Final Report

Transportation Trends Report

Ottawa Transportation Master Plan Update

Prepared for the City of Ottawa
by Arcadis
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1 Introduction

The City of Ottawa has seen many changes since the adoption of the previous Transportation Master Plan (TMP) in 2013. The city has grown substantially in population and has experienced changes in work and travel patterns. The City has also reoriented its transit system on the O-Train with the opening of O-Train Line 1 in September 2019, and has extensively expanded its active transportation network in the past 10 years. Perhaps most significantly, the COVID-19 pandemic has accelerated changes to travel behaviour and working from home. Additionally, new mobility options and service providers, such as e-scooters and ride-hailing companies, have impacted the mobility market.

In November 2022, the City adopted a new Official Plan to guide growth and development through the year 2046.[1] The Official Plan includes the target that 50% of all trips will be made by sustainable modes of transportation (walking, cycling, transit, and carpooling) in 2046. The TMP Update supports the Official Plan (and other City plans such as the Climate Change Master Plan[2]) by identifying the transportation projects and investments that are necessary to accommodate future growth and achieve the City's vision for a safe, reliable, and sustainable transportation system.

This report provides a snapshot of transportation in Ottawa today and how it has changed over the last decade, providing the foundation for an assessment of future infrastructure needs.

[1] The City's Official Plan can be found at: https://ottawa.ca/en/planning-development-and-construction/official-plan-and-master-plans/official-plan

[2] More information on the Climate Emergency and the City's Climate Change Master Plan can be found at: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/climate-change-and-energy#

1.1 TMP Project Structure

The TMP update is comprised of two parts:

- **Part 1 - Policies (completed):** Approved in April 2023, Part 1 of the TMP sets out policies that guide how the City plans, builds, operates, and maintains its transportation system. The policies include a focus on healthy communities, complete streets, climate change, and equity.
- **Part 2 - Capital Infrastructure Plan (underway):** The TMP Capital Infrastructure Plan will identify the projects and investments that are needed to meet Ottawa's travel needs and achieve the City's mode share and greenhouse gas reduction targets. It will also identify a subset of projects that are affordable within the City's long-range financial plans, along with the corresponding timelines for implementation.

1.2 Report Purpose and Structure

This report illustrates how travel behaviour has changed since the 2013 TMP. It will help inform the assessment of transportation needs and opportunities and the development of the TMP Capital Infrastructure Plan. The report is set up as follows:

- **Introduction:** This section provides context for the report.
- **Major Drivers of Change:** This section discusses factors that influence travel behaviour, including the pandemic.
- **Travel Behaviour Trends:** This section identifies key and noteworthy travel trends based on data from the 2022 Origin-Destination travel survey. It answers questions such as why, where, when, and how do people travel?
- **System Analysis:** This section discusses trends with respect to the performance of the overall transportation system.
- **Summary:** This section summarizes the key takeaways and trends that will help inform network development.

1.3 Analysis Approach

1.3.1 Key Data Sources

Various data sources were used to identify the travel trends.

Origin-Destination Survey

To provide the data necessary to understand local travel patterns, the TRANS Committee[3] has conducted five major origin-destination (OD) household travel surveys in Canada's Capital Region (CCR) since 1986. Each of these statistically significant surveys provide a snapshot of residents' daily travel by collecting information on trip origins and destinations, mode of travel, and trip purpose. Other data collected includes the characteristics of the people making the trips and household in which they live, such as dwelling type and vehicle ownership. Survey participants were asked about the trips made by each member of their household (5 years of age or older) on the previous day.

The latest OD Survey was completed in the fall of 2022 and obtained travel data from 69,501 persons across 31,818 households, capturing 162,243 trips. Overall, a 5% random sample of households was surveyed from each part of the region (including urban, suburban, and rural areas).

It is important to note that the OD Survey captured travel at a specific moment in time in 2022, when travel was still transitioning from the pandemic, and that transition is still happening today. This creates difficulty in comparing to previous surveys since travel is still changing and historical trends have been disrupted. It is also worth noting that in December 2022, after the 2022 OD survey was conducted, the federal government implemented a mandate in which federal workers must return

[3] The TRANS Committee co-ordinates transportation data collection and modelling efforts between the major transportation planning agencies of the Capital Region. The TRANS Committee comprises the City of Ottawa, la Ville de Gatineau, OC Transpo (City of Ottawa), la Société de transport de l'Outaouais, Ontario Ministry of Transportation, le Ministère des Transports et de la Mobilité durable du Québec, and the National Capital Commission.

to the office at least 2 days per week.[4] As the nation's capital, Ottawa's workforce has a high share of federal workers, so this has likely impacted commuting patterns since the survey. Furthermore, in April 2024, the federal government announced the transition to three days per week on-site, expected to commence in September 2024. This will lead to further changes to commuting patterns.

The OD Survey is used as the primary data source for the discussion on travel trends in Section 3 of this report. The analysis focuses on all trips that start or end in Ottawa, unless noted otherwise, and considers people 5 years of age or older. Residents' household location was used for any analysis based on geography. Daily trips are considered unless noted otherwise. Where multiple travel modes were used to make a trip, only the primary travel mode is considered. Where trip distances are noted, straight-line distances (i.e., as the crow flies) were used to allow for comparison between different survey years. Appendix A describes the modes that were available to each respondent in the OD Survey, how the data was coded for the corresponding year, and the resulting mode category.

Other Data Sources

Other important data sources include census data collected by Statistics Canada; the most recent survey was conducted in 2021. For this report, census data was used primarily to inform discussion of population and employment.

The Commuter Attitude Survey, conducted in Fall 2023, obtained information on travel attitudes and perspectives from residents of the National Capital Region (NCR) with 3,990 surveys completed. Among these respondents, 2,641 were Ottawa residents. The results from the Ottawa respondents are used in this report to provide additional insight and explanation for the travel trends, complementing the results from the 2022 OD Survey.

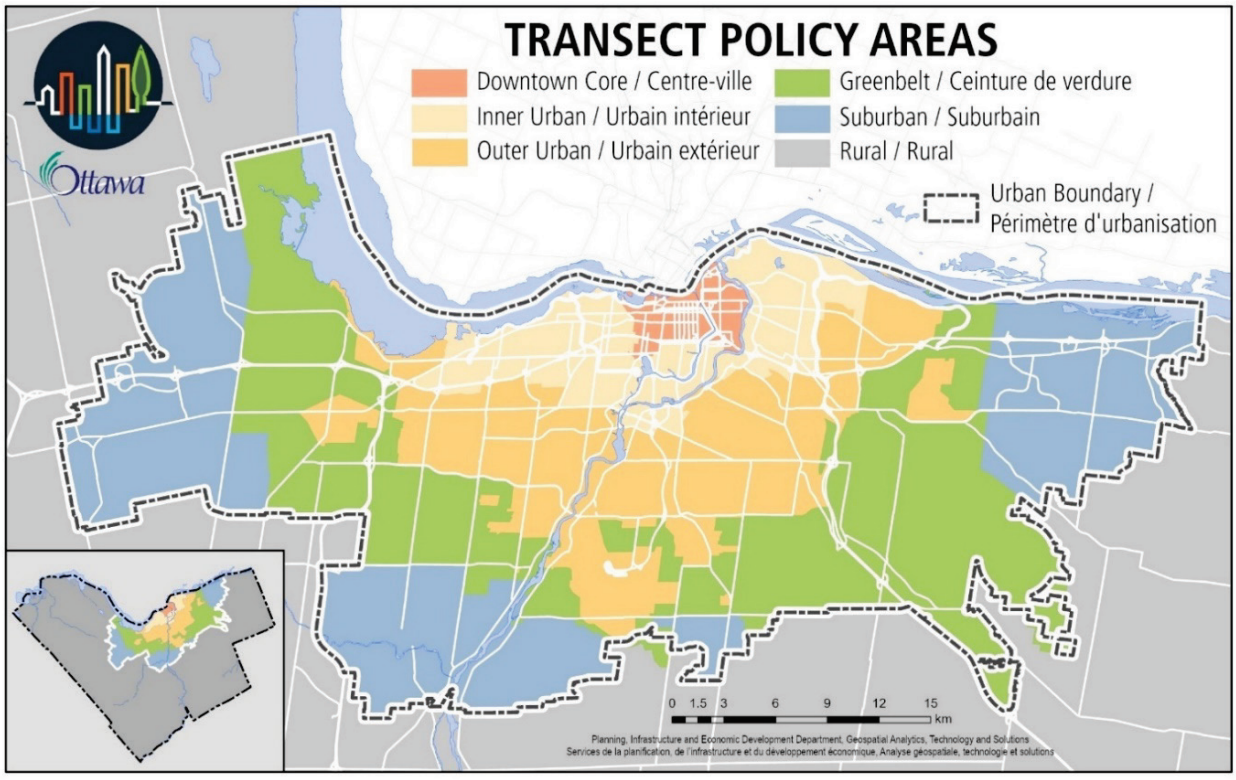
[4] Government of Canada, Common Hybrid Work Model for the Federal Public Service, 2024. See: https://www.canada.ca/en/government/publicservice/staffing/common-hybrid-work-model-federal-public-service.html

1.3.2 Geographical Comparisons

Travel behaviour and trends can vary by location and context. For example, travel activity in rural Ottawa may be quite different from trends observed downtown. For the purposes of this report, various geographical areas are used to highlight key trends.

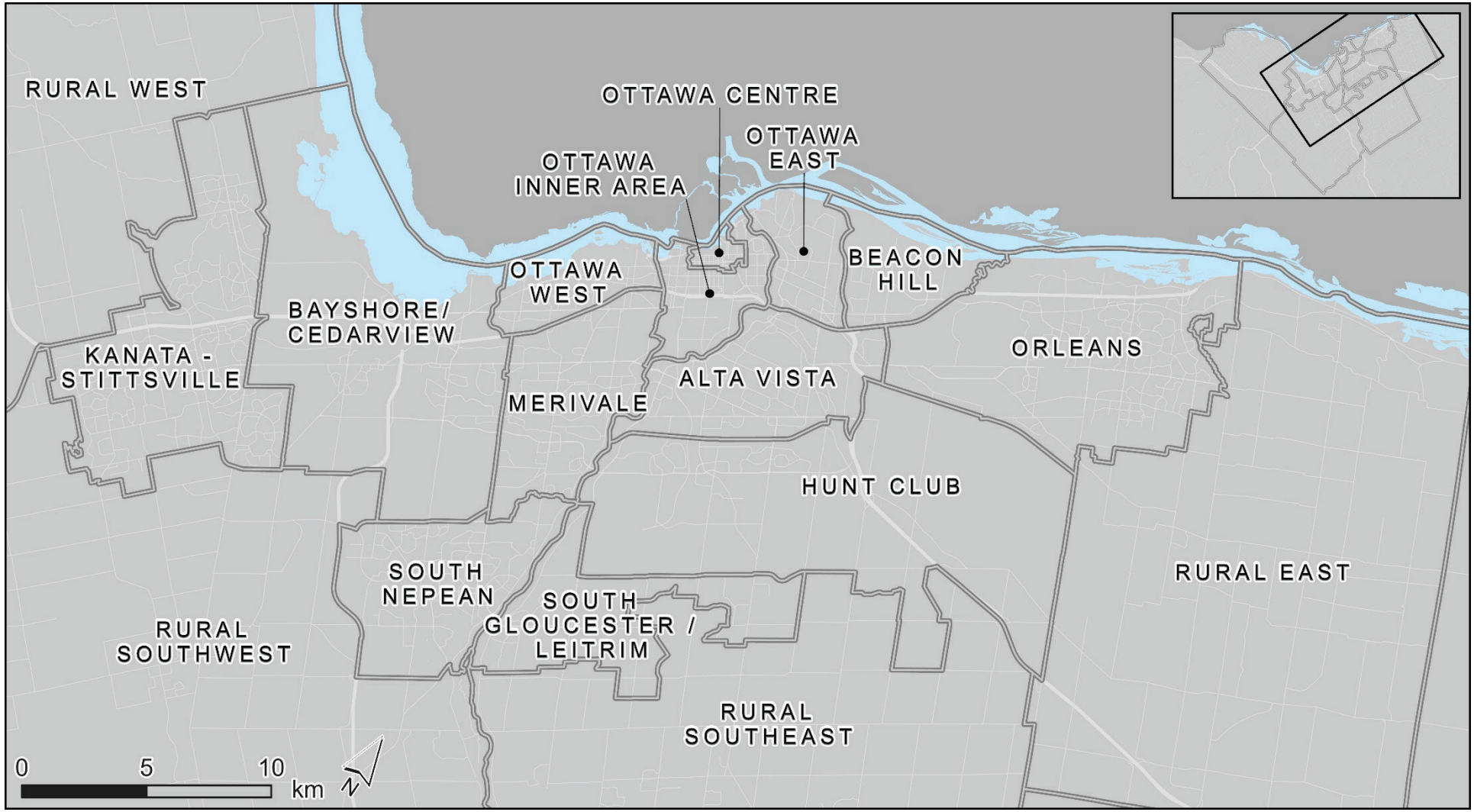
- The Official Plan introduces the concept of "transects" to define different areas of the city that have a similar built form and planned function. These transects are shown in Exhibit 1.1 and are composed of the downtown core, inner urban, outer urban, Greenbelt, suburban, and rural areas.
- Districts, which are used in the TRANS regional travel forecast model, are also used in this report to highlight trends between various communities. These are shown in Exhibit 1.2.

Exhibit 1.1: Transect Policy Areas



Source: 2021 Official Plan - Schedule A.

Exhibit 1.2: TRANS Districts



Source: Adapted from TRANS Committee.

2 Major Drivers of Change

When it comes to travel, the choices that people make are influenced by a wide range of factors. Travel decisions may differ depending on where people live and work, their travel needs, and what transportation options are available to them. External factors also play a role, such as how the city is built, the economy and cost of living, and technological developments.

2.1 Socio-Economic and Demographic Changes

As a diverse and growing city, Ottawa's socio-demographic characteristics have evolved over time and vary throughout the city. Given their influence on the travel choices that people make, it is worthwhile to highlight some significant trends regarding population and employment, dwelling and workplace type, community composition and other household transportation characteristics.

2.1.1 Population and Employment

Ottawa has been consistently growing over the past four decades and has experienced particularly rapid growth in the past decade. Since 2011, the population has grown from 883,000 to 1,017,000 people in 2021, representing a growth of 15%.[5] The workforce has also increased by 10% from 498,000 to 550,000 over the same period; however, the overall employment rate dropped from 64% in 2011 to 59% in 2021.[6]

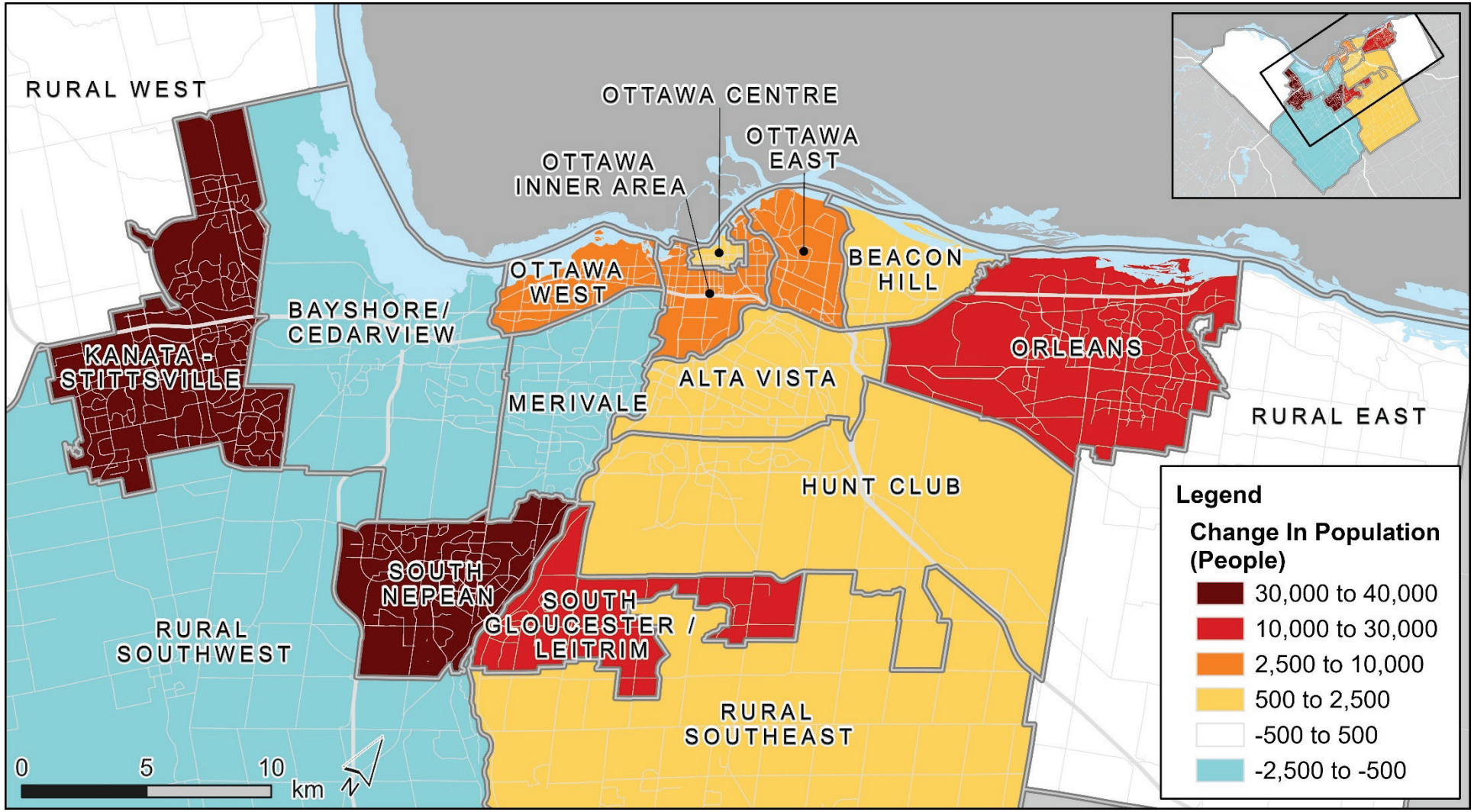
Exhibit 2.1 and Exhibit 2.2 show the change in population and employment between 2011 and 2022.[7] The city has grown both outwards through new developments in the outer suburbs, as well as through intensification within built-up areas. The population declined in certain outer urban areas.

[5] Statistics Canada, 2011 and 2021 Census, Ottawa Census Division

[6] Statistics Canada, 2011 NHS and 2021 Census, Ottawa Census Division.

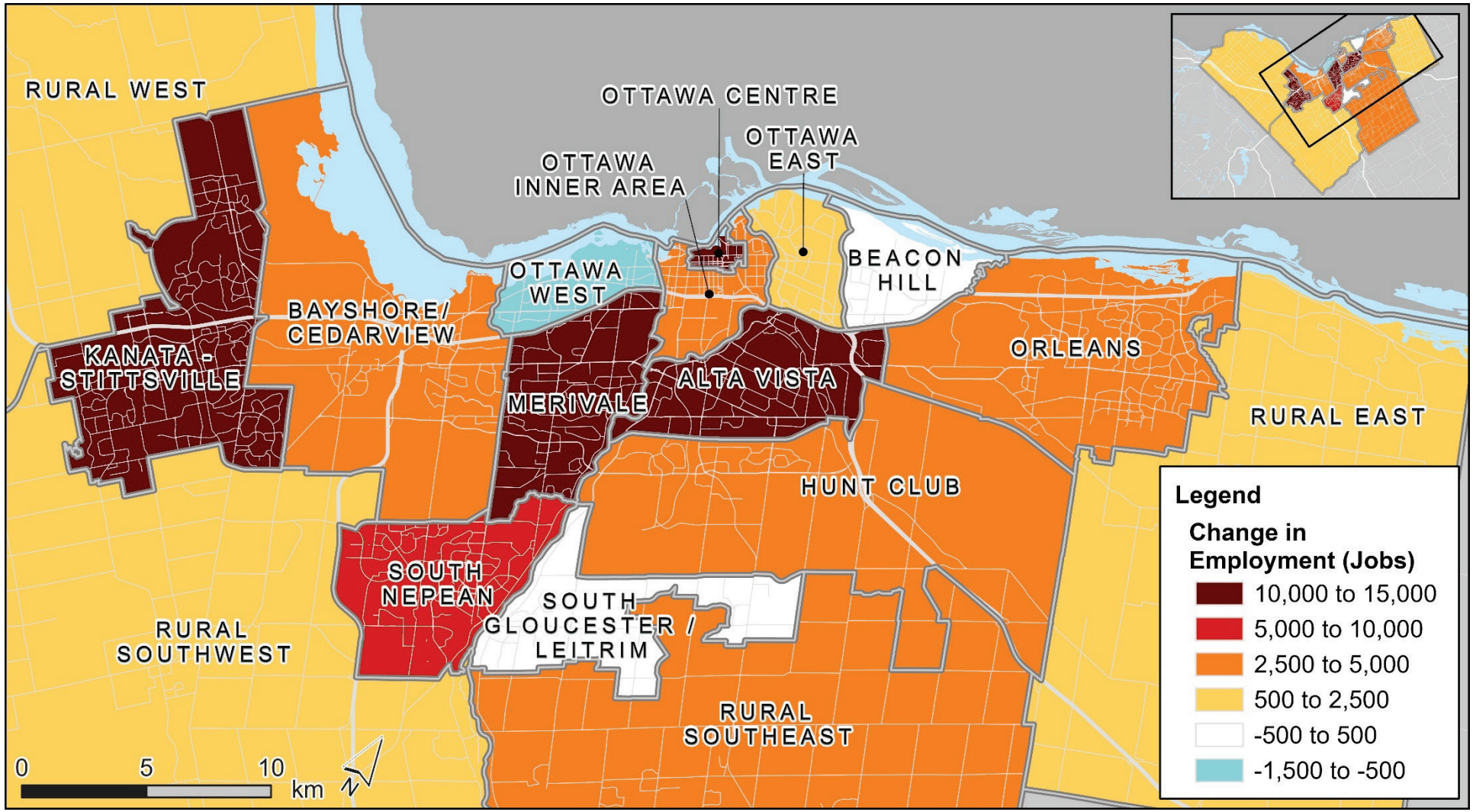
[7] Jobs with the option of work-from-home are included in the district containing the job location, and not the place of residence.

Exhibit 2.1: Change in Population Between 2011 and 2021



Source: Adapted from the 2011 National Household Survey, 2021 Census of Population, and City of Ottawa.

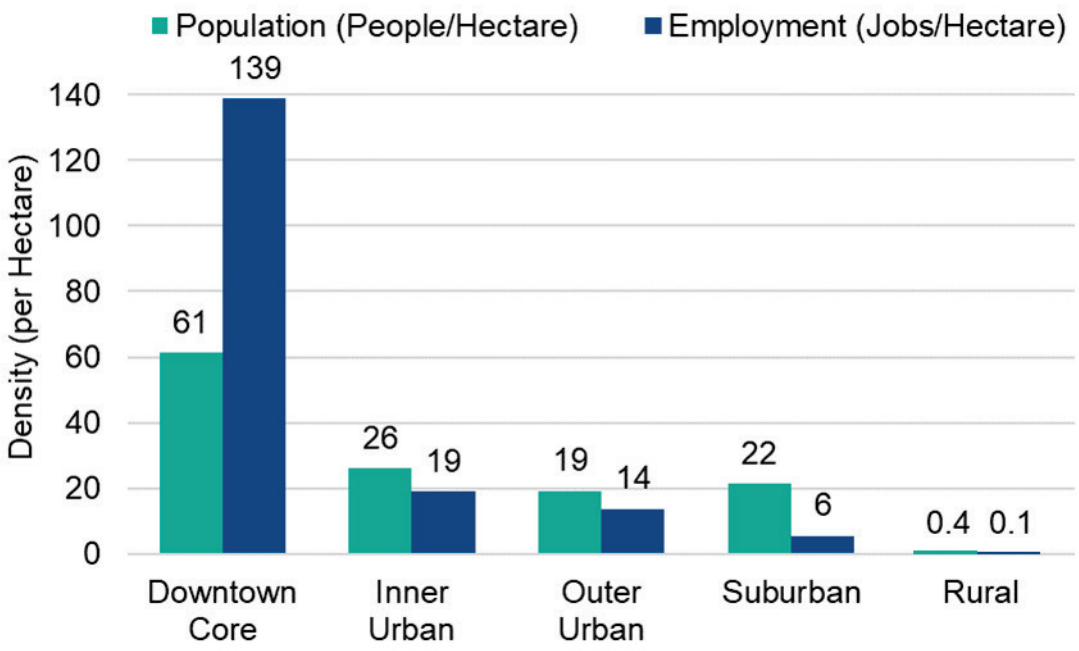
Exhibit 2.2: Change in Employment Between 2011 and 2021



Source: Adapted from the 2011 National Household Survey, 2016 Employment Survey, 2021 Census of Population and City of Ottawa.

Population and employment density remains highest in the urban core and decreases away from the inner parts of the city, as shown in Exhibit 2.3. While the population and employment densities are relatively similar in the inner urban and outer urban areas, the suburban areas have significantly fewer jobs than people, while the downtown core has more jobs than people.

Exhibit 2.3: Population and Employment Density by Area in 2021



Source: Adapted from the 2021 Census of Population and City of Ottawa.

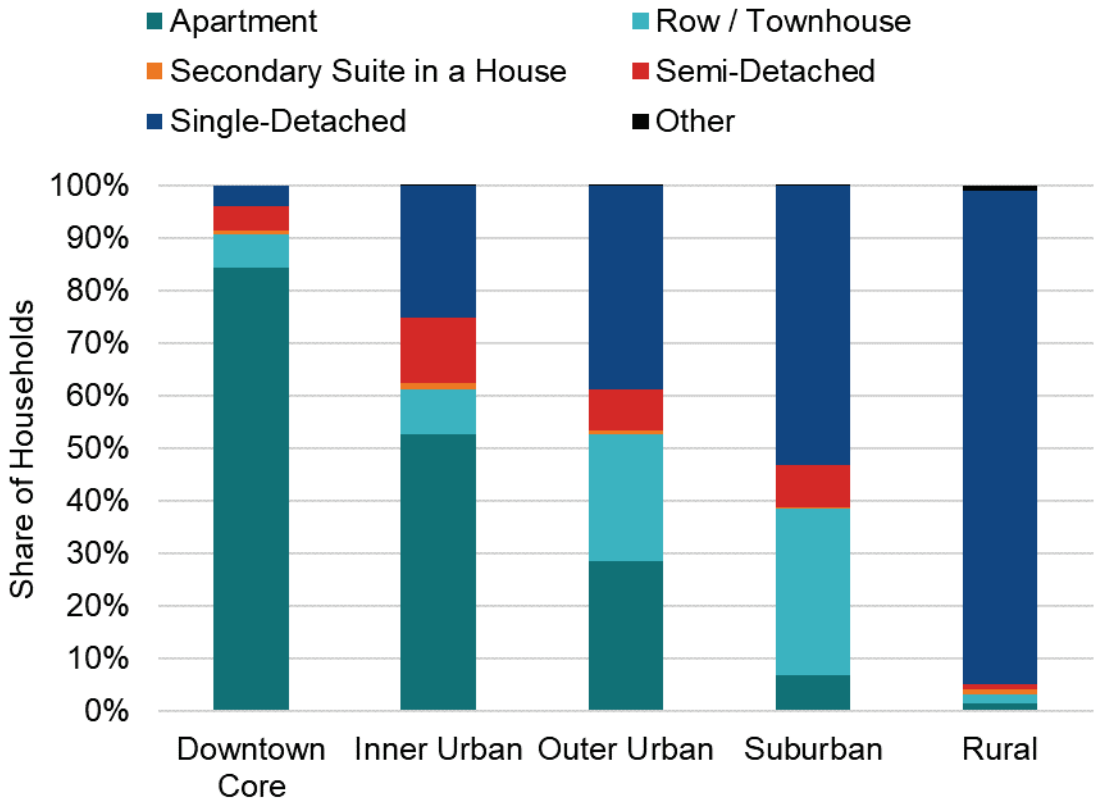
The downtown core continues to be the primary employment hub, but the city has also experienced a trend of employment decentralization over time, with significant employment growth occurring outside the core. In 2011, 23% of all employment in Ottawa was located in the downtown core; by 2021, this had decreased to 18%.[8] This shift, as well as work-from-home trends, has impacted commuting patterns, as discussed in Section 2.2 and Section 3.

[8] Adapted from the 2021 Census of Population and City of Ottawa

2.1.2 Dwelling and Workplace Type

Housing composition varies by area, as shown in Exhibit 2.4. There are more apartments in the city centre (85% of housing stock), while single-detached housing becomes more prevalent away from the downtown, with 95% of rural area dwellings being single-detached. Dwelling type impacts population density and is also correlated with vehicle ownership and mode choice. For example, those living in more urban areas like the downtown core use automobiles much less than those living in less dense areas. A discussion of the relationship between dwelling type and mode choice is provided in Section 3.4.

Exhibit 2.4: Housing Type by Area (2022)



Source: 2022 Origin-Destination Survey.

Employment type has also seen changes since 2011, with a greater proportion of jobs in health care, scientific and technical services, and

construction.[9,10] This is important because different employment types have different travel patterns and may require different transportation solutions. For example, peak period commuting towards office jobs in the downtown core is well-served by the Transitway and O-Train. For other professions, such as healthcare, there tends to be a wider spread of commuting times and destinations; these trips are more difficult to serve by transit. With the rise of working from home (WFH), people are travelling to the office less frequently, especially by transit. Section 2.2 provides additional discussion about COVID and the impact of WFH.

2.1.3 Community Composition

The composition of Ottawa's residents and households varies across the city and has changed in the past decade, impacting how people travel.

Age

The population of Ottawa, like many peer municipalities, has become older on average. Between 2011 and 2022, the average age of Ottawa residents has increased from 38.6 to 39.7 and the number of people 60 or older increased by 46%.[11] This is significant because older residents tend to make more shopping trips and less work trips, as follows:

- For people aged 20-59, 31% of trips are conducted for work and 21% are for shopping;
- For people aged 60-69, 18% of trips are conducted for work and 38% are for shopping;
- For people aged those over the age of 70, 3% of trips are conducted for work and 47% are for shopping.

Additionally, mode choice varies significantly by age, as discussed in Section 3.4.5. Possession of a driver's license also impacts mode choice; 18% of people over the age of 70 do not have a driver's license, compared

[9] Statistics Canada, National Household Survey, 2011.
[10] Statistics Canada, Canada Census, 2021.
[11] 2011 and 2022 Origin Destination Household Travel Survey.

to 12% of those aged 16 to 69. This highlights the importance of providing alternatives to driving, from an equity perspective.

Household Size

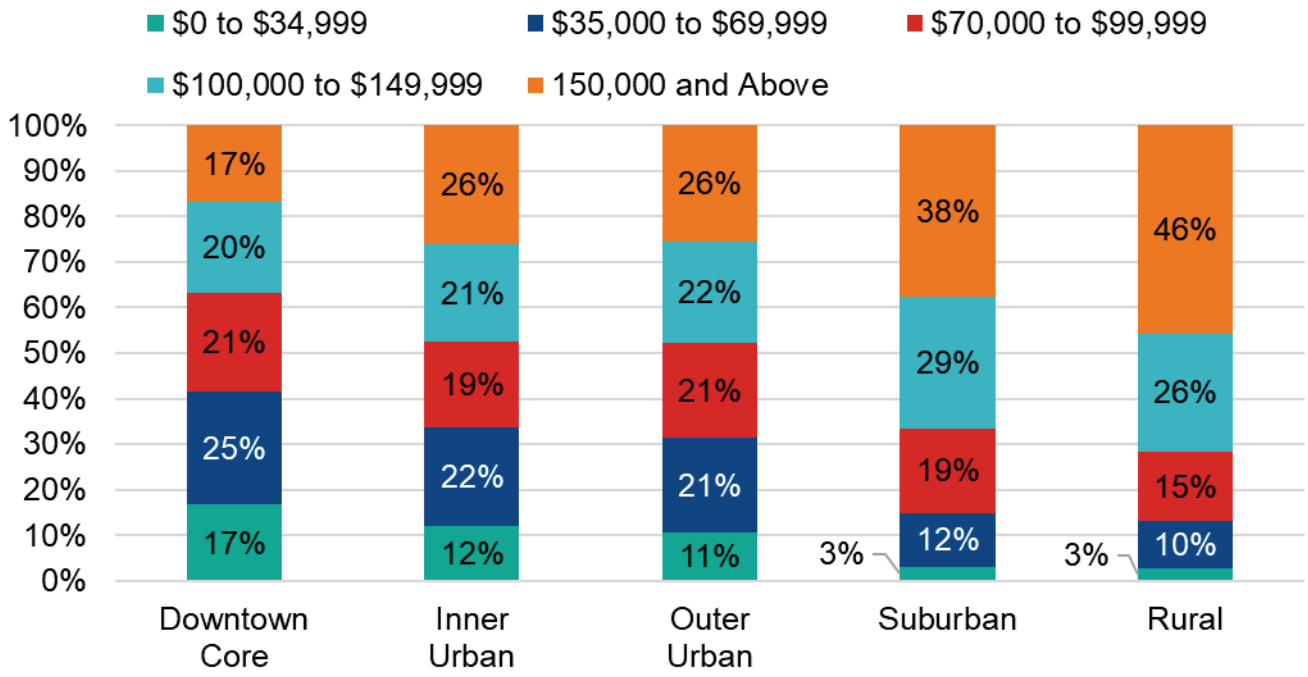
The average household size has remained at 2.4 people per household. Suburban households are larger on average (2.8 people per household) than households in the downtown (1.6 people per household), reflecting differences in dwelling type.[12]

Income Distribution

Income is an important determinant of health and well-being, and has a significant impact on where someone lives, how often they travel, and what modes are available to them. For example, a low-earning household may not be able to afford an automobile, while a high-earning household may own multiple vehicles. As shown in Exhibit 2.5, the income distribution for transects within the Greenbelt is relatively even. However, areas outside of the Greenbelt have a higher concentration of high-income households and relatively few low-income households. Exhibit 2.6 illustrates the relationship between income and dwelling type and shows that more than half of those living in an apartment have an annual household income of less than $70,000. On the other hand, half of those living in single-detached homes fall into the highest income bracket.

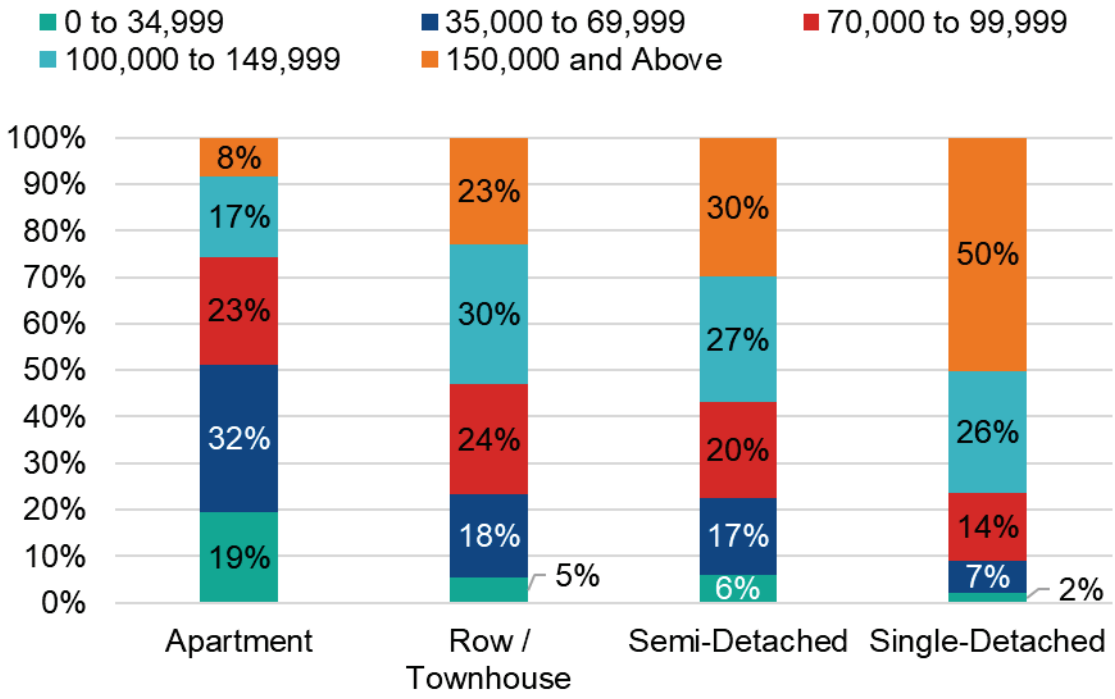
[12] 2011 and 2022 Origin Destination Household Travel Survey.

Exhibit 2.5: Household Income by Area (2022)



Source: 2022 Origin-Destination Survey.

Exhibit 2.6: Household Income by Dwelling Type (2022)



Source: 2022 Origin-Destination Survey.

2.1.4 Economic Trends

Travel behaviour is also shaped by economic factors. Shelter and transportation were the first and third largest spending categories for Canadians in 2021, respectively;[13] the cost of housing and travel influence travel choices.

Between 2011 and 2022, the average hourly wage grew by 11% from $27 in 2011 to $30 in 2021.[14] By comparison, the price of shelter increased by 29%, and the Consumer Price Index (CPI) increased by 26% over the same period.[14] This is significant for three reasons. First, it means that the average Canadian has less money to spend on other costs, such as transportation, than they did in 2011. Secondly, real estate prices influence the location and type of employment offered by employers. Lastly, the price of real estate has a direct influence on where people live and the type of dwelling units that are available to them for purchase or rent; as prices increase, people tend to look for housing in areas where housing costs are lower or choose smaller units such as condos or apartments. This is significant as both dwelling type and residential location are correlated with travel behaviour, as discussed in Section 3.4.

Transportation costs have also increased since 2011, which adds pressure to people's budgets and how they travel. For example, gasoline prices in Ottawa have risen by 30%.[15] Monthly transit passes in Ottawa have risen by 5%, and single trip transit fares have increased by 12%, comparing data from 2011 and 2022.[16]

2.1.5 Household Transportation Characteristics

Household characteristics, such as car, bicycle and transit pass ownership, provide insight into the modes of travel available to residents.

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[13] Statistics Canada, Survey of Household Spending, 2021.

[14] Statistics Canada. Table 18-10-0004-07 Consumer Price Index, monthly, percentage change, not seasonally adjusted, Canada, provinces, Whitehorse and Yellowknife — Transportation. 2011 and 2022 prices based on April CPI values for the respective years.

[15] Statistics Canada, Monthly average retail prices for gasoline and fuel oil, by geography 2011-2024. Ottawa-Gatineau, Ontario part, Ontario/Quebec.

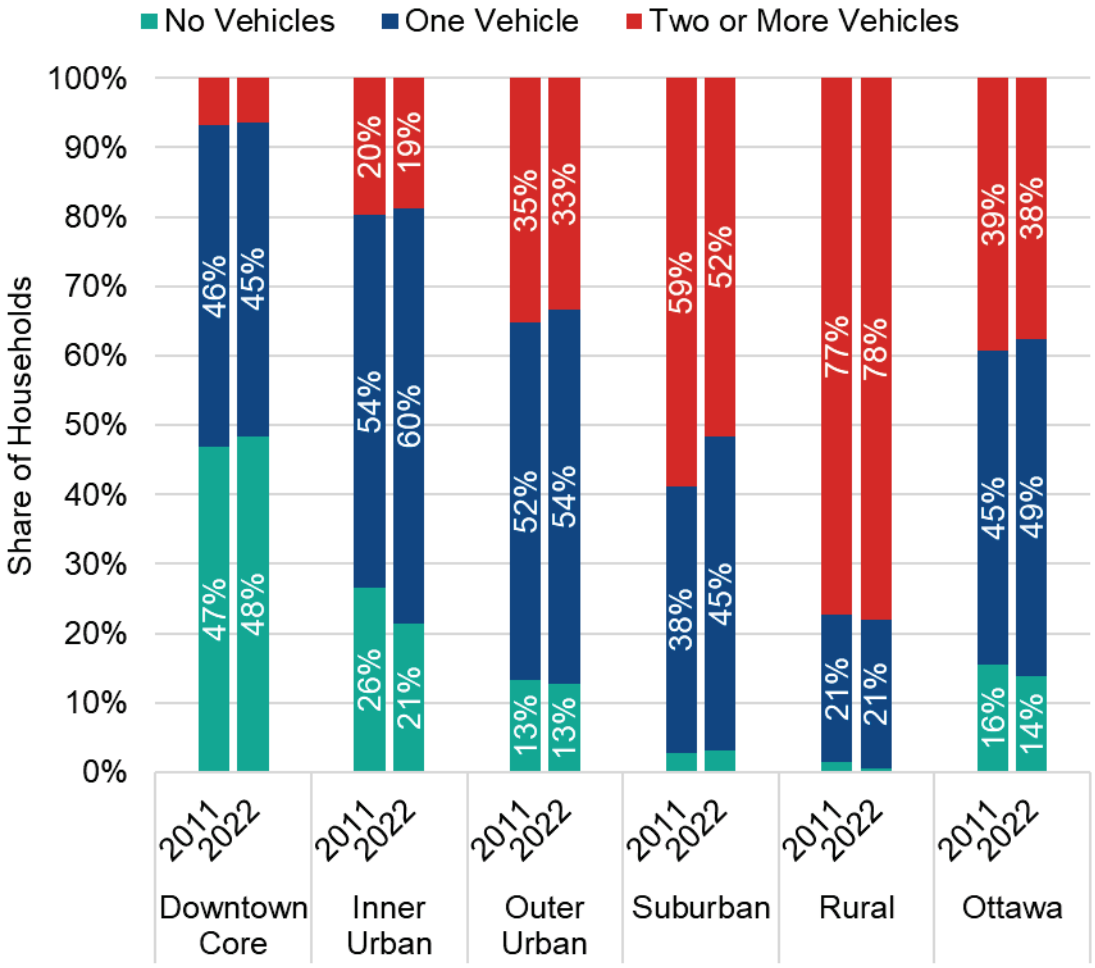
[16] CUTA Data, Canadian Conventional Transit Statistics – 2011 and 2022 Operating Data.

Vehicle Ownership

Vehicle ownership is one of the key determinants of peoples' travel behavior; it influences mode choice, how frequently people make trips, how far people are willing to travel to their destinations, and trip chaining. For example, with a car, parents can easily pick up their children from school, drop them off at an extra-curricular activity, go to the grocery store, and pick up their children again, before returning home.

The average number of cars per household has remained relatively stable at 1.34 in 2011 and 1.33 in 2022. In 2011, 16% of households did not own a car, which has decreased to 14% of households in 2022. As shown in Exhibit 2.7, vehicle ownership varies by area. While average vehicle ownership has remained stable overall, vehicle ownership has increased slightly in the inner urban area, where fewer households now own zero vehicles. Conversely, vehicle ownership has decreased slightly in the outer urban and suburban areas, where fewer households now own two or more vehicles. In general, vehicle ownership is higher outside the Greenbelt in the suburban and rural areas, where most households have access to at least one vehicle, and many own two or more. Areas with lower car ownership have the highest car share membership rates, with 14% of households in the downtown core and 6% of households in the inner urban area having at least one person belonging to a car share program.

Exhibit 2.7: Household Vehicle Ownership Rates by Area (2011-2022)



Source: 2011 and 2022 Origin-Destination Survey.

Based on data from the 2022 OD Survey, 53% of households with an annual income of less than $35,000 do not own a vehicle, a figure that falls to 2% for households making more than $150,000. Households with incomes greater than $150,000 are 2.1 times more likely to own a vehicle and 3.2 times more likely to own an alternative fuel vehicle than households with incomes of less than $35,000. This indicates that, despite government purchase incentive programs and long-term savings in fuel costs, alternative fuel vehicles continue to be primarily purchased by higher-income households. Electric vehicles are further discussed in Section 2.4.

Bicycle Ownership

Bicycle ownership data was collected for the first time in the 2022 OD Survey. Compared to automobile ownership, bicycle ownership (including e-bikes) is more consistent throughout the city, although it also shows an increasing trend away from the downtown core. In the downtown, 59% of households own at least one bicycle, while in rural areas, 75% of households own at least one bicycle. Citywide, 3.8% of households own an e-bicycle. As discussed further in Section 3.4, cycling rates are higher in areas inside the Greenbelt, which are denser and have a more established cycling network.

Transit Passes

The percentage of people with transit passes is fairly uniform across the city at around 15%, with the downtown core at 22% and rural areas at 4% as exceptions. However, the total number of people with transit passes has decreased 12% between 2011 and 2022. This is likely a result of the COVID-19 pandemic, the shift in employment patterns, and the introduction of PRESTO making it easier to pay as you go.[17]

2.2 Pandemic Impacts

The COVID-19 pandemic resulted in rapid changes to travel behaviour upon its onset in March 2020. The permanence of these changes is uncertain, and travel continues to transition. While some changes have been short-lived, others are expected to impact travel over the long-term, affecting the operation of the City's transportation system and infrastructure planning.

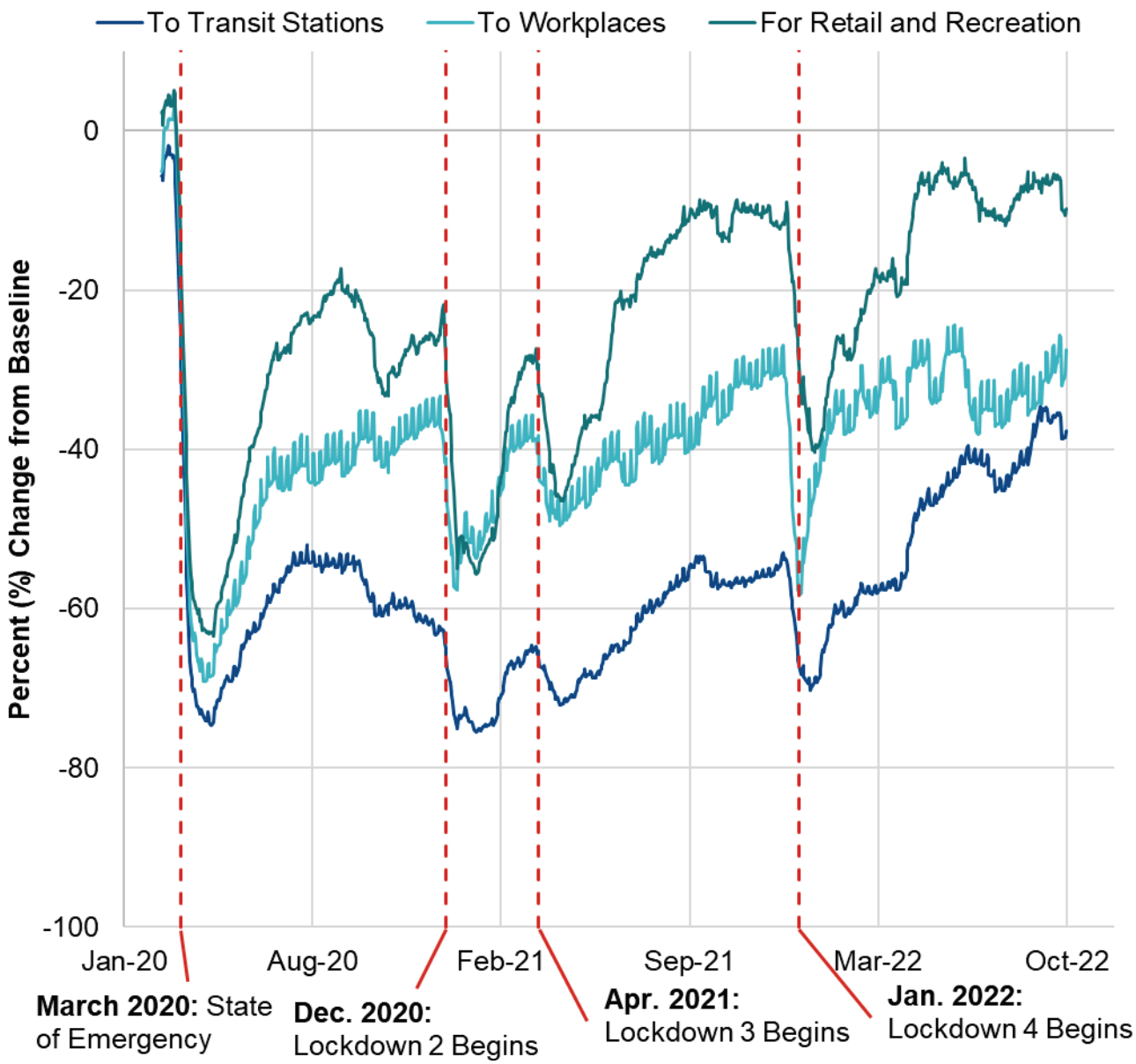
2.2.1 Short-Term Changes in Travel Behaviour

After the onset of the pandemic in 2020, several measures were taken to try to limit people's exposure to the virus including implementing lockdowns and travel restrictions, meaning that those who could work from home were required to do so, and everyone was expected to reduce in-person activities. As a result, the number of trips overall plummeted, as illustrated by Exhibit 2.8 which shows how trips to transit stations,

[17] OC Transpo has also recently introduced payment by credit card and mobile wallet.

workplaces, and for retail and recreation dropped immediately following the implementation of each lockdown.

Exhibit 2.8: Pandemic Travel Behaviour in Ottawa[18]



Source: Google Mobility Data.

Since the pandemic, automobile volumes have recovered significantly, and are approaching levels observed before the pandemic. For example, a

[18] Data obtained from https://www.google.com/covid19/mobility/. The baseline is the median value, for the corresponding day of the week, during the 5-week period Jan 3-Feb 6, 2020.

comparison of 2019 and 2022 traffic count data, suggests that morning peak hour automobile traffic has rebounded to 85% of that seen before the pandemic.[19] Further analysis on traffic count data is discussed more in Section 4. However, transit ridership has increased more slowly, reaching about 75% of pre-pandemic volumes as of December 2023.[20]

2.2.2 Work-From-Home

While working-from-home (WFH) started as a way to reduce the spread of the virus, the practice has continued after the lockdowns ended. Many organizations have shifted to a hybrid model with some workdays spent onsite and some from home. Some organizations have gone entirely remote, though the number is difficult to quantify. These changes have resulted in a significant reduction in work trips since 2011, primarily led by an increase in office workers now working from home one or more days a week. For example, between 2011 and 2022 the workforce grew by 10% but the number of commuting trips dropped by 27%.[21, 22] Based on the OD survey, as of fall 2022:

- 39% of workers work exclusively from the workplace,
- 35% of workers have hybrid work arrangements,
- 19% of workers work exclusively from home,
- 7% of workers do not have a usual place of work.[23]

The OD survey confirms there has been a significant increase in the percentage of workers who have hybrid work arrangements or who work exclusively from home. The survey also showed that hybrid workers commuted into the office around 1.55 days per week on average.

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[19] Analysis based on traffic count data for strategic "screenlines" which capture traffic moving between different parts of the City. The screenlines selected include roads crossing the Greenbelt, roads providing access to the downtown, and interprovincial crossings.

[20] OC Transpo Transit Commission Update, October 12, 2023. Pre-pandemic based on 2019 values for ridership.

[21] Workforce statistics obtained from Statistics Canada's 2011 NHS Survey and 2021 Census

[22] 2011 and 2022 Origin-Destination Household Travel Survey.

[23] Workers that reported not having a usual place of work include people such as caretakers, plumbers and other tradespeople, gig workers (e.g. rideshare or taxi drivers, food delivery drivers), etc.

Since the uptick in WFH at the beginning of the pandemic, workers have been returning to office workplaces. In Canada, about 40% of people worked most of their hours from home in April 2020, which has decreased to about 30% in January 2022, and further decreased to about 20% in November 2023.[24] As discussed in Section 1.3.1, return-to-office mandates have been implemented by the federal government since the 2022 OD survey, which suggests similar return to office trends in Ottawa.

At the same time, estimates of office vacancy rates in Ottawa were around 12-14% for the fourth quarter of 2023,[25, 26] a substantial increase compared to the 5.1% observed before the pandemic.[27] As a result, the City's Planning and Housing Committee has approved streamlining the process for converting some of this space to residential units.[28] The conversion of office space to residential use has implications for travel as once-predominant commuting patterns to and from the office are replaced with other types of trip activity.

2.3 New Infrastructure

New infrastructure is another factor influencing travel behaviour and trends in Ottawa. Since the 2013 TMP was adopted, there have been significant investments in transit, walking and cycling facilities, roadway infrastructure, and network connectivity.

2.3.1 Transit

O-Train Line 1 opened in September 2019. The O-Train serves as the spine of the transit system, with buses feeding into the rail line at major transit hubs at Tunney's Pasture, Hurdman, and Blair stations. Transit travel to and

[24] Statistics Canada, Working from home in Canada, 2024-01-18. See: https://www150.statcan.gc.ca/n1/daily-quotidien/240118/dq240118c-eng.htm
[25] Colliers, Ottawa Office Market Report, Q4 2023. See: https://www.collierscanada.com/en-ca/research/ottawa-office-market-report-2023-q4
[26] CBRE Canada, Canada Office Figures Q4 2023. See: https://www.cbre.ca/insights/figures/canada-office-figures-q4-2023
[27] City of Ottawa Economic Development Update, Q2 2019. See: https://documents.ottawa.ca/sites/documents/files/economic_update_q2_2019_en_0.pdf
[28] City of Ottawa Planning and Housing Committee Meeting #17, November 1, 2023.

from the downtown has been altered as many previous single-seat rides now require a transfer between the bus and the O-Train. There have been many challenges with the opening of Line 1 that have impacted public reception and overall experience with using transit.

Ongoing improvements and the extension of the O-Train to the east, west, and south (Stage 2) are expected to improve the performance and competitiveness of transit moving forward. For example, as the O-Train is extended to the south, east, and west, more riders will be able to access the train directly, without needing to transfer from a bus, which will help to improve travel time and convenience.

Median bus lanes were also introduced to the city in 2014 in the Chapman Mills corridor, and transit priority measures were implemented on St. Laurent Boulevard between Smyth Road and Innes Road in 2017.

2.3.2 Active Transportation Infrastructure and Complete Streets

The City has advanced its active transportation[29] (AT) infrastructure program and implemented new design standards and complete street[30] policies. Protected bicycle lanes and cycle tracks have been introduced and are being adopted city-wide as funding permits. Since 2013, the City has added 260 kilometres of cycling facilities, including 22 kilometres of physically separated bike lanes and 70 kilometres of off-road pathways. Protected intersections, which improve safety for people cycling and walking, have also been implemented in over 35 locations, and more are in the planning stage.

Many cycling barriers have been addressed since 2011, with new and improved facilities across the Ottawa River including the Chief William Commanda Bridge multi-use pathway, a multi-use pathway at the Macdonald-Cartier Bridge, and cycle tracks at the Portage Bridge (Exhibit 2.9). Similar improvements have been made along the Rideau Canal, with the Flora and Corkstown active transportation bridges, cycle tracks on the Bank Street Bridge, and cycle tracks under construction on the Mackenzie

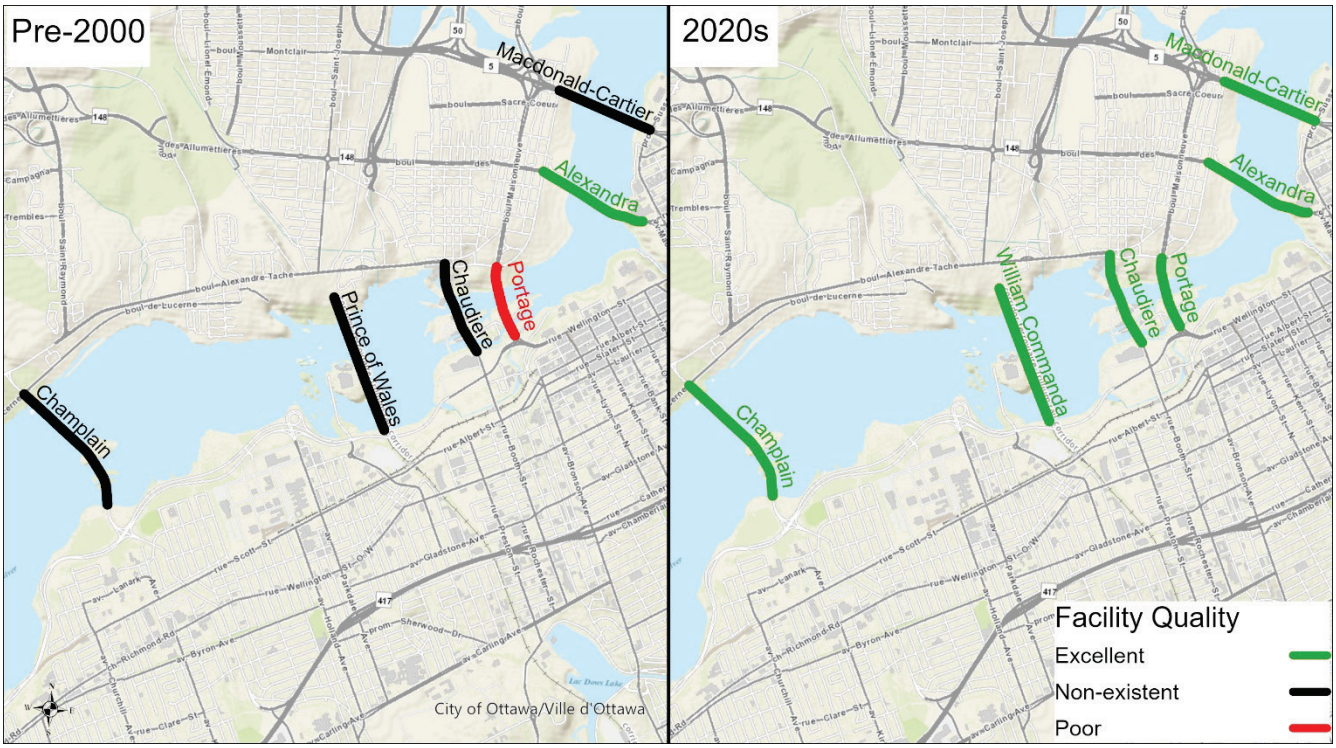
[29] Active transportation includes walking and cycling, as well as travelling with a mobility aid or wheelchair, pushing a stroller, or other forms of active mobility.

[30] Complete Streets incorporate the physical elements that allow a street to offer safety, comfort and mobility for all users of the street regardless of their age, ability, or mode of transportation.

King Bridge. Other crossings include the Max Keeping Bridge across Highway 417 and the Adàwe Crossing across the Rideau River.

Integrated road renewal projects have resulted in complete streets and improved pedestrian and cycling safety; examples include Elgin Street, Main Street and Montreal Road.

Exhibit 2.9: Condition of Cycling Facilities Across the Ottawa River, pre-2000 Versus Today



Source: City of Ottawa.

2.3.3 Roads

The City has also implemented new road and road widening projects since the 2013 TMP was adopted. These include the Vimy Memorial Bridge connecting Barrhaven and Riverside South across the Rideau River and a new interchange at Hunt Club Road and Highway 417. Other notable projects include Robert Grant Avenue, the Hospital Link Road, widening of Strandherd Drive, Palladium Drive realignment and widening, Klondike Road urbanization, Goulbourn Forced Road realignment, Campeau Drive

widening, Old Richmond Road widening, as well as widening a portion of Longfields Drive.

2.4 New Technology

Another major change in transportation since the 2013 TMP is the arrival of new mobility options. Ride-hailing companies,[31] micro-mobility[32] options such as e-bikes and e-scooters, and electric vehicles (EVs) have all been introduced to the city in recent years, providing residents with more ways of getting around. Additionally, there has been a rapid increase in e-commerce and home deliveries.

Ride-Hailing

The City of Ottawa has regulations for vehicles-for-hire (taxis, limousines and private transportation companies). These services play an important role in the overall transportation system. Data from ride-hailing companies indicate that monthly ride-hailing trips more than doubled between January 2018 and 2020, and that February 2020 had the highest number of monthly trips. At the onset of the pandemic, the number of trips in April 2020 fell to 16% of pre-pandemic (February 2020) levels, and have since rebounded to 85%, as of December 2023. Ride-hailing trips still comprise a very small percentage of total daily trips, at less than 0.5% of daily trips.

Ride-hailing trips are more commonly used for trips within the inner parts of the city, and at off-peak times. There were over three times more ride-hailing trips starting inside the Greenbelt, than outside. Also, there were almost two times more ride-hailing trips in off-peak times, compared to the observed morning and afternoon peak periods combined.

[31] Ride-hailing companies, also known as private transport companies (PTCs), offer, facilitate, or operate prearranged transportation services for compensation, using any software or application or telecommunications platform or digital network to connect passengers with PTC Drivers. PTCs are similar to traditional taxi services in function, except that PTC vehicles are typically registered as personal vehicles, not commercial vehicles.

[32] Micro-mobility refers to a range of small, lightweight devices operating at speeds typically below 25 km/h and is ideal for trips up to 10 km.

E-Scooters

In 2020, Ottawa enacted a By-Law permitting the use of private and shared e-scooters as part of a 5-year provincial pilot. In the fourth year of the pilot in 2023, shared e-scooters saw approximately 50,000 unique riders travel 368,000 km across 179,000 rides. Shared e-scooters are only permitted in designated areas in and around the downtown, and can only operate on City-owned pathways, cycling facilities, and roads with a speed limit of 50 km/h or lower. The pilot has shown that e-scooters represent a viable option for shorter trips, with an average trip length of around 2.1 km.[33] E-scooters have proven most popular for leisure and shopping trips, especially in the evening. They also help to improve access to transit, with 18% of shared e-scooter trips starting or ending within 150m of a transit station based on data from the 2023 season.

While e-scooters have increased the mobility options available to residents, they have also created accessibility concerns due to sidewalk riding and improper parking. Throughout the pilot, a number of measures have been introduced to address these issues, and the City continues to explore opportunities for further improvement.

Electric Vehicles

Transitioning from gas and diesel to electric vehicles (EVs) will help the City meet its greenhouse gas emission targets.[34] EV adoption has expanded enormously in recent years. In 2017, only 1.0% of new motor vehicles sold in both Canada and Ontario were either battery electric, or plug-in hybrid electric vehicles.[35] By the third quarter of 2023, this value had increased to 10.3% for Canada and 7.1% for Ontario.[35] Continued exponential growth in new electric vehicle purchases is required to meet the emission reduction goals identified in the City of Ottawa's Energy Evolution targets.[34] The City is developing a personal electric vehicle

[33] City of Ottawa, April 2, 2024 Memoranda issued by Planning, Development and Building Services | City of Ottawa.
[34] City of Ottawa, Energy Evolution, 2020. See: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/reducing-greenhouse-gas-emissions/strategies-and-action-plans/energy-evolution#
[35] Statistics Canada, New motor vehicle registrations, quarterly. See: https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021019-eng.htm

strategy, which will outline the role and responsibility of the City of Ottawa in supporting the adoption of EVs by residents. [34, 36]

E-Commerce

E-commerce has also increased since 2013, and its popularity accelerated during the pandemic as people spent more time at home and relied on deliveries or curbside pickup. In the 2022 OD survey, roughly 127,000 households, over 30%, received an at-home delivery or service on the day they were surveyed. This trend has important implications for travel as personal shopping and restaurant trips are replaced by delivery vehicles.

Emerging Technologies

In addition to these changes, new technologies and mobility options are on the horizon that have the potential to be simultaneously transformative, disruptive, beneficial and/or challenging for urban transportation systems. These technologies, such as mobility as a service,[37] connected vehicles,[38] and automated vehicles,[39] create uncertainty for the future of travel, as discussed in the *Needs, Opportunities and Uncertainty* discussion paper.[40]

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[36] City of Ottawa, Electric Vehicles, 2023. See: https://engage.ottawa.ca/electric-vehicles

[37] Mobility as a Service (MaaS) integrates various travel planning services into a single platform to manage trips across all modes. A user would enter their origin and desired destination, and a central routing service would scan all modes of travel across public and private-sector services to plan the optimal route. Ticketing, trip booking, and payment processing would all be handled by the platform.

[38] Connected vehicles (CV) can communicate with other vehicles, surrounding infrastructure, passengers, and other road users, as well as other connected devices to not only broadcast information, but to receive information that guides driving decisions made by human or automated drivers.

[39] Automated vehicles (AV) are designed to operate the vehicle without a driver. In the long-term vision for AVs, a passenger simply provides their destination, and the AV makes all decisions required to make the journey. AVs use advanced control systems and technology to track the vehicle's position and monitor the driving environment.

[40] The *Needs, Opportunities and Uncertainty discussion* paper will be uploaded to: https://engage.ottawa.ca/transportation-master-plan

3 Travel Behaviour Trends

This section discusses how travel behaviour is changing. It explores who is traveling, where they are going, when, and how they are getting there. The analysis generally focuses on all trips made on a typical day, with some exceptions that discuss peak period travel. Unless stated otherwise, all data is based on the 2011 and 2022 Origin-Destination (OD) Survey.

3.1 Who Is Travelling and Why?

Ottawa has experienced steady population growth. However, given the impact of the pandemic and changing work patterns, this has not translated into an increase in the number of trips. In fact, the number of daily trips starting or ending in Ottawa has decreased by about 0.7% since 2011, from 2.55 to 2.54 million in 2022. The reduction has been even greater in the morning peak (6:45-9:00 a.m.), which went from 532,400 trips in 2011 to 487,600 in 2022, a decline of 8%. Similarly, the average trip rate for Ottawa residents decreased from 2.76 trips per person per day in 2011 to 2.50 in 2022.

Travel behaviour varies by socio-economic and demographic factors. According to the 2022 OD Survey:

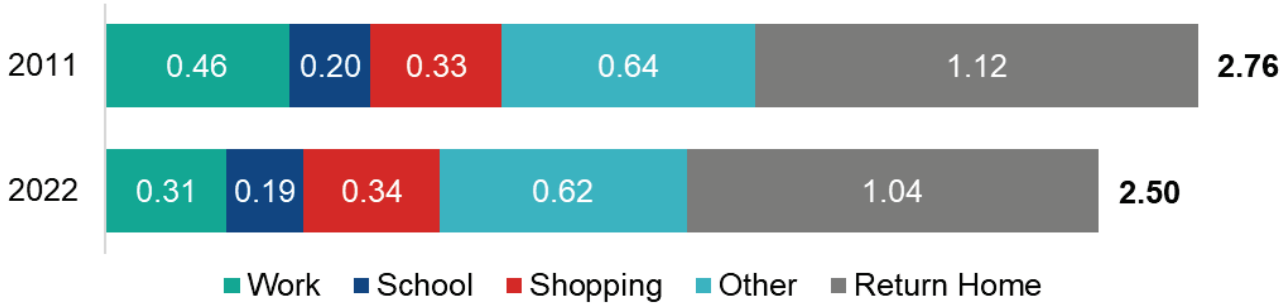
- People in households with an income of less than $35,000 made about 2.1 trips per day in 2022, whereas those living in households earning more than $150,000 made around 2.6 trips per day.
- Males made 2.6 trips per day during the survey period, while females made 2.5 trips and those who identified as non-binary or preferred to self-identify made 2.6 trips per day.
- People with disabilities made fewer trips per day on average, at 2.2 trips per day, compared to those without disabilities, who made 2.5 trips per day. Further, individuals who have an accessible parking permit made 1.8 trips per day and those who

reported using a mobility aid (such as a wheelchair, walker, crutch, cane, or seeing-eye dog) made less than 1.5 trips per day.

- People who live in households that own at least one automobile made over 2.5 trips per day in 2022, while those living in households that do not own a vehicle made about 2.2 trips per day.

Exhibit 3.1 illustrates the daily number of trips by trip purpose per capita.[41] Trip rates for people travelling to work has significantly decreased between 2011 and 2022, while trip rates for shopping have increased. In 2022, the number of daily shopping trips was higher than work trips.

Exhibit 3.1: Daily Trip Rates by Purpose per Capita (2011-2022)

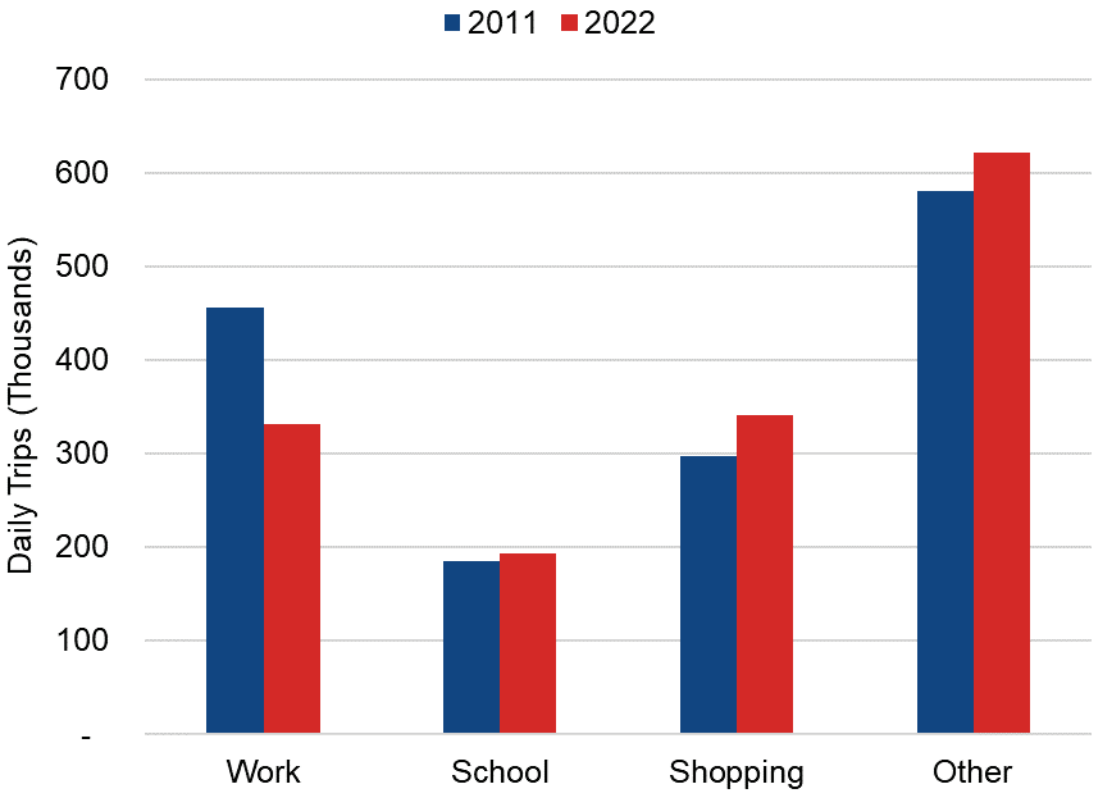


Source: 2011 and 2022 Origin-Destination Survey.

Exhibit 3.2 illustrates the change in the number of trips by purpose between 2011 and 2022. Much of this is likely a direct result of the pandemic and the rise of working from home, which has decreased the overall number of commute trips. While the total number of non-work trips increased, work trips decreased, which correlates with more people working from home.

[41] The *Other* category includes travelling for recreational activities or dining (e.g., at a restaurant, bar, coffee shop, etc.), driving someone somewhere, picking someone up, visiting friends or family, and medical and dental visits.

Exhibit 3.2: Change in Daily Trips by Purpose (2011-2022)



Source: 2011 and 2022 Origin-Destination Survey.

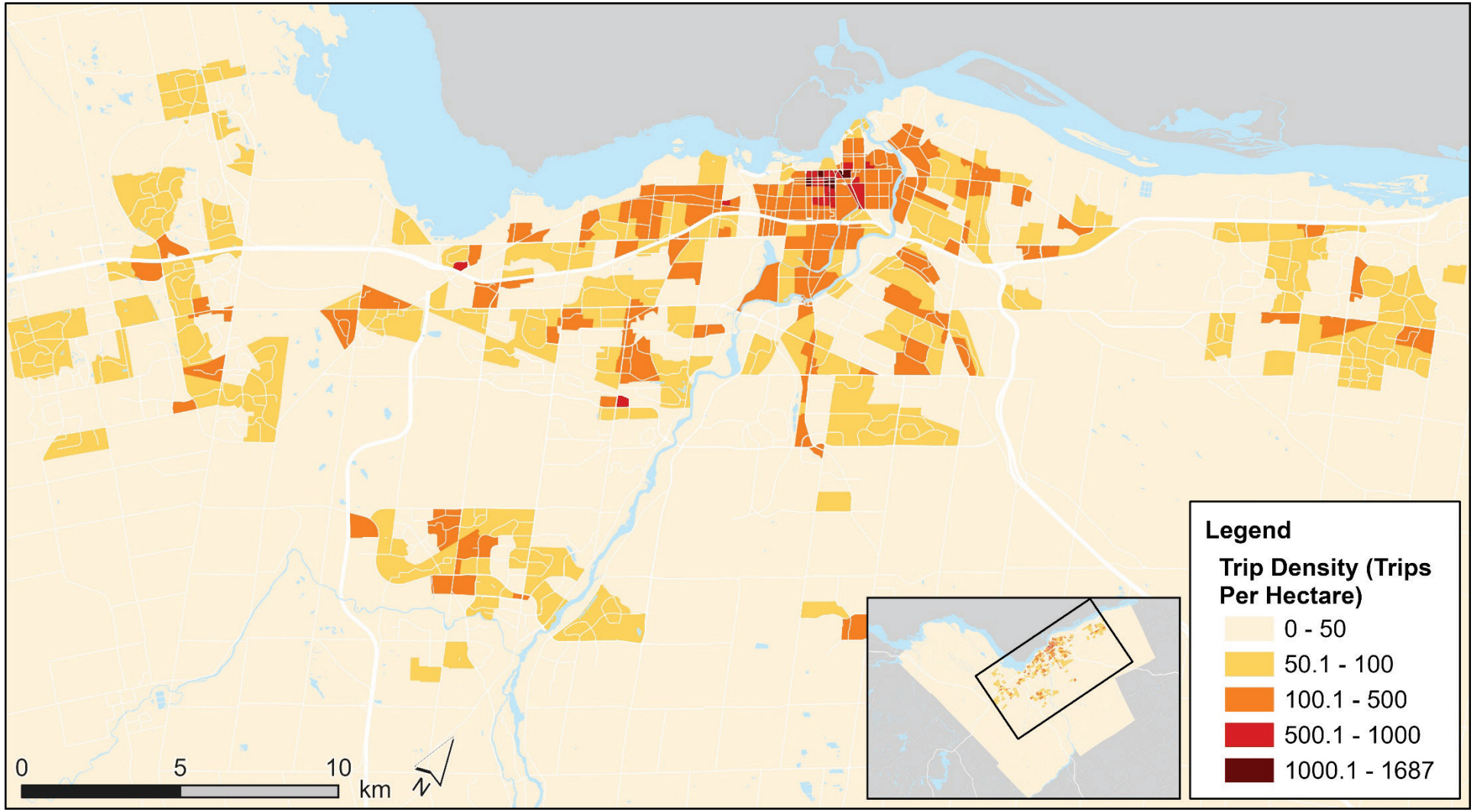
3.2 Where Are People Travelling?

From the 2022 OD survey, the central parts of the city continue to attract the most trips, as shown in Exhibit 3.3. Roughly 64% of trips end at destinations inside the Greenbelt. This area is home to less than half of the city's population, and more than two thirds of the jobs[42]. Major employment, retail, and institutional areas are major destination hotspots.

Exhibit 3.4 shows the number of trips and their start and end points, excluding return home trips. The areas inside the Greenbelt attract more trips than they generate, while the areas outside the Greenbelt generate more trips than they attract.

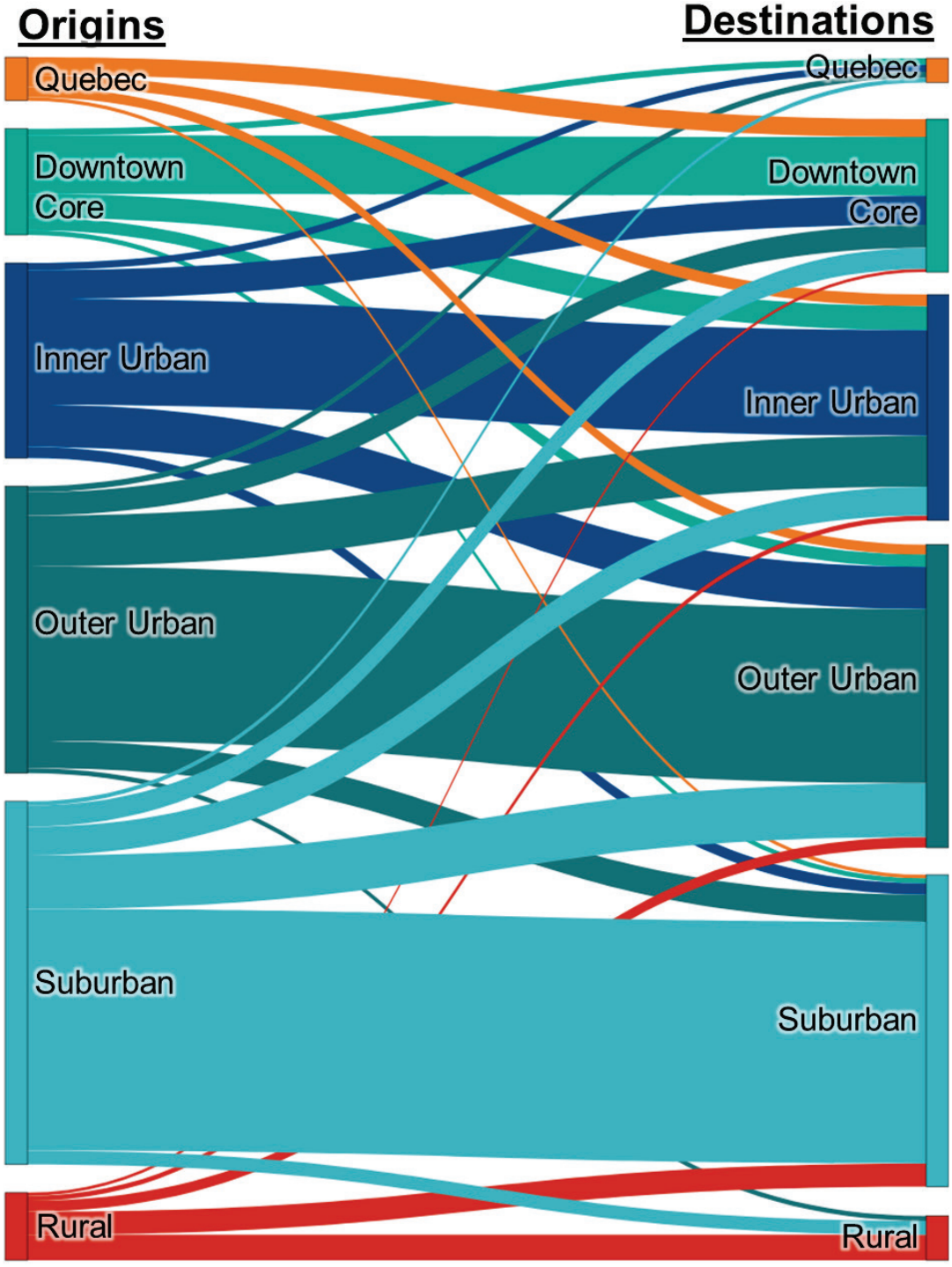
[42] Adapted from 2021 Census of Population and City of Ottawa.

Exhibit 3.3: Daily Trip Destinations, Excluding Return Home Trips (2022)



Source: 2022 Origin-Destination Survey.

Exhibit 3.4: Daily Trips by Origin-Destination Pair (2022)[43]



Source: 2022 Origin-Destination Survey.

While trips are scattered across the city, about half of all trips start and end in the same districts (i.e., internal trips) in 2022. This has increased from 2011, as shown in Exhibit 3.5, and broken down as follows:

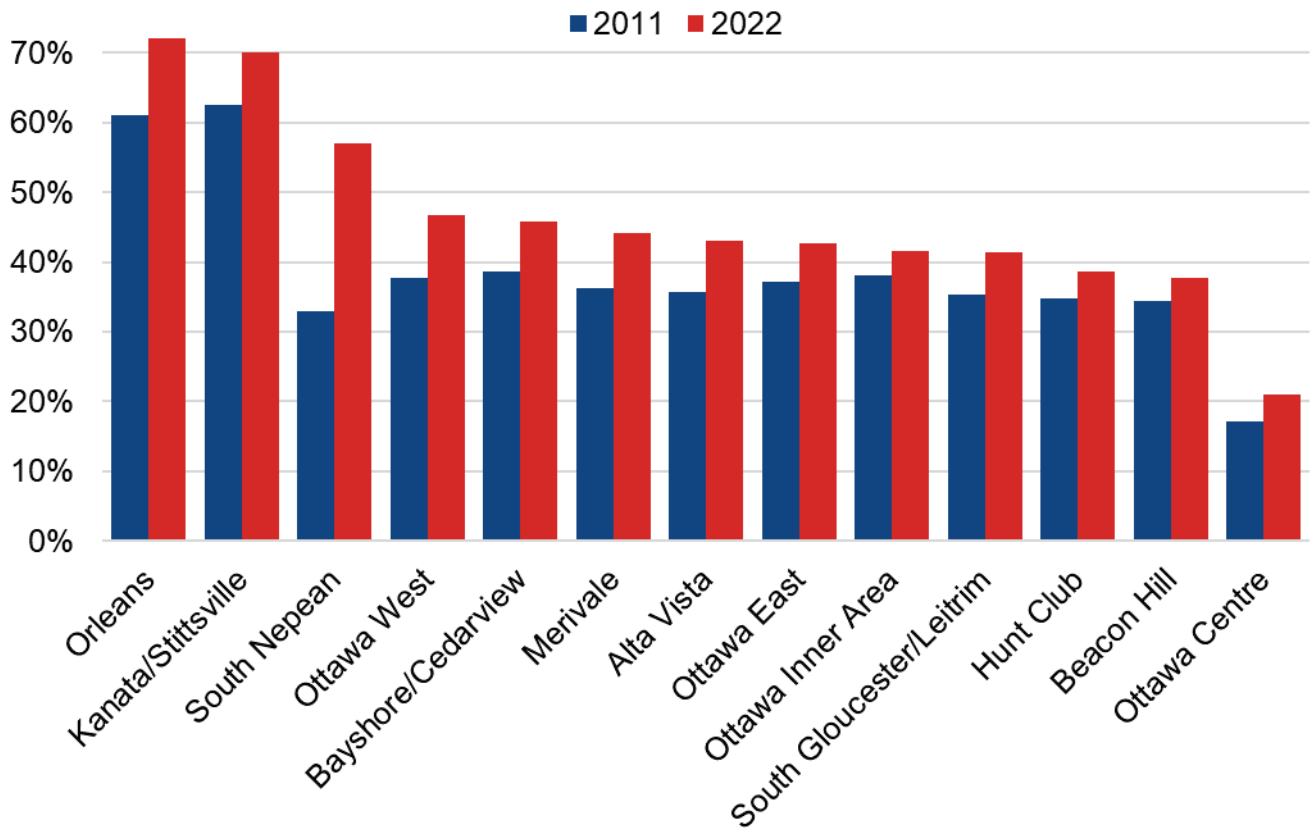
- 34% of trips originating inside the Greenbelt were internal in 2011. This grew to 41% in 2022.
- 59% of trips originating in the suburbs were internal in 2011. This grew to 67% in 2022, broken down as follows:
    - 72% of trips originating in Orleans also end there;
    - 70% of trips originating in Kanata/Stittsville also end there;
    - 64% of trips originating in South Nepean (Barrhaven) also end there; and
    - 41% of trips originating in South Gloucester/Leitrim (Riverside South/Findlay Creek) also end there.

This illustrates that many areas of the city, including suburbs and Barrhaven in particular, increasingly operate as complete communities with many services and amenities located in the community, in line with the City's Official Plan objectives. It may also reflect the reduction in work trips that has occurred, which tend to involve longer distances.

A table illustrating the number of trips between each district is given in Appendix B. External trips, meaning those that either begin or end outside of the city, comprise only a small percentage (3.2%) of total trips. On a typical weekday in 2022, Ottawa attracted 102,000 trips from outside the city, of which 77,000 were from Quebec.

[43] This illustration only includes Origin-Destination pairs with greater than 4,000 trips to avoid clutter. Return home trips are excluded.

Exhibit 3.5: Percentage of Daily Trips That Start and End in the Same Area (2011-2022)



Source: 2011 and 2022 Origin-Destination Survey.

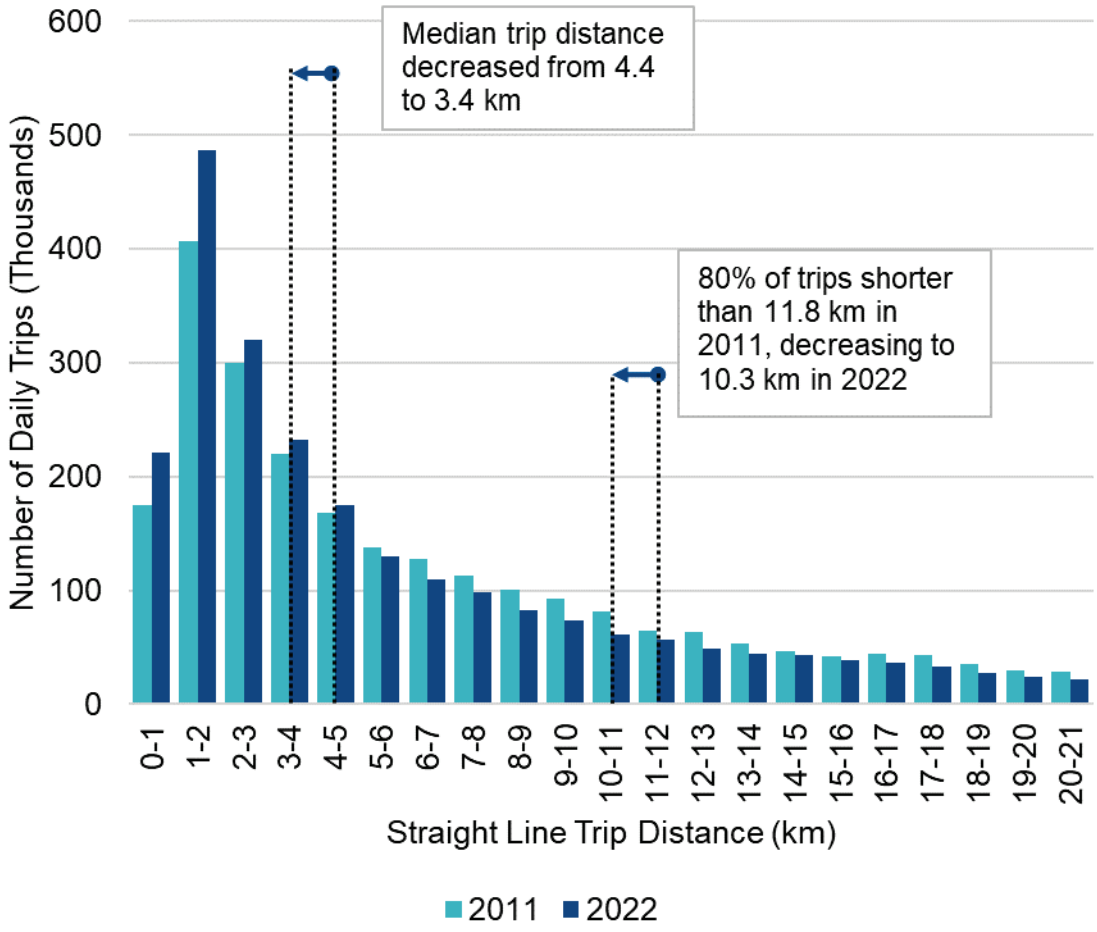
3.2.1 Travel Distances

People in Ottawa made shorter trips in 2022 than they did in 2011. Exhibit 3.6 illustrates the distribution of trip lengths, based on the straight-line distance between the trip origin and destination.[44] The number of trips shorter than 5 km increased, while the number of longer trips decreased. As a result, the median trip distance decreased from 4.4 km in 2011 to 3.4 km in 2022. Similarly, 80% of trips in 2022 were under 10.3 kilometres, a decrease of 1.5 km compared to 2011. This change likely reflects the shift in trip purposes that has occurred since 2011; work trips,

[44] Straight- line trip distance refers to the horizontal distance between an origin and destination (i.e., as the crow flies). Since people must navigate the transportation network to reach their destination, the actual trip distance is around 30% longer on average in 2022. Straight-line distances are presented due to limitations in estimating actual distances, and to be able to compare between 2011 and 2022 distances.

which tend to be longer, have decreased, while shopping trips, which tend to be shorter, have increased.

Exhibit 3.6: Trip Length Distribution (2011-2022)

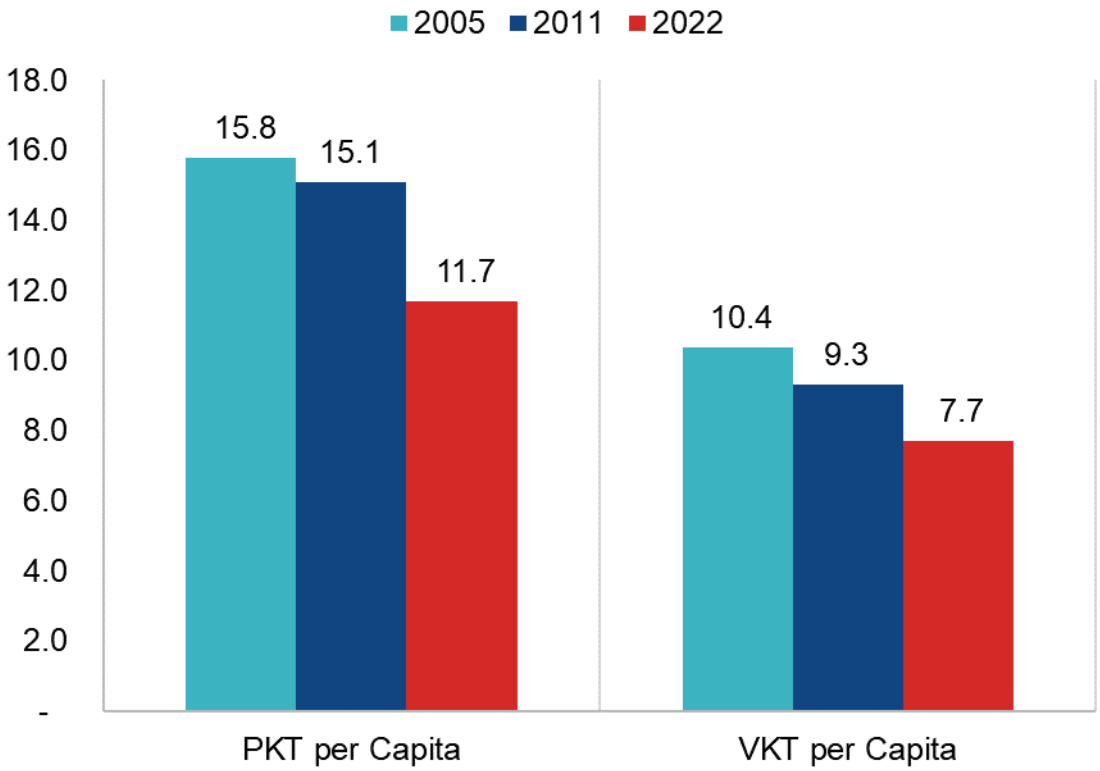


Source: 2011 and 2022 Origin-Destination Survey.

The decrease in travel distance is also supported by Exhibit 3.7, which analyzes the total number of Passenger-Kilometers Travelled (PKT) within the city. PKT is a useful metric because it provides an indication of both how many people are travelling and how far they are travelling, with implications on congestion, emissions, and travel time. PKT per capita, which includes all travel modes, has declined since 2011. Daily vehicle-

kilometres travelled (VKT) per capita has also decreased from 9.3 km to 7.7 km over the same time.[45]

Exhibit 3.7: Change in Daily PKT and VKT per Capita (2005-2022)

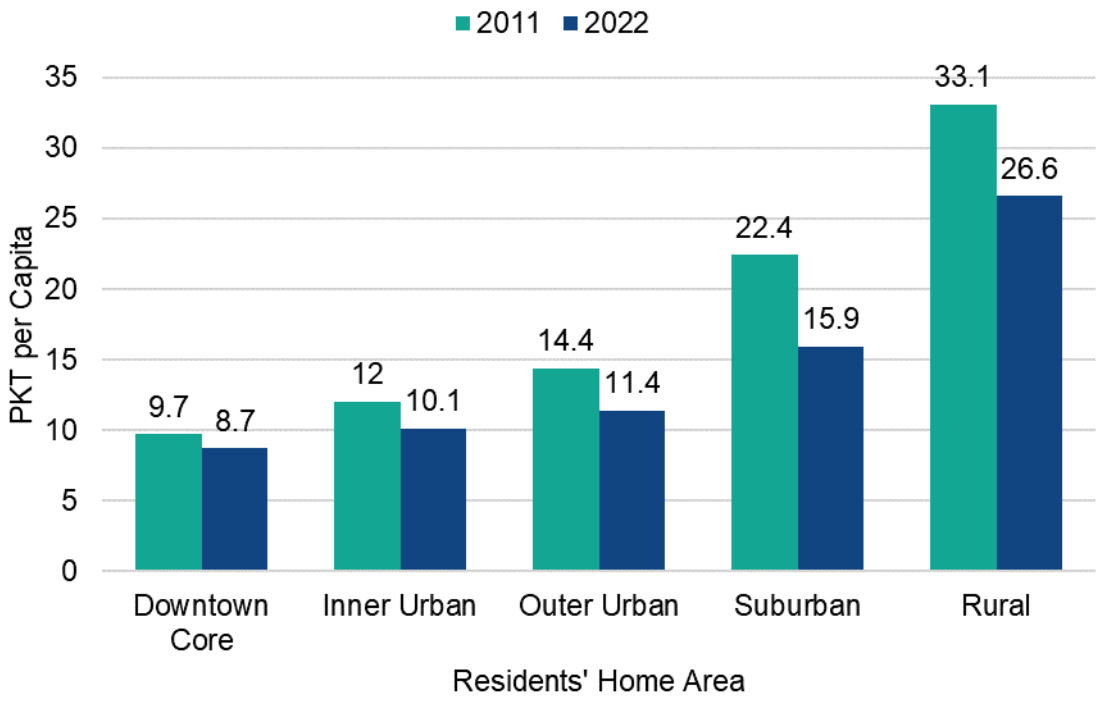


Source: 2005, 2011, and 2022 Origin-Destination Survey.

Travel distances also vary by area. In general, the further away people live from the downtown core, the more kilometres they travel on an average day, as shown in Exhibit 3.8. These variations may be attributed to differences in employment proximity and type, the available transportation networks and services, vehicle ownership, mix and density of land uses, and socio-demographic factors. City-wide, daily PKT per capita decreased by 21% since 2011 with the largest decrease (29%) occurring in the suburbs, reflecting a reduction in longer trips.

[45] Vehicle-kilometres travelled (VKT) measures the distance travelled by automobile drivers, while passenger-kilometres travelled (PKT) includes all travel modes.

Exhibit 3.8: Daily PKT per Capita by Area (2011-2022)

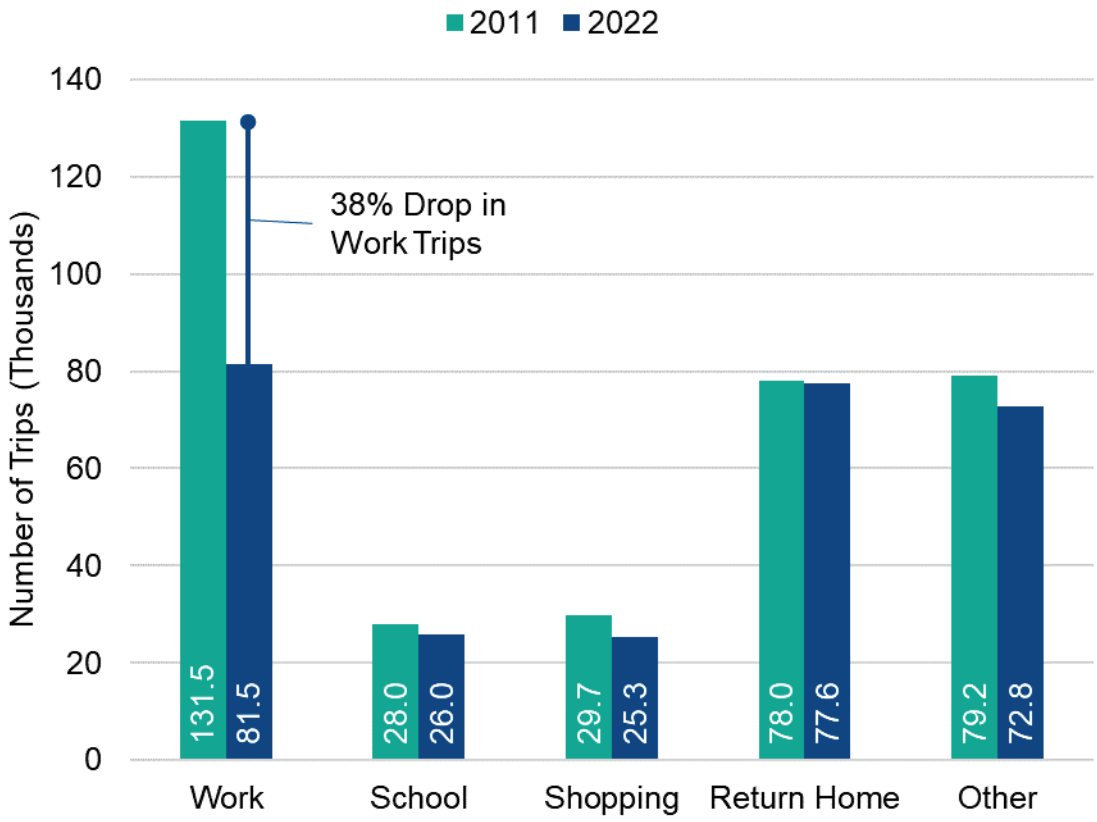


Source: 2011 and 2022 Origin-Destination Survey.

3.2.2 Downtown-Oriented Commuting Trips

Since 2011, daily trips to the downtown core have decreased due to a reduction in work trips, while trip numbers have remained relatively stable for all other purposes, as shown in Exhibit 3.9. Daily commuting trips to the downtown core coming from Kanata/Stittsville, Orleans, South Gloucester/Leitrim or Riverside South/Findlay Creek decreased by over 51% between 2011 and 2022. Daily transit commuting trips from the same areas dropped by almost 70%. However, there is evidence that travel to the downtown is continuing to rebound since the 2022 data was collected, as more people return to the office.

Exhibit 3.9: Daily Downtown-Oriented Trips by Purpose (2011-2022)



Source: 2011 and 2022 Origin-Destination Survey.

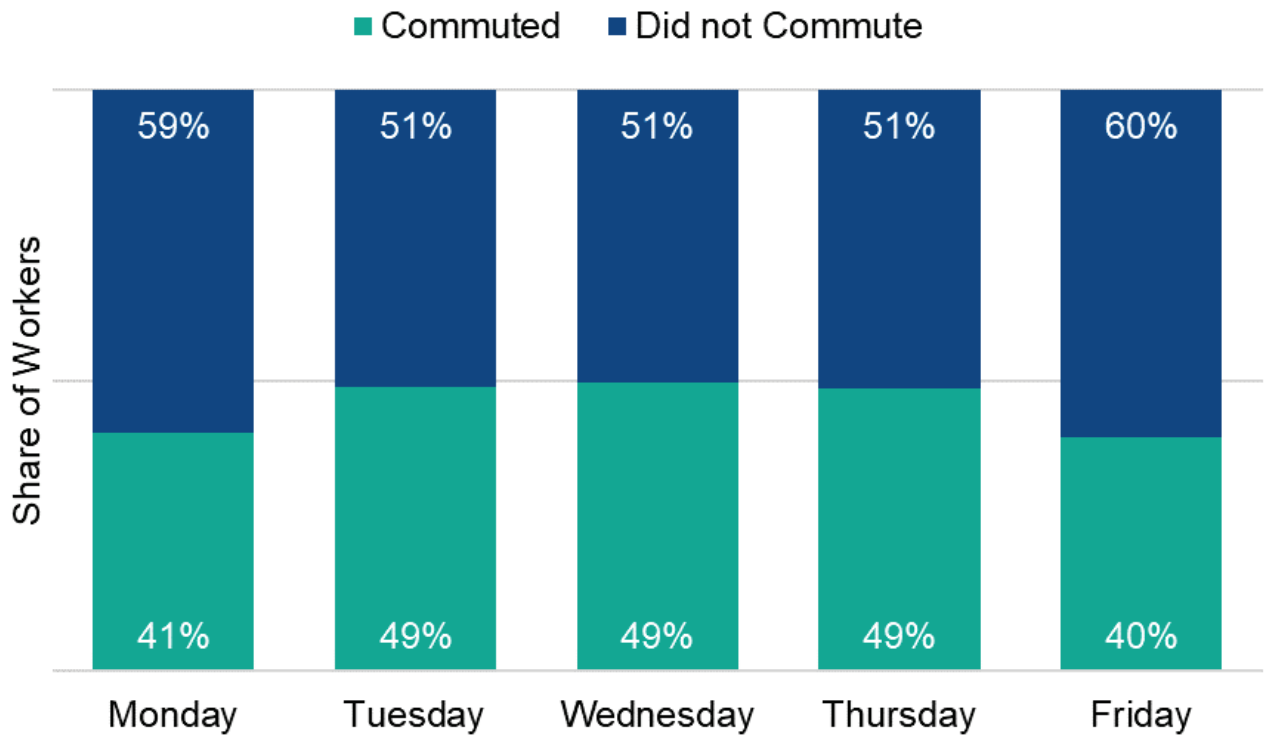
3.3 When Are People Travelling?

Changes in work patterns such as hybrid work and working from home have also affected when people make trips – both throughout the week, as well as throughout the day.

3.3.1 Day of Week

With the increase in hybrid work, some people have more flexibility on which days they travel to the office. As a result, the number of commuting trips varies by day of week. As shown in Exhibit 3.10, there are more commuting trips in the middle of the week compared to Monday and Friday. Exhibit 3.10 captures all workers who live or work in Ottawa.

Exhibit 3.10: Commuting Trips to Work by Day of Week (2022)



Source: 2022 Origin-Destination Survey.

3.3.2 Time of Day

The duration of the morning and afternoon peak periods is largely unchanged from 2011. However, there are differences in the magnitude and shape of the peaks, especially for different trip purposes and modes. For this report, the term peak period refers to a period where travel demand is greater than the daily (5:00 a.m. – 12:00 a.m.) average.[46]

Exhibit 3.11 shows the distribution of trip departure times throughout the day. Both the morning and afternoon peaks have become more pronounced, shortening by about 15 minutes compared to 2011. The magnitudes of the peak hours have also increased since 2011. Additional trends were as follows:[47]

[46] The 12:00 a.m. – 4:00 a.m. time frame was excluded as less than 3% of trips occur during this period.
[47] Peak departure times may not reflect when the transportation system is most heavily used. For the analysis, departure times were rounded down to 15 minutes intervals. In the exhibits, trip departure times

- The morning peak departure period was between 6:30 – 9:00 a.m. in 2011. In 2022, the equivalent period was between 6:45 – 9:00 a.m., reflecting a later start to the morning peak period.
- The afternoon peak departure period was 1:45 – 6:45 p.m. in 2011. In 2022, the equivalent period was between 1:45 – 6:30 p.m., reflecting an earlier end to the afternoon peak period.
- Trips departing during the peak periods comprised over 60% of trips in both 2011 and 2022.
- Between 6:45 – 9:00 a.m., there were 496,400 trips in 2011, decreasing by 28,500 trips (6%) to 467,900 trips in 2022. This decrease is primarily from a reduction in work commuting trips, which decreased by 77,000 trips (31%). This was partially offset by increases in non-commuting trips such as shopping.
- In the midday period (9:00 a.m. – 1:45 p.m.), there were 525,000 trips in 2011, increasing by 44,700 trips (9%) to 569,700 trips in 2022.
- In the morning peak, the hour with the most trip departures has shifted from 7:30 - 8:30 a.m. in 2011 to 7:45 – 8:45 a.m. in 2022. The number of trips in the peak morning hour decreased marginally.
- In the afternoon peak, the hour with the most trip departures has also shifted to a later time, from 3:15 – 4:15 p.m. in 2011 to 3:45 – 4:45 p.m. in 2022. Unlike the morning, afternoon peak hour trips increased by about 5%. In contrast to 2011, the highest hourly trip departures in 2022 were in the afternoon, not the morning.
- Most trips to work departed between 7:15 – 8:15 a.m. in both 2011 and 2022. However, there were 30% fewer trips in 2022, likely due to increased work-from-home.
- Between 1:45 – 6:30 p.m., there were over 1,032,700 trips in 2011, increasing by 58,900 trips (6%) to 1,091,600 trips in 2022.

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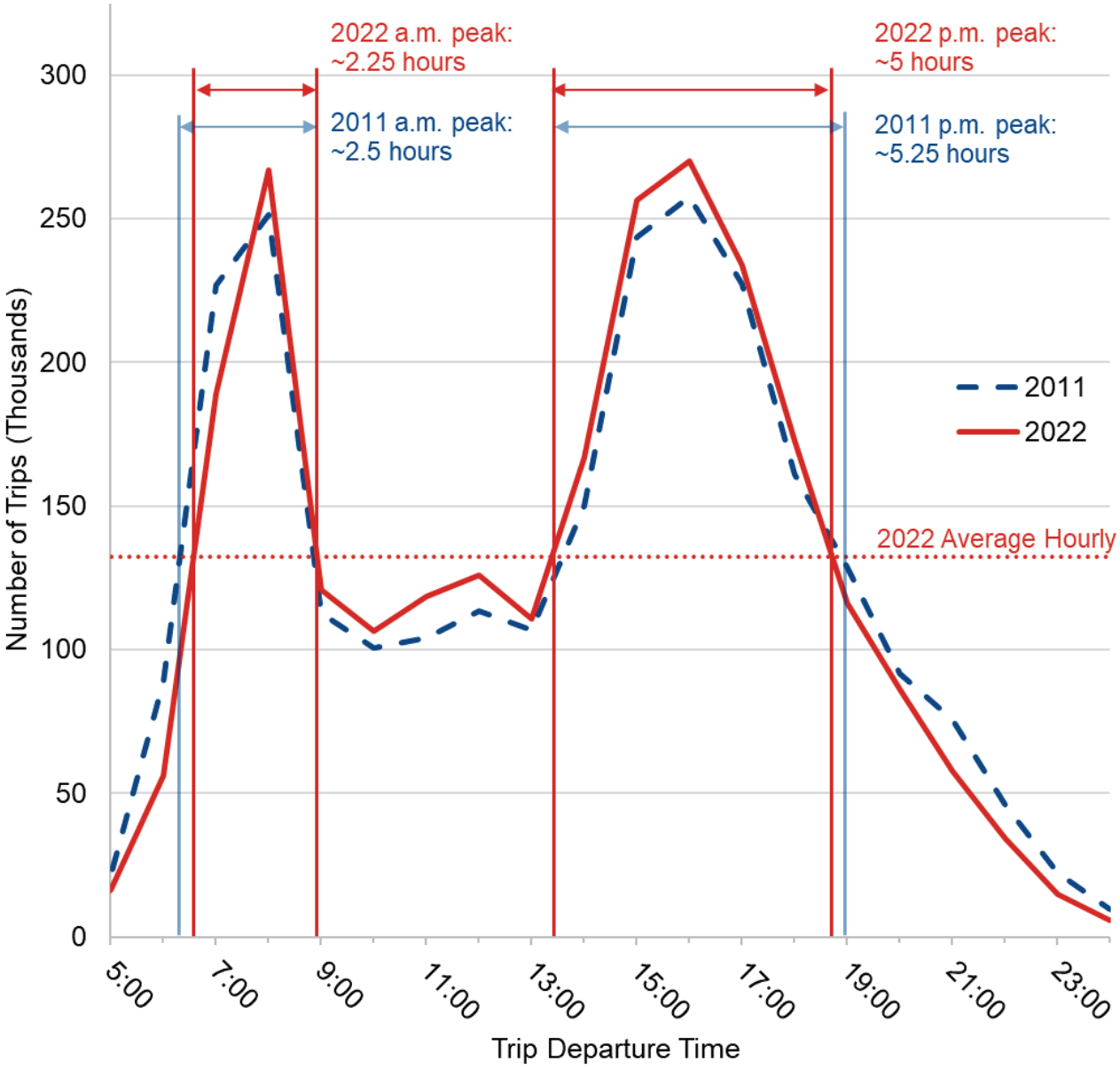
were further rounded to the departure hour for simplification. For example, a trip departing at 7:53 a.m. was analyzed as a trip departing at 7:45 a.m. and shown in the exhibit as a trip departing at 7:00 am.

Exhibit 3.11: Trip Departures by Time of Day (2011-2022)



Source: 2011 and 2022 Origin-Destination Survey.

Travel by Time of Day by Mode

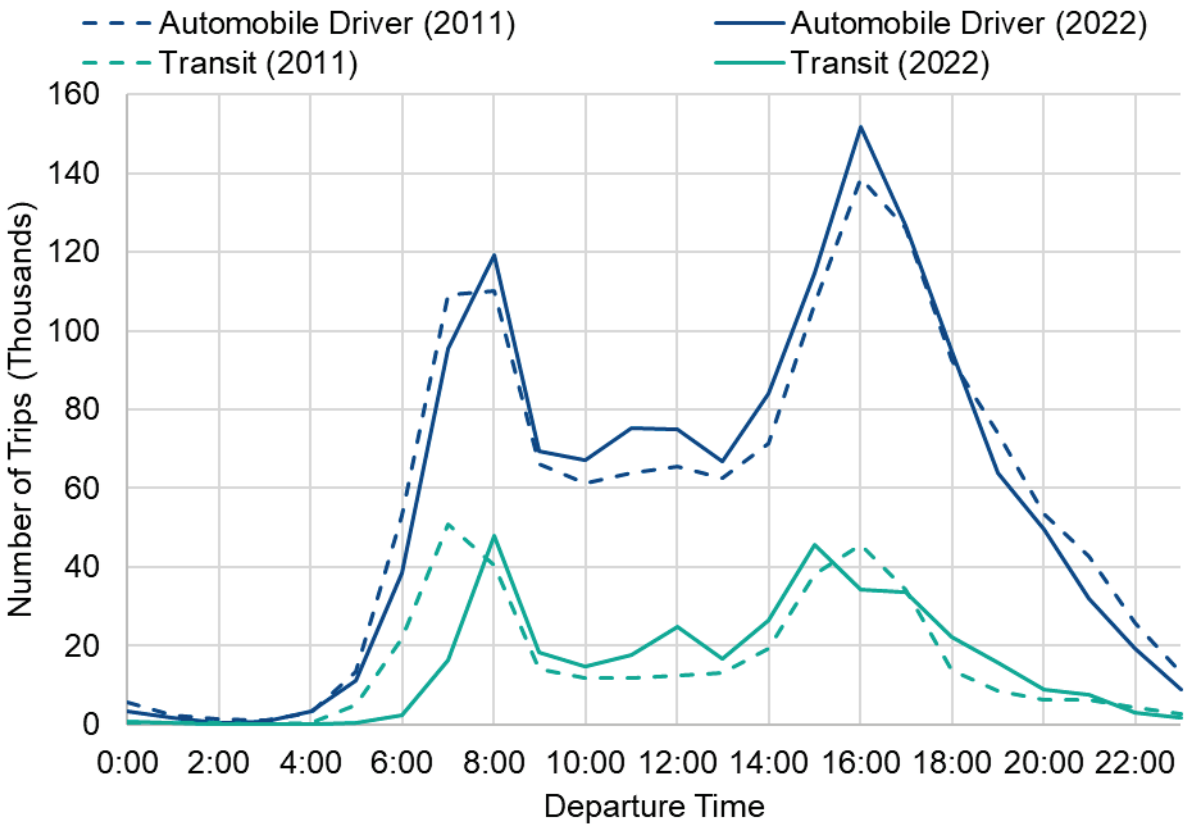
There have also been changes to departure times by mode, as shown in Exhibit 3.12. The peak departure time for transit trips in the morning has shifted later from 7:00-8:00 a.m. in 2011 to 8:00-9:00 a.m. in 2022. In the afternoon, the peak departure time for transit has shifted earlier from 4:00-

5:00 pm to 3:00-4:00 p.m. This is likely due to the reduced proportion of work trips using transit and a higher proportion of trips for school and other purposes, as discussed in Section 3.1. In the morning peak period, there were 96,100 transit trips in 2011, decreasing by 40,900 trips (43%) to 55,300 trips in 2022.

Similar to 2011, there are more trips by driving in the afternoon than in the morning, and the busiest hour of driving activity also occurs in the afternoon. The morning peak period for auto driver trips has become more pronounced, with the number of auto trips declining by 11% during the morning peak period but increasing by 2% during the morning peak hour. This suggests that auto driver trips are now more concentrated during the peak hour than in previous years. In contrast the number of auto trips during the afternoon peak period has increased by 8% compared to 2011, and the number of auto driver trips during the afternoon peak hour has also increased by 8%.

From the 2023 Commuter Attitudes Survey, congestion appears to be playing a role in when drivers choose to depart. In the morning, the survey found that 45% of drivers leave for work earlier than their preferred time and 11% leave later to avoid congestion. In the afternoon, the survey found that 23% of drivers leave earlier than their preferred departure time and 17% leave later.

Exhibit 3.12: Trip Departures by Time of Day by Mode (2011-2022)

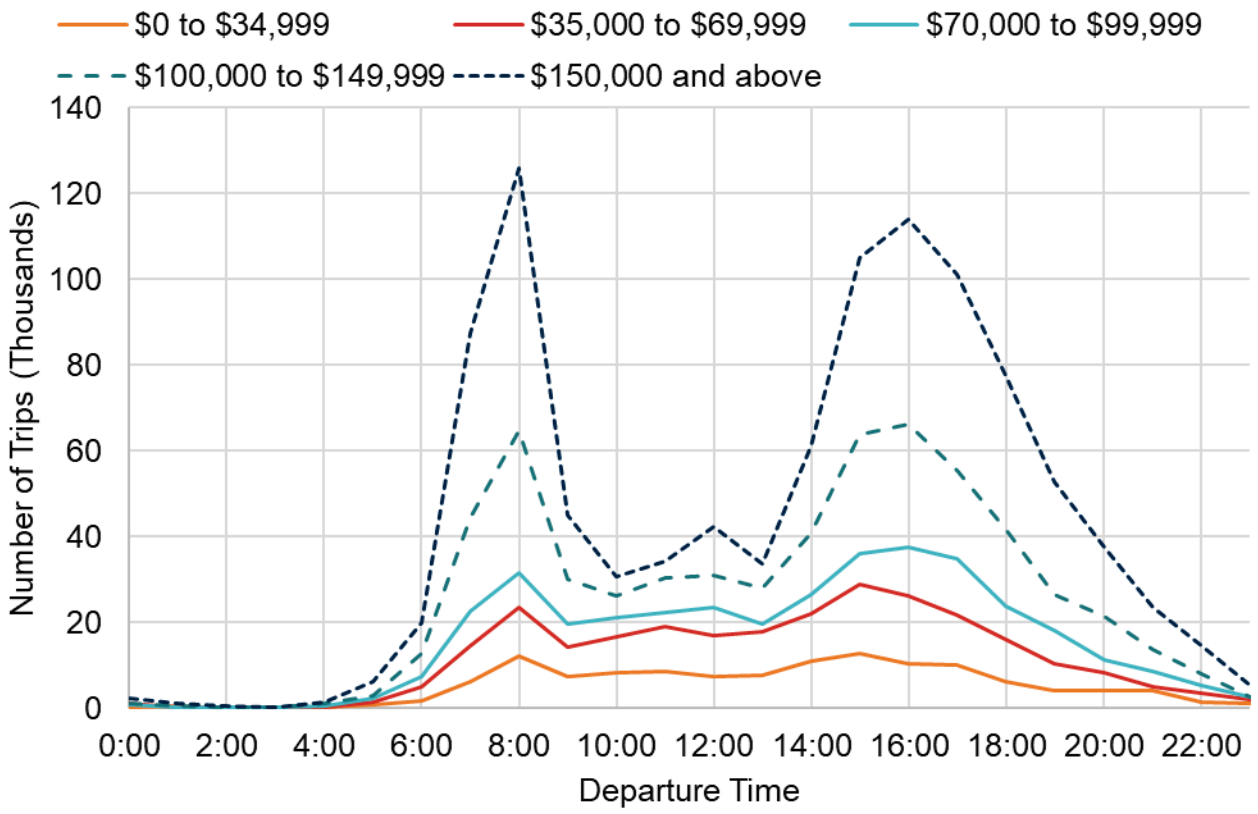


Source: 2011 and 2022 Origin-Destination Survey.

Travel by Time of Day by Income

Time of travel also varies by income, as shown in Exhibit 3.13. The morning and afternoon peaks are much more pronounced for higher income households whereas lower income households have more consistent transportation demand throughout the day.

Exhibit 3.13: Trip Departures by Time of Day by Household Income (2022)



Source: 2022 Origin-Destination Survey.

3.4 How Are People Travelling?

The way people travel is influenced by a variety of factors, including the availability and attractiveness of each mode, as well as the characteristics of the person making the trip. In this report, travel modes are grouped into walking,[48] cycling,[49] transit,[50] automobile driver, automobile passenger, and other.[51] Additional information on the mode groupings can be found in

[48] *Walking* includes trips using mobility aids.

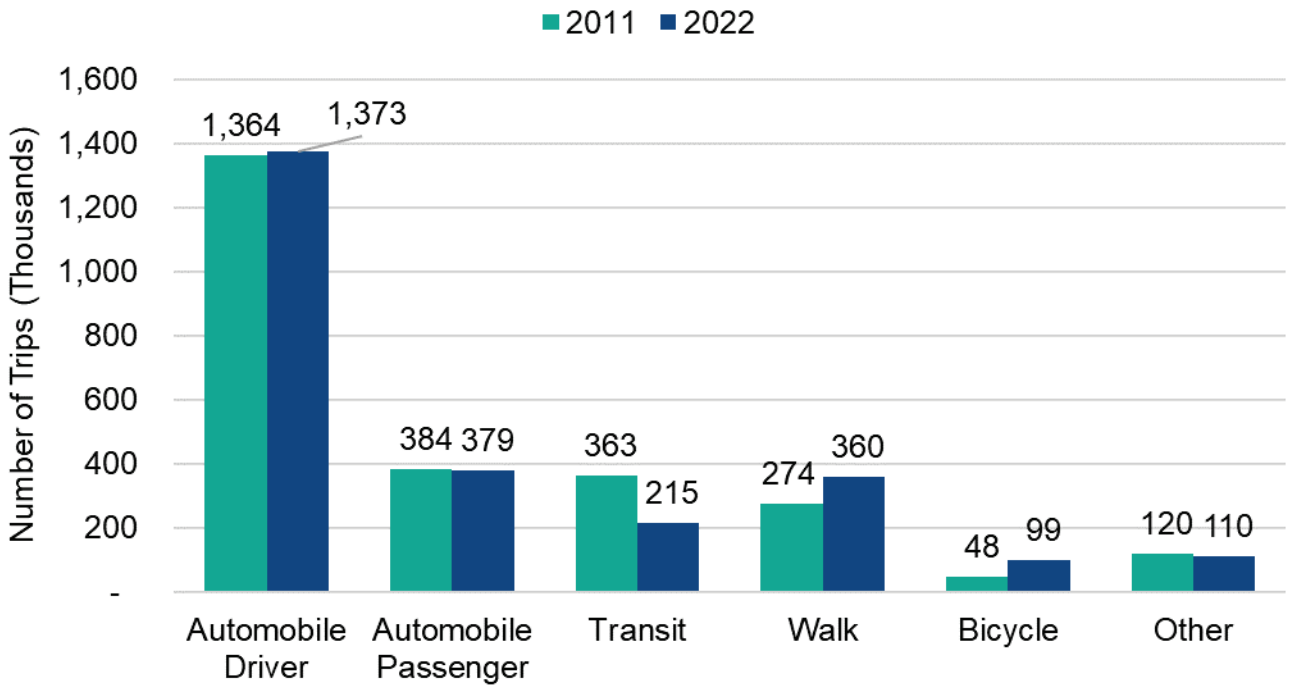
[49] *Cycling* includes trips using e-bikes and e-scooters.

[50] *Transit* includes trips using OC Transpo services including buses and the O-Train, as well as trips with the Société de transport de l'Outaouais (STO).

[51] *Other* includes trips using a school bus, taxi, ride-hailing company, intercity bus or train, Para Transpo services, motorcycle or moped, airplane, ferry, or “other” unspecified mode. School bus trips are 81% of these "other" daily trips, taxi, and ride-hailing account for 14% of “other” trips.

Appendix A. The number of trips by each mode in 2011 and 2022 are presented in Exhibit 3.14, showing significant increases for walking and cycling and decreases for transit and other. A more detailed table summarizing the number of trips by mode is included in Appendix C. Daily mode shares are for trips starting or ending in Ottawa.

Exhibit 3.14: Daily Trips by Mode (2011-2022)



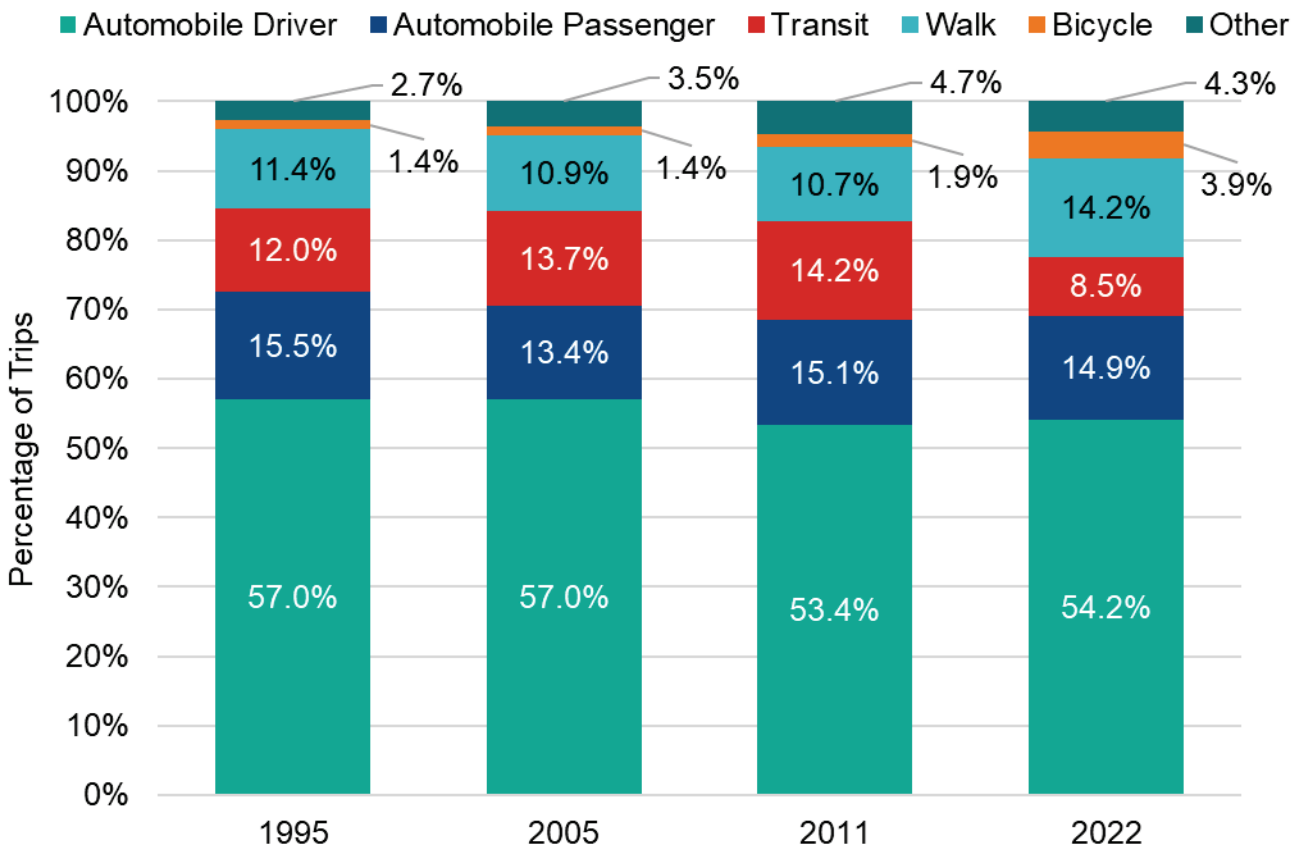
Source: 2011 and 2022 Origin-Destination Survey.

3.4.1 Mode Share Over Time

Compared to 2011, the share of transit trips in Ottawa has decreased, similar to post-pandemic transit trends across North America. The share of active transportation trips (walking and cycling) has increased significantly, and driving has remained relatively stable. As shown in Exhibit 3.15, the proportion of trips by auto driver was 54.2% in 2022, up marginally from 53.4% in 2011. Over this same time, the share of trips by transit decreased from 14.2% to 8.5%. In contrast, the walking mode share increased from 10.7% to 14.2%, while the cycling mode share doubled from 1.9% to 3.9%. The results suggest that e-bikes and e-scooters account for 9% and 2%, respectively, of trips in the “cycling” category in 2022. It is

noteworthy that the increase in the cycling mode share is largely independent of the growth in shorter trips; for trips under 5 km, cycling mode share shows a similar increase from 2.8% to 5.3%.

Exhibit 3.15: Daily Mode Share Over Time (1995-2022)[52]



Source: 1995, 2005, 2011, and 2022 Origin-Destination Survey.

With regards to the morning peak period (6:45-9:00), the most significant change from 2011 is a decrease in transit mode share from 19.4% to 11.8%. This difference is largely offset by increases in the active modes, with walking increasing from 9.9% to 13.9% and cycling increasing from 2.4% to 4.9%.[53]

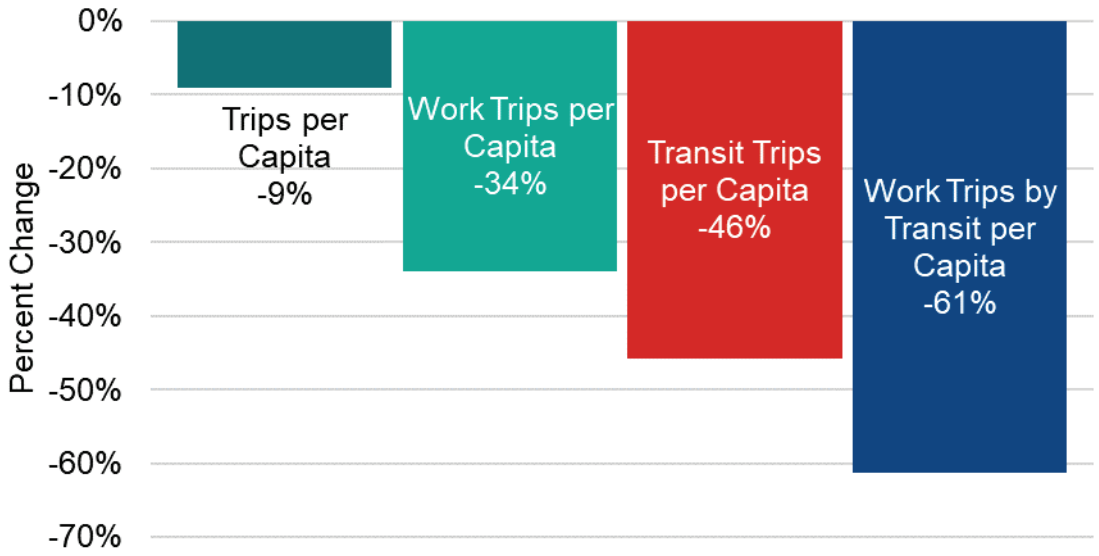
[52] The 1995 and 2005 surveys only included those 11 and older, whereas the more recent surveys included those older than the age of 5. As a result, this may inflate the share of automobile trips for the older surveys.

[53] These numbers are slightly different from the 2013 TMP resulting from the inclusion of *Other* trips as well as possible methodological differences.

There are several possible reasons for the slower transit recovery. In particular, many people who took transit downtown (especially for work) prior to the pandemic no longer do so. There were 57,900 fewer daily transit trips in 2022 compared to 2011, with 66% of this reduction coming from work trips as opposed to other trip purposes (excluding return home trips). As shown in Exhibit 3.16, the number of work trips per Ottawa resident taken by transit decreased by 61% between 2011 and 2022, which is significantly more than the decrease in transit trips (-46%), work trips (-34%), and daily trips (-9%). This suggests that the combined effect of the pandemic and the trend towards working from home have had a disproportionate impact on work trips by transit. To further support this: In 2011, transit mode share was 49% for morning peak period work trips to downtown from other parts of the city. Almost half of these trips are no longer occurring, by any mode. For the remaining trips, transit mode share dropped to 32%. According to the Commuter Attitudes Survey, 73% of National Capital Region commuters who shifted away from public transit are now driving alone; walking, cycling and carpooling account for another 8-9% each.

Further discussion on transit challenges is provided in Section 4.3.

Exhibit 3.16: Change in Daily Trips per Capita (2011-2022)



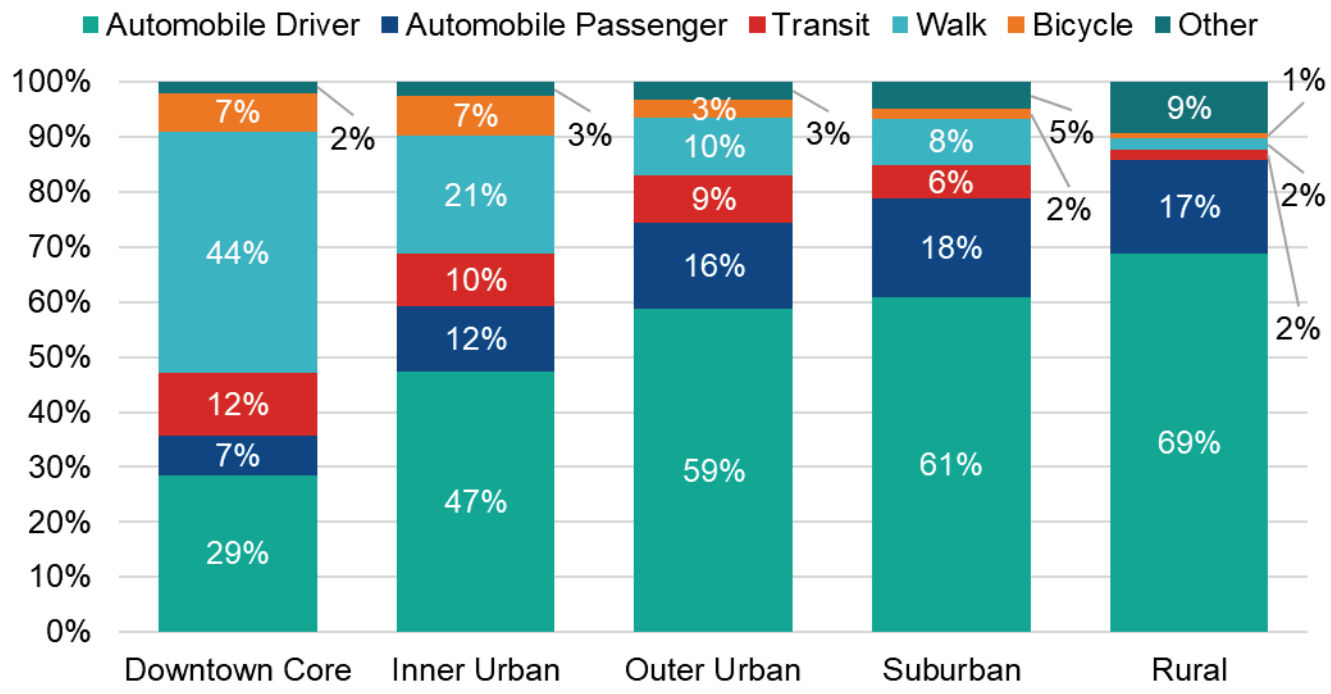
Source: 2011 and 2022 Origin-Destination Survey.

From the 2023 Commuter Attitudes Survey, the two most common reasons for using a particular mode of travel were that it was the most convenient or had the shortest travel time. For people in the downtown and inner urban areas, other common reasons were that their chosen mode was less expensive or more relaxing.

3.4.2 Mode Share by Area

Exhibit 3.17 focuses on mode share by trip origin. In general, the proportion of trips by driving increases away from the downtown core, while transit, walking, and cycling increase towards the downtown core. Since 2011, the auto driver mode share has decreased in the downtown core and inner urban area and increased slightly in other areas. Of trips beginning in the downtown core and inner urban area, less than 50% were by driving in 2022.

Exhibit 3.17: Daily Mode Share by Trip Origin (2022)

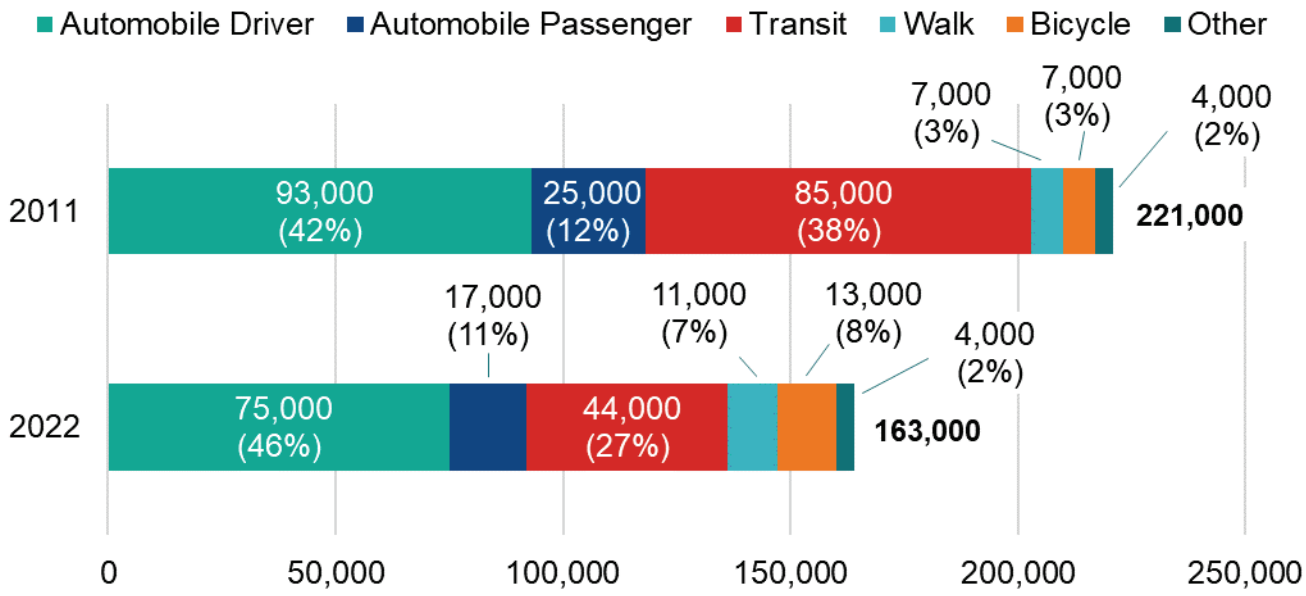


Source: 2022 Origin-Destination Survey.

Daily trips to the downtown core (originating from outside of the core) have decreased from 221,000 trips in 2011 to 163,000 trips in 2022, with the largest decline in transit trips, and gains in walking and cycling trips. As

shown in Exhibit 3.18, the share of driving, walking, and cycling trips have increased by 4%, 4%, and 5%, respectively, while the share of transit trips has decreased by 11%.

Exhibit 3.18: Daily Mode Share for Trips Destined to the Downtown Core from Outside of the Downtown Core (2011-2022)

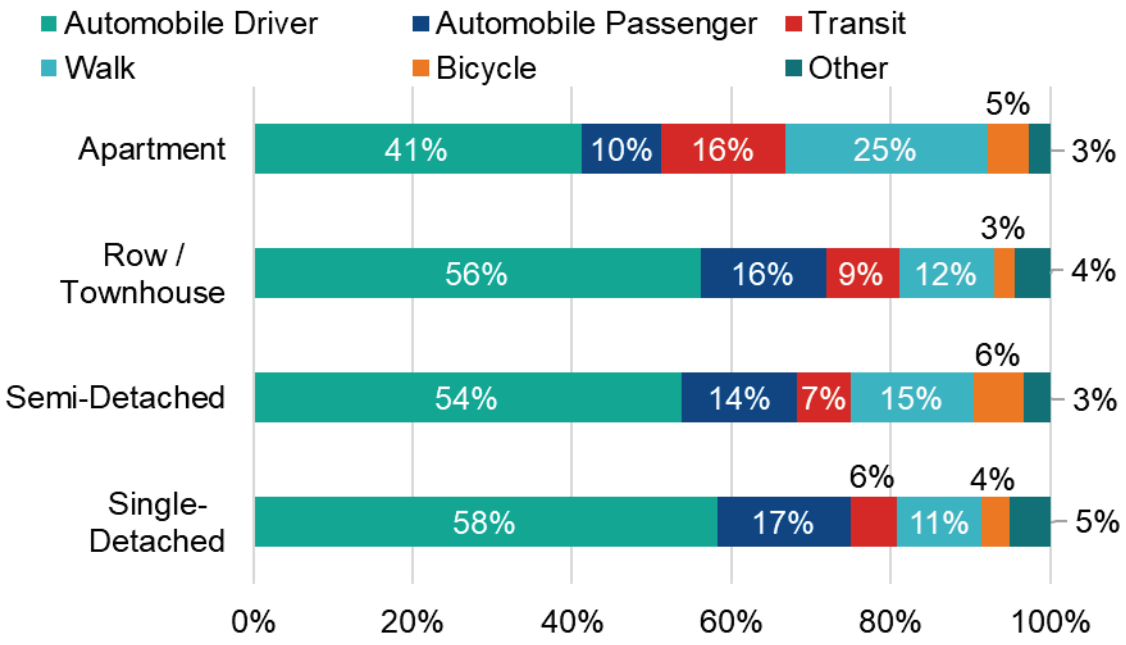


Source: 2011 and 2022 Origin-Destination Survey.

3.4.3 Mode Share by Household Characteristics

Dwelling type is correlated with mode choice. As shown in Exhibit 3.19, people living in an apartment are less likely to use an automobile than people living in other dwelling types. Those living in an apartment are also twice as likely to walk or use transit. Apartments are much more prevalent in the downtown and inner urban areas where vehicle ownership is lower and where land use patterns better enable shorter trips that can be made by sustainable modes.

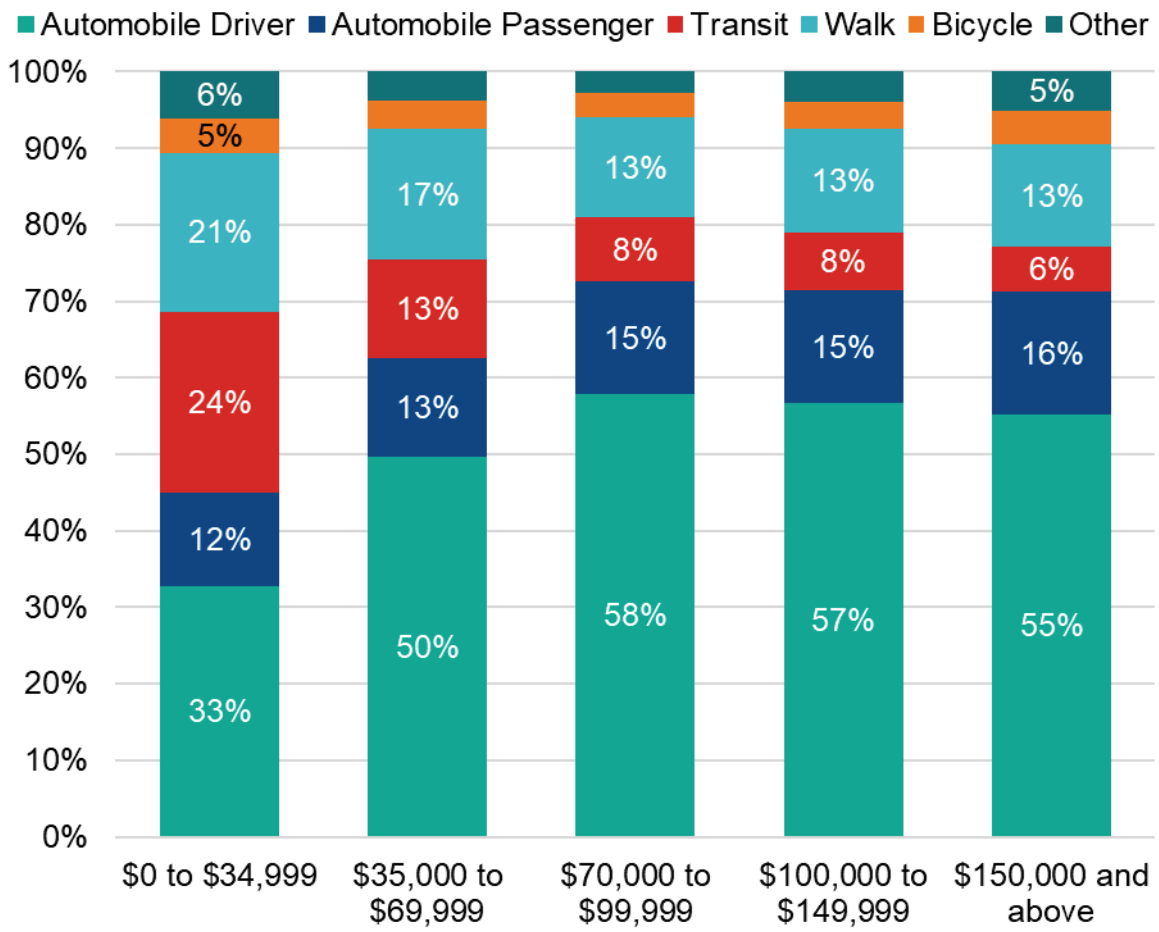
Exhibit 3.19: Daily Mode Share by Dwelling Type (2022)



Source: 2022 Origin-Destination Survey.

Income is another factor correlated with mode choice. Exhibit 3.20 shows that people living in households making less than $35,000 per year are four times more likely to take transit and almost 50% more likely to use active modes than those living in households earning more than $150,000 per year. In contrast, people in the three highest income groups are 60% more likely to use an automobile as a driver or passenger than the lowest-income group. Post-secondary students comprise almost a quarter of Ottawa residents in the lowest income category, compared to less than 10% for higher income categories, highlighting the importance of transit and active modes for students.

Exhibit 3.20: Daily Mode Share by Household Income (2022)

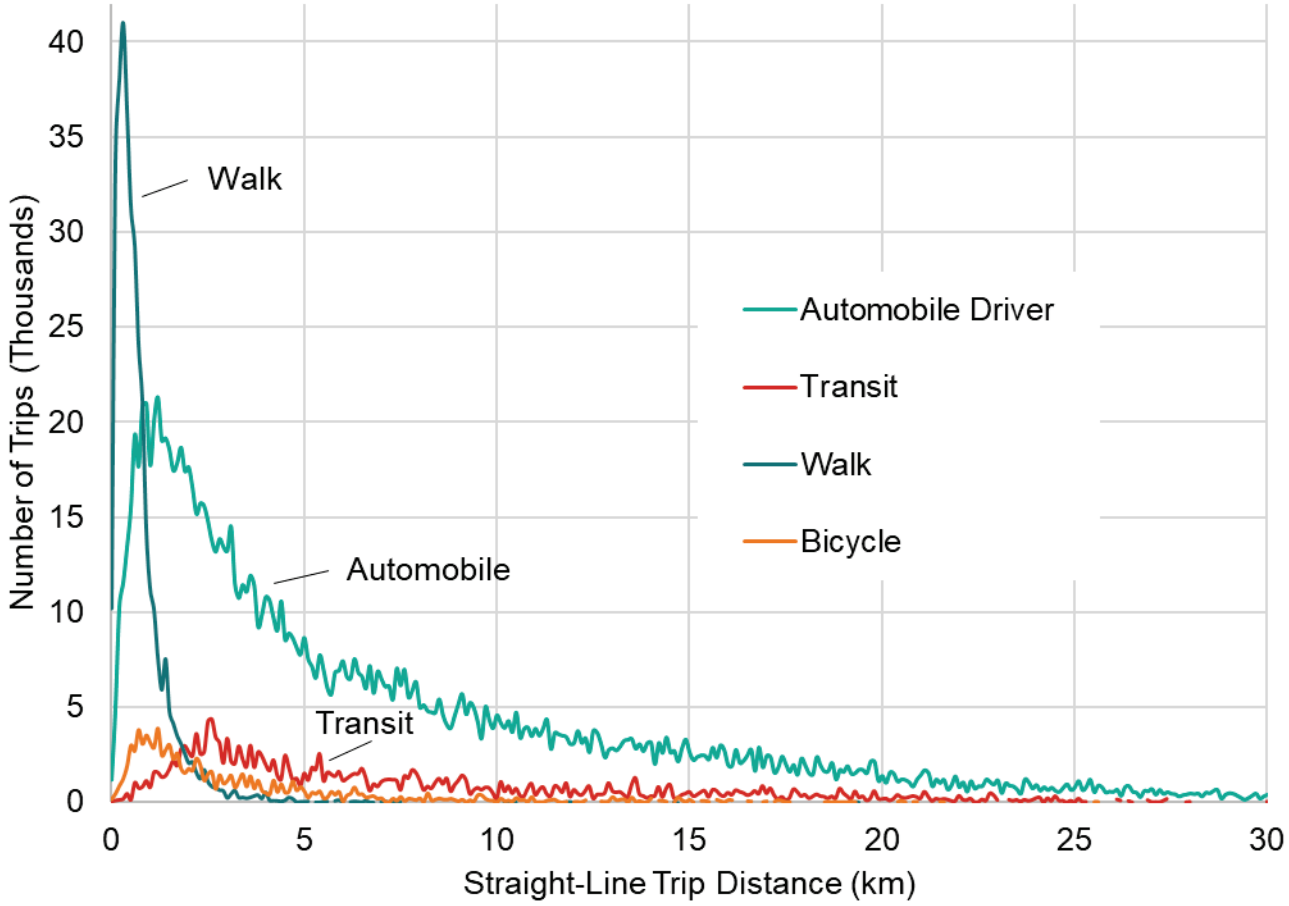


Source: 2022 Origin-Destination Survey.

3.4.4 Mode Share by Distance

As discussed in Section 3.2.1 and illustrated in Exhibit 3.21, most trips are short, regardless of mode, with a median trip distance of 3.4 km. Walking and cycling are used more frequently for shorter trips, while transit tends to be used more for longer trips. Driving is used for trips of all distances.

Exhibit 3.21: Daily Trips by Mode by Distance (2022)



Source: 2022 Origin-Destination Survey.

Exhibit 3.22 provides additional information on trip distance by mode. In general, driving and transit have a similar trip length distribution, with transit trips being slightly longer. The results suggest there is potential to convert a significant number of automobile trips to active modes. Twenty-six percent of automobile driver trips and 32% of automobile passenger trips, a total of almost 460,000 daily trips, are less than 2.1 km straight-line trip distance, the median trip distance for bike trips. E-bikes and e-scooters tend to be used for longer trips than regular bicycles. The median e-bike and e-scooter trips were 2.9 km and 2.4 km,[54] respectively.

[54] Using straight-line distances. In the Electric Kick Scooter Pilot discussion in Section 2.4, the average e-scooter trip distance was noted as 2.1 km. This figure only considers e-scooter trips that are part of the

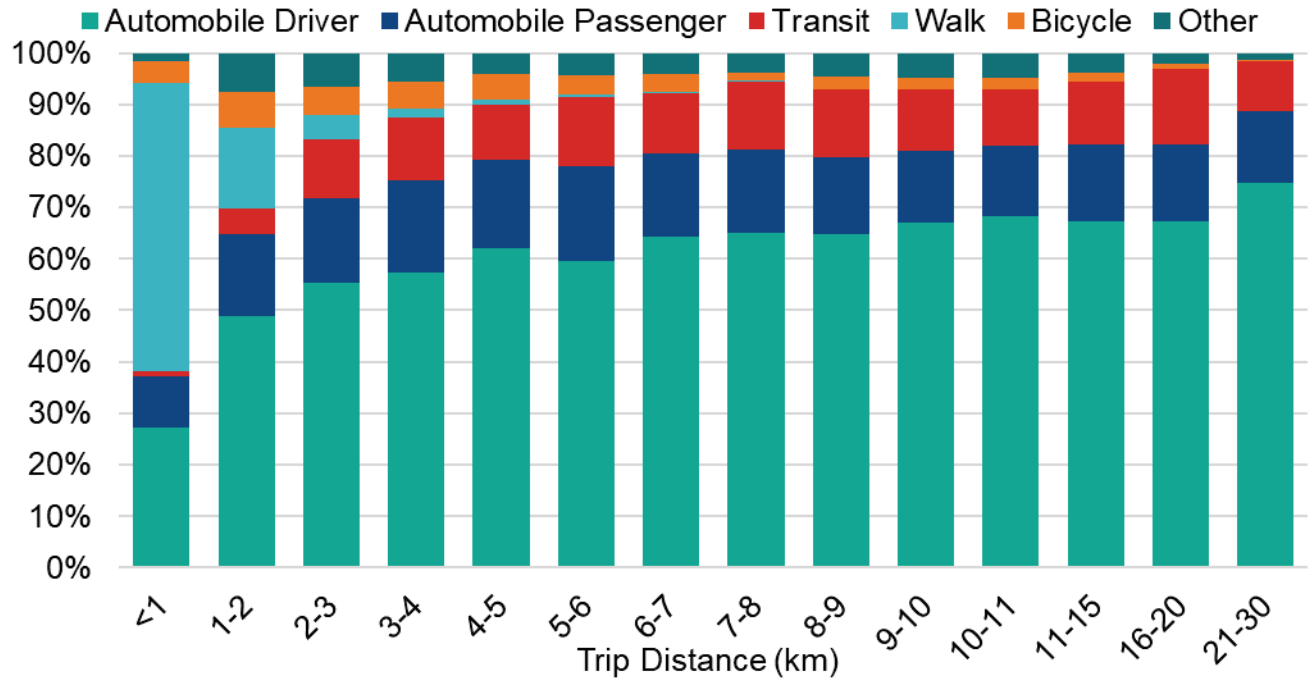
Exhibit 3.22: Median and 80th Percentile Straight-Line Trip Distance by Mode (2022)[55]

	Walk	Bicycle	Automobile Driver	Transit
Median: 50% of Trips Are Shorter Than…	0.5 km	2.1 km	4.5 km	5.6 km
80th Percentile: 80% of Trips Are Shorter Than…	1.0 km	4.8 km	12.5 km	13.0 km

Source: 2022 Origin-Destination Survey.

Exhibit 3.23 shows that transit maintains a relatively stable mode share for trips from two to 20 km in length. Similarly, the mode share for auto passenger trips is consistent for all trip lengths. Walking has the highest mode share for trips less than 1 km. Cycling use decreases slightly with distance and tapers off after 20 km. Automobile driver mode share increases as trip distance increases.

Exhibit 3.23: Daily Mode Share by Distance (2022)



Source: 2022 Origin-Destination Survey.

shared e-scooter pilot, which can only be operated in specific areas. E-scooter trips reported in the OD Survey include both shared and privately owned scooters.

[55] Based on the straight-line trip distance.

3.4.5 Trip Duration by Mode

Trips by all modes have an average duration of around 16 minutes, except for transit, which has an average duration of 45 minutes.[56] Transit also has the longest average trip distance, as discussed above. As shown in Exhibit 3.24, the share of transit trips for work and school purposes, relative to shopping and other purposes, is much higher than for other modes. The average trip durations for work and school trips are higher than for other purposes, and trips to work cover the longest distances on average. Trip distances by mode are further discussed in Section 3.4.4.

Exhibit 3.24: Trip Purpose by Mode (Daily Trips, 2022)

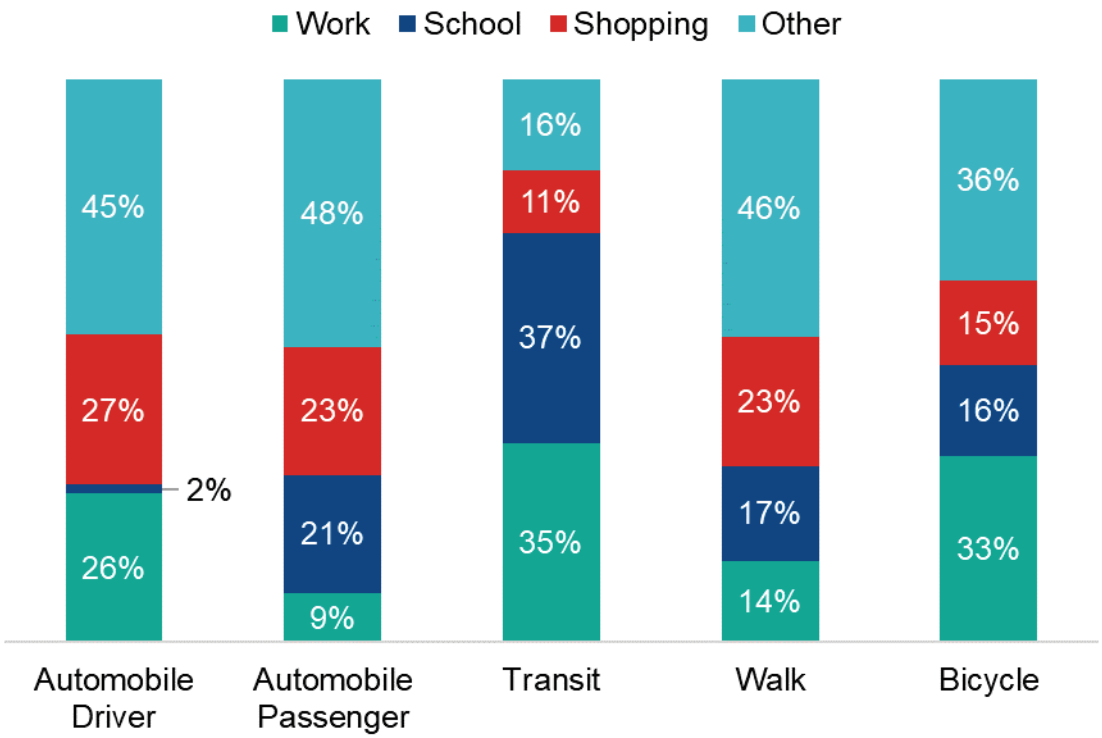
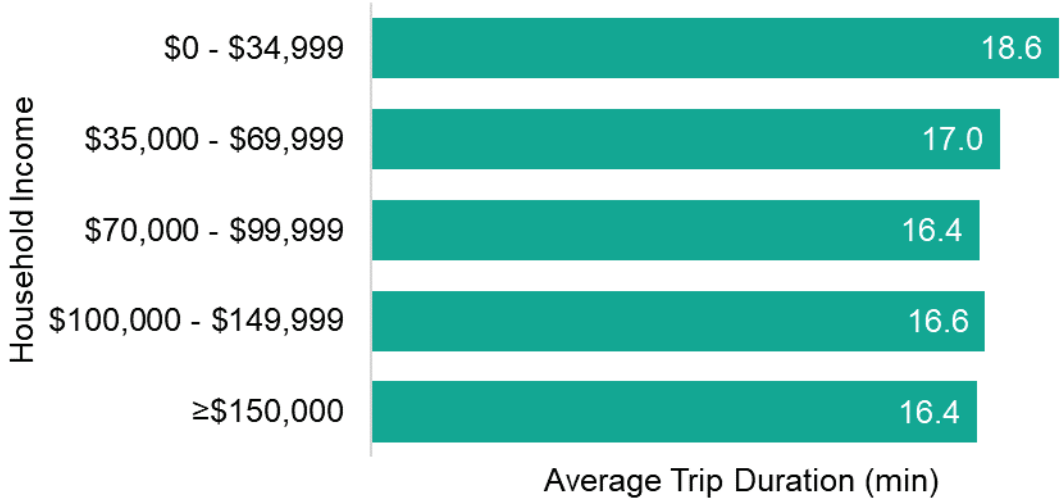


Exhibit 3.25 illustrates the average trip duration by income, for all modes combined. Individuals living in lower income households experience longer travel times on average, primarily due to higher transit use. These groups are four times more likely to use transit than individuals from the highest income households. Mode share by income is discussed in Section 3.4, and

[56] Trip durations in the 2022 OD Survey were estimated for each trip origin-destination pair using Google Ads Application Programming Interface (API). These may not correspond to the actual route that was taken for each trip.

the difference between automobile and transit travel times is discussed further in Section 4.2.

Exhibit 3.25: Average Trip Duration by All Modes by Income (2022)

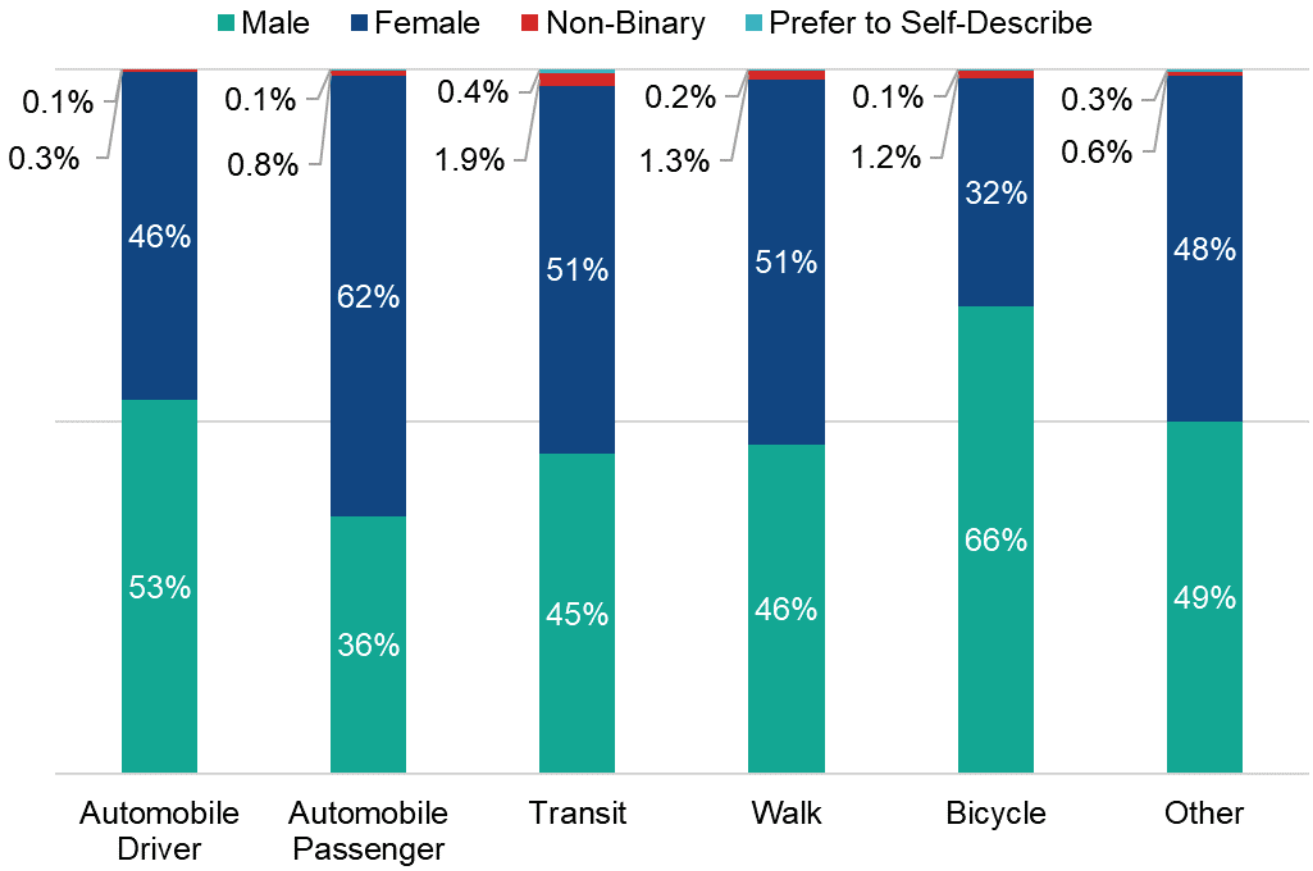


Source: 2022 Origin-Destination Survey.

3.4.6 Mode Share by Demographics

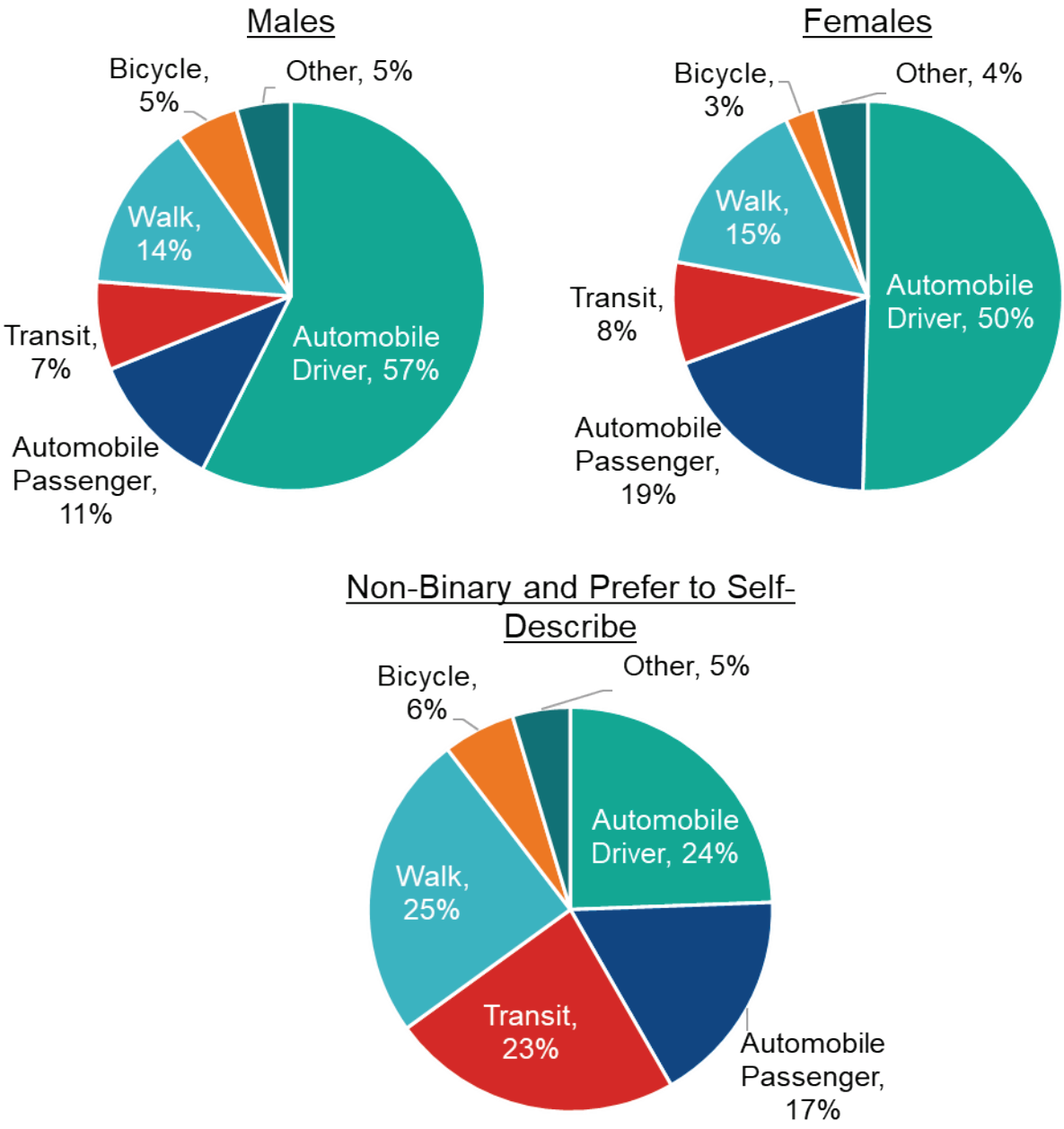
Exhibit 3.26 and Exhibit 3.27 show the relationship between gender and travel mode choice. Based on the 2022 survey results, males are more likely to drive than females, while females are more likely to be a passenger. Males are also more likely to cycle, while females are slightly more likely to walk and use transit. Males make 66% and 53% of all bicycle and automobile driving trips, respectively. Females make 62% of automobile passenger trips and 51% of both transit and walking trips. Meanwhile, those who identify as non-binary or prefer to self-describe are more than 60% less likely to use automobile modes and are more than twice as likely to take transit.

Exhibit 3.26: Gender Distribution by Mode for Daily Trips (2022)



Source: 2022 Origin-Destination Survey.

Exhibit 3.27: Daily Mode Share by Gender (2022)

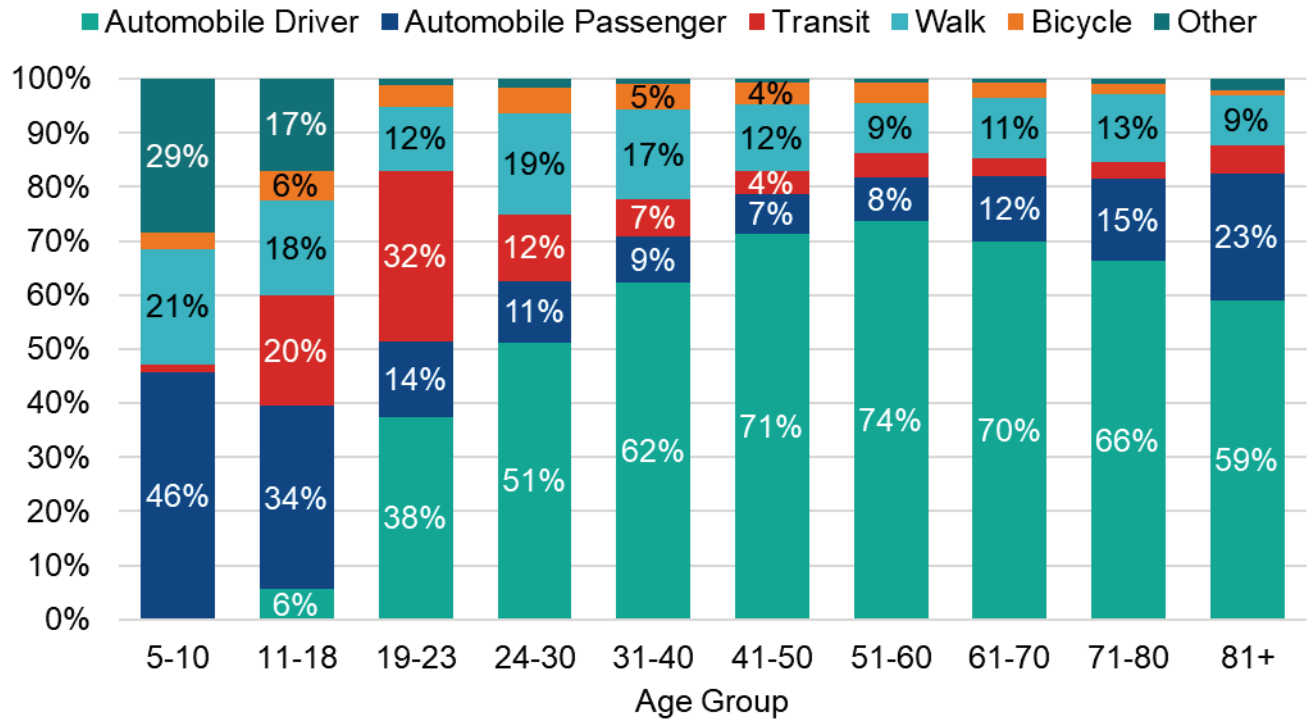


Source: 2022 Origin-Destination Survey.

Exhibit 3.28 illustrates how mode share varies with age. The most common travel modes for children under the age of 11 are automobile passenger, school bus (included in the “other” category), and walking (which includes strollers).

Young adults aged 19 to 23 have the highest transit mode share, using transit for almost a third of all trips. In addition, this age group completes more than half of their trips as either a driver or passenger. With each increasing age bracket, the share of automobile trips increases, before stabilizing in the 51 to 60 age bracket. Starting in the 61 to 70 age bracket, the share of passenger trips increases relative to driving. Cycling maintains a relatively stable mode share for those between the ages of 11 and 60. E-scooters were most popular with people aged 25 to 44.

Exhibit 3.28: Mode Share by Age (2022)



Source: 2022 Origin-Destination Survey.

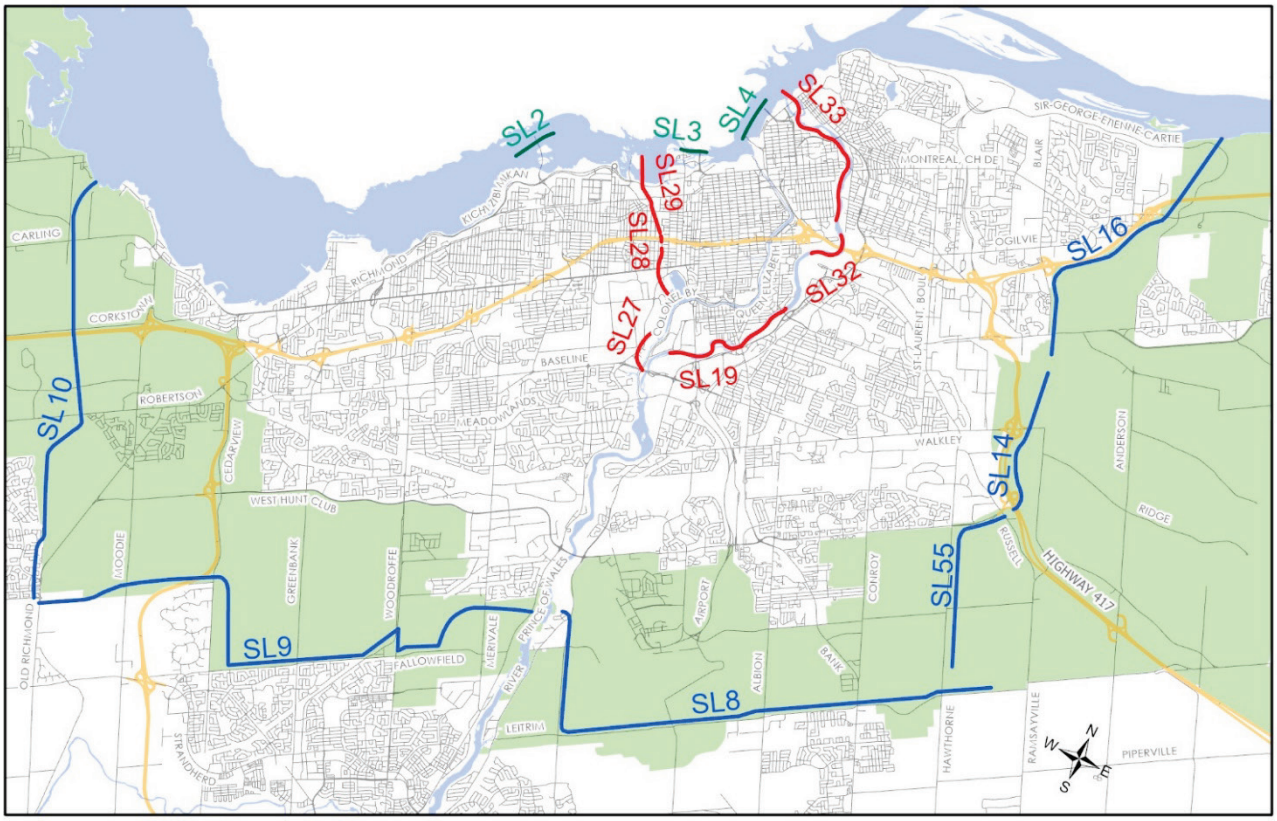
4 System Performance

This chapter discusses the performance of the transportation system in terms of travel demand and travel time.

4.1 Traffic Volumes

Exhibit 4.1 shows the screenlines[57] that are used to track and analyze traffic volumes in different areas of the city.

Exhibit 4.1: Ottawa Screenline System



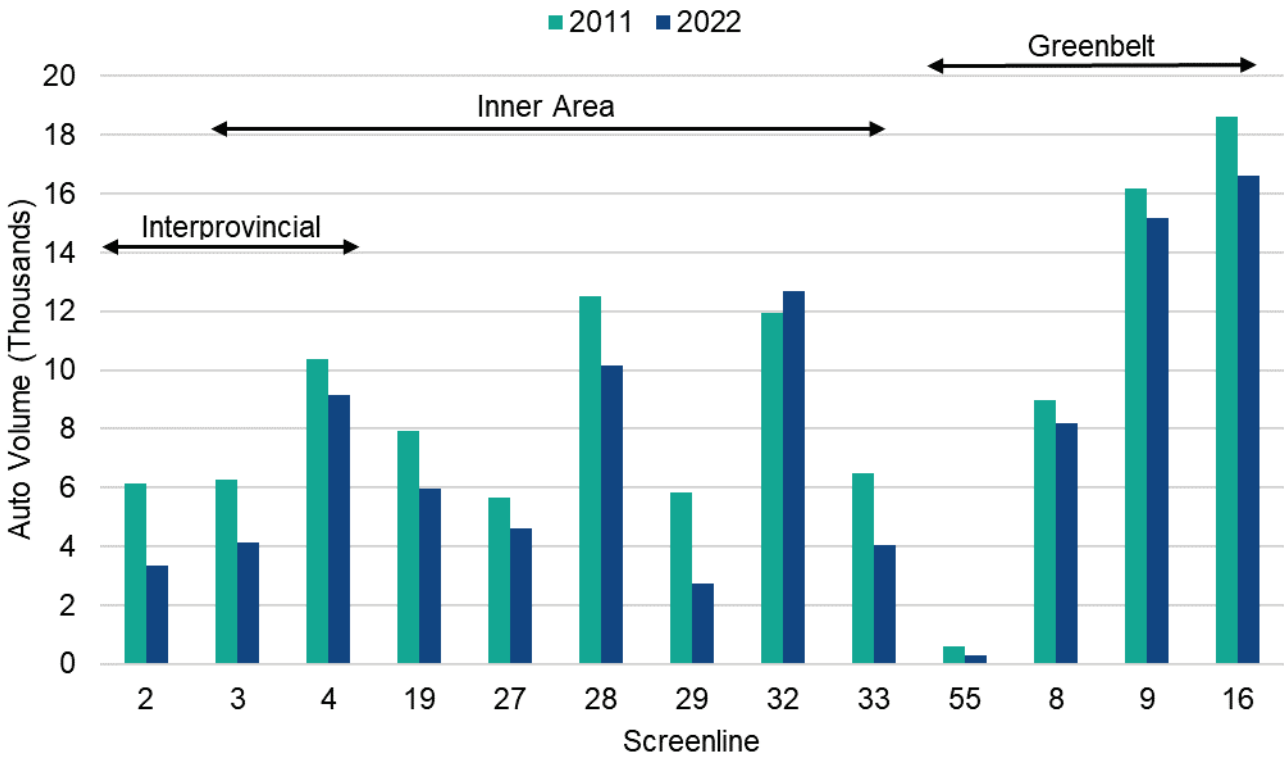
Source: City of Ottawa.

[57] The City regularly collects traffic data using traffic count stations located in strategic locations across Ottawa. These count stations are grouped together to form screenlines that capture traffic crossing key boundaries such as the Greenbelt or Ottawa River. Other screenlines exist but are not shown for simplicity.

As discussed in Section 3.3.2, the number of automobile trips in the morning peak period has decreased between 2011 and 2022. The City of Ottawa uses the morning peak period for network planning purposes, so this is an important indicator for the Transportation Master Plan update.

As shown in Exhibit 4.2, morning peak period automobile traffic heading inbound towards the downtown core has decreased at all of the interprovincial crossings (2, 3, and 4), at most locations entering the inner area (3, 4, 19, 27, 28, 29, 32, and 33), and at screenlines crossing the Greenbelt (8, 9, 16, and 55).[58]

Exhibit 4.2: Change in Morning Peak Period Automobile Trips Towards the Downtown



Source: 2011 and 2022 Screenline Traffic Counts.

Between 2022 and 2023, automobile traffic counts have increased by 11% on screenlines crossing the Greenbelt, and about 12% on screenlines entering the inner area.

[58] Screenlines 10 and 14 in the Greenbelt had data gaps so are not shown in Exhibit 4.2. Trucks and buses are not included since no data was available for 2011.

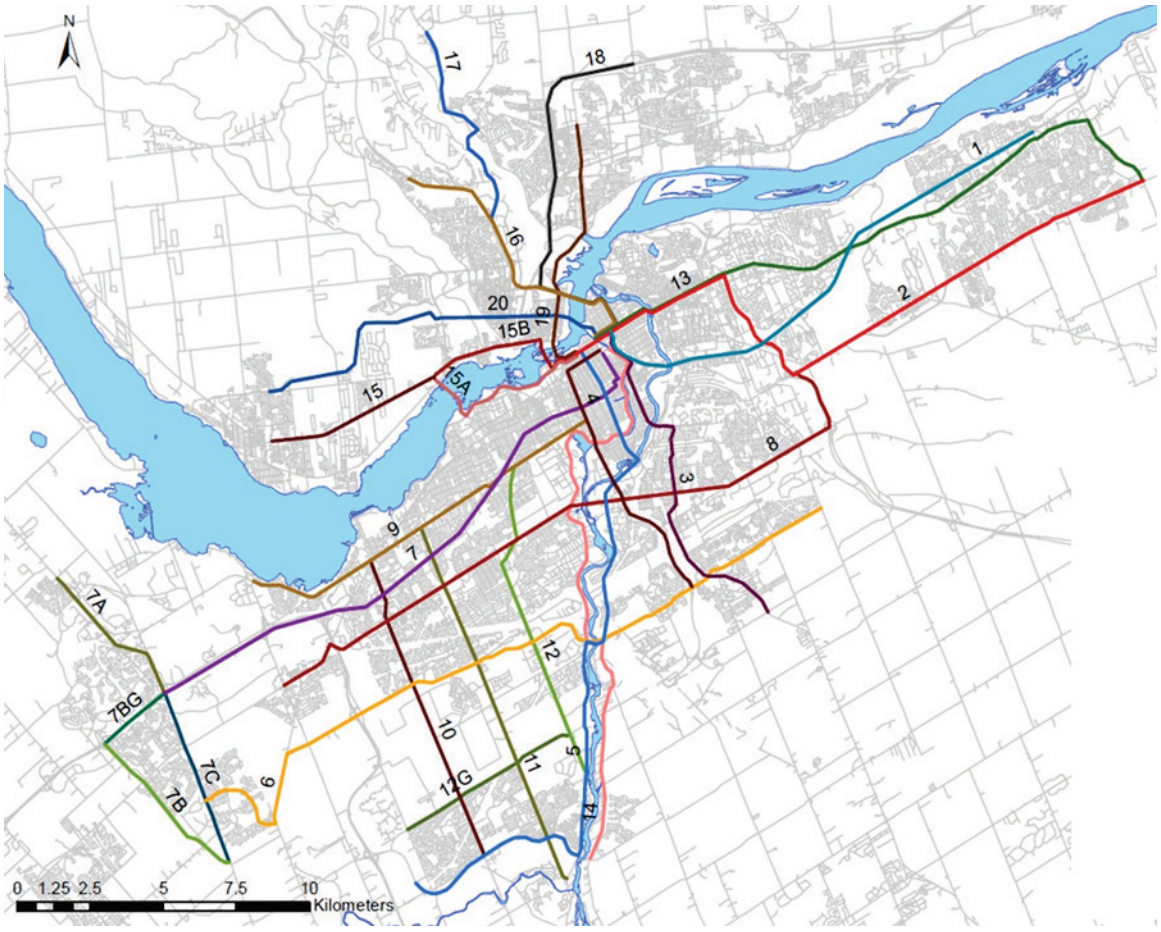
4.2 Travel Times

Travel times by automobile and transit are highly variable by time of day and area of the city.

4.2.1 Automobiles

Travel times[59] by automobile were obtained for various routes, as shown in Exhibit 4.3, for the months of September to December of 2019.

Exhibit 4.3: Selected Routes for Analysis of 2019 Travel Time Data

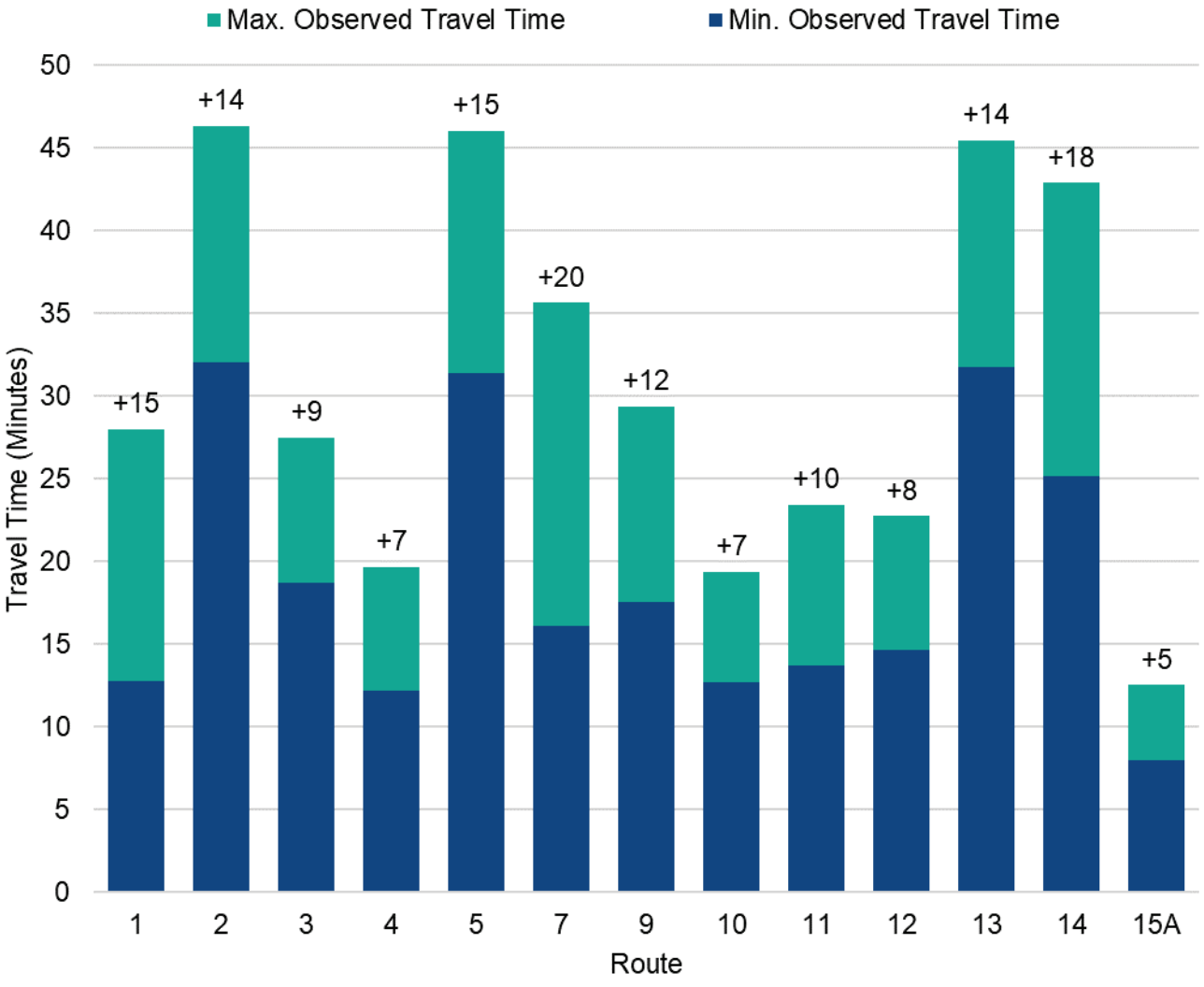


Source: City of Ottawa.

[59] Travel time data was obtained from HERE Global B.V. and based largely on GPS data for personal vehicles, i.e., navigation systems, fleet telematics systems and/or mobile devices. The data is provided in 15-minute intervals for weekdays.

As expected, automobile travel times increase during peak periods. As shown in Exhibit 4.4, select routes experience 5 to 20 minutes of additional travel time, or delay, at the busiest times of day. The route with the maximum observed delay was from Eagleson Road in Kanata to City Hall along Highway 417 (Route 7), such that driving this route at peak times can take more than twice as long compared to off-peak times. Automobile travel time variability can be caused by a wide range of factors including fluctuation in demand, traffic incidents, weather events, construction zones, and special events.

Exhibit 4.4: Variation in Automobile Travel Times for Select Routes (2019)



Source: 2019 HERE Global B.V.

4.2.2 Transit

When travelling between the same origin and destination, door-to-door transit trips often take longer than automobile trips for various reasons:

- Accessing a transit stop often takes longer than accessing an automobile.
- Transit routes cannot provide the most direct route between all origins and destinations.
- Travelers need to wait for transit vehicles, including when transferring between transit routes.
- Transit vehicles stop more frequently to pick up and drop off passengers.

Travel times by transit and by driving were compared for various routes during peak (8:00 a.m.) and off-peak (9:00 p.m.) travel conditions, as shown in Exhibit 4.5**.** [60]

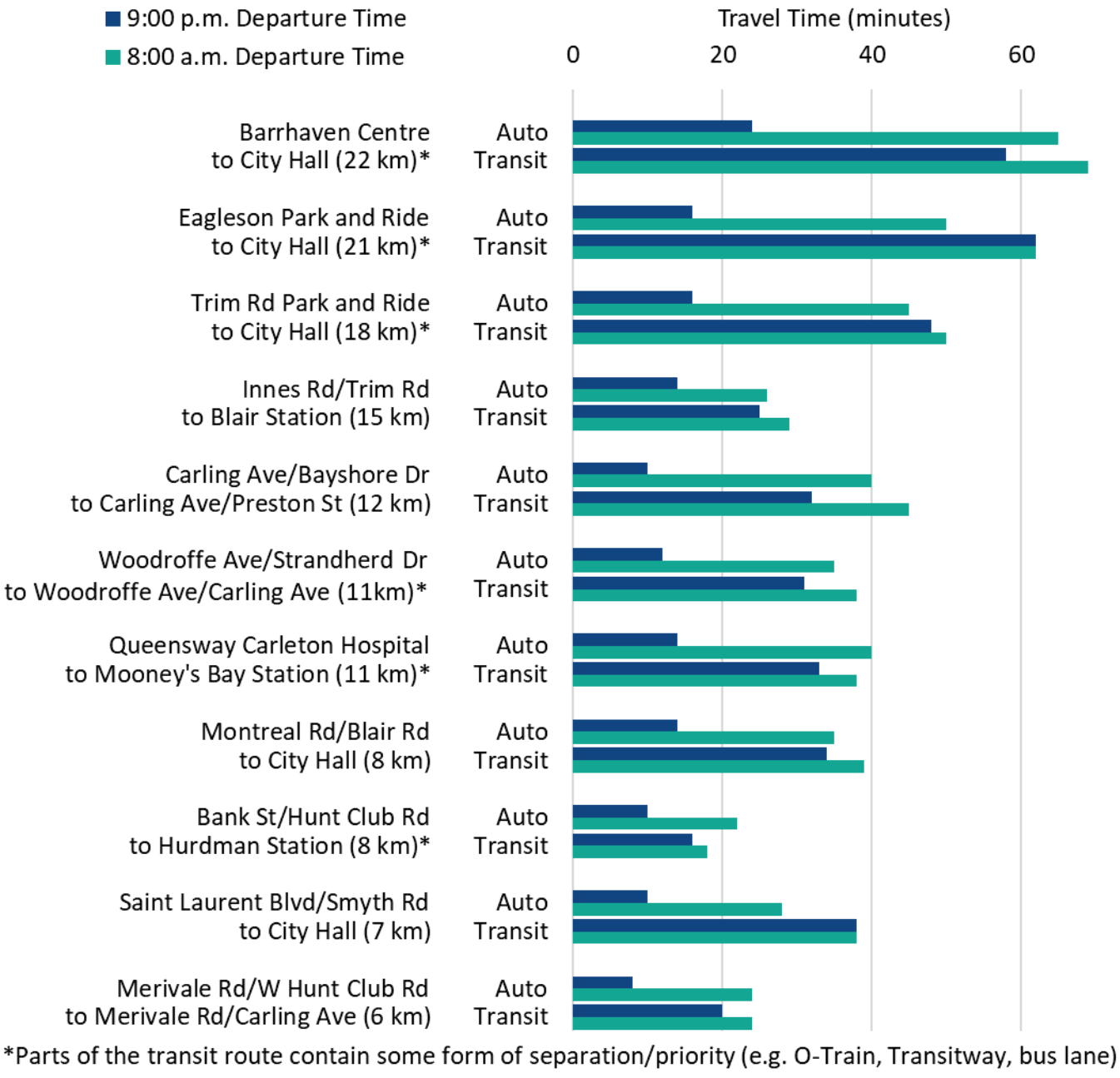
For the selected routes in the off-peak periods, driving is significantly faster than transit. The most competitive transit route is between Bank Street / Hunt Club Road and Hurdman Station, which uses the Transitway for most of the route. For many other corridors, transit can take up to three times longer than driving. This means that driving has a significant travel time advantage when roads are uncongested, and this creates a challenge to attract transit users during off-peak periods.

At peak times, the increase in auto travel times exceeds the increase in transit travel times. This means that transit becomes more competitive when roads are congested. For trips along Carling Avenue, Woodroffe Avenue, Baseline Road, and Montreal Road, the additional time penalty for transit due to congestion ranges between 5-13 minutes relative to off-peak

[60] The travel time analysis was conducted on Thursday, January 4, 2024 based on Google travel times for sample routes. The Google travel planner uses OC Transpo schedule data to develop transit travel times. The 8 a.m. departure time was used to represent travel during the peak period, reflecting the discussion from Section 3.3. Traffic congestion is typically higher at peak times, which results in more delay. 9 p.m. was used to represent travel at off-peak times, which typically have less congestion and delay. The routes used by transit and auto are not necessarily the same and may vary by time of day. The transit departure times may start up to 15 minutes earlier or later than noted to account for schedules.

times. The only transit route that was faster than its automobile counterpart was the Queensway Carleton Hospital to Mooney's Bay Station route, likely due to the presence of bus lanes at select congested locations.

Exhibit 4.5: Automobile and Transit Travel Time Analysis (2024)



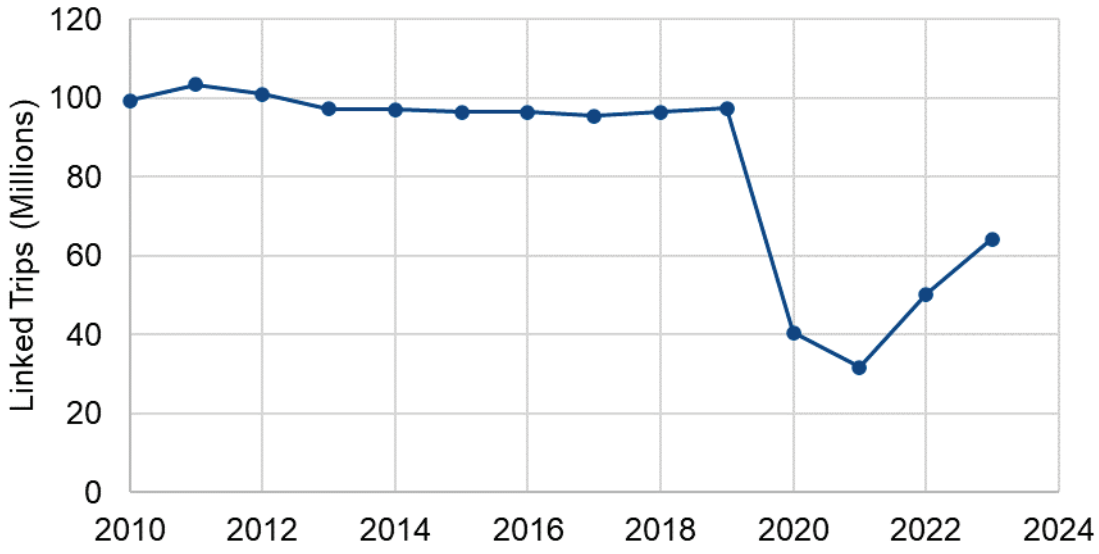
Source: Google Maps Trip Planner.

4.3 Transit Ridership

Transit ridership has declined in the past decade. Annual transit ridership peaked in 2011 at 104 million trips, decreased gradually to a low of 95 million trips in 2017, and increased to 97 million trips in 2019 when O-Train Line 1 opened. During the pandemic in 2020, ridership dropped to 40 million trips, decreasing further to a low of 32 million trips in 2021, before gradually starting to recover. These trends can be observed in Exhibit 4.6. Transit ridership is continuing to recover since the initial drop from the pandemic. Between December 2022 and December 2023, transit ridership has increased by 21%, reaching about 75% of pre-pandemic volumes as of December 2023.[61] Several of the busiest bus routes have seen ridership recovery above this network wide average, including:

- Routes 88 (Baseline) and 80 (Merivale) are at 95% of pre-pandemic levels,
- Routes 19, 24, 55, 62, 87, 97 and 99 are at ≥ 90% of pre-pandemic levels.

Exhibit 4.6: Annual Transit Trips (2011 – 2022)



Source: OC Transpo.

[61] OC Transpo Transit Commission Update, February 8, 2024. Pre-pandemic based on 2019 ridership values.

As discussed earlier, many trips that were previously made by transit are no longer occurring at all. Furthermore, hybrid workers who only commute a few days a week are unlikely to purchase a monthly transit pass. With infrequent work trips and without a transit pass, people are more likely to choose to drive to work, even if this entails paying high parking costs and/or tolerating congestion. Hybrid work arrangements are expected to persist into the future and will likely continue to impact transit ridership over the long term.

Declines in transit ridership pose a challenge to maintaining and improving transit service, given that transit operating budgets are partially funded through fares. According to Ottawa's transit service planning standards, when routes experience ridership increases, they warrant higher frequencies. When routes experience ridership declines, they warrant lower frequencies. In turn, transit ridership is affected by how often a bus or train comes, whether it goes to where people want to go, and whether it comes on time. Between 2020 and 2022, the on-time performance for OC Transpo bus routes operating every 16 minutes or less varied between 69% and 75%.[62]

The 2023 Commuter Attitude Survey suggests that the top reasons for not using transit in Ottawa are issues with service reliability and route changes since the pandemic that made transit less convenient. Suggested improvements to the transit system include more frequent service (77% of responses), better real time information (48% of responses), and better route connections (48% of responses). Further recovery of transit ridership is dependent on adequate operating funding to enable frequent and reliable service, as well as land use and transportation system changes to attract new riders.

4.4 Cycling

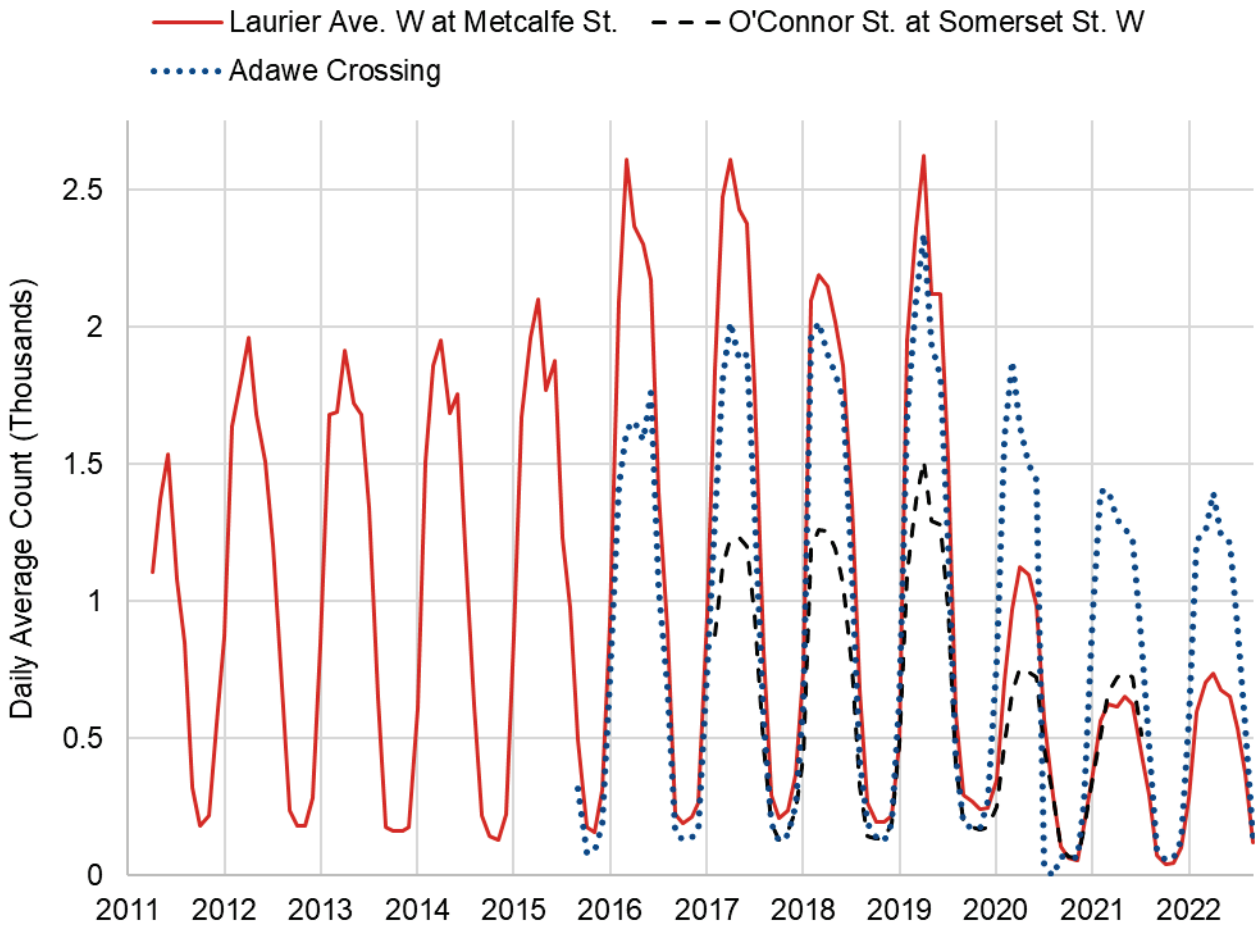
There is evidence that the City's investment in cycling infrastructure has attracted new riders. From the OD survey, the number of daily cycling trips

[62] On-time performance is used to measure transit reliability. More information can be found at: https://www.octranspo.com/en/about-us/performance-measures/

in Ottawa has increased from 48,000 in 2011 to 99,000 in 2022, doubling the cycling mode share from 2% to 4%. New active transportation links, especially those crossing a barrier, have observed high usage. For example, the Adàwe Crossing across the Rideau River opened in late December of 2015; almost 330,000 people cycled across it in the first year, with over 390,000 trips in 2019.

Cycling use is much more common during the warmer months in Ottawa. However, winter cycling has a steady base of users, as shown in Exhibit 4.7.[63] Some of the most-used winter cycling links are the Adàwe Crossing and Laurier Avenue, which are both maintained during the winter months.

Exhibit 4.7: Monthly Cycling Trips Along Select Cycling Routes



Source: Eco-Counter.

[63] There were no recorded counts in November 2020 on the Adàwe Crossing.

From the 2023 Commuter Attitude Survey, the main reasons why commuters do not choose to cycle in Ottawa is that their route is too far or takes too long (49% of responses), inclement weather such as snow and rain (39% of responses), and perceived safety and risk of collisions (34% of responses). Of the cyclists that switch commuting modes during the winter months (December to March), a third of them use transit, a third of them drive alone, and a fifth of them switch to walking.

5 Summary

There have been significant changes in Ottawa since 2011. Population and employment have increased, and new transportation infrastructure, such as the O-Train and active transportation connections, have impacted how people travel.

The COVID-19 pandemic caused massive disruptions with numerous implications that are likely to be long-lasting, such as the increase in working from home. In the fall of 2022, 19% of workers were still fully working from home, and an additional 35% had hybrid work arrangements. Linked to hybrid work arrangements, commuting activity tends to be concentrated in the middle of the week.

Other notable changes between 2011 and fall 2022 include the following:

- The total number of daily trips starting or ending in Ottawa decreased city-wide, despite the increase in population.
- The average Ottawa resident made fewer trips per day as a result in the reduction of work trips. Trips were also shorter, with a notable reduction in the median trip distance.
- The proportion of trips by walking and cycling increased significantly; most notably, the cycling mode share doubled.
- The public transit mode share decreased. Much of this shift is linked to working from home; for example, many of the trips that were previously made by public transit (e.g. work trips to downtown) are no longer occurring by any mode of travel.
- The average distance travelled in a day decreased, as did the average daily driving distance.

Regarding where people are traveling, parts of the city inside the Greenbelt continue to attract the most trips, although trips to the downtown core have decreased. Suburban communities are becoming more “complete” as evidenced by the increase in internal trips (i.e. trips that start and end in the same area).

Factors such as geography, income, age, and gender continue to have significant implications for travel patterns. In general, households outside of the Greenbelt have higher incomes, are more likely to live in single-detached homes and tend to make more trips by driving. People living in the downtown core and inner urban areas have the lowest automobile use, and highest proportion of trips by walking and cycling. People living in lower income households are more likely to use transit and to make longer duration trips. Youth are also very dependent on transit.

The fall 2022 OD data provides a valuable snapshot of post-pandemic travel in Ottawa. Recognizing that travel behaviour is continuing to evolve, the TMP Capital Infrastructure Plan will incorporate data from the fall 2022 OD Survey; it will also reflect changes in commuting since fall 2022 as well as anticipated future changes.

In the coming months, work will continue to develop the TMP Capital Infrastructure Plan. This will include finalizing the TRANS travel forecasting model; assessing future travel demand; and identifying a more detailed set of transportation needs (e.g. specific corridors / routes where congestion or bus delays are expected to be significant, or where additional road / transit capacity is needed to accommodate growth), considering the results of public engagement as well as technical analysis. The TMP team will then identify and screen transit and road projects; update the City's transportation networks; prioritize projects; and develop investment scenarios considering affordability as well as the City's mode shift objectives and climate change targets.

Appendix A

Exhibit A.1: Mode Classification

OD Survey Mode	2022 OD Survey Code	2011 OD Survey Code	Mode Category
Car - driver	1	1	Automobile Driver
Car - passenger	2	2	Automobile Passenger
Transit bus	3		Transit
O-Train/LRT	4		Transit
OC Transpo school route / STO school route (e.g., 600 series, 700 series, etc.)	5		Transit
Bicycle	6	5	Bicycle
Walk (entire trip) (also includes skateboard, roller-blade)	7	13	Walk
Paratransit	8	9	Other
Assisted mobility device (wheelchair, mobility scooter)	9		Walk
Taxi	10	3	Other
Paid rideshare (e.g. Uber, Lyft or other smart-phone app ride-hailing service)	11		Other
Motorcycle or moped	13	4	Other
e-bike (power-assisted bicycle with pedals)	14		Bicycle
e-scooter (electric motorized scooter)	15		Bicycle
Other bus / minibus	16	8	Transit
School Bus (e.g., yellow bus) / Autobus scolaire	18	7	Other
Intercity or chartered bus	21	10	Other
VIA Rail train	22	11	Other
Airplane	23	12	Other
Ferry	24	14	Other
Other	77	15	Other
Decline / don't know		16	Excluded
Urban Transit (OC Transpo, STO, O-Train)		6	Transit

Questions on micro-mobility (such as e-bikes and e-scooters) were new for the 2022 OD Survey. Modes such as paid rideshare and assisted mobility devices were also included for the first time in 2022.

Appendix B

Exhibit B.1: Trips Between Origin-Destination Districts, 2011

2011 Trips (000s) (Origin/Destination)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
1. Ottawa Centre	27.7	28.8	7.6	3.4	10.1	5.7	9.2	8.2	6.7	7.1	5.3	1.4	11.2	3.8	23.9	0.4	160
2. Ottawa Inner Area	29.0	108.4	14.5	5.4	24.5	10.1	19.8	12.1	10.4	8.4	5.2	1.7	11.3	5.1	17.6	1.0	285
3. Ottawa East	7.4	14.4	49.2	10.2	14.0	3.3	4.4	2.7	2.4	2.5	1.2	0.8	9.0	2.2	8.2	0.5	132
4. Beacon Hill	3.5	5.5	10.6	29.1	8.8	1.4	2.1	1.8	1.3	1.1	0.7	0.4	11.4	1.6	4.9	0.5	85
5. Alta Vista	9.9	24.3	13.5	8.4	85.2	21.7	14.1	5.8	6.4	5.5	5.5	3.5	16.9	6.8	9.9	0.8	238
6. Hunt Club	5.8	10.7	3.2	1.5	21.1	42.2	10.5	2.9	2.3	2.6	2.8	3.8	3.4	4.8	2.9	0.7	121
7. Merivale	9.2	19.1	4.8	2.4	13.9	9.9	87.7	20.7	26.0	12.0	12.5	2.3	6.2	7.0	7.3	1.0	242
8. Ottawa West	7.9	13.0	2.5	1.5	5.7	3.0	20.3	57.9	17.2	6.3	3.8	0.6	3.1	2.3	7.6	0.5	153
9. Bayshore / Cedarview	7.0	9.9	2.5	1.4	6.8	2.2	25.4	17.3	72.9	18.6	10.1	0.8	2.7	5.3	4.8	0.9	188
10. Kanata / Stittsville	7.0	8.3	2.4	1.0	5.4	2.5	12.1	6.2	18.6	161.3	5.6	0.6	2.6	18.9	3.8	1.7	258
11. South Nepean	5.4	5.3	1.2	0.6	5.5	2.8	12.8	3.6	9.6	5.7	79.9	1.0	1.1	5.9	2.3	0.5	143
12. South Glouc. / Leitrim	1.6	1.7	0.8	0.5	3.3	3.6	2.2	0.7	1.0	0.6	1.0	12.0	0.8	3.5	0.5	0.2	34
13. Orleans	11.2	11.7	9.0	12.1	16.2	3.5	6.1	2.9	2.6	2.4	1.2	0.8	151.2	8.7	6.6	1.5	248
14. Rural	4.0	5.1	2.0	1.9	7.2	4.7	7.1	2.7	5.4	18.4	5.6	3.5	8.3	61.1	2.7	6.0	146
15. Quebec	24.2	17.8	7.8	4.9	9.8	2.9	7.4	7.9	4.9	4.0	2.3	0.5	6.4	2.3	0.0	0.0	103
16. External	0.3	1.2	0.7	0.7	0.7	0.7	1.1	0.6	0.9	1.8	0.5	0.2	1.6	6.1	0.0	0.0	17
TOTAL	161	285	132	85	238	120	242	154	189	258	143	34	247	145	103	16	2554

Exhibit B.2: Trips Between Origin-Destination Districts, 2022

2022 Trips (000s) (Origin/Destination)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
1. Ottawa Centre	21.7	23.6	6.7	2.0	4.9	2.7	4.3	5.0	3.6	3.0	3.5	1.1	5.2	2.2	13.7	0.3	104
2. Ottawa Inner Area	23.3	113.8	15.0	5.8	22.6	7.6	14.8	12.8	7.8	9.5	7.1	3.3	9.1	3.5	15.9	1.4	273
3. Ottawa East	6.7	14.4	51.6	10.2	11.3	2.2	2.5	2.2	2.0	1.6	0.5	0.7	6.3	2.1	6.2	0.5	121
4. Beacon Hill	1.7	5.5	9.9	33.0	7.7	1.9	1.5	1.5	1.2	1.3	0.7	0.9	14.3	1.4	4.5	0.5	87
5. Alta Vista	5.5	22.4	11.4	7.9	92.8	18.9	10.3	4.9	4.2	4.3	4.3	4.0	10.6	4.5	7.6	1.5	215
6. Hunt Club	3.0	7.7	2.5	1.7	18.8	43.6	7.2	2.1	2.5	2.9	3.4	6.1	3.6	4.3	2.5	0.9	113
7. Merivale	4.4	15.3	2.0	1.7	10.6	7.5	95.8	17.5	19.5	9.7	12.0	4.1	4.0	5.9	5.2	1.4	217
8. Ottawa West	4.9	13.6	2.0	1.4	4.6	2.3	18.0	68.9	12.2	4.9	3.5	0.9	1.5	2.3	5.6	1.0	148
9. Bayshore / Cedarview	3.4	7.5	2.1	1.3	4.3	2.5	19.1	12.6	78.9	18.0	9.4	1.1	1.8	4.9	4.5	1.1	172
10. Kanata / Stittsville	3.3	9.3	1.5	1.4	4.8	2.4	9.9	5.2	17.9	220.2	7.2	0.6	1.9	21.8	2.9	3.8	314
11. South Nepean	3.5	7.3	0.6	0.7	4.2	2.7	12.5	3.7	8.9	7.8	123.4	6.7	0.8	8.1	1.6	1.8	194
12. South Glouc. / Leitrim	1.1	3.3	0.7	0.9	3.9	6.0	3.9	1.0	1.1	0.5	6.7	24.9	0.7	4.3	0.6	0.4	60
13. Orleans	5.5	9.2	6.6	13.5	10.9	3.5	4.0	1.5	1.8	1.9	0.7	0.7	193.8	8.1	4.4	2.9	269
14. Rural	2.0	3.8	2.2	1.4	4.6	3.9	5.9	2.2	5.1	21.0	8.5	4.6	7.6	61.1	1.9	9.2	145
15. Quebec	13.6	15.9	5.8	4.1	7.9	2.3	5.4	5.5	4.5	3.3	1.4	0.4	4.5	1.7	0.0	0.0	76
16. External	0.3	1.6	0.7	0.5	1.6	0.9	1.3	0.8	1.2	4.2	1.3	0.3	2.8	8.7	0.0	0.0	26
TOTAL	104	274	121	88	215	111	217	148	173	314	194	60	269	145	77	27	2536

Appendix C

Exhibit C.1: Observed Trips by Mode Over Time – Daily Trips

Mode Category	1995	2005	2011	2022
Automobile Driver	1,136,293 (57%)	1,330,572 (57%)	1,363,821 (53.4%)	1,373,379 (54.2%)
Automobile Passenger	309,828 (15.5%)	313,028 (13.4%)	384,461 (15.1%)	378,825 (14.9%)
Transit	239,063 (12%)	320,216 (13.7%)	362,989 (14.2%)	214,729 (8.5%)
Walk	228,066 (11.4%)	253,600 (10.9%)	274,425 (10.7%)	359,886 (14.2%)
Bicycle	27,582 (1.4%)	33,010 (1.4%)	48,070 (1.9%)	99,114 (3.9%)
Other	53,393 (2.7%)	82,480 (3.5%)	120,213 (4.7%)	109,839 (4.3%)

Exhibit C.2: Observed Trips by Mode Over Time – Morning Peak Period (6:45-9:00)

Mode Category	1995	2005	2011	2022
Automobile Driver	202,976 (53.0%)	231,300 (51.4%)	229,499 (46.2%)	235,673 (48.3%)
Automobile Passenger	47,050 (12.3%)	51,589 (11.5%)	60,445 (12.2%)	59,800 (12.3%)
Transit	66,983 (17.5%)	85,090 (18.9%)	96,148 (19.4%)	58,005 (11.9%)
Walk	38,119 (10.0%)	43,573 (9.7%)	49,230 (9.9%)	65,944 (13.5%)
Bicycle	6,564 (1.7)	7,773 (1.7%)	11,849 (2.4%)	23,585 (4.8%)
Other	20,927 (5.5%)	30,667 (6.8%)	49,240 (9.9%)	44,594 (9.1%)