Matrices

The tables on the following pages provide origin-destination matrices for the 15 Focus Areas in the study area and the external geographies.

Origin-destination matrices have been provided for four time periods:

- 24-hour daily total
- AM Peak: trips with departure times between 7 AM and 8:29 AM (1.5-hour period)
- PM Peak: trips with departure times between 3 PM and 5:29 PM (2.5-hour period)
- Off Peak: all other times outside the peak periods, including the inter-peak period, evening, and overnight.

The expanded survey counts are based on a random sample of the population and should be understood to be estimates. All expanded survey counts have been rounded to the closest 10. The sum of individual cells may not add to the listed survey totals or sub-area subtotals due to rounding.

Table 58. Origin-Destination Matrix – 24-Hour

Origin \ Destination	A	B	C	D	E	F	G	H	I	J	K	L	M	RW	RE	W Ext	N Ext	E Ext	S Ext	Other Ext	Total
Focus Area A	7,440	1,270	6,800	4,040	950	750	1,120	1,250	2,270	1,740	860	1,670	850	1,180	690	580	220	120	-	870	34,660
Focus Area B	1,120	5,140	920	650	650	1,780	1,660	800	410	600	630	940	990	570	310	50	60	130	-	420	17,840
Focus Area C	5,990	750	14,700	4,430	810	1,390	1,080	660	4,700	1,870	1,110	2,270	1,130	670	330	1,080	190	140	50	930	44,260
Focus Area D	4,340	720	4,110	6,400	890	900	750	570	2,520	2,080	820	1,460	770	790	290	300	90	170	-	230	28,200
Focus Area E	1,060	860	870	1,150	1,740	1,070	490	540	330	1,450	1,040	1,220	610	160	130	130	-	130	-	240	13,200
Focus Area F	1,100	1,370	1,060	980	1,200	2,590	1,560	380	470	1,730	2,430	1,470	1,160	200	210	90	130	90	20	170	18,400
Focus Area G	1,170	1,610	1,090	620	620	1,400	5,080	1,150	770	1,230	1,590	4,580	3,040	370	760	20	140	20	80	510	25,860
Focus Area H	1,270	680	720	370	600	320	1,320	11,260	490	640	680	1,490	1,050	420	1,980	130	40	60	30	340	23,890
Focus Area I	1,930	490	4,650	2,420	450	610	950	450	8,690	1,540	560	1,860	620	460	210	340	110	100	-	550	26,980
Focus Area J	1,650	540	1,970	2,220	1,730	1,400	1,370	550	1,500	7,700	1,980	4,020	1,130	350	260	140	160	30	-	550	29,230
Focus Area K	950	480	700	1,100	1,070	2,710	1,620	800	700	1,850	3,050	7,500	2,190	300	240	30	100	50	-	210	25,650
Focus Area L	1,620	1,130	2,250	1,280	1,320	1,450	4,210	1,630	1,830	3,920	7,270	22,110	5,330	570	660	10	50	10	-	470	57,120
Focus Area M	1,040	920	1,180	980	530	1,270	3,130	1,200	650	1,140	2,140	4,740	3,290	310	370	-	-	40	-	220	23,170
Rural Area W	1,220	550	820	580	30	150	370	380	490	460	410	610	340	1,910	150	20	280	140	-	240	9,150
Rural Area E	600	370	220	270	80	210	710	1,920	120	410	250	770	500	190	700	70	60	110	-	280	7,800
West External	630	180	880	240	220	50	40	100	360	70	20	50	70	20	70	70	-	-	-	40	3,100
North External	270	70	190	90	20	90	140	60	60	270	120	60	-	200	60	-	140	-	-	10	1,840
East External	50	120	180	70	160	90	30	20	80	40	50	40	40	140	200	-	-	160	-	90	1,570
South External	50	-	-	-	-	50	40	-	-	20	-	-	-	30	-	-	-	-	-	-	180
Other External	1,160	290	780	400	260	170	270	230	600	320	120	210	180	240	360	20	-	20	-	910	6,530
Total	34,670	17,530	44,060	28,280	13,330	18,450	25,920	23,940	27,020	29,100	25,140	57,060	23,270	9,090	7,950	3,080	1,780	1,530	180	7,260	398,610

West External Travel Area = Loyalist County

North External Travel Area = South Frontenac County

East External Travel Area = Leeds & Gananoque

South External Travel Area = Frontenac Islands

Other External = Outside the travel area defined for the study.

Table 59. Origin-Destination Matrix – AM Peak

Origin \ Destination	A	B	C	D	E	F	G	H	I	J	K	L	M	RW	RE	W Ext	N Ext	E Ext	S Ext	Other Ext	Total
Focus Area A	1,040	110	1,320	370	20	160	250	110	270	330	120	400	250	30	30	280	100	100	-	170	5,450
Focus Area B	70	1,150	-	20	70	290	290	110	10	120	50	430	330	40	20	-	10	80	-	50	3,130
Focus Area C	590	110	2,320	480	220	260	170	80	990	370	110	810	250	100	30	390	60	10	50	220	7,630
Focus Area D	370	150	300	390	240	90	180	40	380	520	110	450	200	-	-	60	50	-	-	20	3,540
Focus Area E	150	110	80	260	310	190	240	50	80	510	210	390	60	-	-	10	-	10	-	30	2,680
Focus Area F	40	180	70	90	90	390	290	50	30	170	300	350	210	-	10	-	30	10	-	40	2,340
Focus Area G	80	90	30	10	20	160	680	140	30	310	140	1,020	270	-	60	-	40	10	-	100	3,160
Focus Area H	50	260	130	10	190	50	420	1,970	100	110	40	430	150	40	160	10	20	10	-	140	4,280
Focus Area I	150	190	470	280	50	240	230	140	1,920	360	120	760	240	50	-	90	10	-	-	150	5,450
Focus Area J	140	60	110	110	270	230	300	100	80	1,900	220	1,400	200	50	10	10	90	-	-	80	5,350
Focus Area K	70	70	40	30	180	150	170	100	160	490	360	1,880	410	60	10	-	-	-	-	20	4,190
Focus Area L	60	90	70	120	90	20	390	40	150	300	430	3,520	250	10	70	-	-	-	-	30	5,630
Focus Area M	80	10	20	40	10	110	40	20	30	90	110	780	110	-	-	-	-	20	-	10	1,480
Rural Area West	210	50	110	30	-	-	110	70	70	150	130	200	210	270	40	20	50	-	-	110	1,820
Rural Area East	120	140	30	70	50	50	230	670	-	120	70	350	30	10	180	10	10	10	-	80	2,230
West External	50	-	10	-	-	10	-	-	-	-	-	-	-	-	-	20	-	-	-	10	90
North External	-	-	-	-	-	-	-	10	-	-	70	-	-	-	-	-	-	-	-	-	90
East External	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	30	-	-	30
South External	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	30	-	-	0
Other External	-	-	30	-	-	-	-	-	20	-	20	10	-	10	-	-	-	-	-	140	220
Total	3,260	2,760	5,140	2,300	1,800	2,400	3,970	3,710	4,320	5,840	2,600	13,170	3,150	670	640	900	460	270	50	1,380	58,790

West External Travel Area = Loyalist County
North External Travel Area = South Frontenac County
East External Travel Area = Leeds & Gananoque
South External Travel Area = Frontenac Islands
Other External = Outside the travel area defined for the study.

Table 60. Origin-Destination Matrix – PM Peak

Destination / Origin	A	B	C	D	E	F	G	H	I	J	K	L	M	RW	RE	W Ext	N Ext	E Ext	S Ext	Other Ext	Total
Focus Area A	2,360	250	1,730	550	200	180	290	160	430	470	140	230	20	550	80	30	-	-	-	180	7,870
Focus Area B	240	960	150	240	50	360	300	230	150	90	180	120	220	130	240	20	-	-	-	50	3,700
Focus Area C	1,880	270	4,570	740	140	250	140	210	1,270	360	250	260	10	80	140	80	100	-	-	30	10,760
Focus Area D	890	90	750	1,330	190	180	70	40	500	310	160	270	60	140	30	10	-	-	-	30	5,020
Focus Area E	220	150	240	350	460	120	90	260	60	320	230	190	30	10	60	20	-	-	-	30	2,830
Focus Area F	470	220	380	320	360	720	270	130	230	570	460	140	280	60	30	50	10	-	-	40	4,730
Focus Area G	390	360	240	270	300	400	1,290	290	380	240	540	620	300	180	280	-	70	-	10	30	6,190
Focus Area H	670	200	90	200	180	180	180	3,560	110	100	340	130	220	150	730	-	20	-	-	30	7,070
Focus Area I	530	60	1,470	790	140	30	170	60	2,800	470	40	180	80	60	60	90	-	60	-	40	7,110
Focus Area J	610	160	380	760	710	330	310	200	210	1,780	650	520	260	70	90	10	-	10	-	100	7,150
Focus Area K	190	140	260	230	170	600	220	170	150	320	730	930	240	120	80	-	90	-	-	70	4,690
Focus Area L	540	380	1,090	670	360	400	920	740	850	1,260	2,560	4,630	1,510	320	330	-	-	-	-	90	16,640
Focus Area M	340	360	390	250	170	450	650	330	260	470	460	660	430	140	130	-	-	-	-	140	5,640
Rural Area West	430	140	150	110	10	70	40	10	60	20	70	100	-	850	10	-	70	70	-	-	2,200
Rural Area East	110	80	40	80	-	50	120	210	-	20	20	90	-	140	140	-	-	-	-	80	1,160
West External	270	110	490	60	70	30	-	30	150	20	-	10	30	20	70	-	-	-	-	-	1,350
North External	140	20	160	30	-	-	10	-	40	150	30	20	-	140	30	-	20	-	-	-	790
East External	30	90	110	60	120	50	10	20	50	10	10	20	20	50	90	-	-	40	-	-	770
South External	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
Other External	410	20	400	140	90	60	200	60	120	130	70	120	40	120	60	20	-	20	-	130	2,200
Total	10,710	4,060	13,090	7,160	3,720	4,490	5,270	6,690	7,800	7,110	6,920	9,240	3,720	3,300	2,670	330	370	200	10	1,060	97,900

West External Travel Area = Loyalist County

North External Travel Area = South Frontenac County

East External Travel Area = Leeds & Gananoque

South External Travel Area = Frontenac Islands

Other External = Outside the travel area defined for the study.

Table 61. Origin-Destination Matrix – Non-Peak (Inter-Peak and Evening/Overnight)

Destination / Origin	A	B	C	D	E	F	G	H	I	J	K	L	M	RW	RE	W Ext	N Ext	E Ext	S Ext	Other Ext	Total
Focus Area A	4,040	900	3,750	3,130	720	410	580	980	1,560	940	600	1,040	580	600	580	270	120	30	-	520	21,340
Focus Area B	800	3,040	770	390	540	1,130	1,070	460	250	400	410	390	450	400	50	30	50	50	-	320	11,010
Focus Area C	3,520	370	7,800	3,210	450	890	780	370	2,440	1,140	750	1,210	860	480	160	620	30	130	-	680	25,870
Focus Area D	3,090	490	3,060	4,680	460	630	500	500	1,640	1,260	560	730	510	660	260	230	30	170	-	190	19,640
Focus Area E	690	610	540	540	970	770	160	230	190	620	610	630	530	150	60	90	-	120	-	180	7,690
Focus Area F	590	970	610	580	740	1,480	1,000	210	220	990	1,670	980	660	140	180	40	90	80	20	90	11,330
Focus Area G	700	1,160	820	350	300	840	3,100	720	360	680	920	2,930	2,480	190	420	20	30	10	80	380	16,500
Focus Area H	550	220	490	170	230	100	720	5,730	280	430	300	930	680	230	1,090	120	-	60	30	170	12,540
Focus Area I	1,260	240	2,710	1,350	270	330	550	240	3,960	710	410	930	300	360	150	150	110	40	-	360	14,410
Focus Area J	900	310	1,480	1,340	750	840	760	250	1,220	4,020	1,110	2,090	670	230	170	130	70	30	-	370	16,740
Focus Area K	690	270	400	840	730	1,960	1,230	540	390	1,040	1,970	4,690	1,540	120	160	30	10	50	-	120	16,760
Focus Area L	1,020	670	1,090	490	870	1,030	2,900	850	830	2,360	4,280	13,970	3,570	250	260	10	50	10	-	350	34,840
Focus Area M	620	550	770	700	350	710	2,440	850	360	590	1,560	3,300	2,760	180	230	-	-	20	-	70	16,050
Rural Area West	590	360	550	440	30	90	210	290	370	290	210	320	130	800	90	-	170	70	-	130	5,130
Rural Area East	380	140	150	120	30	100	370	1,030	120	260	160	340	460	40	380	60	50	100	-	120	4,410
West External	310	70	380	180	150	10	40	70	220	60	20	40	40	-	-	60	-	-	-	40	1,660
North External	130	50	30	60	20	90	130	40	20	130	30	40	-	60	20	-	130	-	-	10	960
East External	30	30	70	10	50	40	30	-	30	30	50	20	20	90	110	-	-	100	-	90	770
South External	50	-	-	-	-	20	40	-	-	20	-	-	-	30	-	-	-	-	-	-	150
Other External	750	270	360	260	170	110	80	160	450	190	40	80	140	120	300	-	-	-	-	650	4,110
Total	20,700	10,710	25,820	18,820	7,810	11,550	16,680	13,530	14,910	16,150	15,630	34,650	####	5,110	4,650	1,850	950	1,060	130	4,820	241,920

West External Travel Area = Loyalist County
North External Travel Area = South Frontenac County
East External Travel Area = Leeds & Gananoque
South External Travel Area = Frontenac Islands
Other External = Outside the travel area defined for the study.

Table 62. Origin-Destination Matrix – 24-Hour Transit Trips

Origin \ Destination	A	B	C	D	E	F	G	H	I	J	K	L	M	RW	RE	W Ext	N Ext	E Ext	S Ext	Other Ext	Total
Focus Area A	30	20	160	50	90	70	40	-	40	350	140	440	20	-	-	-	-	-	-	-	1,450
Focus Area B	10	340	20	-	30	220	120	20	30	230	110	240	210	-	-	-	-	-	-	-	1,590
Focus Area C	240	30	460	120	80	110	90	20	110	420	160	510	260	-	60	-	-	-	-	-	2,670
Focus Area D	30	60	110	80	20	50	10	-	40	230	90	200	110	-	-	30	-	-	-	-	1,050
Focus Area E	110	70	110	20	-	-	40	30	20	110	20	410	160	-	-	-	-	-	-	-	1,110
Focus Area F	30	150	100	120	10	130	100	10	40	490	100	290	280	-	-	-	-	-	20	-	1,870
Focus Area G	70	110	80	10	40	120	30	120	50	300	40	590	270	-	10	-	-	-	-	-	1,830
Focus Area H	-	20	60	-	-	10	180	260	-	210	40	500	210	-	-	-	-	-	-	-	1,480
Focus Area I	20	30	90	-	80	30	50	-	220	320	20	500	120	-	-	-	-	-	-	-	1,490
Focus Area J	250	120	360	170	140	400	300	120	390	700	240	1,250	410	-	10	-	-	-	-	40	4,890
Focus Area K	140	110	120	80	10	40	40	90	20	290	40	900	140	-	30	-	-	-	-	-	2,040
Focus Area L	300	280	600	180	440	190	560	620	410	1,530	670	1,170	450	40	-	-	-	-	-	-	7,450
Focus Area M	110	250	330	220	100	330	320	190	50	330	260	320	30	-	-	-	-	-	-	-	2,830
Rural Area West	-	-	-	-	-	-	-	-	-	10	-	40	-	-	-	-	-	-	-	-	50
Rural Area East	-	-	60	-	-	-	10	-	-	10	30	-	-	-	-	-	-	-	-	-	100
West External	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
North External	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
East External	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	20
South External	50	-	-	-	-	30	30	-	-	20	-	-	-	30	-	-	-	-	-	-	160
Other External	660	240	690	310	210	140	120	210	390	260	90	150	140	180	210	20	-	-	-	20	4,030
Total	2,060	1,830	3,350	1,390	1,250	1,890	2,030	1,700	1,800	5,820	2,050	7,500	2,800	240	320	50	0	0	20	50	36,140

Note: Origins and Destinations reflect the overall trip including transit access and egress segments. In the case of multi-mode trips, particularly those with drive-access or passenger-access transit, the origin or destination may or may not be close to the actual transit boarding and alighting bus stops used.

West External Travel Area = Loyalist County
North External Travel Area = South Frontenac County
East External Travel Area = Leeds & Gananoque
South External Travel Area = Frontenac Islands
Other External = Outside the travel area defined for the study.

5.4   Trips To, From and Within Focus Areas

The tables on the following pages break out the trip purposes and mode shares for trips to, from, and within each of the 13 urban Focus Areas and the two rural areas. The tables also identify the proportion of all trips that are auto driver and auto passenger trips that would be bikeable (within 4.6 km cycling distance or roads and cycling paths) or walkable (within 1.6 km walking distance).
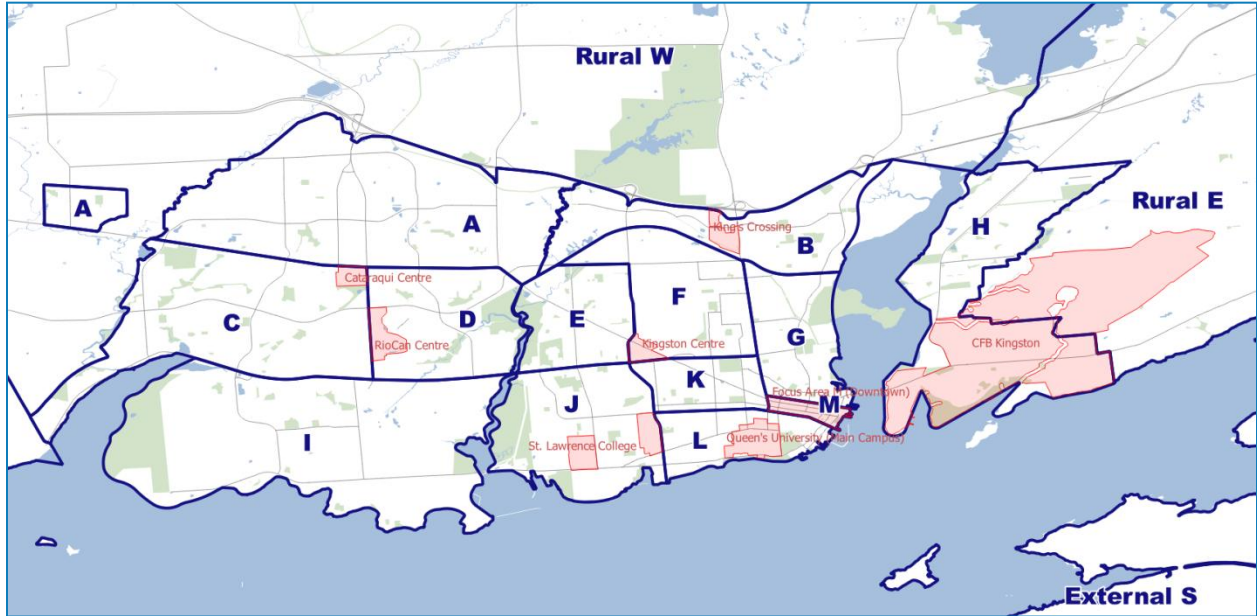
Focus Area A
Sub-area: West
Neighbourhoods: Cataraqui North, Westbrook Enclave
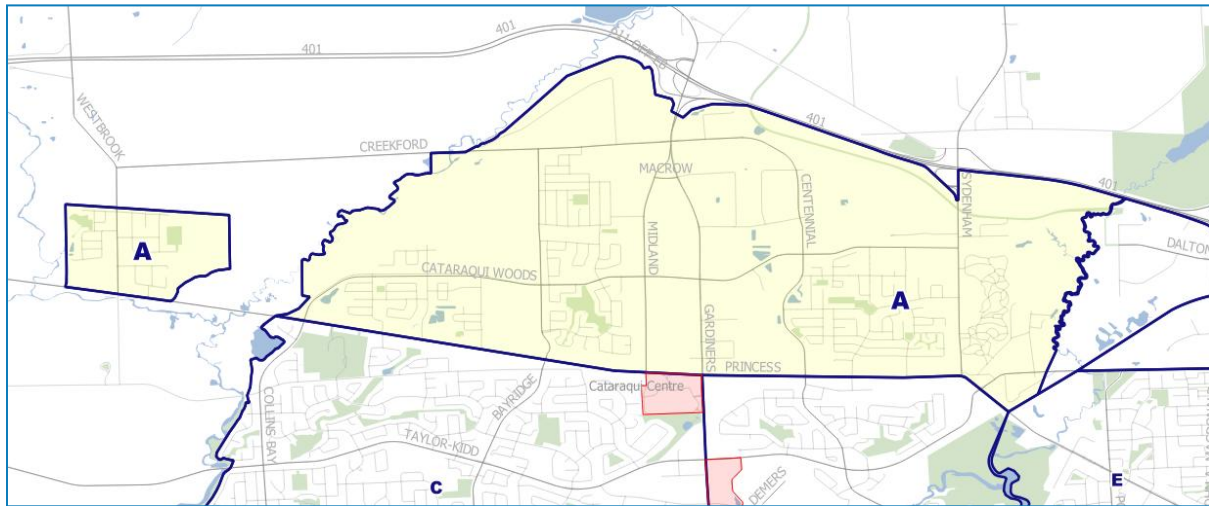
	From	%	To	%	Within	%
Trips	**27,220**	**100%**	**27,230**	**100%**	**7,440**	**100%**
Purpose						
Work or work-related	4,510	17%	4,240	16%	920	12%
To post-secondary school	500	2%	0	0%	0	0%
To K-12 school	1,310	5%	160	1%	310	4%
Serve passenger	1,920	7%	1,720	6%	440	6%
Shop / personal bus. / other	4,160	15%	8,800	32%	2,440	33%
Recreation / social / restaurant	3,420	13%	2,340	9%	850	11%
Return home	11,420	42%	9,980	37%	2,490	33%
Mode						
Auto Driver	18,720	69%	18,830	69%	5,140	69%
Auto Passenger	5,350	20%	5,340	20%	930	13%
Kingston Transit	1,420	5%	1,350	5%	30	0%
School Bus	890	3%	950	3%	260	3%
Walk	360	1%	270	1%	1,020	14%
Cycle	50	0%	120	0%	40	1%
Other	430	2%	380	1%	30	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	7,480	27%	7,330	27%	4,600	62%
Auto Passenger (Bikeable)	1,810	7%	1,840	7%	820	11%
Walkable Auto Trips						
Auto Driver (Walkable)	1,110	4%	1,240	5%	2,150	29%
Auto Passenger (Walkable)	310	1%	260	1%	350	5%

Focus Area B
Sub-area: Central
Neighbourhoods: Marker's Acres, Rideau Heights (north), Kingscourt / Novelis (north)
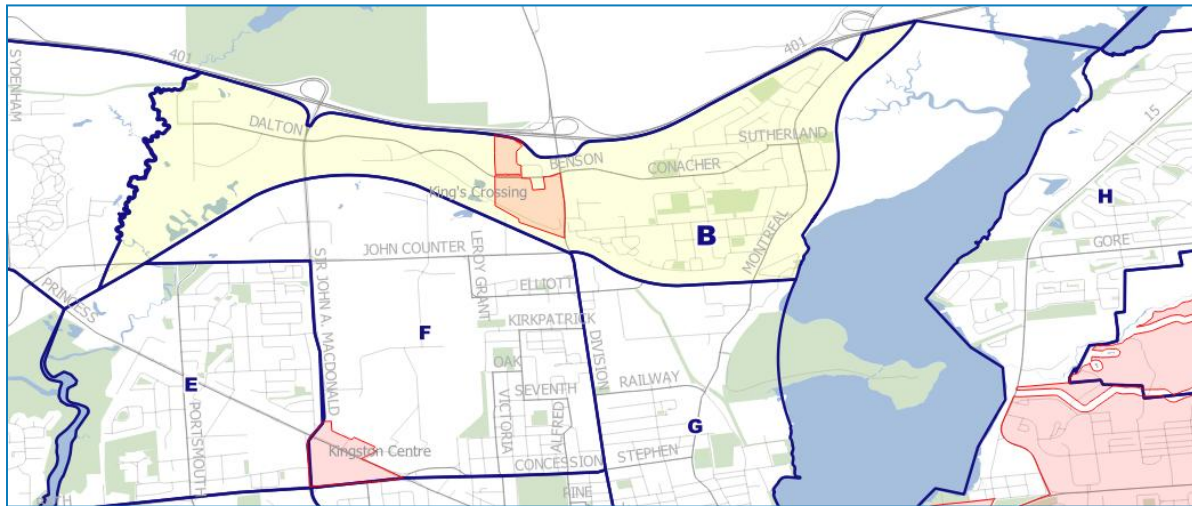
	From	%	To	%	Within	%
Trips	**12,690**	**100%**	**12,390**	**100%**	**5,140**	**100%**
Purpose						
Work or work-related	2,340	18%	2,070	17%	490	10%
To post-secondary school	370	3%	0	0%	0	0%
To K-12 school	460	4%	580	5%	470	9%
Serve passenger	1,130	9%	570	5%	580	11%
Shop / personal bus. / other	2,340	18%	2,310	19%	930	18%
Recreation / social / restaurant	1,640	13%	1,900	15%	720	14%
Return home	4,420	35%	4,960	40%	1,950	38%
Mode						
Auto Driver	7,580	60%	7,530	61%	2,060	40%
Auto Passenger	2,380	19%	2,170	18%	1,130	22%
Kingston Transit	1,240	10%	1,250	10%	340	7%
School Bus	740	6%	760	6%	230	4%
Walk	230	2%	280	2%	970	19%
Cycle	220	2%	190	2%	360	7%
Other	300	2%	200	2%	50	1%
Bikeable Auto Trips						
Auto Driver (Bikeable)	2,410	19%	2,230	18%	2,060	40%
Auto Passenger (Bikeable)	830	7%	730	6%	1,130	22%
Walkable Auto Trips						
Auto Driver (Walkable)	220	2%	130	1%	1,210	24%
Auto Passenger (Walkable)	70	1%	60	0%	470	9%

Focus Area C
Sub-area: West
Neighbourhoods: Bayridge, Westwood, Sutton Mills, Gardiners / Meadowbrook (west)
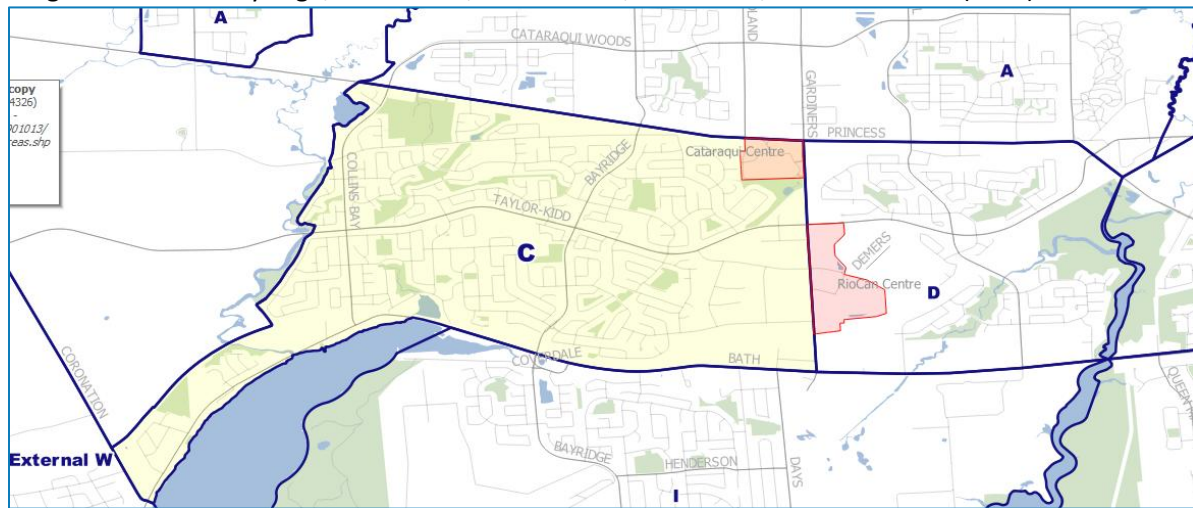
	From	%	To	%	Within	%
Trips	**29,560**	**100%**	**29,360**	**100%**	**14,700**	**100%**
Purpose						
Work or work-related	6,390	22%	2,300	8%	1,420	10%
To post-secondary school	1,020	3%	50	0%	20	0%
To K-12 school	880	3%	1,010	3%	1,620	11%
Serve passenger	1,850	6%	2,610	9%	1,430	10%
Shop / personal bus. / other	5,970	20%	5,640	19%	2,140	15%
Recreation / social / restaurant	4,850	16%	3,890	13%	1,950	13%
Return home	8,600	29%	13,840	47%	6,130	42%
Mode						
Auto Driver	20,050	68%	19,810	67%	7,620	52%
Auto Passenger	5,520	19%	5,250	18%	2,200	15%
Kingston Transit	2,210	7%	2,210	8%	460	3%
School Bus	1,140	4%	1,360	5%	530	4%
Walk	290	1%	370	1%	3,360	23%
Cycle	160	1%	160	1%	380	3%
Other	200	1%	200	1%	150	1%
Bikeable Auto Trips						
Auto Driver (Bikeable)	8,530	29%	8,870	30%	6,950	47%
Auto Passenger (Bikeable)	2,220	8%	2,380	8%	2,180	15%
Walkable Auto Trips						
Auto Driver (Walkable)	1,330	4%	1,150	4%	3,320	23%
Auto Passenger (Walkable)	310	1%	360	1%	1,050	7%

Focus Area D
Sub-area: West
Neighbourhoods: Waterloo Village, Gardiners / Meadowbrook (east)
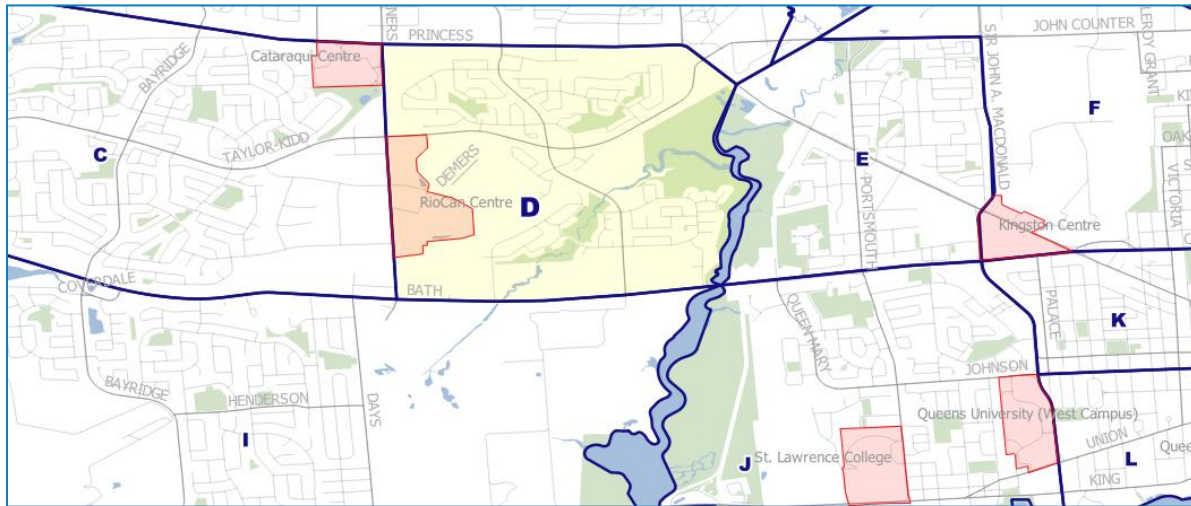
	From	%	To	%	Within	%
Trips	**21,800**	**100%**	**21,880**	**100%**	**6,400**	**100%**
Purpose						
Work or work-related	3,840	18%	2,170	10%	460	7%
To post-secondary school	380	2%	0	0%	0	0%
To K-12 school	840	4%	200	1%	30	0%
Serve passenger	1,200	6%	1,210	6%	260	4%
Shop / personal bus. / other	4,780	22%	7,690	35%	2,050	32%
Recreation / social / restaurant	2,320	11%	3,740	17%	1,210	19%
Return home	8,450	39%	6,880	31%	2,400	38%
Mode						
Auto Driver	15,210	70%	15,360	70%	3,900	61%
Auto Passenger	4,190	19%	4,050	19%	1,210	19%
Kingston Transit	980	4%	1,000	5%	80	1%
School Bus	630	3%	740	3%	0	0%
Walk	570	3%	580	3%	1,220	19%
Cycle	40	0%	30	0%	0	0%
Other	190	1%	120	1%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	7,680	35%	7,990	37%	3,890	61%
Auto Passenger (Bikeable)	2,240	10%	2,180	10%	1,190	19%
Walkable Auto Trips						
Auto Driver (Walkable)	1,490	7%	1,440	7%	1,870	29%
Auto Passenger (Walkable)	360	2%	370	2%	710	11%

Focus Area E
Sub-area: Central
Neighbourhoods: Grenville Park, Strathcona Park, Hillendale
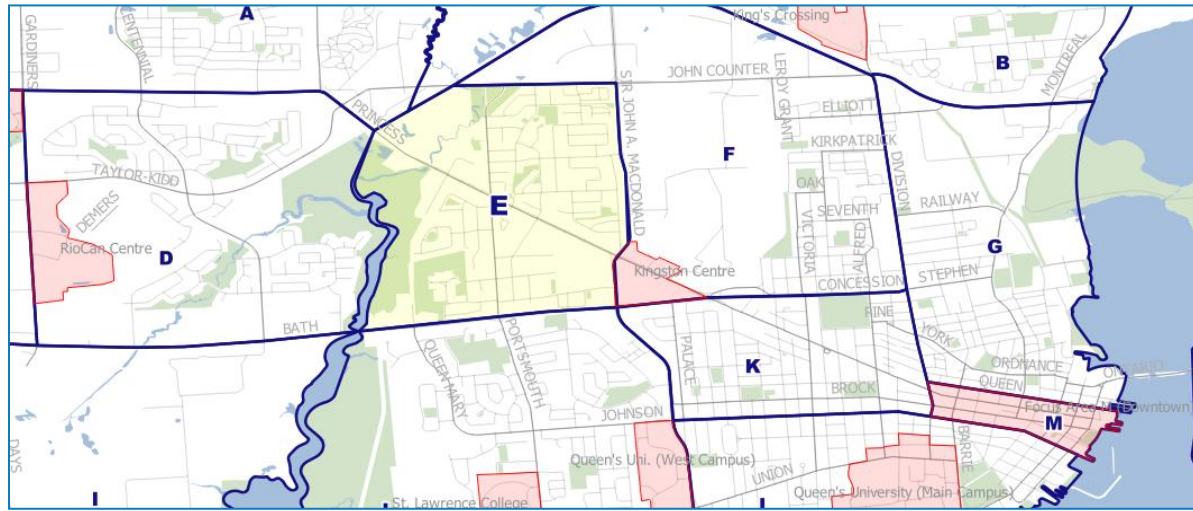
	From	%	To	%	Within	%
Trips	**11,460**	**100%**	**11,590**	**100%**	**1,740**	**100%**
Purpose						
Work or work-related	2,170	19%	970	8%	120	7%
To post-secondary school	650	6%	0	0%	0	0%
To K-12 school	560	5%	590	5%	170	10%
Serve passenger	610	5%	540	5%	70	4%
Shop / personal bus. / other	2,330	20%	1,400	12%	310	18%
Recreation / social / restaurant	2,210	19%	1,040	9%	280	16%
Return home	2,930	26%	7,040	61%	790	45%
Mode						
Auto Driver	6,870	60%	6,930	60%	540	31%
Auto Passenger	1,870	16%	2,010	17%	310	18%
Kingston Transit	1,110	10%	1,040	9%	0	0%
School Bus	740	6%	660	6%	30	2%
Walk	430	4%	500	4%	480	28%
Cycle	250	2%	260	2%	320	18%
Other	200	2%	190	2%	60	3%
Bikeable Auto Trips						
Auto Driver (Bikeable)	4,200	37%	4,220	36%	540	31%
Auto Passenger (Bikeable)	1,060	9%	1,090	9%	310	18%
Walkable Auto Trips						
Auto Driver (Walkable)	850	7%	920	8%	400	23%
Auto Passenger (Walkable)	60	1%	170	1%	310	18%

Focus Area F
Sub-area: Central
Neighbourhoods: Kingscourt / Novelis (south)
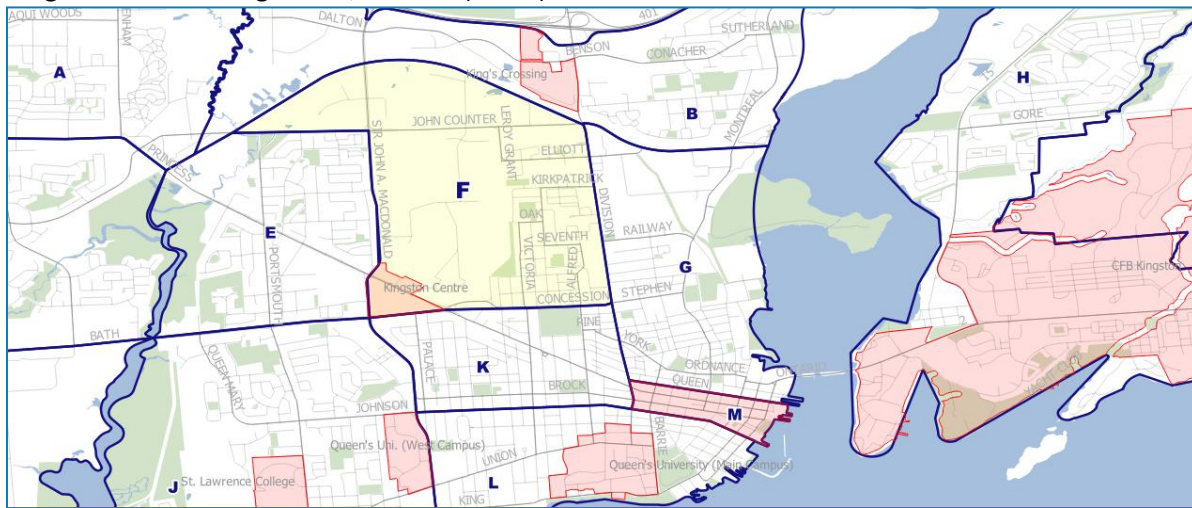
	From	%	To	%	Within	%
Trips	**15,800**	**100%**	**15,850**	**100%**	**2,590**	**100%**
Purpose						
Work or work-related	2,290	14%	3,270	21%	270	10%
To post-secondary school	530	3%	0	0%	0	0%
To K-12 school	360	2%	200	1%	110	4%
Serve passenger	980	6%	1,080	7%	310	12%
Shop / personal bus. / other	2,630	17%	4,700	30%	700	27%
Recreation / social / restaurant	2,310	15%	1,670	11%	390	15%
Return home	6,710	42%	4,930	31%	810	31%
Mode						
Auto Driver	9,880	63%	9,900	62%	850	33%
Auto Passenger	2,110	13%	2,130	13%	100	4%
Kingston Transit	1,740	11%	1,600	10%	130	5%
School Bus	350	2%	280	2%	40	2%
Walk	950	6%	980	6%	1,260	49%
Cycle	490	3%	550	3%	110	4%
Other	280	2%	400	3%	110	4%
Bikeable Auto Trips						
Auto Driver (Bikeable)	6,220	39%	6,150	39%	850	33%
Auto Passenger (Bikeable)	1,360	9%	1,400	9%	100	4%
Walkable Auto Trips						
Auto Driver (Walkable)	1,490	9%	1,830	12%	580	22%
Auto Passenger (Walkable)	270	2%	410	3%	90	3%

![KingstonMoves logo]

Focus Area G
Sub-area: Central
Neighbourhoods: Inner Harbour, Rideau Heights (south)
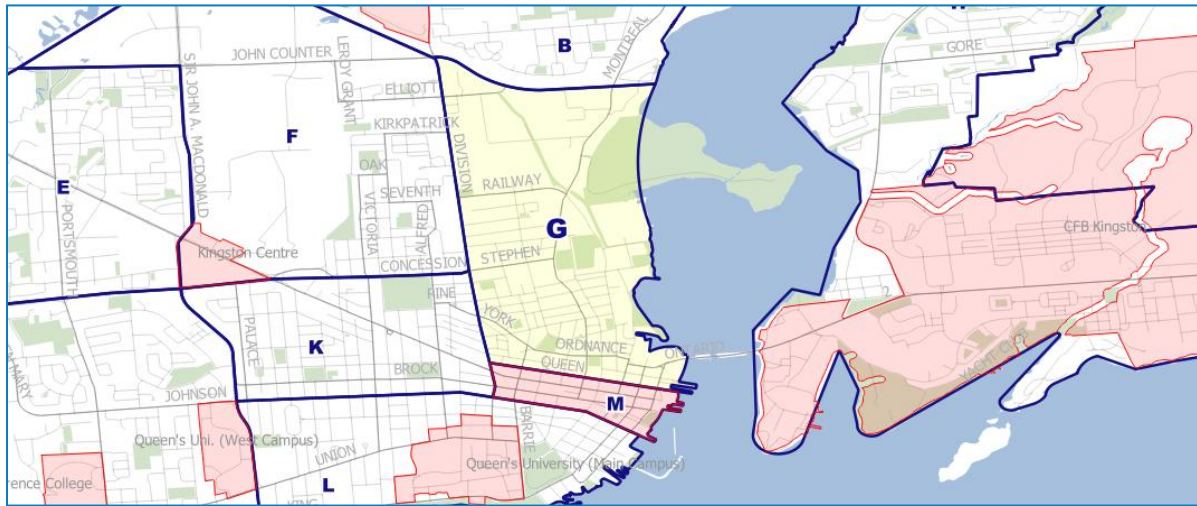
	From	%	To	%	Within	%
Trips	20,780	100%	20,850	100%	5,080	100%
Purpose						
Work or work-related	3,810	18%	4,350	21%	500	10%
To post-secondary school	1,550	7%	0	0%	0	0%
To K-12 school	360	2%	830	4%	260	5%
Serve passenger	1,230	6%	1,520	7%	390	8%
Shop / personal bus. / other	3,780	18%	2,160	10%	940	19%
Recreation / social / restaurant	3,360	16%	3,010	14%	900	18%
Return home	6,680	32%	8,990	43%	2,080	41%
Mode						
Auto Driver	9,700	47%	9,840	47%	1,220	24%
Auto Passenger	2,910	14%	2,920	14%	390	8%
Kingston Transit	1,800	9%	1,850	9%	30	1%
School Bus	380	2%	450	2%	40	1%
Walk	4,410	21%	4,170	20%	2,920	57%
Cycle	1,350	6%	1,330	6%	440	9%
Other	230	1%	290	1%	40	1%
Bikeable Auto Trips						
Auto Driver (Bikeable)	4,920	24%	5,040	24%	1,220	24%
Auto Passenger (Bikeable)	1,410	7%	1,390	7%	390	8%
Walkable Auto Trips						
Auto Driver (Walkable)	1,140	5%	1,330	6%	800	16%
Auto Passenger (Walkable)	320	2%	310	1%	300	6%

Focus Area H
Sub-area: East
Neighbourhoods: East End (Greenwood Park / St. Lawrence South, Cataraqui River East, CFB Kingston portions within urban boundary)
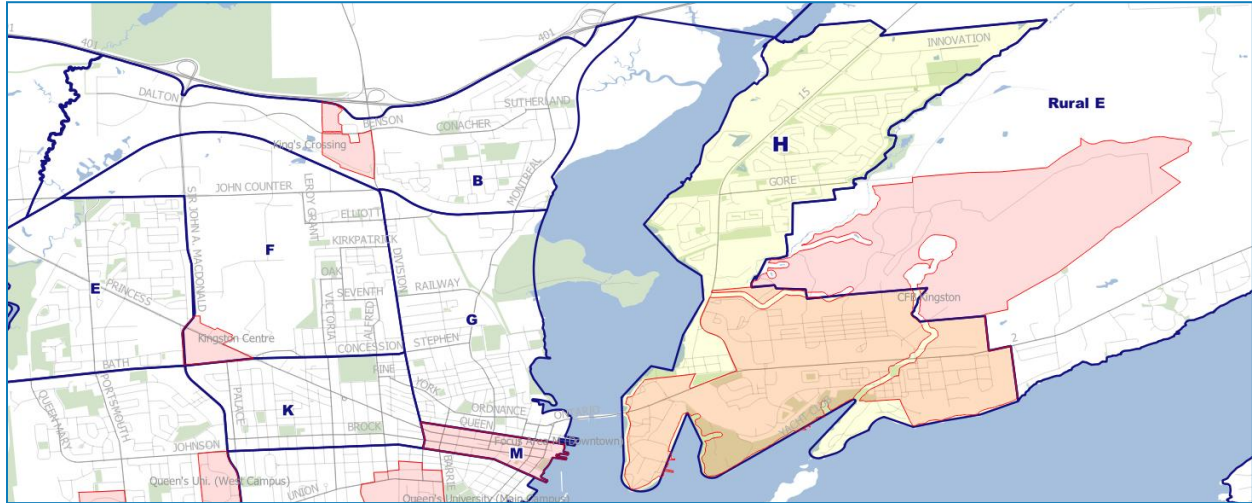
	From	%	To	%	Within	%
Trips	**12,630**	**100%**	**12,670**	**100%**	**11,260**	**100%**
Purpose						
Work or work-related	2,630	21%	2,610	21%	2,310	21%
To post-secondary school	550	4%	60	0%	90	1%
To K-12 school	600	5%	430	3%	1,040	9%
Serve passenger	660	5%	840	7%	1,370	12%
Shop / personal bus. / other	1,670	13%	1,410	11%	1,010	9%
Recreation / social / restaurant	2,010	16%	1,690	13%	1,370	12%
Return home	4,500	36%	5,630	44%	4,080	36%
Mode						
Auto Driver	7,990	63%	8,200	65%	5,640	50%
Auto Passenger	2,090	17%	2,040	16%	1,260	11%
Kingston Transit	1,220	10%	1,230	10%	260	2%
School Bus	670	5%	620	5%	550	5%
Walk	250	2%	210	2%	2,570	23%
Cycle	260	2%	220	2%	940	8%
Other	160	1%	140	1%	40	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	990	8%	990	8%	4,960	44%
Auto Passenger (Bikeable)	240	2%	330	3%	1,230	11%
Walkable Auto Trips						
Auto Driver (Walkable)	100	1%	100	1%	1,450	13%
Auto Passenger (Walkable)	0	0%	0	0%	640	6%

Focus Area I
Sub-area: West
Neighbourhoods: Lemoine Point, Collins Bay, Auden Park, Henderson, Reddendale
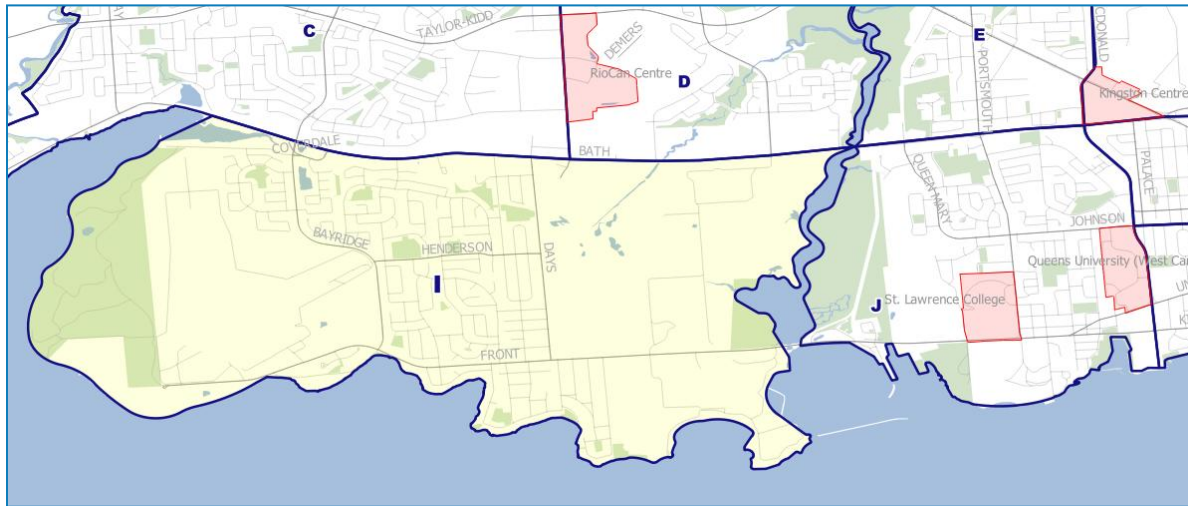
	From	%	To	%	Within	%
Trips	**18,290**	**100%**	**18,330**	**100%**	**8,690**	**100%**
Purpose						
Work or work-related	3,800	21%	1,750	10%	400	5%
To post-secondary school	680	4%	0	0%	0	0%
To K-12 school	310	2%	950	5%	1,330	15%
Serve passenger	1,730	9%	1,140	6%	1,080	12%
Shop / personal bus. / other	3,070	17%	3,000	16%	1,430	16%
Recreation / social / restaurant	3,810	21%	1,690	9%	940	11%
Return home	4,890	27%	9,810	54%	3,500	40%
Mode						
Auto Driver	12,150	66%	12,070	66%	3,700	43%
Auto Passenger	3,310	18%	3,630	20%	1,200	14%
Kingston Transit	1,270	7%	1,190	6%	220	3%
School Bus	800	4%	570	3%	590	7%
Walk	280	2%	300	2%	2,530	29%
Cycle	250	1%	260	1%	460	5%
Other	230	1%	320	2%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	3,990	22%	3,820	21%	3,490	40%
Auto Passenger (Bikeable)	1,170	6%	1,120	6%	1,180	14%
Walkable Auto Trips						
Auto Driver (Walkable)	330	2%	450	2%	1,600	18%
Auto Passenger (Walkable)	140	1%	130	1%	540	6%

Focus Area J
Sub-area: Central
Neighbourhoods: Portsmouth, Fairway Hills, Calvin Park, Polson Park
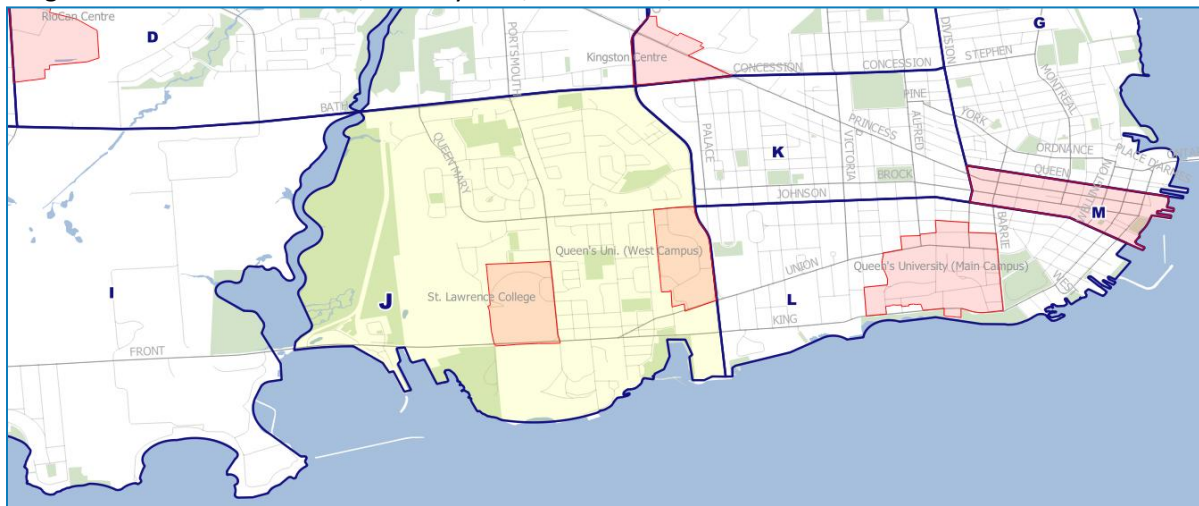
	From	%	To	%	Within	%
Trips	**21,530**	**100%**	**21,400**	**100%**	**7,700**	**100%**
Purpose						
Work or work-related	3,520	16%	2,120	10%	480	6%
To post-secondary school	1,480	7%	3,860	18%	1,380	18%
To K-12 school	570	3%	930	4%	570	7%
Serve passenger	1,750	8%	990	5%	530	7%
Shop / personal bus. / other	3,990	19%	540	3%	360	5%
Recreation / social / restaurant	3,240	15%	2,140	10%	990	13%
Return home	6,990	32%	10,820	51%	3,390	44%
Mode						
Auto Driver	10,880	51%	10,670	50%	1,730	22%
Auto Passenger	3,120	14%	2,930	14%	640	8%
Kingston Transit	4,240	20%	4,840	23%	700	9%
School Bus	650	3%	660	3%	190	2%
Walk	1,510	7%	1,160	5%	4,170	54%
Cycle	820	4%	820	4%	170	2%
Other	320	1%	310	1%	110	1%
Bikeable Auto Trips						
Auto Driver (Bikeable)	5,330	25%	5,210	24%	1,730	22%
Auto Passenger (Bikeable)	1,500	7%	1,280	6%	640	8%
Walkable Auto Trips						
Auto Driver (Walkable)	890	4%	700	3%	1,050	14%
Auto Passenger (Walkable)	230	1%	150	1%	440	6%

Focus Area K
Sub-area: Central
Neighbourhoods: Williamsville, Sunnyside (north)

	From	%	To	%	Within	%
Trips	**22,590**	**100%**	**22,090**	**100%**	**3,050**	**100%**
Purpose						
Work or work-related	2,880	13%	1,810	8%	200	7%
To post-secondary school	5,210	23%	10	0%	0	0%
To K-12 school	570	3%	210	1%	20	1%
Serve passenger	1,560	7%	1,630	7%	210	7%
Shop / personal bus. / other	3,080	14%	2,430	11%	600	20%
Recreation / social / restaurant	3,840	17%	3,450	16%	880	29%
Return home	5,440	24%	12,570	57%	1,150	38%
Mode						
Auto Driver	9,290	41%	9,220	42%	1,060	35%
Auto Passenger	3,100	14%	3,030	14%	140	5%
Kingston Transit	2,000	9%	1,920	9%	40	1%
School Bus	290	1%	180	1%	0	0%
Walk	5,900	26%	5,820	26%	1,700	56%
Cycle	1,700	8%	1,680	8%	120	4%
Other	310	1%	240	1%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	6,220	28%	5,880	27%	1,060	35%
Auto Passenger (Bikeable)	1,960	9%	2,070	9%	140	5%
Walkable Auto Trips						
Auto Driver (Walkable)	1,880	8%	1,590	7%	1,010	33%
Auto Passenger (Walkable)	750	3%	610	3%	140	5%

Focus Area L
Sub-area: Central
Neighbourhoods: Queens (south), Alwington, Sunnyside (south)
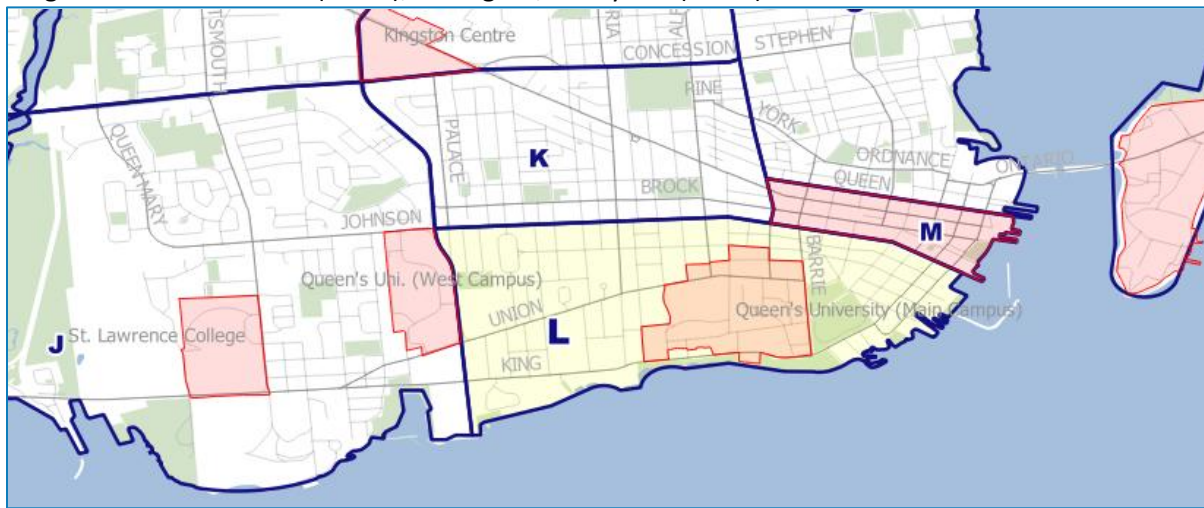
	From	%	To	%	Within	%
Trips	**35,000**	**100%**	**34,940**	**100%**	**22,110**	**100%**
Purpose						
Work or work-related	1,920	5%	8,680	25%	2,200	10%
To post-secondary school	350	1%	11,200	32%	6,050	27%
To K-12 school	370	1%	1,520	4%	350	2%
Serve passenger	1,680	5%	3,460	10%	1,220	6%
Shop / personal bus. / other	6,170	18%	1,330	4%	910	4%
Recreation / social / restaurant	4,060	12%	3,570	10%	2,840	13%
Return home	20,460	58%	5,180	15%	8,540	39%
Mode						
Auto Driver	12,130	35%	12,080	35%	1,610	7%
Auto Passenger	4,110	12%	4,020	12%	850	4%
Kingston Transit	6,280	18%	6,180	18%	1,170	5%
School Bus	610	2%	600	2%	0	0%
Walk	9,160	26%	9,250	26%	16,500	75%
Cycle	2,510	7%	2,560	7%	1,980	9%
Other	210	1%	250	1%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	5,520	16%	5,680	16%	1,610	7%
Auto Passenger (Bikeable)	2,290	7%	2,230	6%	850	4%
Walkable Auto Trips						
Auto Driver (Walkable)	1,320	4%	1,470	4%	1,340	6%
Auto Passenger (Walkable)	430	1%	440	1%	690	3%

Focus Area M
Sub-area: Central
Neighbourhoods: Downtown (portions of Inner Harbour, Queen's, and Sydenham neighbourhoods)
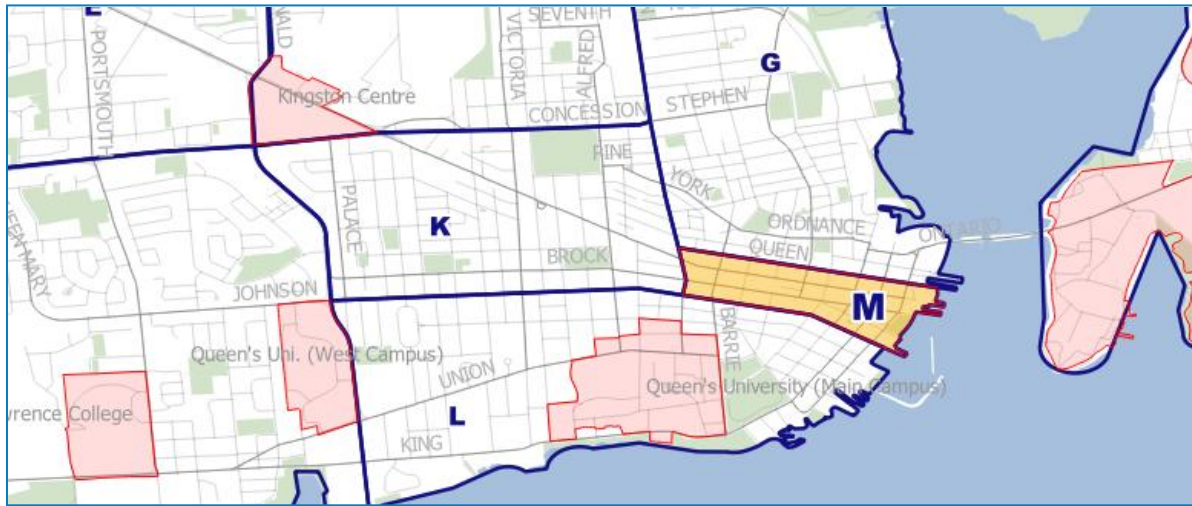
	From	%	To	%	Within	%
Trips	**19,880**	**100%**	**19,970**	**100%**	**3,290**	**100%**
Purpose						
Work or work-related	1,760	9%	4,390	22%	310	9%
To post-secondary school	1,690	9%	0	0%	0	0%
To K-12 school	90	0%	410	2%	0	0%
Serve passenger	1,130	6%	900	5%	0	0%
Shop / personal bus. / other	2,160	11%	6,800	34%	1,430	43%
Recreation / social / restaurant	1,370	7%	5,470	27%	960	29%
Return home	11,680	59%	2,020	10%	600	18%
Mode						
Auto Driver	7,190	36%	7,110	36%	220	7%
Auto Passenger	2,640	13%	2,670	13%	130	4%
Kingston Transit	2,800	14%	2,630	13%	30	1%
School Bus	300	2%	320	2%	0	0%
Walk	5,550	28%	5,960	30%	2,760	84%
Cycle	1,050	5%	990	5%	150	5%
Other	350	2%	290	1%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	3,210	16%	3,440	17%	220	7%
Auto Passenger (Bikeable)	1,280	6%	1,340	7%	130	4%
Walkable Auto Trips						
Auto Driver (Walkable)	1,090	5%	880	4%	220	7%
Auto Passenger (Walkable)	420	2%	400	2%	130	4%

Rural Area West
Sub-area: Rural
Neighbourhoods: Rural, west of the river
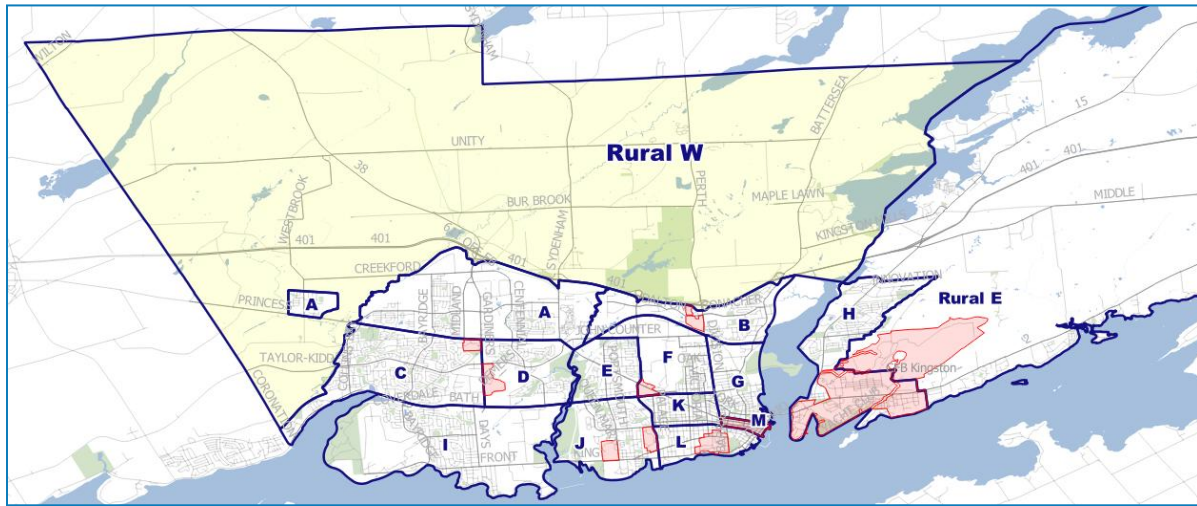
	From	%	To	%	Within	%
Trips	**7,240**	**100%**	**7,170**	**100%**	**1,910**	**100%**
Purpose						
Work or work-related	2,040	28%	400	6%	160	8%
To post-secondary school	50	1%	0	0%	0	0%
To K-12 school	590	8%	0	0%	270	14%
Serve passenger	710	10%	430	6%	180	9%
Shop / personal bus. / other	1,200	17%	350	5%	180	9%
Recreation / social / restaurant	1,340	19%	1,120	16%	350	18%
Return home	1,320	18%	4,870	68%	780	41%
Mode						
Auto Driver	5,480	76%	5,450	76%	910	48%
Auto Passenger	1,210	17%	1,170	16%	400	21%
Kingston Transit	50	1%	40	1%	0	0%
School Bus	400	6%	360	5%	470	25%
Walk	0	0%	40	1%	100	5%
Cycle	120	2%	120	2%	30	2%
Other	0	0%	0	0%	10	1%
Bikeable Auto Trips						
Auto Driver (Bikeable)	430	6%	360	5%	510	27%
Auto Passenger (Bikeable)	170	2%	180	3%	260	14%
Walkable Auto Trips						
Auto Driver (Walkable)	10	0%	20	0%	150	8%
Auto Passenger (Walkable)	10	0%	20	0%	130	7%

Rural Area East

Sub-area: Rural

Neighbourhoods: Rural, east of the river
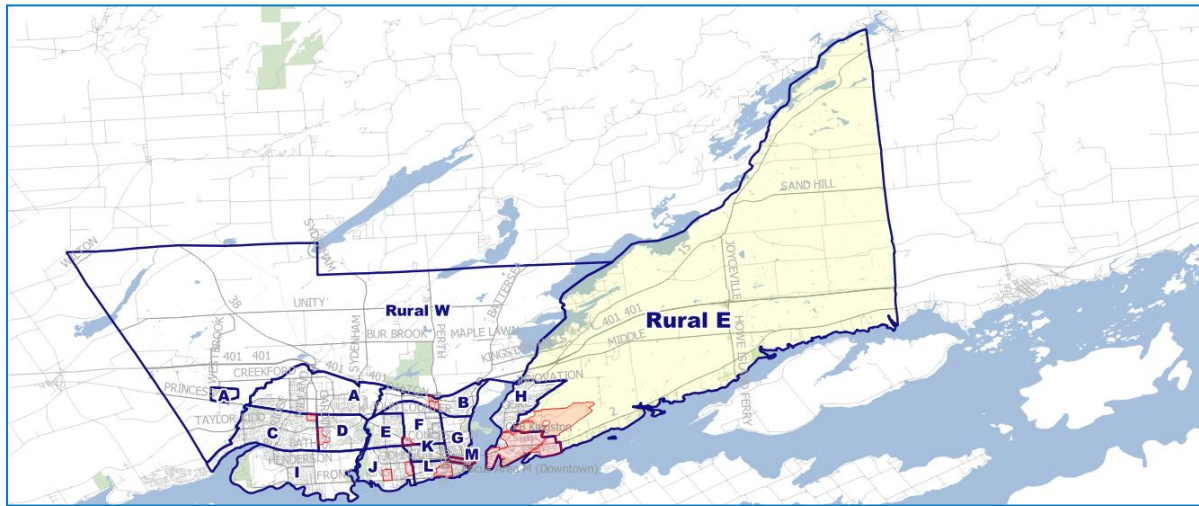
	From	%	To	%	Within	%
Trips	**7,100**	**100%**	**7,250**	**100%**	**700**	**100%**
Purpose						
Work or work-related	1,960	28%	480	7%	60	9%
To post-secondary school	180	3%	0	0%	0	0%
To K-12 school	620	9%	30	0%	70	10%
Serve passenger	630	9%	110	2%	60	9%
Shop / personal bus. / other	1,430	20%	280	4%	0	0%
Recreation / social / restaurant	1,440	20%	630	9%	90	13%
Return home	840	12%	5,730	79%	430	61%
Mode						
Auto Driver	5,190	73%	5,300	73%	430	61%
Auto Passenger	1,330	19%	1,250	17%	120	17%
Kingston Transit	100	1%	100	1%	0	0%
School Bus	310	4%	400	6%	60	9%
Walk	30	0%	30	0%	70	10%
Cycle	90	1%	90	1%	20	3%
Other	60	1%	80	1%	0	0%
Bikeable Auto Trips						
Auto Driver (Bikeable)	300	4%	230	3%	160	23%
Auto Passenger (Bikeable)	100	1%	80	1%	20	3%
Walkable Auto Trips						
Auto Driver (Walkable)	80	1%	60	1%	90	13%
Auto Passenger (Walkable)	0	0%	0	0%	0	0%

6 Travel Patterns for Population Groups of Interest

Table 63 presented on the following pages highlights survey results for population sub-groups that may be of interest. The survey results presented include selected demographics (for context) and selected trip characteristics. The sub-groups are defined as follows:

- **Survey Total:** The survey totals and averages are provided for reference.
- **Year-Round Resident:** Kingston residents who live in the city all year round. Together, year-round residents and seasonal students sum to the survey total.
- **Seasonal Student:** Kingston residents who live in the city only from September to April in order to attend post-secondary school. Survey respondents either indicated that they have a permanent residence in another city, or, if not, that they did not reside in Kingston in the month of May before the survey and did not expect to live in Kingston in the month of May after the survey. It may be noted that this sub-group includes a very small number of non-student cohabitants of seasonal students (e.g., a spouse who moves also residents in Kingston only during the school year).
- **Public PSE Student:** Students who attend one of the three main public post-secondary education institutions in Kingston: Queen's University, St. Lawrence College, or RMC. It may be note that due the small survey sample of RMC students, separate reporting has not been provided for students of RMC.
- **Queen's Student:** Queen's University students.
- **SLC Student:** St. Lawrence College students.
- **60+ Not Working:** Residents 60 years of age and older who do not work. This sub-group includes people in this age bracket whose main status was retired, unemployed or other. Retired people under the age of 60 are not included in this sub-group.
- **18-59 Unemployed/ Other:** This sub-group includes adults who indicated that their main status is "unemployed" or "other" and who did not report having a job or attending school. Retired people in this age bracket are not included in this population sub-group.
- **Full Time Worker:** Residents who work full-time.
- **Part Time Worker:** Residents who work part-time.
- **Parents (of children 0-19):** Parents who live with one or more children between 0 and 19 years of age, based on self-reported household type (e.g., single parent with children, couple with children, extended family) and the ages of other household members. This sub-group excludes parents who live with only adult children over the age of 20.
- **Elementary Student (K-8):** Students of elementary schools. Most elementary schools in Kingston cover kindergarten through grade 8.
- **Secondary Student (Gr. 9-12):** Students of secondary schools (high schools). Most secondary schools in Kingston include grades 9 through 12, although some offer classes beginning in grade 7 or grade 8.

The information presented is intended to provide insight into individual sub-groups. It is important to note that the population sub-groups are not mutually exclusive. Comparisons between sub-groups should be undertaken with the understanding that the sub-groups may overlap. For example, 74% of

parents work full-time, therefore the survey responses of working parents will contribute to the averages for the "parents" sub-group as well as to the averages for the "full-time worker" subgroup. With the exception of the Year-Round Resident and Seasonal Student sub-groups, no other combinations of individual column counts will sum to the survey total.

It is also important to note that the information presented here is based entirely on the expanded survey dataset. Occasionally, the information in the table may differ from other statistics presented elsewhere in this report that have been partially based on the other data sources. For example, as has documented earlier in this report, the survey dataset somewhat under-represents students living on campus at Queen's University and does not provide any representation of RMC students who live on campus (although it does represent RMC students living off-campus).

Table 63. Demographics and Trip Characteristics for Selected Population Subgroups (Groups are Not Mutually Exclusive)

	Survey Total	Year-Round Resident	Seasonal Student	Public PSE Student	Queen's Student	SLC Student	60+ Not Working	18-59 Unem-ployed/ Other	Full Time Worker	Part Time Worker	Parents (of children 0-19)	Element-ary Student (K-8)	Secondary Student (Gr. 9-12)
Subgroup Population													
Survey sample (n persons)	7,463	6,903	702	1,628	1,102	528	2,349	869	4,203	1,722	2,282	1,358	860
Expanded persons	139,580	123,390	16,190[16]	26,770[16]	21,520[16]	5,040	23,510	6,950	46,880	14,990	25,400	10,900	6,060
% of Expanded Persons	100%	88%	12%	19%	15%	4%	17%	5%	34%	11%	18%	8%	4%
Work Status													
Work Full-Time	34%	38%	2%	3%	3%	4%	-	-	100%	-	74%	n/a	-
Work Part-Time	11%	11%	10%	16%	14%	26%	-	-	-	100%	11%	n/a	14%
Unemployed	3%	3%	-	-	-	-	1%	55%	-	-	6%	n/a	-
Other	21%	13%	88%	81%	84%	70%	2%	45%	-	-	7%	n/a	60%
Retired	18%	21%	-	-	-	-	97%	-	-	-	2%	n/a	-
Not in labour force 0-15	13%	15%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100%	26%
Student Status													
K-12 Student	12%	14%	-	-	-	-	-	-	-	6%	0%	100%	100%
Full Time PSE/Other	18%	8%	94%	93%	95%	84%	0%	-	1%	28%	3%	-	-
Part Time PSE/Other	2%	1%	4%	7%	5%	16%	0%	-	1%	2%	1%	-	-
Demographics													
% Female	52%	52%	50%	50%	48%	62%	58%	59%	48%	61%	52%	50%	47%*
Average age	38.7	41.1	20.9	22.8	22.4	24.0	72.8	39.4	42.7	38.6	40.7	8.8	15.4
0 - 4 years	4%	5%	0%	-	-	-	-	-	-	-	-	-	-
5-14 years	9%	10%	-	-	-	-	-	-	-	0%	-	100%	26%
15-24 years	22%	13%	91%	78%	81%	70%	-	14%	8%	34%	1%	0%	74%
25-34 years	13%	14%	8%	17%	16%	20%	-	27%	23%	16%	19%	-	-
35-44 years	10%	12%	0%	3%	2%	5%	-	22%	23%	11%	40%	-	-
45-54 years	12%	14%	0%	2%	1%	4%	-	23%	27%	12%	34%	-	-
55-64 years	12%	14%	-	0%	0%	0%	16%	15%	17%	15%	6%	-	-
65-74 years	9%	10%	-	0%	0%	-	44%	-	2%	10%	1%	-	-
75+ years	7%	8%	-	-	-	-	40%	-	0%	2%	0%	-	-

[16] Expanded survey estimate of persons somewhat under-represents the number of students living on campus at Queen's and does not represent students living on campus at RMC.

	Survey Total	Year-Round Resident	Seasonal Student	Public PSE Student	Queen's Student	SLC Student	60+ Not Working	18-59 Unem-ployed/ Other	Full Time Worker	Part Time Worker	Parents (of children 0-19)	Elementary Student (K-8)	Secondary Student (Gr. 9-12)
Transit Pass, Licence													
Transit Pass (% of 15+)	33%	25%	84%	83%	84%	81%	13%	26%	14%	44%	12%	n/a	85%
Drivers Licence (% of 16+)	86%	86%	91%	85%	88%	75%	84%	63%	94%	87%	93%	n/a	54%
Daily Trips													
Took trips on travel day	82%	81%	85%	88%	87%	93%	72%	69%	93%	87%	91%	92%	92%
Daily Trips	398,600	357,620	40,980	71,930	58,410	12,850	61,000	17,710	163,510	49,650	97,010	29,490	17,260
% of Daily Trips	100%	90%	10%	18%	15%	3%	15%	4%	41%	12%	24%	7%	4%
Daily Trip Rate	2.98	3.05	2.53	2.69	2.71	2.55	2.59	2.55	3.49	3.31	3.82	2.71	2.85
Daily Mode Shares													
Auto Driver	51%	56%	10%	18%	12%	40%	68%	47%	71%	51%	75%	0%	7%
Auto Passenger	15%	16%	5%	8%	7%	11%	17%	16%	9%	12%	8%	46%	37%
Kingston Transit	8%	7%	17%	21%	19%	30%	3%	10%	5%	11%	4%	1%	15%
School Bus	3%	3%	0%	0%	0%	0%	0%	0%	0%	1%	0%	27%	23%
Walk	18%	13%	62%	46%	54%	15%	9%	22%	10%	20%	10%	20%	13%
Bicycle	4%	4%	4%	6%	7%	2%	1%	3%	4%	4%	3%	5%	4%
Other	1%	1%	1%	1%	1%	2%	1%	1%	1%	1%	1%	0%	1%
Est. # Daily Trips by Mode													
Auto Driver	204,950	200,910	4,040	12,780	7,150	5,130	41,590	8,310	116,380	25,440	72,360	-	1,250
Auto Passenger	58,300	56,050	2,250	5,820	4,310	1,460	10,670	2,860	14,710	5,750	7,670	13,580	6,430
Kingston Transit	31,990	24,910	7,080	15,100	11,240	3,850	1,970	1,840	7,730	5,510	3,650	420	2,510
School Bus	12,320	12,260	60	60	20	30	10	-	10	540	20	8,060	3,940
Walk	71,590	46,080	25,510	33,220	31,300	1,860	5,650	3,950	16,010	9,970	9,230	5,900	2,220
Bicycle	14,940	13,190	1,750	4,180	3,830	290	500	500	6,620	1,840	3,200	1,400	770
Other	4,520	4,220	300	780	550	230	610	250	2,050	600	860	150	150
% of Workers Who Travel to Work on Given Weekday													
% of FT Workers	81%	81%	76%	71%	79%	51%	n/a	n/a	81%	n/a	81%	n/a	-
% of PT Workers	43%	45%	31%	28%	29%	26%	n/a	n/a	n/a	43%	45%	n/a	38%

	Survey Total	Year-Round Resident	Seasonal Student	Public PSE Student	Queen's Student	SLC Student	60+ Not Working	18-59 Unem-ployed/ Other	Full Time Worker	Part Time Worker	Parents (of children 0-19)	Element-ary Student (K-8)	Secondary Student (Gr. 9-12)
Mode of 1st Work Trip of Day													
Auto Driver	68%	69%	30%	37%	25%	62%	n/a	n/a	71%	55%	77%	n/a	20%
Auto Passenger	7%	7%	2%	1%	0%	2%	n/a	n/a	7%	9%	7%	n/a	49%
Transit	10%	9%	38%	28%	32%	20%	n/a	n/a	8%	19%	6%	n/a	18%
Bicycle	5%	5%	2%	7%	9%	2%	n/a	n/a	5%	3%	5%	n/a	0%
Walked	9%	9%	29%	27%	34%	13%	n/a	n/a	8%	13%	4%	n/a	13%
Other	1%	1%	0%	0%	0%	0%	n/a	n/a	1%	1%	1%	n/a	0%
Trip Purpose (Dest. Activity)													
To usual work	11%	12%	1%	2%	2%	3%	-	-	22%	11%	17%	-	2%
Work related	4%	4%	1%	1%	0%	2%	-	-	8%	6%	6%	-	1%
To post-secondary school	6%	3%	33%	31%	31%	33%	-	-	0%	7%	1%	-	1%
To K-12 school	4%	4%	0%	-	-	-	-	-	-	1%	-	33%	31%
Shopping	12%	12%	6%	7%	6%	8%	25%	19%	10%	10%	9%	2%	2%
Personal Business	4%	5%	2%	2%	2%	2%	10%	8%	3%	3%	3%	2%	3%
Restaurant	4%	4%	4%	4%	4%	2%	5%	4%	4%	4%	3%	1%	3%
Recreation	6%	6%	2%	3%	3%	5%	9%	8%	5%	6%	5%	8%	10%
Social	5%	4%	5%	4%	5%	3%	9%	7%	2%	5%	2%	5%	2%
Serve passenger	7%	7%	2%	3%	3%	3%	5%	14%	9%	8%	17%	5%	3%
Other	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	1%	2%	2%
Return home	38%	38%	42%	41%	41%	40%	37%	40%	36%	38%	36%	42%	42%
Home-Based Trip Purposes													
HBW (home-based work)	18%	20%	3%	4%	4%	5%	-	-	38%	22%	26%	-	4%
HBS (home based school)	16%	11%	57%	52%	52%	52%	0%	-	0%	12%	1%	56%	53%
HBO (home based other)	43%	45%	26%	27%	27%	25%	74%	79%	35%	41%	45%	29%	28%
NHB (non-home based)	23%	24%	14%	17%	17%	18%	26%	21%	27%	25%	28%	15%	16%
Avg. Straight-Line Km													
Avg. Km (all purposes)	4.8	5.1	1.8	2.6	2.2	4.2	5.5	4.1	5.8	4.5	10.9	2.9	4.1
HBW (home-based work)	7.2	7.2	4.9	4.8	3.1	9.0	-	-	7.4	6.1	7.9	-	2.3
HBS (home based school)	2.5	3.3	1.2	2.0	1.6	3.8	2.8	-	9.2	2.8	2.5	2.5	3.8
HBO (home based other)	4.6	4.8	3.1	3.3	3.1	4.3	5.8	4.1	4.6	4.2	4.1	3.6	4.9
NHB (non-home based)	4.6	4.8	1.7	2.6	2.2	4.1	4.7	4.1	5.3	4.5	5.5	2.9	4.3

% of Trips by Start Hour

	Survey Total	Year-Round Resident	Seasonal Student	Public PSE Student	Queen's Student	SLC Student	60+ Not Working	18-59 Unem-ployed/ Other	Full Time Worker	Part Time Worker	Parents (of children 0-19)	Element-ary Student (K-8)	Secondary Student (Gr. 9-12)
400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
500	1%	1%	0%	0%	0%	0%	0%	1%	1%	0%	1%	0%	1%
600	2%	2%	1%	1%	1%	2%	1%	0%	4%	1%	3%	0%	1%
700	7%	8%	3%	5%	4%	8%	2%	2%	10%	6%	9%	6%	19%
800	10%	10%	9%	9%	9%	11%	4%	8%	11%	9%	13%	24%	12%
900	6%	5%	7%	7%	8%	4%	7%	8%	4%	7%	6%	5%	1%
1000	5%	5%	7%	7%	7%	8%	10%	7%	3%	6%	3%	0%	0%
1100	6%	5%	8%	6%	6%	4%	12%	9%	3%	5%	5%	1%	2%
1200	5%	5%	6%	5%	5%	4%	9%	8%	5%	6%	5%	1%	2%
1300	5%	5%	7%	6%	6%	5%	9%	6%	4%	6%	4%	1%	1%
1400	6%	6%	6%	6%	5%	7%	11%	8%	4%	7%	4%	5%	18%
1500	9%	9%	7%	7%	8%	6%	10%	9%	7%	9%	8%	24%	11%
1600	10%	10%	9%	9%	9%	9%	8%	9%	13%	8%	12%	10%	8%
1700	9%	9%	8%	8%	9%	7%	6%	8%	11%	8%	10%	8%	6%
1800	6%	6%	7%	8%	7%	8%	4%	6%	7%	6%	6%	5%	6%
1900	5%	5%	5%	6%	6%	6%	3%	4%	5%	5%	5%	3%	5%
2000	4%	3%	4%	4%	5%	4%	2%	3%	4%	4%	3%	3%	2%
2100	2%	2%	3%	3%	3%	4%	1%	1%	2%	3%	2%	1%	2%
2200	1%	1%	3%	2%	2%	2%	1%	1%	1%	2%	1%	0%	1%
2300	0%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%
2400	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2500	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2600	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2700	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

	Survey Total	Year-Round Resident	Seasonal Student	Public PSE Student	Queen's Student	SLC Student	60+ Not Working	18-59 Unemployed/ Other	Full Time Worker	Part Time Worker	Parents (of children 0-19)	Element-ary Student (K-8)	Secondary Student (Gr. 9-12)
Transit Trips, Access Mode													
Daily Transit Trips	31,990	24,910	7,080	15,100	11,240	3,850	1,970	1,840	7,730	5,510	3,650	420	2,510
% of Transit Trips	100%	78%	22%	47%	35%	12%	6%	6%	24%	17%	11%	1%	8%
Walk-Access Transit	94%	93%	96%	95%	96%	94%	89%	100%	88%	95%	91%	100%	99%
Drive-Access Transit	3%	4%	1%	1%	1%	1%	2%	-	10%	2%	8%	-	-
Drive-Access - Passenger	1%	1%	0%	1%	1%	1%	1%	-	2%	2%		-	-
Bicycle-Access Transit	1%	1%	1%	2%	1%	3%	2%	-	0%		1%	-	-
Other Mode (taxi, KAB, moped, school bus, etc.)	1%	1%	1%	1%	1%	2%	6%	-	0%	1%	0%	-	1%
Walkable/Bikeable Drive Trips													
Daily Vehicle Trips (auto driver)	204,950	200,910	4,040	12,780	7,150	5,130	41,590	8,310	116,380	25,440	72,360	n/a	1,250
% that are Walkable	15%	15%	29%	17%	23%	9%	17%	19%	13%	15%	15%	n/a	30%
% that are Bikeable	50%	49%	68%	55%	65%	42%	54%	51%	47%	52%	50%	n/a	68%

7 Comparison with Previous Surveys

This section presents available information reported for the 2002 and 2008 household travel surveys with comparison against the 2019 survey results (**Table 64**). As there were significant differences in the methodologies and sample frame definitions in each of the survey cycles, the comparisons below should not be taken as particularly meaningful. Due to differences in the definition of the population universe and in how the survey results were expanded, the expanded counts (number of persons, number of trips, etc.) may not be based on comparable definitions. More importantly, the geographical scope of the 2002 and 2008 surveys was the Kingston CMA (these surveys included residents in communities neighbouring the City of Kingston), whereas the 2019 survey was limited to only residents of the City of Kingston. Further, the different survey instruments employed may have differed in their success in capturing discretionary trips.

There are also significant differences with regards to the inclusion of post-secondary students in the sample. The 2019 Household Travel Survey included seasonal (September-April) post-secondary students considered as temporary residents in the Census. The sampling approach taken in 2002 and 2008 would not have fully accounted for these post-secondary students.[17] Even if some such seasonal residents were surveyed, the data weighting approach in 2002 and 2008 was based only on Census population and dwelling counts. By contrast, in 2019, supplementary surveys specific to post-secondary students were conducted via emailed survey invitations, in-person recruitment, and social media. These methods were used to compensate for a lower response rate from post-secondary student households contacted via mail and phone in the main survey of households, as well as to attempt to reach students living in on campus residences (who were not part of the address-based sample frame for the survey of households). In 2019, the data weighting took into account both the Census counts of private dwelling occupied by usual residents and the City's estimates of dwellings occupied by seasonal students. Further, there may have been differences in survey design, data processing, and error checking that may influence the comparability of the survey datasets.

Therefore, differences in the recorded trip rates per person are more likely to be the result of differences in methodology than due to differences in trip-making behaviour, making it difficult to track actual changes in travel patterns over time. Also, the households outside the CMA that were surveyed in 2002 and 2008—which could represent up to 12% of the surveyed households in those survey cycles— are more geographically dispersed and are likely to have higher auto mode shares and may have differences in other travel patterns as well. The comparisons below are presented as-is and should not feature heavily in the reader's understanding of trends in changing travel patterns. The 2019 survey will serve as a new baseline against which to compare the results from future survey cycles that have a similar scope and use a similar methodology.

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[17] In 2002 and 2008, some seasonal student households may have been surveyed if the student household's address and phone number was included in the telephone listings used for sampling, however students with only recently-listed landline phone numbers would not likely have made it into the telephone directory, and students in cell-phone-only households would not have been listed in the telephone directory at all.

Notwithstanding these caveats, looking at some of the percentage distributions, the survey results do seem to suggest positive shifts in mode shares away from auto driver trips and towards sustainable modes, for example, 3% public transit in 2002 to 8% in 2019. It may also be noted that the 2019 active transportation mode shares for afternoon 'peak hour' trips (71% auto driver and passenger combined, 16% walking, 4% cycling) compare very favourably to the targets set by the 2015 Kingston Transportation Master Plan (KTMP) in terms of reduction of auto trips and increase of active transportation mode shares. The peak hour split for Public Transit (8%) has room for growth in meeting the targets set in 2015. It may be noted that the peak *hour* as defined by overall trip volumes was defined as from 4:30 PM to 5:30 PM in the 2002 and 2008 surveys, which were the basis for setting the 2015 targets. Mode shares vary by time of day—with the balance of school commuters, work commuters, and travellers for other purposes also varying—even within the full extended peak period from 3:00 PM to 5:30 PM. For the purpose of making an equivalent comparison across years, the same 4:30 PM to 5:30 PM hour was used in determining the 2019 'peak hour' mode shares listed in the table below (even though in 2019 the actual hour with the highest volume of trips was from 4:00 PM to 5:00 PM).

Table 64. Comparison of the 2019 Survey Results against the 2002 and 2008 Survey Results[18]

	2002 vs. 2019		2008 vs. 2019	
	2002 (All ages) [19]	2019 (All ages; trips collected for ages 5+ years)	2008 (Persons 15+ Years of Age)	2019 Filtered to Persons 15+ for Comparison
Survey Data				
Surveyed Households	2,649	3,500[20]	1,425	3,500[20]
Surveyed Persons	6,303	7,463	2,911 (15+)	6,644 (15+)
Trip Records	16,045	21,878	6,763	20,269
% of Population	4.4%	5.1%	2.3%	5.2%

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[18] Sources of historical data: 2004 Kingston Transportation Master Plan Appendix III: 2002 Household Travel Survey; City of Kingston Transportation Model Update Model Development Report, July 2009; City of Kingston 2015 Transportation Master Plan.
All comparisons should be interpreted with considerable caution, particularly any expanded counts of persons or trips or computation of average daily trips. The different surveys employed different sampling sources, different survey methodologies, different age thresholds for capture of trips, different definitions of the population universe to expand the survey data to represent, and different weighting methodologies.

[19] 2002 Age Threshold: The survey methodology indicates that the survey collected data for all household members and did not provide any indication that trips were only captured for residents above a certain age threshold. Based on the number of home-based school trips reported, it appears that the 2002 survey likely captured trips for persons of all ages, or at least those of at least 5 years of age and older.

[20] 2019 Surveys Completed: Actual number of valid surveys in 2019 was 3,648 before consolidating multi-person households with only one respondent who could not answer on behalf of roommates, and 3,500 households after collapsing of such surveys into composite households.

	2002 vs. 2019		2008 vs. 2019	
	2002 (All ages) [19]	2019 (All ages; trips collected for ages 5+ years)	2008 (Persons 15+ Years of Age)	2019 Filtered to Persons 15+ for Comparison
Expanded Survey Data				
Households	59,404 (CMA)	59,360 (City)	62,739 (CMA)	59,360 (City)
Persons	142,034 (CMA)	146,750 (City) (total estimated) 139,580 (City) (survey)[21]	127,765 (CMA, 15+)	127,230 (City, 15+) (total estimated) 120,990 (City, 15+) (survey)[21]
Total Daily Trips	356,841	398,600	337,000	364,220
Dwelling Type				
% Apartments	n/d	33%	29% (2006 Census)	33%
Auto Ownership				
No vehicles	16%	18%	n/d	18%
1 vehicle	42%	42%	n/d	42%
2 vehicles	36%	29%	n/d	29%
3 vehicles	5%	7%	n/d	7%
4+ vehicles	1%	3%	n/d	3%
Avg per household	1.34	1.35	n/d	1.35
Avg persons per auto	1.78	1.71[22]	n/d	not computed

[21] Household Counts and Population Statistics: The 2002 and 2008 surveys were likely expanded to represent total population in the Kingston CMA, including population in collective dwellings. The 2019 survey on the other hand was expanded to represent population living in private dwellings in the City of Kingston plus a portion of the population living in on-campus residences (although it somewhat under-represents persons living on campus due to small sample sizes and limits on extreme weights), excluding the portion of the population that lives in collective dwellings.

[22] Average Persons per Auto: The 2019 statistic is for persons per vehicle based on households; excludes population living on campus (not considered part of household counts).

	2002 vs. 2019		2008 vs. 2019	
	2002 (All ages) [19]	2019 (All ages; trips collected for ages 5+ years)	2008 (Persons 15+ Years of Age)	2019 Filtered to Persons 15+ for Comparison
Trips				
Daily Trips / Person	n/d	2.98	2.64	3.01
Transit Riders per Day	n/d	32,000	15,563[23]	31,090
AM Peak Hour Trips	38,169 (7:45-8:45)	40,700 (8:00-9:00)	43,359 (7:30-8:30)	33,000 (8:00-9:00)
Mid-Day Peak Hour Trips	n/d	22,400 (11:00-12:00)	29,982 (11:00-12:00)	21,860 (11:00-12:00)
PM Peak Hour Trips	34,180 (16:30-17:30)	40,700 (16:00-17:00)	36,472 (16:30-17:30)	37,200 (16:00-17:00)
Avg. straight-line trip length	6.2 km	4.8 km	n/d	not computed
Auto Occupancy				
All Trips	n/d	1.37	1.22	1.37
During AM peak hour	n/d	1.39	1.14	1.39
24-Hour Mode Shares				
Auto Driver	82%	51%	62%	56%
Auto Passenger	n/d	15%	14%	12%
Transit	3%	8%	5%	9%
School Bus	3%	3%	2%	1%
Taxi/Other	-	1%	3%	1%
Bicycle	1%	4%	1%	4%
Walk	11%	18%	13%	18%

[23] 2008 Transit Riders per Day: The 2008 survey data were weighted to reduce the weighted transit trips to match transit ridership counts from Kingston Transit (reducing the initial expanded count from 20,836 to 15,563 trips, including Queen's University and Kingston General Hospital shuttle and transfer trips), however, if the transit ridership counts in 2008 under-represented the travel of students, it may have under-represented total transit use for that year.

	2002 vs. 2019		2008 vs. 2019	
	2002 (All ages) [19]	**2019 (All ages; trips collected for ages 5+ years)**	**2008 (Persons 15+ Years of Age)**	**2019 Filtered to Persons 15+ for Comparison**
Work Trips				
Work Trips as % of Total Trips	25% HBW Trips	18% HBW Trips or 28% leaving or arriving at a work or work-related location	35% Unclear whether HBW trips or some other measure	20% HBW trips or 32% leaving or arriving at a work or work-related location [24]
Auto Driver	n/d	69%	75%	69%
Auto Passenger	n/d	7%	8%	7%
Transit	n/d	8%	4%	8%
School Bus	n/d	0%	n/a	0%
Taxi/Other	n/d	2%	4%	2%
Bicycle	n/d	4%	2%	4%
Walk	n/d	10%	8%	10%
Afternoon Peak Hour (Historical Def'n)[25]				
Auto Driver & Passenger Combined	82%	72%	76%	71%
Public Transit	3%	8%	5%	8%
Cycling	1%	4%	1%	4%
Walking	11%	15%	13%	16%
Other/School Bus	3%	1%	5%	1%
Active Transportation Subtotal (Walk + Cycling)	12%	21%	14%	21%
Home-Based Purpose				
HBW	25%	18%	n/d	20%
HBS	15%	16%	n/d	12%
HBO	45%	43%	n/d	44%
NHB	19%	23%	n/d	24%

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[24] Work Trips as % of Total Trips: It is unclear whether the 2008 statistic is based on home-based work trips or another type of definition, therefore the 2019 data have been computed two ways: first, based on home-based work trips and second, based on trips leaving or arriving at work or a work-related destination.

[25] Afternoon peak hour of 16:30-17:30 as defined in 2002 and 2008. The 2019 peak hour with the greatest volume of trips was identified as 16:00-17:00. However, as mode shares vary by time of day, for comparability with 2002 and 2008, the hour from 16:30 to 17:30 was used to generate the 2019 mode shares listed in this part of the table.