



London
CANADA

2016 Household Travel Survey Summary Report

Prepared for the City of London
by IBI Group
July 11, 2018

Executive Summary

The London Household Travel Survey was conducted in the fall of 2016 to provide a detailed picture of travel behaviour among residents of the City of London and the surrounding Census Metropolitan Area. The survey collected critical information about trip making, travel preferences and attitudes that are used to for the planning of road, transit, cyclist and pedestrian infrastructure and services. Previous versions of the household travel survey were conducted in 1987, 2002, and 2009.

The 2016 survey was conducted primarily via a web-based computer interface and involved the collection of extensive travel and socio-economic data for 5,300 households in the City of London, representing approximately 3% of households. Additional targeted surveys of students attending Western University and Fanshawe College were also undertaken to ensure university/college students were adequately represented in the overall travel survey. The student survey ensured capture of those living in student residences and off-campus housing and obtained travel information for 1,600 post-secondary students.

The number of surveys collected exceeded the quotas established at the outset of the project, meaning that the survey sample provides a robust and reliable picture of travel patterns among the City's residents and non-resident students. The resulting data provide a strong evidence base for transportation policy, planning, and strategy.

Survey Instrument

The web-based survey instrument represents an **emerging next generation approach** to household surveys to address increasing survey bias in conventional telephone-based household surveys that does not adequately capture key segments of the population. This advanced instrument was able to successfully collect a high-quality sample of data that is often difficult to obtain from travel surveys, such as non-work and mid-day trips that are often under-reported by conventional telephone-based surveys.

Survey Expansion and Validation

A rigorous review of the survey was undertaken to ensure that only realistic and applicable trip records are present in the final dataset. This process consisted of a series of logic checks that test the feasibility and geographic scope of respondent and travel data. Subsequent to the cleaning, the survey sample was expanded to the total population of the London CMA. This consisted of a **multi-step process** that attempted to match demographic information recorded in the survey (age distribution, household type, worker type, etc.) to those recorded in the Census of Canada. This process also included the **“fusion”** of records from the household survey and student surveys in such a way to eliminate data overlap and potential double-counting between the two datasets.

The resultant expanded survey was validated against external data sources provided by the City, including traffic counts and transit ridership data. This validation showed that the survey accurately captured travel subtleties across travel modes, times of day, and geography.

Trip Rates

The survey recorded approximately **1.63 million** daily trips, a substantial increase compared to the 675,000 and 860,000 daily trips recorded in the 2009 and 2002 travel surveys. The daily trip rate per City of London resident is **3.4 trips/person**, compared to 2.3 and 2.8 trips per day per person in 2009 and 2002, respectively.

These results do not necessarily suggest Londoners are making more trips now than in the past. The increased trip rate is more likely a reflection of improvements introduced in the survey instrument, conduct, and expansion that have resulted in a more complete picture of travel. This is supported by the fact that work and school trip rates are relatively stable compared to past surveys and peer cities, meaning that the present survey has captured more discretionary and non-home-based travel. Furthermore, the survey has been successfully validated against external traffic count and transit ridership data.

Trip Length

In the London CMA, the average trip length for all trips made by all modes of travel is **5.8 km** compared to 5.2 km made within the City of London in 2009. Work trips are the longest with an average trip length of 9.1 km. School trips are the shortest with an average trip length of 4.2 km.

Choice of Transportation Mode

Daily transit mode share among City residents is **7.6%** compared to the 2009 reported value of 11%. This does not suggest, however, that transit usage has dropped. As recorded by London Transit Commission, the number of riders per capita—a strong proxy for transit mode share—remained relatively constant between 2009 and 2016.

As with observed differences in trip rates, this drop in transit share is most likely a reflection of methodological changes and improvements. The 2016 survey captured a broader cross-section of the population than in 2009 (aged 11 and older, vs. 15 and older, respectively), and children aged 11-15 are rarely frequent transit users. Along the same vein, the 2016 survey captured more discretionary and non-home-based travel, which is also less likely to be made by transit. Finally, the 2016 survey included an improved method of capturing post-secondary student travel, and an associated data fusion process to accurately incorporate university and college travel preferences into the survey.

The 7.6% transit mode share is consistent with those reported by similar municipalities. Waterloo and Hamilton, for example, recorded shares 5% and 7%, respectively based on 2011 data. Ottawa-Gatineau—a larger urban centre with existing rapid transit—recorded a daily transit share of 14% in 2011.

Time of Day

Approx. **45%** of the daily trips were made during the morning and afternoon peak hour periods. This is a reduction from 2009 when 55% of the daily trips were made during peak hour periods. Mode share is relatively constant throughout the day despite the increased trip making during a.m. and p.m. peak periods. At 21,190 trips, transit attains its highest mode share during the a.m. peak period, although this is not much higher than the overall daily mode share.

Attitudes and Perceptions

As part of the travel survey, optional attitudinal questions were provided at the end of the trip-making portion of the survey. Respondents generally felt as though their needs were being met by the City's transportation system, but that there was **room for improvement in bicycle and transit infrastructure**. Approximately 65% felt that the car was either "excellent" or "good" at meeting their transportation needs, whereas fewer than 5% ranked it as "poor." Cycling and walking received the highest percentage of "poor" rankings

Almost **half of households that reported having a car as their primary mode of travel reported that they would consider switching modes**. The majority of these respondents would be willing to switch to carpool, while smaller percentages would switch to transit, bicycle, and walk.

Building new major roadways received the highest percentage of "very important" ratings out of all improvements at 38% and the lowest number of "not important" ratings at 11%. However, several transit improvements also received high ratings. These include developing a rapid transit system and improving the frequency of bus service, which were rated as "very important" by 32% and 31% of households respectively.

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1 Introduction

1.1 Background

The London Household Travel Survey was conducted in the fall of 2016 to provide a detailed picture of travel behaviour among residents of the City of London and the surrounding Census Metropolitan Area. The survey collected critical information about trip making, travel preferences and attitudes that are used to for the planning of road, transit, cyclist and pedestrian infrastructure and services. The data is also used to estimate computer models of transportation demand to assess the City's future transportation needs and to examine strategies to meet these needs and the City's long-term transportation goals and objectives. Previous versions of the household travel survey were conducted in 1987, 2002, and 2009.

The 2016 survey was conducted primarily via a web-based computer interface and involved the collection of extensive travel and socio-economic data for 5,300 households in the City of London, representing approximately 3% of households. Households participating in the survey provided detailed information for each person in the household aged 11 years and above for one complete day. In addition to this household survey, additional targeted surveys of students attending Western University and Fanshawe College were also undertaken to ensure university/college students were adequately represented in the overall travel survey. The student survey ensured capture of those living in student residences and off-campus housing and obtained travel information for 1,600 post-secondary students.

The web-based survey instrument represents an emerging next generation approach to household surveys to address increasing survey bias in conventional telephone-based household surveys that does not adequately capture key segments of the population. The survey successfully achieved all of its objectives and sample targets and provides a solid database to support future transportation planning and investment decisions. The protection of privacy was ensured throughout all aspects of the survey.

1.2 Purpose

The purpose of this report is to document the methodology employed to develop the final travel survey dataset and to highlight key findings about travel behaviour in the City of London and the surrounding Census Metropolitan Area (CMA). To this end, the report provides an overview of the survey instrument (i.e. the questionnaire and survey interface), data processing, validation, and a summary of some of the key travel demand indicators recorded by the survey.

1.3 Report Structure

The report provides an overview of the process to collect travel information and the process to develop the final expanded survey, followed by an overview of its key survey findings:

- Chapter 2 presents the **design and conduct** of the survey, including an overview of the questionnaire, sample design, survey instrument, and completion statistics;
- Chapter 3 summarizes **data cleaning and expansion**, including manual vetting of survey records, incorporation of post-secondary student records into the dataset, expansion of the survey data to represent the full population and validation of the final dataset;
- Chapter 4 presents the key **findings** from an analysis of the survey database, focussing on trip rates, trip purpose, travel patterns, mode share, and respondent attitudes about transportation in London.

2 Design and Conduct

2.1 Survey Design

Overview

The survey was conducted via a two-stage web-based instrument. Respondents were recruited through a mail out and telephone campaign that targeted 45,000 residents of the City of London and surrounding Census Municipal Area (CMA). Upon receiving the initial mailer or phone call, respondents accessed stage one of the survey online using a designated respondent survey code.

Stage one consisted of household and personal characteristic questions. Upon completion of these questions, respondents were assigned a stage two date within the next six weekdays during which all household members aged 11 and older were asked to record each trip they made over a 24-hour period, beginning at 4:00 a.m. on their assigned date. After this date, respondents were asked to answer a series of questions describing each trip for each member of their household. Finally, respondents were asked a series of attitudinal questions relating to their transportation choices. Any respondents that had completed stage one but had not completed stage two within several days of their assigned trip diary date were contacted by phone to remind them to complete the second stage of the survey.

A parallel post-secondary student-specific version of the survey was distributed to all full-time and part-time students at Western University and Fanshawe College via email. This targeted survey acted as a supplement to the household-targeted survey and helped provide a more complete picture of transportation choices in London for this critical segment of the population that is typically under-estimated in a conventional household survey.

The survey monitoring process tracked respondent type to ensure adequate representation from all key socioeconomic and demographic groups of the population.

Questionnaire

The survey questionnaire consisted of four main groups of questions. The first and second question groups made up the first stage of the survey, while the third and fourth question groups made up the second stage of the survey.

The first question group, to be answered by the head of each responding household, asked for characteristics about the household including:

- Location of residence;
- Dwelling type; and
- Number of persons, cars, and bikes in the household.

The second question group consisted of demographic questions on each member of the responding household including:

- Age;
- Gender;
- Whether they possess a driver's licence;
- Employment status and occupation;
- Usual place of work; and,
- Monthly cost of parking.

The version of the questionnaire developed for Western University and Fanshawe College students also asked:

- Whether they lived on-campus and if so, in which residence; and,
- Whether they lived with family, roommates, or alone.

The third question group, marking the beginning of stage two of the survey, asked detailed questions about trips made by each member of the household aged 11 and over for the assigned trip diary date. These questions included:

- Location of origin and destination for each trip;
- Departure time for each trip;
- Primary mode used on each trip;
- Trip purpose: work, post-secondary school, school, shopping/recreational, other discretionary;
- Access and egress modes for trips where the primary mode was transit; and
- Several checks to ensure there were no remaining unreported trips.

The final question group consisted of attitudinal questions related the effectiveness of potential incentives to change current travel patterns including:

- How well each mode meets a respondent's travel needs;
- The most important factors that influence a respondent's choice of transportation;
- Which modes a respondent currently uses or would consider using;
- Under what circumstances a respondent would consider taking transit, carpooling or cycling; and,
- Which transportation improvements and policies a respondent perceived as being most important.

Complete versions of the Student and Non-Student questionnaires with all questions, logic flows, and response options can be found in Appendix A.

Web-Based Instrument

The online survey instrument was developed, implemented, and hosted by The Logit Group. The survey instrument was designed to be fully responsive to facilitate responses via desktop computers, tablets, and smart phones. The survey instrument also included branching logic functionality and question/answer piping to adapt each question to the respondent's previous answers.

Incentives

A prize draw was included as an incentive to respondents in order to encourage participation and maximize the survey response rate. Each household that completed both stages of the survey would be awarded one entry to the prize draw. Winners of this draw were selected by a random draw. Various types of prizes were chosen in order to appeal to all potential survey respondents. Over 130 prizes were available, including:

- 3 bicycles worth up to \$600 each;
- 5 iPad Air 2s;
- 15 prepaid Visa cards worth \$100 each;
- 40 City of London Gift Cards for Spectrum programs worth \$50 each; and,
- 75 Tim Horton's Gift Cards worth \$25 each.

2.2 Sample Design

This survey had a target response rate of 3% for the City of London and 2% for the remainder of the London CMA, resulting in an overall target CMA response rate of 2.8%, as shown in Exhibit 2.1. An estimate for 2016 households, calculated assuming a 5% growth rate from the 2011 Census, was used to construct the sample because 2016 Census data was not yet available at the time of survey execution. The resulting calculated target quotas were 4,850 surveys for London and 900 for the remainder of the London CMA.

Exhibit 2.1: Population Figures and Survey Quotas for London and the London CMA

Area	2011 Households (Census)	2016 Households (Forecast)	Required Sample (%)	Required Sample (n)
London	153,630	161,312	3%	4,839
Rest of CMA	41,430	43,502	2%	870
TOTAL	195,060	204,813	2.8%	5,709

Household addresses and telephone number data was purchased for 45,000 households in London and the London CMA in proportion with the target quotas for each area in order to achieve the target of 5,750 completed surveys. Response targets and address data purchased for each area within the London CMA is summarized in Exhibit 2.2.

The total of 45,000 addresses purchased for the study area assumed a response rate of 12.8%, and was informed by previous experience on household surveys in other Canadian municipalities where a similar survey approach was adopted.

Exhibit 2.2: Response Targets and Address Information Purchased by Area

Area	Target Quota	Total Addresses Purchased
Thames Centre	99	776
Middlesex Centre	119	930
St. Thomas	329	2,570
Central Elgin	100	780
Strathroy-Caradoc	167	1,306
Adelaide-Metcalf	21	166
Southwold	33	260
London	4,850	38,212
TOTAL	5,718	45,000

For the post-secondary student survey, all current full-time and part-time students at Western University and Fanshawe College were contacted by email from their respective institution with an invitation to complete the survey, recognizing the importance of post-secondary student travel data. Full- and part-time registration data was collected from each institution to determine sample rates once data was collected.

2.3 Survey Conduct and Completion Statistics

The survey was conducted in the fall of 2016, with the first mailers delivered on October 14. Responses were collected through November 11. The post-secondary student-specific version of the survey was emailed to Western University and Fanshawe College students on October 14, 2016 and collected responses through November 14, 2016.

At the conclusion of the survey phase of this study a total of 5,828 surveys were completed, meeting the overall survey target. Of these 5,828 completed surveys 5,135 were completed online, with the remainder being completed via telephone during the reminder call to complete stage two of the survey. An additional 78 responses were received that are complete through the travel diary stage and are missing only responses to the attitudinal questions. The 5,828 responses represents an overall sample of 2.85%, slightly more than the target sample rate of 2.8%. A summary of the responses by assigned travel diary day is shown in Exhibit 2.3.

Exhibit 2.3: Responses by Assigned Travel Diary Day

Travel Diary Day	Assigned	Completed
Monday	1,351	968
Tuesday	1,485	1,075
Wednesday	1,577	1,118
Thursday	1,919	1,342
Friday	1,851	1,325
TOTAL	8,183	5,828

While the overall survey target was exceeded, the sample rate of 1.1% for areas outside of the City/within the CMA was low compared to the 2% target, despite efforts to increase the response. Many of these residents felt the survey was only for those within the City and did not complete the survey. Owing to the lower population and sample rate for the CMA outside of the City, it presents a small proportion of trips relative to overall travel within the City and not considered to compromise the survey objectives. To confirm this, Census place-of-work/place-of-residence linkage data and traffic screenlines near City boundaries were examined and concluded that the quality of the data remains high. Improved instructions to potential respondents can address this in future surveys.

A total of 1,596 responses to the post-secondary student survey were received, 1,017 of which were completed by Western students and 579 completed by Fanshawe students. This represents a sample of 6.2% at Western University and 3.8% at Fanshawe College, indicating a desirable “oversample” of both student bodies.

3 Data Cleaning and Expansion

A rigorous review of the survey was undertaken to ensure that only realistic and applicable trip records are present in the final dataset. This process, known as data cleaning, consists of a series of logic checks that test the feasibility and geographic scope of respondent and travel data. A well-designed and comprehensive cleaning process is critical to achieving high-quality data. Subsequent to the cleaning, the survey sample is expanded in order to approximate travel patterns for all residents of the London CMA.

3.1 Data Cleaning

The cleaning process consisted of recoding records that were incomplete or illogical if the correct interpretation was obvious (e.g. miscoding of data) or eliminating trip records that were unusable (e.g. missing critical data). This ensured that the final dataset included only high quality data with internally-consistent records and could be used with confidence.

A number of factors were considered in determining the validity of a record. If the households had home locations outside of the study area (e.g. Hamilton, ON) or incomplete information (e.g. no home location), they were considered invalid. All the persons and trips of these households were not carried forward to the final dataset.

Additional validation and correction procedures included the following:

- Trips with a missing origin and/or destination or with the same origin and destination were marked as invalid if the locations could not be deduced based on other relevant information (e.g. other reported trips of the person, home/school/work location, trip purpose, and travel mode).
- For records with partial trip location information (e.g. a street name with no address), locations were deduced from other reported trips of persons in a household or other records with the same street name and trip purpose.
- Trips with incorrectly coded locations were reviewed for accuracy in geocoding and corrected as needed. Geocoded locations were standardized, including major landmarks, shopping malls, schools, etc. Common locations, such as Western University or Masonville Place, were standardized using one set of coordinates. If the geocoding of trips could not be corrected to represent a logical trip, the trip record was marked as invalid.
- If a number of household persons reported a simultaneous, joint trip (e.g. made at the same time, with an identical origin and destination) and all records identified the travel mode as auto driver and the household reported owning only one automobile, the first record was

left untouched and the remaining records' travel modes were recoded as auto passenger.

- All trips for travellers under 16 years of age recording mode of travel as auto driver were recoded to auto passenger.
- Trip purposes at origin/destination locations were checked against the location to ensure the reported purpose could reasonably take place at the stated location (e.g. a shopping centre should be not recorded with trip purpose "Home"). For records with trip purpose field that was either blank or "other", details in the location text was used to assign the record a more specific purpose.
- Trip start time was checked against origin/destination locations and trip purpose to ensure the trip could reasonably take place at the reported time. For example, an elementary school trip with a start time coded as 8:00 p.m. was corrected by changing p.m. to a.m. If the trip start time could not be corrected to represent a logical trip, the trip record was marked as invalid.
- Trip distance was checked against travel mode to ensure that a person could reasonably travel the distance by the reported mode. For example, all the trips with a travel distance greater than 5 km and the travel mode "Walking" were reviewed and corrected by either updating location information or changing the mode based on reported trips of persons in a household. The trip record was marked as invalid if there was not enough information to recode the trips.

Data cleaning resulted in a final dataset of 5,828 households (down from 5,882), or a 2.6% sample of London CMA households, slightly lower than the 2.8% target. While the 3% sampling rate for City of London households was achieved, the sampling rate for the rest of CMA fell short of the 2% target due to lower a response rate. Additional survey invites were not sent out, reflecting the fact that the primary target of the survey was residents of the City of London. 1,596 post-secondary student surveys were retained in the final database (down from 1,615), representing 5% of total enrollment at the City's two major post-secondary institutions. The final dataset includes a total of 7,424 valid households and 43,712 valid trip records. Exhibit 3.1 presents the final number of valid households retained in the dataset in comparison to the total number of households and the number of purchased addresses. Exhibit 3.2 summarizes the sample of households, persons, and trips by household and student surveys.

Exhibit 3.1: Conversion and Completion Statistics by Geographic Area

	Total Households	Addresses Purchased	Completed Surveys (% of purchase)	Valid Surveys (% of total)
City of London	175,558	38,212	5,346 (14%)	5,346 (3.0%)
Rest of CMA	44,894	6,788	536 (8%)	482 (1.1%)
Total Survey Area	220,452	45,000	5,882 (13%)	5,828 (2.6%)

Exhibit 3.2: Final Valid Survey Records

	Households	Persons	Trips
Household Survey			
Collected Sample	5,882	14,111	40,886
Invalid	54	165	1,501
VALID RECORDS	5,828	13,946	39,385
Student Survey			
Collected Sample	1,615	1,615	4,422
Invalid	19	19	95
VALID RECORDS	1,596	1,596	4,327
Total Survey Records			
Collected Sample	7,497	15,726	45,308
Invalid	73	184	1,596
VALID RECORDS	7,424	15,542	43,712

3.2 Data Fusion

The household survey and post-secondary student survey datasets have different (but partially overlapping) target populations and could not be merged without further processing. The household survey targeted all residents of the London CMA (i.e. the resident population as of the 2016 Census) while the student survey targeted all students at two major post-secondary institutions, regardless of whether they were captured by the Census. As such, the student survey includes both those living in temporary residences (not captured by the Census) and those living permanently in London (captured by the Census). This overlap between the target populations can potentially lead to double-counting if not aggregated and expanded properly.

To address these challenges while leveraging the availability of both surveys, two datasets were prepared in advance of the household-based expansion.

The first dataset, capturing the Census population, draws from two sources:

- all household survey records (part of Census by sample design); and
- post-secondary student survey records in which the respondent lives with his/her family.

The second dataset, capturing the non-Census population, takes the remaining records from the student survey (i.e. those who live in a campus residence, live with roommates, or live alone). This aggregation procedure ensures that the London households are not misrepresented by the temporary residents, who are instead captured in the other dataset to represent an important demographic group in the City.

3.3 Household-Based Expansion

The purpose of the household expansion was to create a trip database that represented the entire population of the London CMA. This was accomplished

by scaling up or expanding the sample of household records (i.e. the first dataset) according to sample characteristics across different dimensions to match the total number of households. A multiple-step expansion was undertaken to ensure that the survey matched the number of households in defined zones for expansion purposes, and that key socioeconomic/demographic groups (age groups, worker/non-worker breakdown, etc.) were accurately represented not biased due to poorer response rates in certain groups. For instance, young adults typically have lower response rates than older adults given their lifestyle and this is compensated in the expansion process with Census control totals by key socioeconomic/demographic group used in the process, as further outlined below.

The sample of cleaned household records was expanded based on the number of households in a system of expansion zones that were designed for this survey. Expansion zones for the City of London and the London CMA are shown in Exhibit 3.2 and Exhibit 3.3, respectively.

The initial household expansion factor for a given expansion zone was calculated as the number of households from the Census divided by the number of households in the first dataset for that given area (equivalent to the reciprocal of the sampling rate). On average, a 3% household sample rate has an expansion factor of 33.3 to represent 100% of households. To ensure that the household sample was representative of the population in the City of London, the initial expansion factor was then adjusted to the following household dimensions in an iterative process until the expansion factor converged:

- Household size (1, more than 1) by expansion zone;
- Age (0-14, 15-24, 25-64, 65 and over) by expansion zone;
- Number of workers working in Downtown for entire City
- Number of employed household members by expansion zone
- Fanshawe College (live-with-family) enrollment totals for entire City
- Western University (live-with-family) full-time enrollment totals for entire City
- Western University (live-with-family) part-time enrollment totals for entire City
- Number of households by expansion zone (same as initial expansion).

Exhibit 3.3: Sampling Rate by Expansion Zone in the City of London

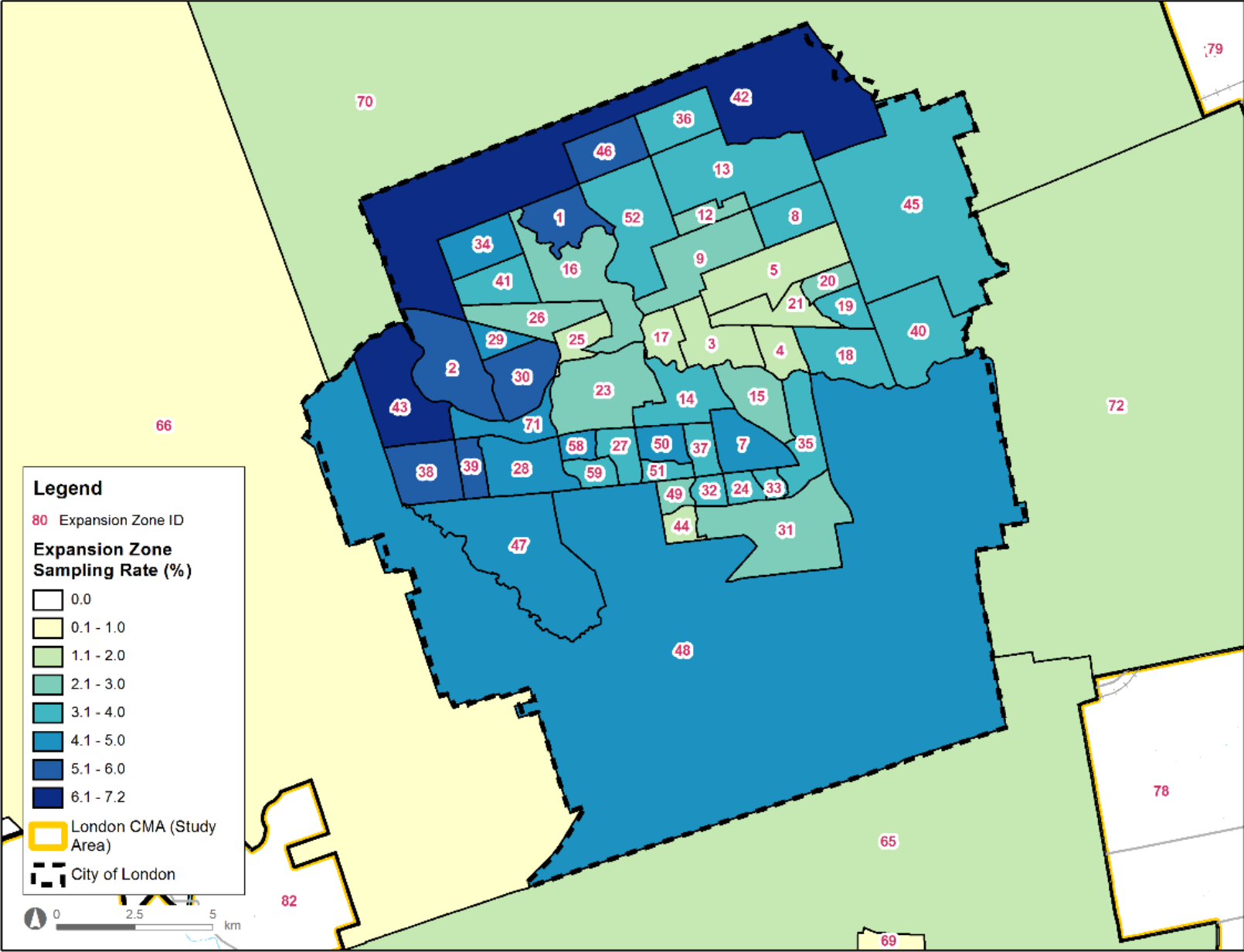
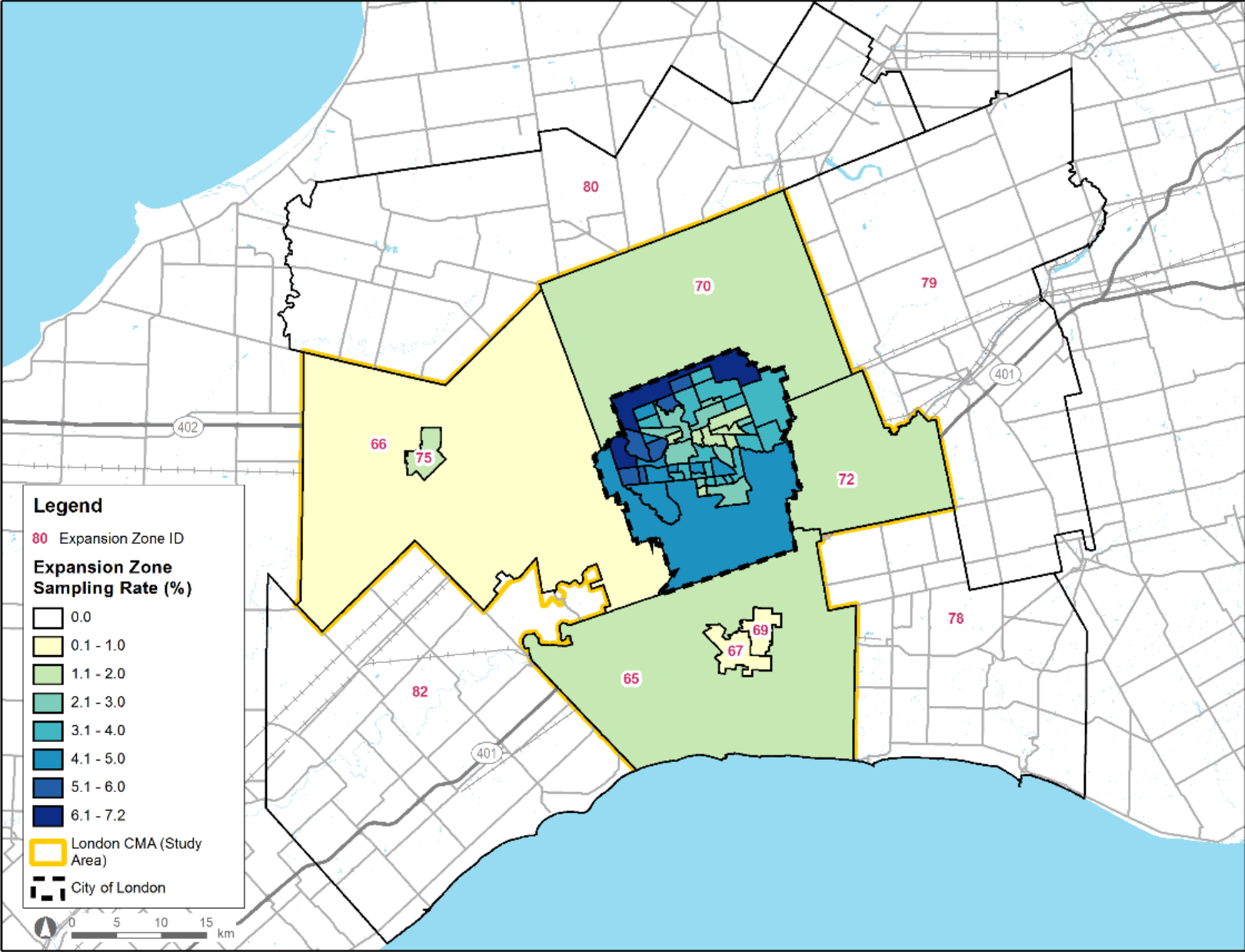


Exhibit 3.4: Sampling Rate by Expansion Zone in the London CMA



This iterative process minimizes potential bias in the sample by ensuring the expanded totals are representative of actual household and person characteristics. In other words, it ensures that different demographic groups are not over-represented or under-represented due to higher number of samples collected from the survey, including those that might be double-counted from both surveys. The expansion was considered converged when the expansion factors between iterations stabilized (within a 2% difference).

The overall average expansion factor for the City is 34.5 to expand to the total households, with the variation of the factors ranging from 5 to 100 by expansion zone due to the variation in sampling rate among the expansion zones and among certain demographic groups. The final household expansion factor was then applied to all the person and trip data associated with that households in the given expansion zone. Households outside the City of London carried the initial expansion factor and were not further expanded to demographics due to the lower sampling rate (0.9%-1.7%). The expansion factors range from 60 to 116 outside the City due to the lower sampling rate.

3.4 Secondary Expansion

There are two secondary expansion procedures after the primary household expansion: an expansion of non-resident post-secondary student records and a trip-based expansion to account for trip under-reporting.

Non-Resident Post-Secondary Student Expansion

Non-resident post-secondary student survey records (i.e. the second dataset) were expanded to on-campus resident enrollment and off-campus resident population. The on-campus residents were expanded to campus residence enrollment totals. The off-campus residents were expanded to the remaining enrollment (less the proportion of students records assigned to the household survey dataset). The expansion was applied to three groups of post-secondary students: all Fanshawe students, Western full-time students and Western part-time students.

Exhibit 3.5 shows the expansion factor for the non-resident campus survey data. The sampling rate of Fanshawe College on-campus residents and Western University full-time students off-campus residents are higher than that of the household survey average, and the remaining groups have a lower sampling rate around 2%.

Exhibit 3.5: Post-Secondary School Expansion Summary

	Sample Students	Enrollment Total	Sample Rate	Expansion Factor
On-campus Residence				
Western University Full-time	125	6,465	1.93%	52
Western University Part-time	1	52	1.93%	52
Fanshawe College	55	1,616	3.40%	29
On-Campus Subtotal	181	8,133	2.23%	
Off-campus Residence				
Western University Full-time	585	8,683	6.74%	15
Western University Part-time	21	1,207	1.74%	57
Fanshawe College	273	13,671	2.00%	50
Off-Campus Subtotal	879	23,561	3.73%	
NON-CENSUS TOTAL	1,060	31,694	3.34%	

Trip-Based Expansion

After the secondary expansion, the two datasets could be merged into a single dataset for trip expansion. This step also accounts for the under-reporting of trips when one informant (the individual filling out the survey) provides trip data about other members of the household after reporting his/her own trips, and does not have perfect knowledge of all of the trip making done by other members of the household.

This is a common problem in household travel surveys, especially for discretionary trips (mainly non-work, non-school trips), and is evident in the difference between trip rates reported by informants and non-informants in the survey. The expansion was applied to home-based other (HBO) and non-home-based (NHB) trips made by all adults (at least 25 years old) and workers. HBO and NHB trips made by non-workers under 25 were very low in comparison and therefore were not adjusted. Exhibit 3.5 shows the trip expansion factors applied to all HBO and NHB trips made by non-informant adults and workers in all household and campus survey data. The trip expansion factors developed range from 1.357 to 2.312.

Exhibit 3.6: Trip Expansion Factor by Purpose and Person Type

Trip Expansion Factor	HBO	NHB
Full-time worker (all ages)	1.357	1.951
Part-time worker (all ages)	1.565	2.104
Non-worker adult (25-64)	1.503	2.094
Non-worker senior (65+)	1.698	2.312

3.5 Validation

The expanded survey dataset was compared against population and household characteristics from the 2016 Census. Additionally, survey trip data was assigned to computer models of the transportation network and compared to traffic counts and transit ridership provided by the City.

Exhibit 3.6 shows the comparison of the expanded survey dataset against the 2016 Census across various household and person demographic categories. The expanded data generally match with the Census data very well, especially the person attributes. The survey shows an under-representation of row houses and apartments and over-representation of single detached and semi-detached households. However, dwelling type is correlated and indirectly captured in the household size variable, which is a more important explanatory variable and which matches the Census totals closely. Survey totals by expansion zone can be found in Appendix B.

Exhibit 3.7 shows three cordons, which are enclosed areas roughly concentric from Downtown London. The vehicle count data entering and exiting each of the cordons were compared against the network-assigned auto driver trips for both a.m. and p.m. peak hours, as shown in Exhibit 3.8. The assigned trips from the survey generally fell within 10% of the count data, except for inbound trips into downtown in the a.m. peak hour, which is within 20%. This is a high degree of accuracy for a survey of this nature, particularly given the relatively low sample size collected.

Exhibit 3.7: Validation of Survey Expansion Versus 2016 Census Demographics

	City of London			External			Total Survey		
	Census	Expanded	Exp/Cen	Census	Expanded	Exp/Cens	Census	Expanded	Exp/Cen
Household Size									
1	56,163	54,809	0.98	10,299	4,855	0.47	66,461	59,665	0.90
2+	119,395	120,203	1.01	34,595	39,364	1.14	153,991	159,567	1.04
TOTAL HHs	175,558	175,012	1.00	44,894	44,219	0.98	220,452	219,231	0.99
Dwelling Type									
Detached	93,926	118,486	1.26	38,286	39,797	1.04	132,212	158,283	1.20
Row/Apartment	81,632	54,254	0.66	6,608	3,806	0.58	88,240	58,060	0.66
TOTAL HHs	175,558	172,740	0.98	44,894	43,603	0.97	220,452	216,342	0.98
Gender									
Male	185,610	177,991	0.96	54,217	56,563	1.04	239,827	234,554	0.98
Female	198,215	209,017	1.05	56,027	56,321	1.01	254,242	265,338	1.04
TOTAL PERSONS	383,825	387,007	1.01	110,244	112,884	1.02	494,069	499,891	1.01
Age									
0–14	61,885	61,010	0.99	19,355	18,340	0.95	81,240	79,350	0.98
15–24	52,875	51,849	0.98	12,825	12,723	0.99	65,700	64,572	0.98
25–64	205,305	211,206	1.03	57,464	62,142	1.08	262,769	273,348	1.04
65+	63,760	64,672	1.01	20,600	19,940	0.97	84,360	84,612	1.00
TOTAL PERSONS	383,825	388,737	1.01	110,244	113,145	1.03	494,069	501,882	1.02
Employment									
Employed	218,330	217,958	1.00	65,030	58,341	0.90	283,360	276,299	0.98
Not Employed	165,495	170,789	1.03	45,214	54,804	1.21	210,709	225,593	1.07
TOTAL PERSONS	383,825	388,747	1.01	110,244	113,145	1.03	494,069	501,892	1.02

Exhibit 3.8: Cordon Areas in the City of London

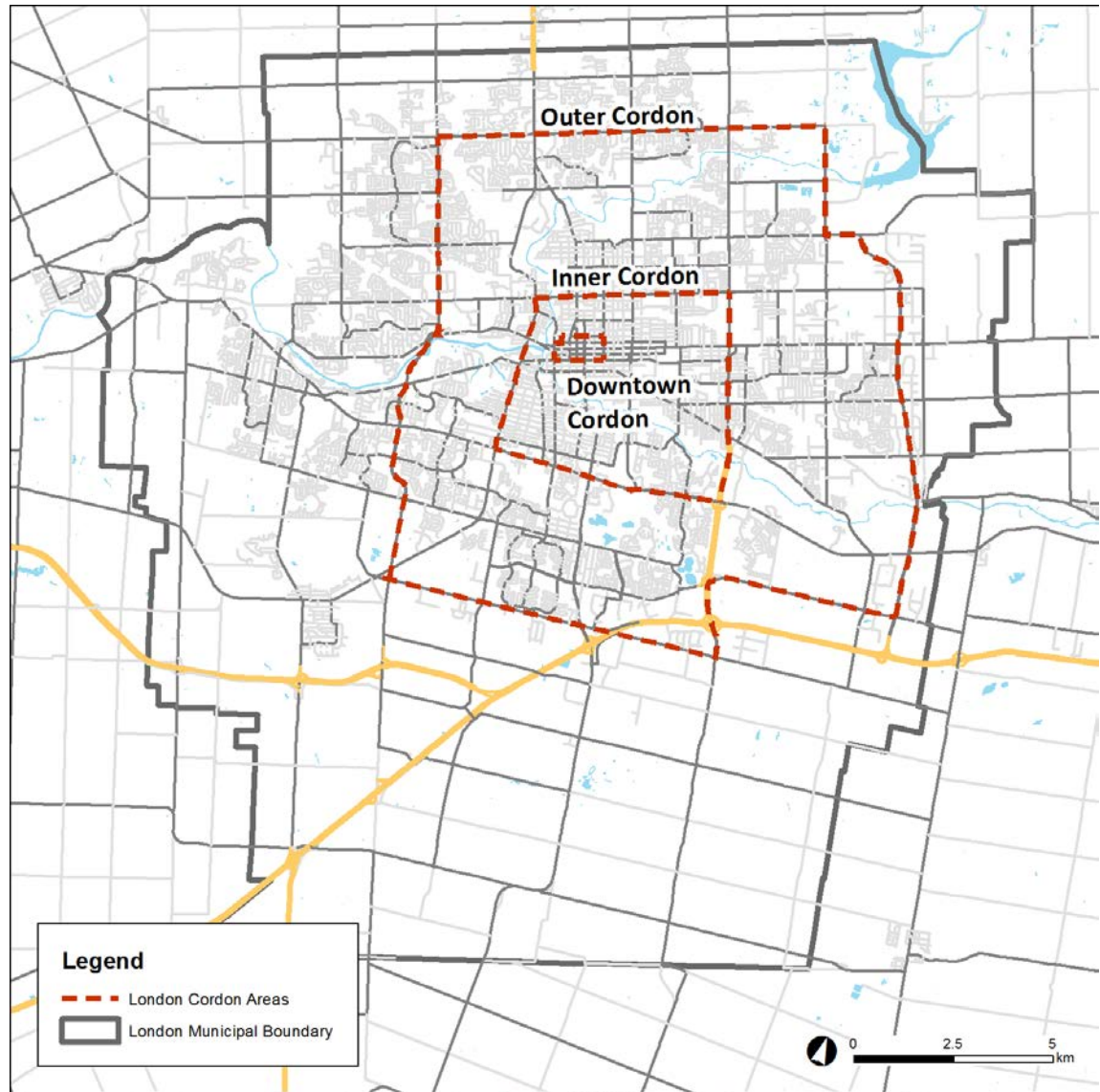


Exhibit 3.9: Validation of Expanded Survey Trips against Peak Hour Cordon Counts

Cordon Counts	AM			PM		
	Observed	Survey	Obs/Surv	Observed	Survey	Obs/Surv
Outer outbound	9,428	8,629	0.92	16,079	13,544	0.84
Outer inbound	17,337	14,868	0.86	15,896	13,634	0.86
Inner outbound	7,873	7,993	1.02	14,609	14,098	0.97
Inner inbound	14,590	14,295	0.98	11,946	9,683	0.81
Downtown outbound	6,537	6,386	0.98	9,220	9,229	1.00
Downtown inbound	8,730	9,387	1.08	7,580	6,558	0.87

Exhibit 3.10 compares 2016 London Transit Commission ridership (linked trips) against expanded survey records. The reported annual ridership was converted to average fall weekday ridership by dividing by an annual-to-daily factor of 249. This factor was calculated based on the annual ridership from 2016 CUTA report and 2016 transit boardings data from LTC covering different seasons and days of the week.

This comparison shows that surveyed daily transit ridership is somewhat higher than daily ridership derived from LTC data, but still within an acceptable range that is arguably within the margin of error of ridership estimation methods and the survey itself.

Exhibit 3.10: Validation of Expanded Transit Trips against CUTA Ridership Data

LTC Annual	LTC Average Weekday	Survey Daily (City)	Survey / LTC
22,574,959	90,662	98,035	1.08

4 Survey Results

4.1 Trip Rates

Trip rates per person for City of London residents and London CMA residents are shown in Exhibit 4.1. Work trips are most concentrated (peaked) in the a.m. peak, but have similar rates in the p.m. and off-peak periods. Post-secondary school and other school trips are evenly split between the a.m. peak and off-peak time periods. The high number of off-peak school trips are indicative of London's relatively large post-secondary student population. Other trip types are heavily concentrated in the off-peak hours as is to be expected. Off-peak home-based other (HBO) trips have the highest rate at over one per day per person.

Exhibit 4.1: Person Trip Rates by Time Period and Purpose

Period	HBW	HBS	HBO	NHB	Total
City of London					
AM Peak (7:00 - 9:59)	0.21	0.12	0.24	0.10	0.66
PM Peak (15:00 17:59)	0.19	0.07	0.41	0.24	0.90
Off-Peak	0.24	0.11	1.02	0.50	1.88
DAILY	0.64	0.30	1.66	0.84	3.44
London CMA					
AM Peak (7:00 - 9:59)	0.20	0.11	0.24	0.11	0.66
PM Peak (15:00 17:59)	0.19	0.07	0.41	0.24	0.90
Off-Peak	0.25	0.10	1.00	0.49	1.84
DAILY	0.64	0.28	1.65	0.83	3.40

Exhibit 4.2 shows the absolute number of daily trips by trip purpose by departure time (i.e. for each trip purpose, the absolute number of trips in each hour over the course of the day) and Exhibit 4.3 shows the percentage distribution of daily trips by trip purpose by departure time (e.g. for each trip purpose, the percentage of trips that occur in each hour of the day to a 100% total). Work trips are more concentrated in the a.m. peak than the p.m. peak, reflecting a relatively fixed work start time and staggered work end times. While school trips also peak in the a.m. and p.m., the p.m. school peak occurs at 3 p.m., whereas the work peak occurs later. HBO trips peak in the early evening, but also have a strong presence throughout the day. Non home-based (NHB) trips peak at the noon hour and again in the early afternoon, likely as a result of trips made from work or school to another purpose.

In terms of trip distribution throughout the day, the two peak periods account for 46% of the approximately 1,632,532 trips made by London CMA residents. Of all trips, HBO trips account for the most daily trips at 49%, followed by NHB at 25%, HBW at 19%, and HBS at 8%.

Exhibit 4.2: Number of Trips by Trip Purpose and Time of Day—London CMA

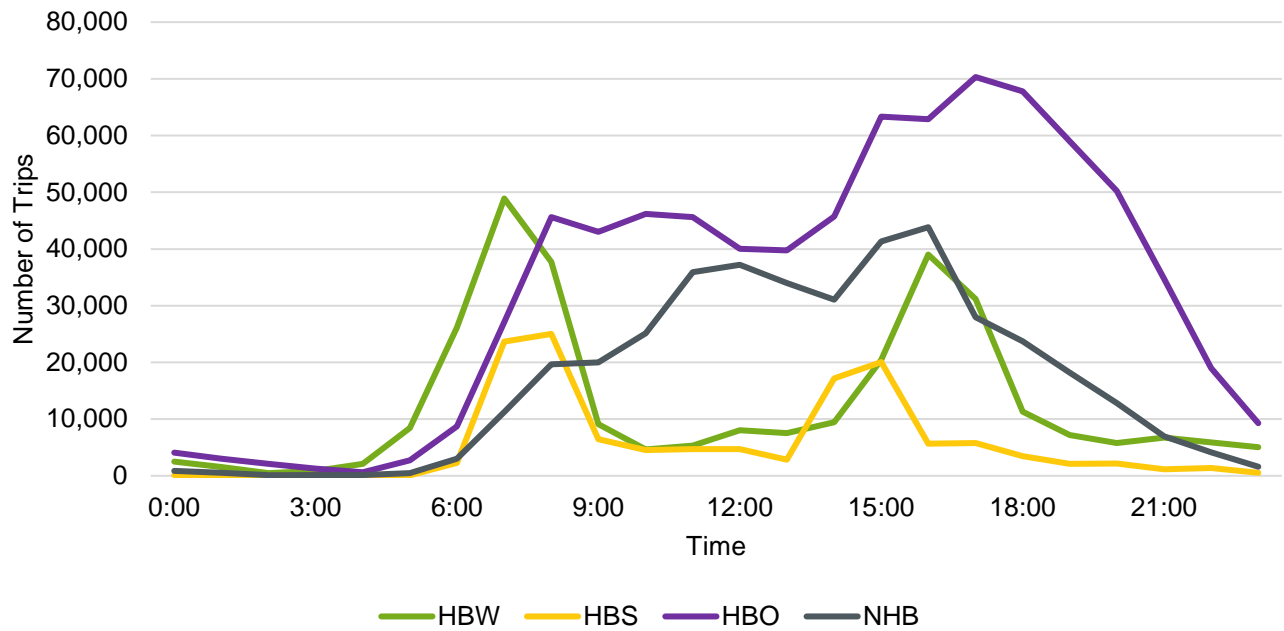


Exhibit 4.3: Percentage Distribution of Daily Trips by Purpose and Time of Day—London CMA

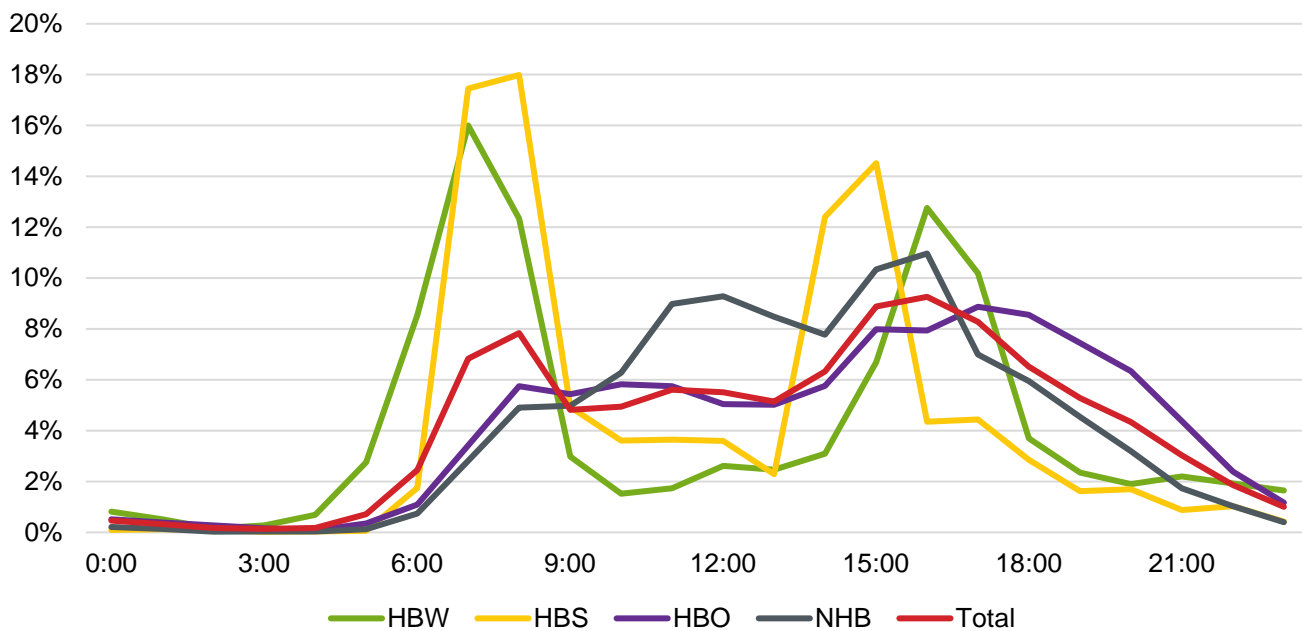


Exhibit 4.4 highlights trip rates by age and gender. Trip rates for males and females follow the same general pattern, with trip rates peaking between the ages of 40 and 44. However, the female trip rate is consistently higher than the male trip rate.

Exhibit 4.4: Trip Rates by Age and Gender—London CMA

Age Cohort	Female	Male	Overall
11 to 14	3.03	2.63	2.83
15 to 19	2.74	2.76	2.74
20 to 24	2.67	2.36	2.52
25 to 29	3.25	2.40	2.84
30 to 34	3.82	3.32	3.59
35 to 39	4.13	3.64	3.91
40 to 44	4.27	3.86	4.09
45 to 49	4.07	3.70	3.90
50 to 54	3.81	3.75	3.78
55 to 59	3.60	3.35	3.49
60 to 64	3.59	3.74	3.66
65+	3.30	3.47	3.38
TOTAL 11+	3.50	3.29	3.40

At 3.40 trips per person per day, overall trip rates recorded in the 2016 travel survey are higher than both the 2009 (2.32) and 2002 (2.79) travel surveys. HBO and NHB trips account for much of the difference, particularly in the off-peak period. This is not to suggest that Londoners are making more trips now than in the past; rather, it is more likely a reflection of improvements introduced to the survey instrument and conduct. The web-based instrument appears to have alleviated respondent fatigue and reduced respondent/non-respondent bias. Respondents were therefore more likely to record all or more of the trips that they made without the time pressure of a telephone survey interview (and with time to consult other household members about their travel). As such, there is a more complete recording of trips and reduced under-reporting of HBO and NHB trips, rather than actually making more trips. Also, the use of incentives is felt to have had a positive impact on response rates. There was no evidence of significant under-reporting of Work and School trips and thus these trips rates may be considered appropriate for time-series comparisons with previous London household surveys.

The above under-reporting findings are supported by two compelling pieces of evidence:

- Assignment of p.m. peak auto driver survey records results in very similar volumes to real-world traffic counts at the City’s major screenlines (see section 3.5). The 2016 survey has substantially more home-based other and non-home-based trip records than

previous surveys, yet assigned results are still mostly below but similar to actual traffic counts for this period.

- The greatest increase in trip rates compared to previous surveys is for home-based other and non-home-based trips, as these are the more difficult to recall as they are more spontaneous and less repetitive than work and school trips. At 0.64, the daily work trip rate is comparable to the 2002 survey (0.78). Evidence from the Transportation Tomorrow Survey (TTS) in the Toronto area (and in other jurisdictions) has shown that trip under-reporting is most common for home-based other and non-home-based trips. The higher trip rates for HBO and NHB trip purposes combined with a consistent work trip rate suggests a higher quality survey dataset.

As a further “benchmark” of the survey results, Exhibit 4.5 presents a comparison of surveyed person trip rates to those of Greater Toronto Area municipalities as recorded in the 2016 TTS. The two cities are of similar size to London and with relatively similar employment and post-secondary education characteristics.

The table confirms the points above: work and school trip rates are largely consistent between the London survey and the TTS, while other and non-home-based travel are lower. This is a reflection of all the enhancements made to the London survey, including an intuitive web-based survey instrument, the incorporation and promotion of incentives, and a rigorous expansion process.

Exhibit 4.5: Comparison of Trip Rates per Person by Municipality

Municipality	HBW	HBS	HBO	NHB	Total
London (CMA)	0.64	0.30	1.66	0.84	3.44
Hamilton (City)	0.74	0.24	1.03	0.36	2.40
Oshawa	0.68	0.22	0.95	0.35	2.20

Source: 2016 London Household Survey, 2016 Transportation Tomorrow Survey

4.2 Trip Origins and Destinations

Exhibit 4.6 shows a map of the 12 district system used for macro-level analysis in this report. Exhibit 4.7 and Exhibit 4.8 present total London CMA trip matrices of origin-destination flows for the a.m. peak (3-hour; 7 – 10 a.m.) and p.m. peak (3-hour; 3 – 6 p.m.) periods, respectively. Exhibit 4.9 shows the origin-destination trips flows for the off-peak period (18 hours; 10 a.m. – 3 p.m. and 6 p.m. – 7 a.m.). The time period of a trip is based on the reported trip start time from the survey. The total number of London CMA trips (all modes) by time period: a.m. peak period – 317,500; p.m. peak period – 431,700; off-peak period – 882,800; total daily trips – 1,632,500.

Exhibit 4.6: Trip Super Zones

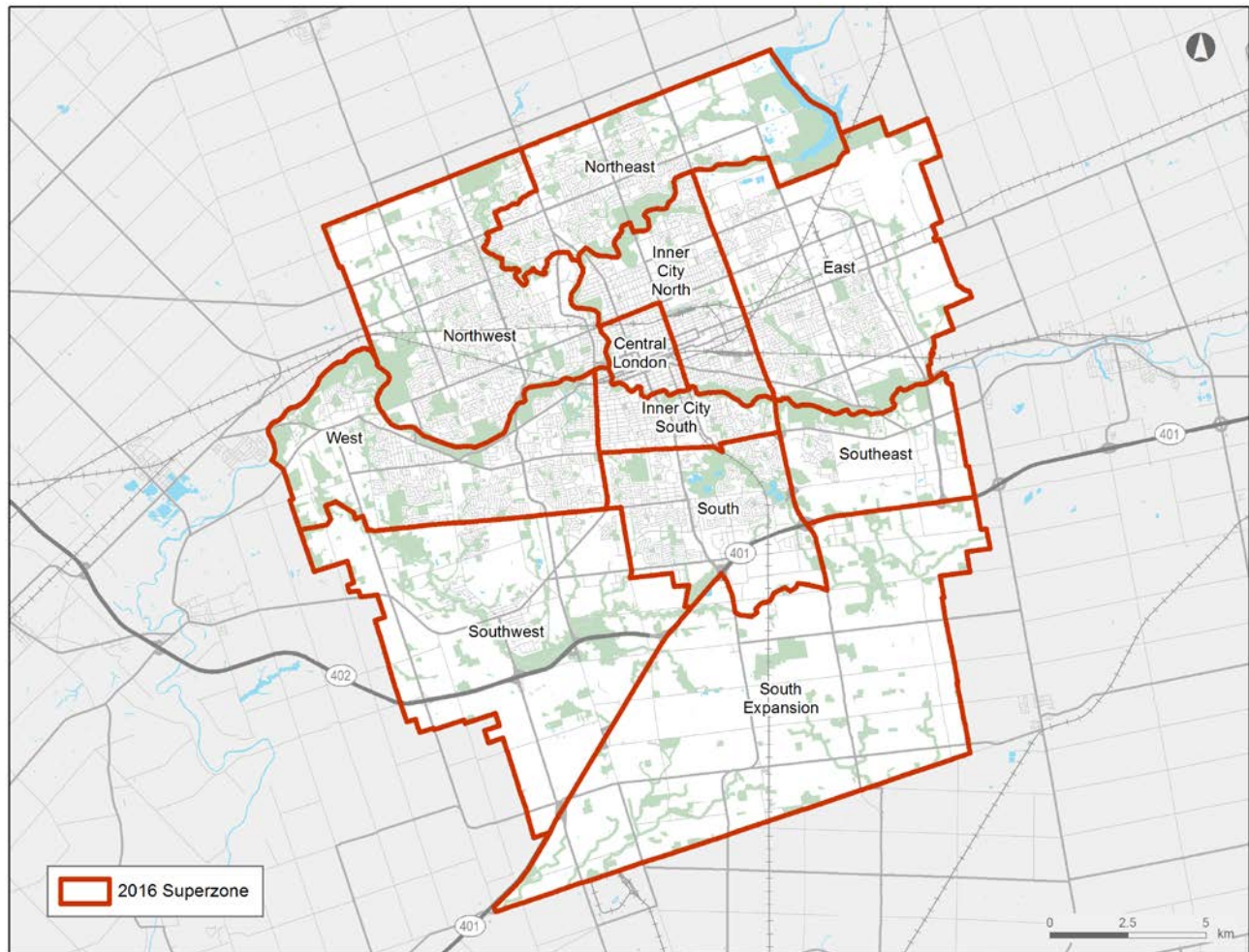


Exhibit 4.10 shows origins for daily trips destined to Western University and Fanshawe College. Exhibit 4.11 shows a.m. peak trip origins for trips destined for the downtown core. Exhibit 4.12 shows the origins and destinations of transit trips during the p.m. peak (3-hour) period.

The origin densities for trips destined to Western University and Fanshawe College are more concentrated around both campuses, reflecting student accommodations in close proximity. This is especially the case for Western University. Downtown destinations have trip origins that are more evenly distributed throughout residential areas of the City, although many also originate in central London. Transit trips are focussed on post-secondary institutions, shopping malls, and the downtown core.

Exhibit 4.7: Trip Origins & Destinations by Super Zone, AM Peak (7:00 – 10:00)

		Destination												TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	
Origin	1. Central London	4,800	2,300	1,100	400	2,900	1,600	800	900	0	500	100	400	15,800
	2. Inner City North	6,100	9,500	1,600	1,500	5,000	6,500	1,400	1,300	0	100	0	1,500	34,500
	3. Inner City South	3,000	1,300	6,900	300	1,900	1,700	600	1,900	200	900	0	900	19,700
	4. North East	2,800	3,100	500	8,400	4,500	2,500	400	700	100	100	100	2,400	25,600
	5. North West	5,800	4,000	1,700	2,500	24,600	3,400	2,300	1,600	100	500	200	3,400	50,000
	6. East	3,700	4,000	800	600	1,800	17,500	700	1,100	200	200	100	1,900	32,600
	7. West	4,300	1,500	2,100	500	5,500	2,100	12,100	3,000	100	1,400	100	3,200	36,000
	8. South	4,100	1,600	3,100	400	1,900	2,100	2,100	11,000	200	900	700	2,200	30,200
	9. South East	200	200	300	0	100	800	0	300	600	0	0	300	2,900
	10. South West	400	200	400	100	800	300	1,200	1,100	0	700	100	700	5,900
	11. South Expn	0	0	100	0	0	0	0	100	0	0	300	200	800
	12. External	4,100	2,000	1,100	900	5,000	4,100	1,500	2,400	100	1,200	400	40,700	63,400
TOTAL	39,200	29,700	19,700	15,800	53,900	42,600	23,100	25,500	1,600	6,500	2,300	57,600	317,500	

Exhibit 4.8: Trip Origins & Destinations by Super Zone, PM Peak (15:00 to 18:00)

		Destination												TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	
Origin	1. Central London	8,300	5,700	2,800	2,700	6,000	4,000	3,900	4,100	200	400	200	3,500	41,900
	2. Inner City North	4,300	13,400	2,500	3,600	4,700	4,700	2,200	2,200	100	700	0	2,700	41,300
	3. Inner City South	1,700	2,300	7,800	700	1,900	900	1,900	4,300	400	700	200	1,800	24,800
	4. North East	1,000	3,000	800	13,200	4,900	2,000	600	700	0	200	100	1,900	28,200
	5. North West	2,400	4,300	2,100	6,800	33,400	2,000	6,100	2,200	200	1,000	0	4,500	65,000
	6. East	2,100	7,600	1,300	4,100	3,800	22,700	2,600	3,800	700	600	100	5,000	54,400
	7. West	1,200	1,200	1,600	400	4,600	900	17,000	2,900	0	2,500	600	2,500	35,500
	8. South	1,800	2,600	2,800	1,000	2,600	2,200	4,500	18,700	600	2,100	500	2,800	42,200
	9. South East	200	200	500	100	100	600	200	500	400	0	0	100	2,800
	10. South West	300	600	600	100	900	600	3,700	2,000	100	2,900	200	1,900	13,800
	11. South Expn	100	200	100	200	200	100	300	1,700	100	300	100	500	3,800
	12. External	1,500	2,700	1,600	2,400	4,400	3,100	3,200	3,000	300	1,000	500	54,100	78,000
TOTAL	24,800	43,900	24,600	35,500	67,500	43,700	46,000	46,100	3,300	12,400	2,500	81,300	431,700	

Exhibit 4.9: Trip Origins & Destinations by Super Zone, Off-Peak (All times except for 7:00 – 10:00 and 15:00 – 18:00)

		Destination												
		1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Origin	1. Central London	19,600	11,600	6,300	4,800	8,700	5,600	5,300	5,400	200	800	0	5,000	73,500
	2. Inner City North	9,100	34,700	3,400	9,500	9,900	17,700	3,500	4,300	400	1,300	700	4,800	99,300
	3. Inner City South	5,100	4,800	13,300	1,300	4,100	2,000	5,700	7,800	600	1,000	500	3,000	49,300
	4. North East	4,200	7,600	1,300	27,700	12,400	4,700	1,600	1,100	100	800	200	3,700	65,300
	5. North West	8,700	11,900	4,600	12,600	76,500	6,000	12,100	3,900	300	2,600	200	9,700	149,100
	6. East	6,700	16,500	3,100	4,300	5,000	41,100	3,100	5,500	1,100	500	500	7,600	95,000
	7. West	4,400	3,600	5,000	1,500	10,400	3,400	27,700	8,800	200	8,500	800	3,000	77,400
	8. South	3,800	4,100	7,400	1,100	3,300	6,200	7,500	33,300	1,000	4,400	2,700	7,200	81,900
	9. South East	300	400	500	200	100	600	100	800	300	100	100	700	4,300
	10. South West	900	1,200	1,700	400	1,900	600	8,000	3,700	0	8,000	300	2,900	29,700
	11. South Expn	200	300	300	300	400	400	700	2,600	100	200	300	1,300	7,100
	12. External	4,300	5,000	2,600	3,600	8,100	6,600	4,700	5,100	600	2,500	1,000	106,800	150,800
	TOTAL	67,300	101,700	49,600	67,300	140,600	94,900	80,100	82,500	5,100	30,700	7,300	155,900	882,800

Exhibit 4.10: Trip Origin Density for Western University and Fanshawe College (Daily)

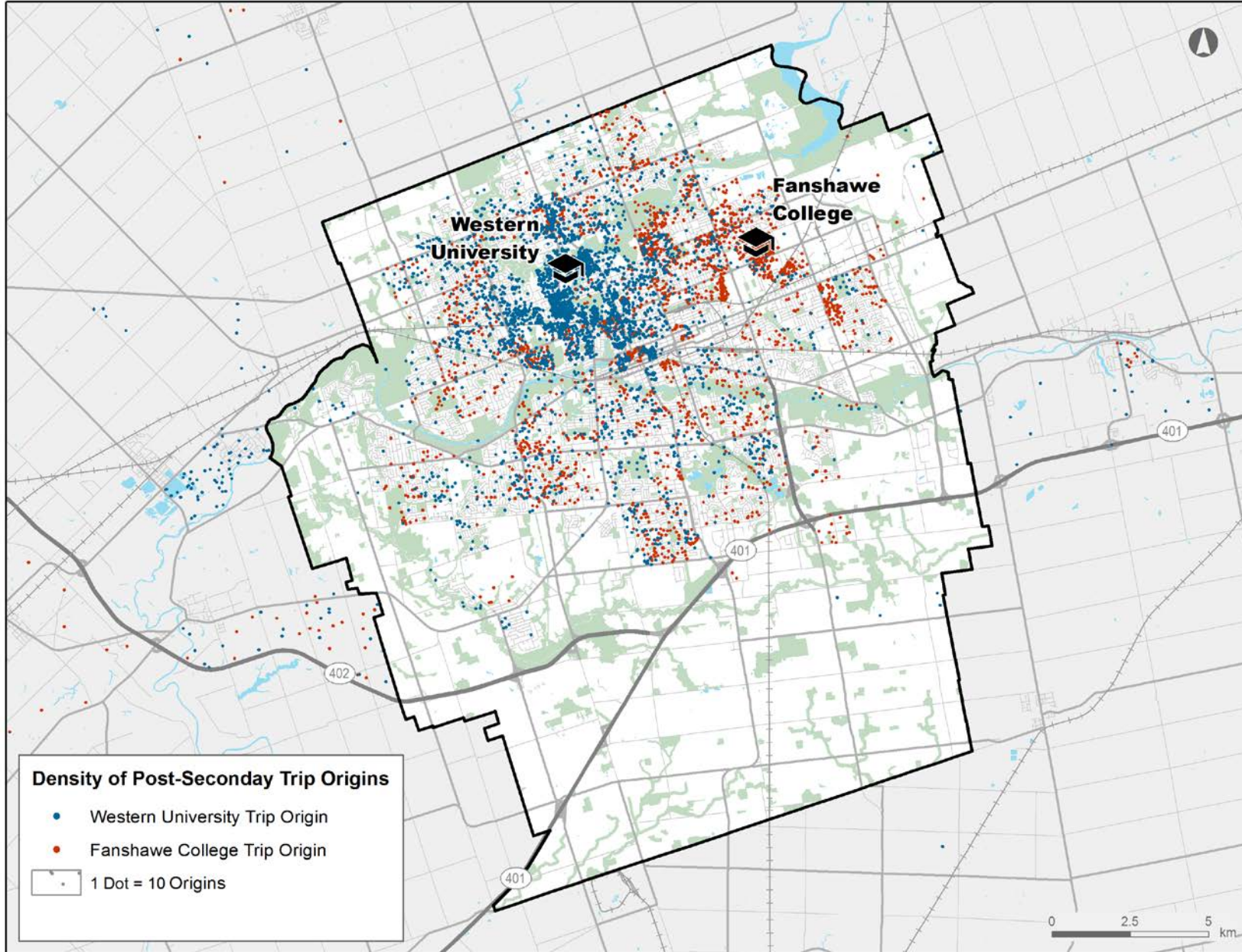


Exhibit 4.11: Trip Origin Density for Downtown London, AM Peak Period (7:00 – 9:59)

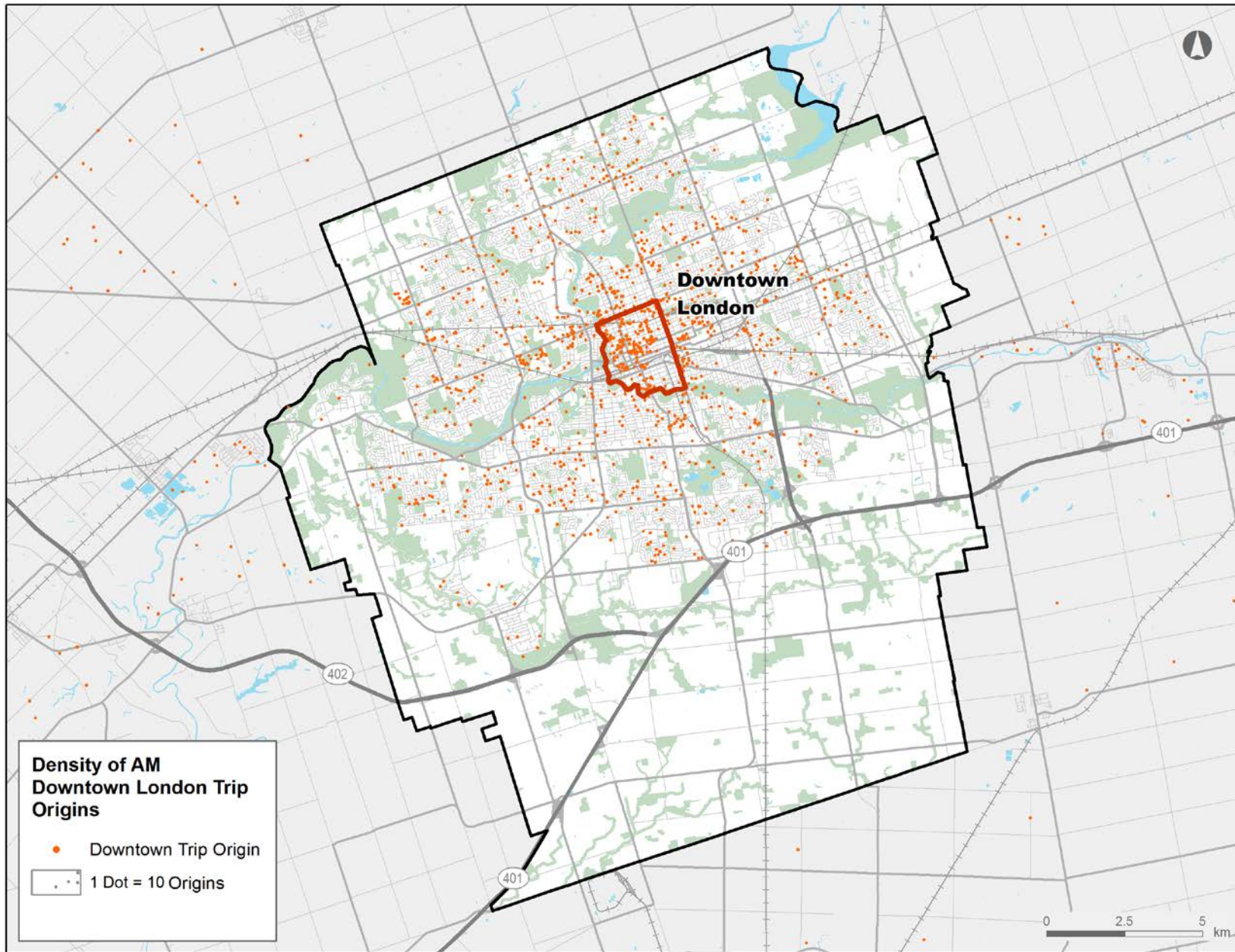
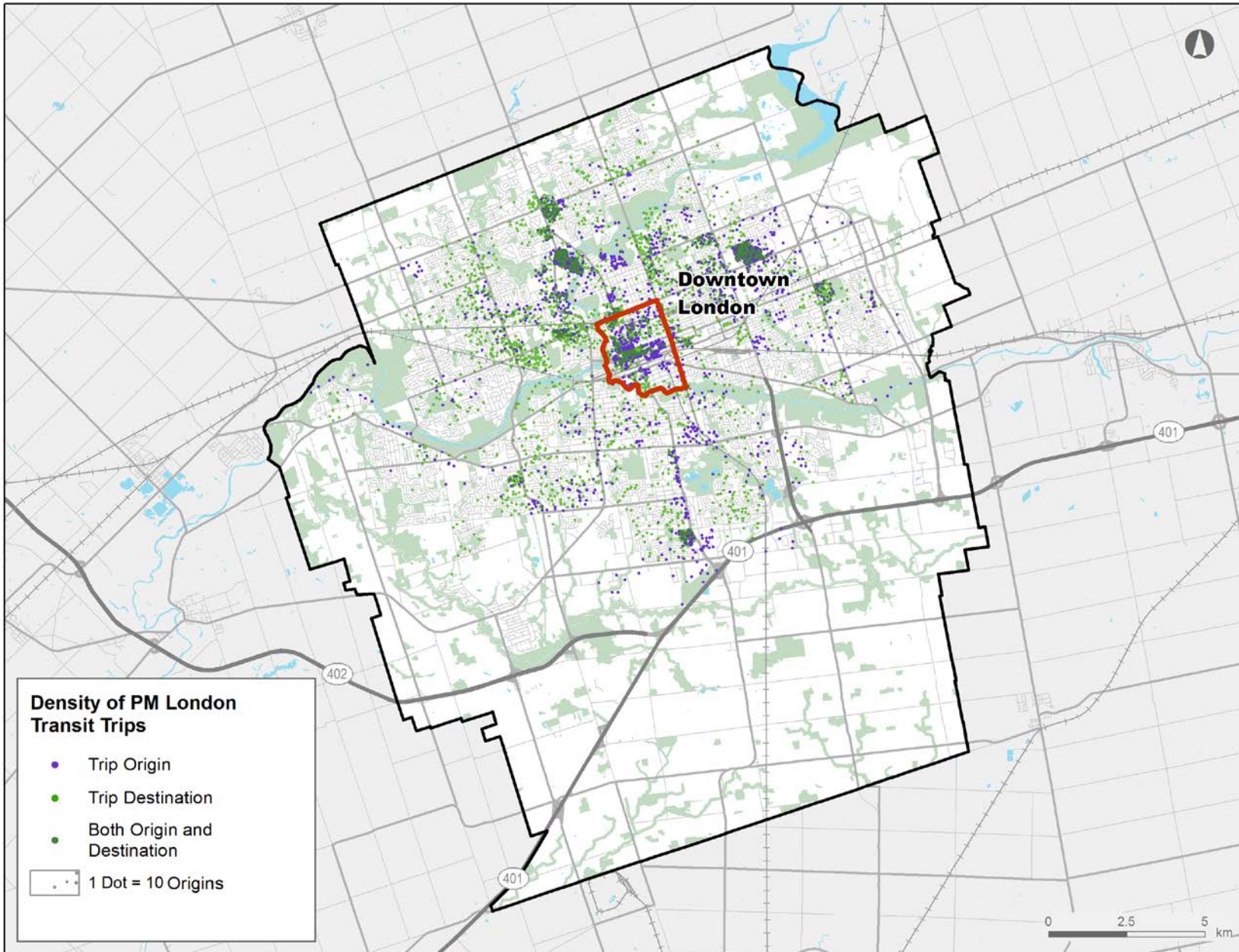


Exhibit 4.12: Transit Trip Origin and Destination Density, PM Peak Period (15:00 – 17:59)



4.3 Trip Distance

Trip distances vary significantly by trip purpose and travel mode. Exhibit 4.13 shows the average trip distance by purpose and mode, while Exhibit 4.14 shows trip distance by purpose as a percentage of daily trips by purpose. Distance is defined as the straight-line distance between the centre of the origin zone and destination zone. Figures reflect all household survey records for residents of the City and the CMA, including trip attracted to areas external to the London CMA.

Work trips are the longest with an average trip length of 9.1 km. School trips are the shortest with an average trip length of 4.2 km, although it has the highest segment trip distance of 11.9 km for auto driver trips largely due to Western and Fanshawe students commuting from outlying areas. Other trip types, HBO and NHB, have average trip lengths of 5.1 km.

Average trip distances by mode follow a typical pattern with Auto Driver (all trip purposes) exhibiting the longest average distance at 6.7 km, closely followed by auto passenger. Walking trips have the shortest average trip length at 0.9 km.

Exhibit 4.13: Average Trip Distance by Purpose and Mode (km)

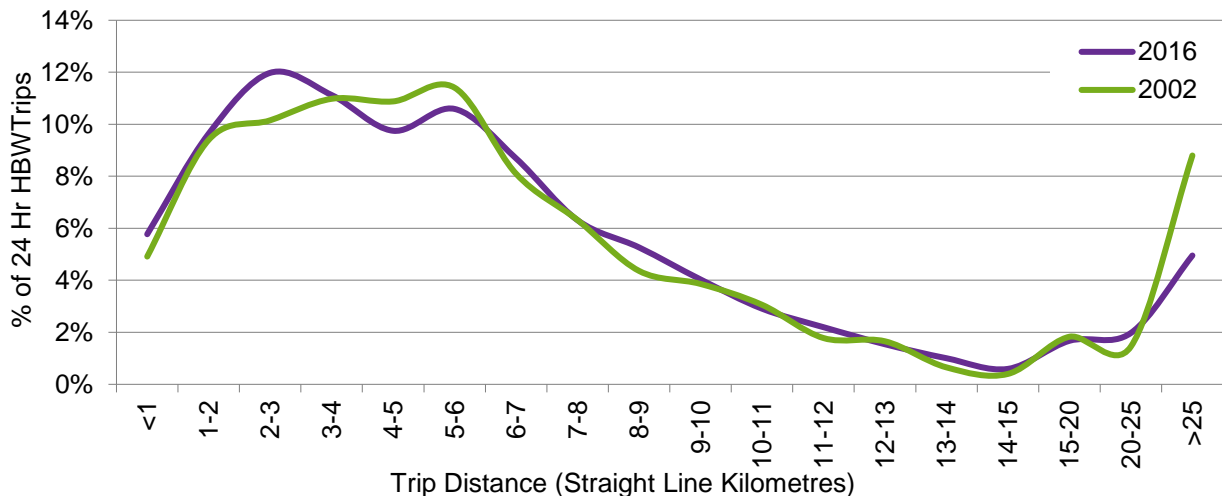
Purpose	Auto Driver	Auto Passenger	Transit	Walk	Bicycle	Other	Total
City of London							
HBW	8.1	5.6	5.0	1.4	3.4	6.9	7.2
HBS	5.7	3.3	4.0	0.9	2.2	4.3	3.1
HBO	4.4	5.0	3.7	0.8	2.4	3.9	4.0
NHB	5.2	4.7	4.4	0.9	3.2	6.8	4.7
TOTAL	5.5	4.8	4.2	0.9	2.7	4.8	4.7
London CMA							
HBW	10.2	6.3	5.0	1.4	3.3	8.9	9.1
HBS	11.9	4.4	4.4	0.9	2.1	4.9	4.2
HBO	5.6	6.6	3.7	0.8	2.4	5.1	5.1
NHB	5.5	5.0	4.3	0.9	3.2	8.1	5.1
TOTAL	6.7	6.0	4.3	0.9	2.7	5.8	5.8

Exhibit 4.14: Distribution of Trip Distance by Purpose—London CMA

Distance Range (km)	HBW	HBS	HBO	NHB	Total
<1	5%	24%	19%	20%	17%
1-2	9%	22%	19%	15%	16%
2-3	11%	14%	13%	14%	13%
3-4	10%	9%	10%	10%	10%
4-5	8%	7%	8%	8%	8%
5-6	9%	7%	6%	7%	7%
6-7	7%	4%	5%	6%	5%
7-8	5%	2%	3%	4%	4%
8-9	5%	2%	3%	3%	3%
9-10	4%	3%	2%	2%	3%
10-11	2%	1%	2%	2%	2%
11-12	2%	1%	1%	1%	1%
12-13	2%	0%	1%	1%	1%
13-14	1%	0%	1%	1%	1%
14-15	2%	0%	1%	0%	1%
15-20	4%	1%	2%	1%	2%
20-25	5%	0%	1%	1%	2%
>25	9%	3%	3%	3%	4%

Exhibit 4.15 shows the trip length distribution of work trip lengths, comparing results from the current 2016 survey with the 2002 survey. The highest proportion of trips is in the 1 to 6 km range, with the proportion of trips decreasing with longer distances and an increase at trips greater than 20 km. Over the 14-year period between 2002 and 2016, the trip lengths and trip length distributions have remained relatively constant, despite the significant growth in the City over this time period.

Exhibit 4.15: 2002 and 2016 Home-Based Work Trip Distance (City of London residents)



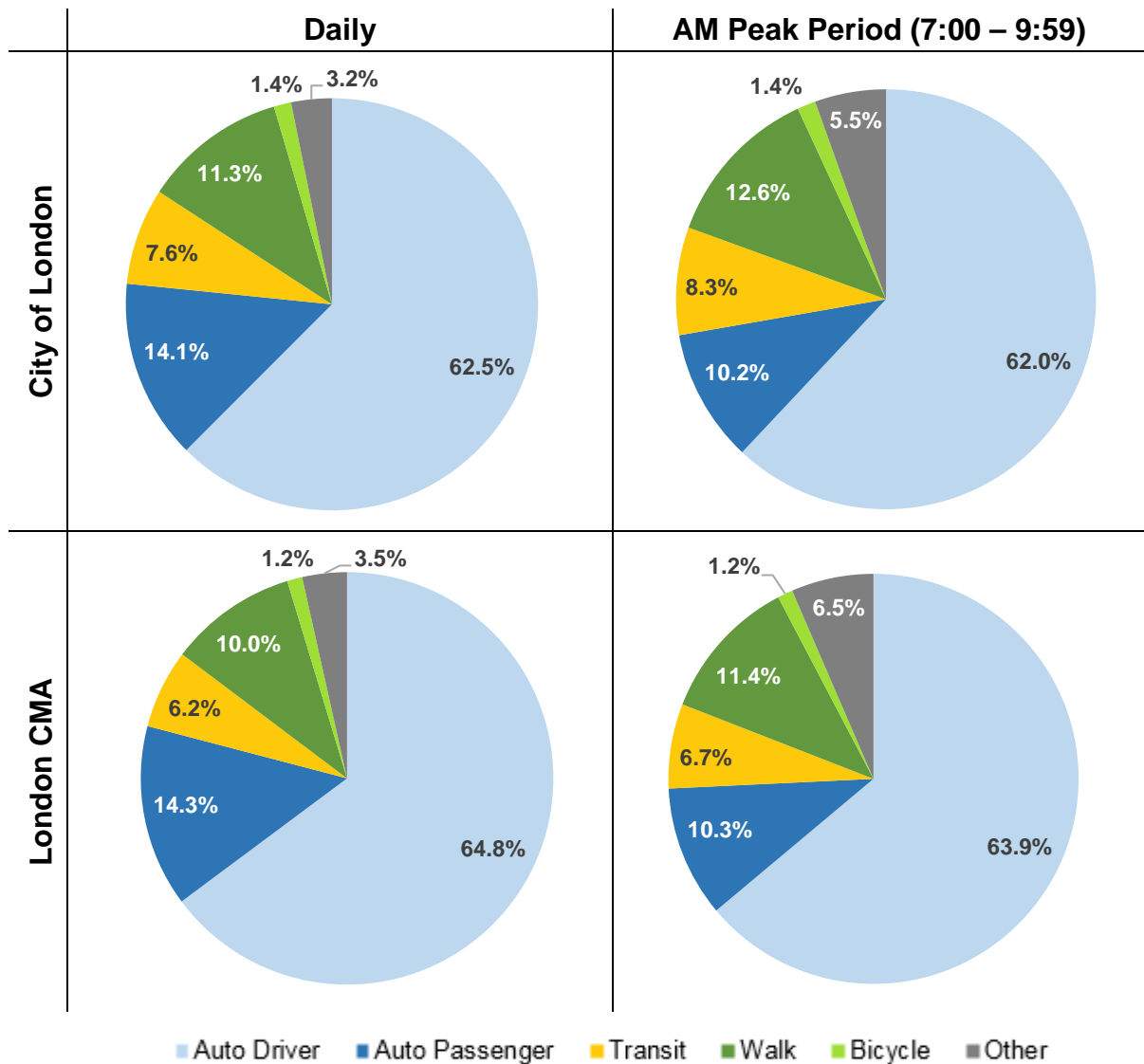
4.4 Mode Share

Exhibit 4.16 presents a.m. peak period and daily mode share statistics for the City of London and the entire London CMA, as recorded in the travel survey. Auto driver is the dominant travel mode in the City of London with 62.5% of total daily trips, followed by auto passenger at 14.1%. This share of auto travel is lower than other medium-sized urban areas in southern Ontario, such as Waterloo and Hamilton (71% and 67%, respectively, as recorded in the 2011 Transportation Tomorrow Survey). The daily share of transit trips, including trips made by non-Census post-secondary students of Western and Fanshawe, is 7.6% among City residents and 6.2% across the entire CMA¹. This level of transit use also compares well among cities of similar size to London, with transit shares in Waterloo and Hamilton 5% and 7%, respectively, based on 2011 data. Ottawa-Gatineau—a much larger urban region with an existing rapid transit system—recorded a daily transit share of 14% in 2011. The daily share of transit trips for elementary/secondary students and post-secondary students are 6.2% and 37.2% respectively.

Additional information on mode share by time of day and trip purpose, as well as trends since the 2002 travel survey, are shown in the subsections below.

¹ Due to the significant under-sampling of part-time Fanshawe students, the expansion process results in an over-prediction of school trips by transit for Fanshawe students. The results of the survey analysis should be interpreted in consideration of this limitation; however, this is minimal impact on the overall mode share. The over-prediction is accounted for in the model development process.

Exhibit 4.16: City of London and London CMA Mode Share—Daily and AM Peak Period



4.5 Time of Day

Trips by time period and mode are shown in Exhibit 4.16. There are approximately 1.63 million daily trips in the London CMA by all modes, with 19.4% or 317,500 trips in the a.m. peak (3-hour) period, 26.4% or 431,700 trips in the p.m. peak and 54.1% or 882,800 trips in the off-peak (18-hour) period.

Mode share is relatively constant throughout the day despite the increased trip making during a.m. and p.m. peak periods. At 21,190 trips, transit attains its highest mode share of 6.7% in London CMA during the a.m. peak period, although this is not much higher than the overall daily mode share of 6.2%. Despite the transit mode share being highest in the a.m. peak period, the absolute number of transit trips is greater during the p.m. peak period at 25,029 given the higher overall travel during the p.m. peak period. There are 54,920 transit trips during the off-peak (18-hour) period.

Exhibit 4.17: Trips by Time Period and Travel Mode—London CMA

Mode		Period			
		AM Peak	PM Peak	Off-Peak	DAILY
Auto Driver	Trips	202,880	284,973	570,288	1,058,140
	% by Mode	63.9%	66.0%	64.6%	64.8%
	% by Time	19.2%	26.9%	53.9%	100.0%
Auto Passenger	Trips	32,843	56,998	143,017	232,858
	% by Mode	10.3%	13.2%	16.2%	14.3%
	% by Time	14.1%	24.5%	61.4%	100.0%
Transit	Trips	21,190	25,029	54,920	101,139
	% by Mode	6.7%	5.8%	6.2%	6.2%
	% by Time	21.0%	24.7%	54.3%	100.0%
Walk	Trips	36,170	46,024	81,765	163,958
	% by Mode	11.4%	10.7%	9.3%	10.0%
	% by Time	22.1%	28.1%	49.9%	100.0%
Bicycle	Trips	3,804	5,786	9,773	19,363
	% by Mode	1.2%	1.3%	1.1%	1.2%
	% by Time	19.6%	29.9%	50.5%	100.0%
Other	Trips	20,604	12,863	23,073	57,074
	% by Mode	6.5%	3.0%	2.6%	3.5%
	% by Time	36.1%	22.5%	40.4%	100.0%
TOTAL	Trips	317,489	431,673	882,835	1,632,532
	% by Mode	100.0%	100.0%	100.0%	100.0%
	% by Time	19.4%	26.4%	54.1%	100.0%

Note: There are 534 trips with unknown time periods made using the “other” mode omitted from this table. The total includes the records.

4.6 Trip Purpose

Trips and mode shares by trip purpose are shown in Exhibit 4.17. As noted in the trip rate section above, HBO trips account for the most daily trips at 49%, followed by NHB at 25%, HBW at 19%, and HBS at 8%.

Transit mode share is greatest for school trips at 25.1%, which is significantly higher than the next highest mode share, which is for work trips at 6.6%. The transit mode share for HBO and NHB trips is 3.9% and 4.1%, respectively. In absolute terms, school trips account for 33,698 transit trips or 33.3% of all transit trips, which is higher than the 20,048 transit trips for work trip purposes (19.8% of all transit trips).

Daily work trip travel is dominated by the auto mode, with 79.9% of work trips by auto driver and an additional 7.1% by auto passenger.

Cycling and walking trips are most prevalent for home-based other trips; 44.1% of cycling trips and 51.3% of walking trips are for “home-based other” purposes.

Exhibit 4.18: Trips by Purpose and Travel Mode—London CMA

Mode		Purpose				
		HBW	HBS	HBO	NHB	TOTAL
Auto Driver	Trips	244,058	11,588	523,075	279,419	1,058,140
	% by Mode	79.9%	8.6%	66.0%	69.8%	64.8%
	% by Purpose	23.1%	1.1%	49.4%	26.4%	100.0%
Auto Passenger	Trips	21,724	22,612	133,738	54,783	232,858
	% by Mode	7.1%	16.8%	16.9%	13.7%	14.3%
	% by Purpose	9.3%	9.7%	57.4%	23.5%	100.0%
Transit	Trips	20,048	33,698	31,071	16,321	101,139
	% by Mode	6.6%	25.1%	3.9%	4.1%	6.2%
	% by Purpose	19.8%	33.3%	30.7%	16.1%	100.0%
Walk	Trips	11,709	34,873	84,159	33,217	163,958
	% by Mode	3.8%	26.0%	10.6%	8.3%	10.0%
	% by Purpose	7.1%	21.3%	51.3%	20.3%	100.0%
Bicycle	Trips	5,273	3,081	8,534	2,474	19,363
	% by Mode	1.7%	2.3%	1.1%	0.6%	1.2%
	% by Purpose	27.2%	15.9%	44.1%	12.8%	100.0%
Other	Trips	2,777	28,437	11,963	13,897	57,074
	% by Mode	0.9%	21.2%	1.5%	3.5%	3.5%
	% by Purpose	4.9%	49.8%	21.0%	24.3%	100.0%
TOTAL	Trips	305,589	134,290	792,540	400,113	1,632,532
	% by Mode	100.0%	100.0%	100.0%	100.0%	100.0%
	% by Purpose	18.7%	8.2%	48.5%	24.5%	100.0%

4.7 Trends²

Exhibit 4.18 compares the share of trips by mode of travel as recorded in the 2002 and 2016 household travel surveys. The table highlights three noteworthy trends:

- a decrease in auto driver share from 2002 and 2016;
- an increase in walking and cycling trips in 2016; and
- a moderate increase in transit mode share between 2002 and 2016.

² In interpreting these trends, it should be noted that there are substantial differences in the survey instruments used year-by-year. The 2002 and 2009 surveys were both administered over the telephone, which can serve to bias responses towards an older age profile. By comparison, the 2016 survey was administered over the internet, with follow-up telephone surveys to capture those without internet access. The 2016 survey also collected a far richer sample of student travel data than either the 2002 or 2009 surveys. Nearly 1,600 students completed the survey, compared to 300 in 2002. No targeted student surveys were completed in 2009; post-processing adjustments were instead applied to reflect their unique travel patterns.

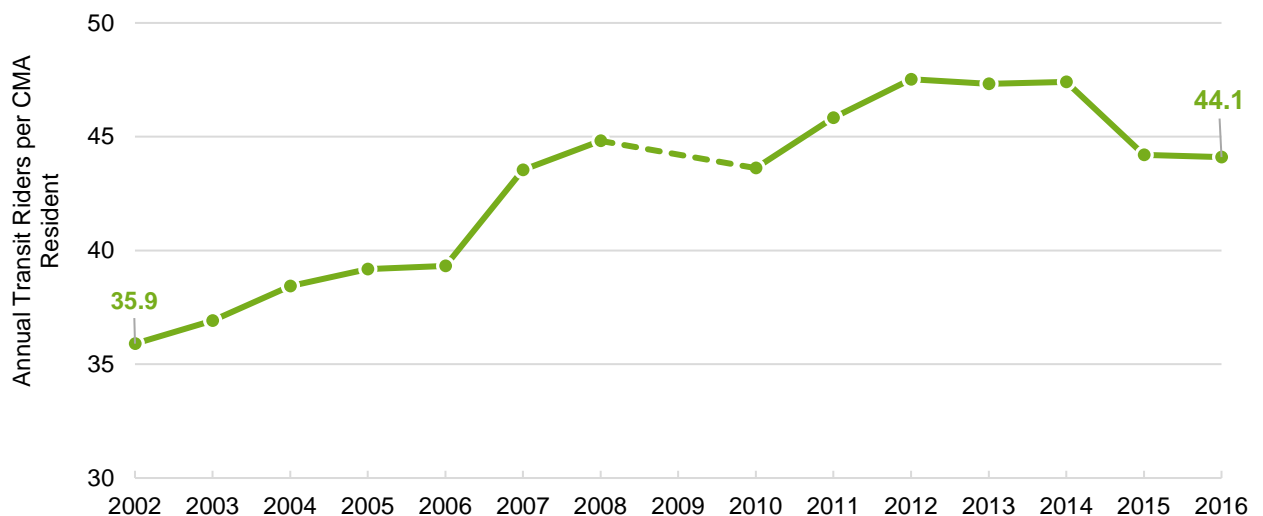
Exhibit 4.19: Daily Mode Share: 2002 & 2016 Household Travel Surveys—City of London

	2002	2016	2016-2002
Auto Driver	73.3%	62.5%	-10.8
Auto Passenger	9.5%	14.1%	+4.6
Transit	7.1%	7.6%	+0.5
Walk/Cycle	7.3%	12.6%	+5.3
Other	2.9%	3.2%	+0.3

The decrease in auto driver mode share and corresponding increase in walk and cycle mode share is likely to be a combination of two factors. First, transportation tastes and preferences are changing across broad segments of the population. Compared to 14 years ago, greater planning emphasis has been placed on encouraging walking and cycling, and people are more likely to walk or cycle to work or leisure. In fact, the only demographic groups for whom walking and cycling have decreased is among youth, a finding consistent with a recent travel trend study for the National Capital Region. Second, the web-based survey instrument introduced in the 2016 Survey is likely to have increased the likelihood of survey participants recording their short-distance walking and cycling trips in comparison to previous surveys.

The moderate increase in transit mode share over the past 14 years is consistent with patterns observed in other cities in Ontario. To benchmark this trend, Exhibit 4.20 charts the change in annual London Transit Commission ridership per capita—a close surrogate for transit mode share. Since 2002, transit ridership per capita has increased by approximately 23%. By comparison, the share of daily transit trips has increased approximately 8%. As previously noted, total trip rates are higher in the 2016 survey compared to the 2002 survey, which accounts for the slower growth rate in transit mode share.

Exhibit 4.20: Annual Transit Ridership Per Capita: 2002 to 2016

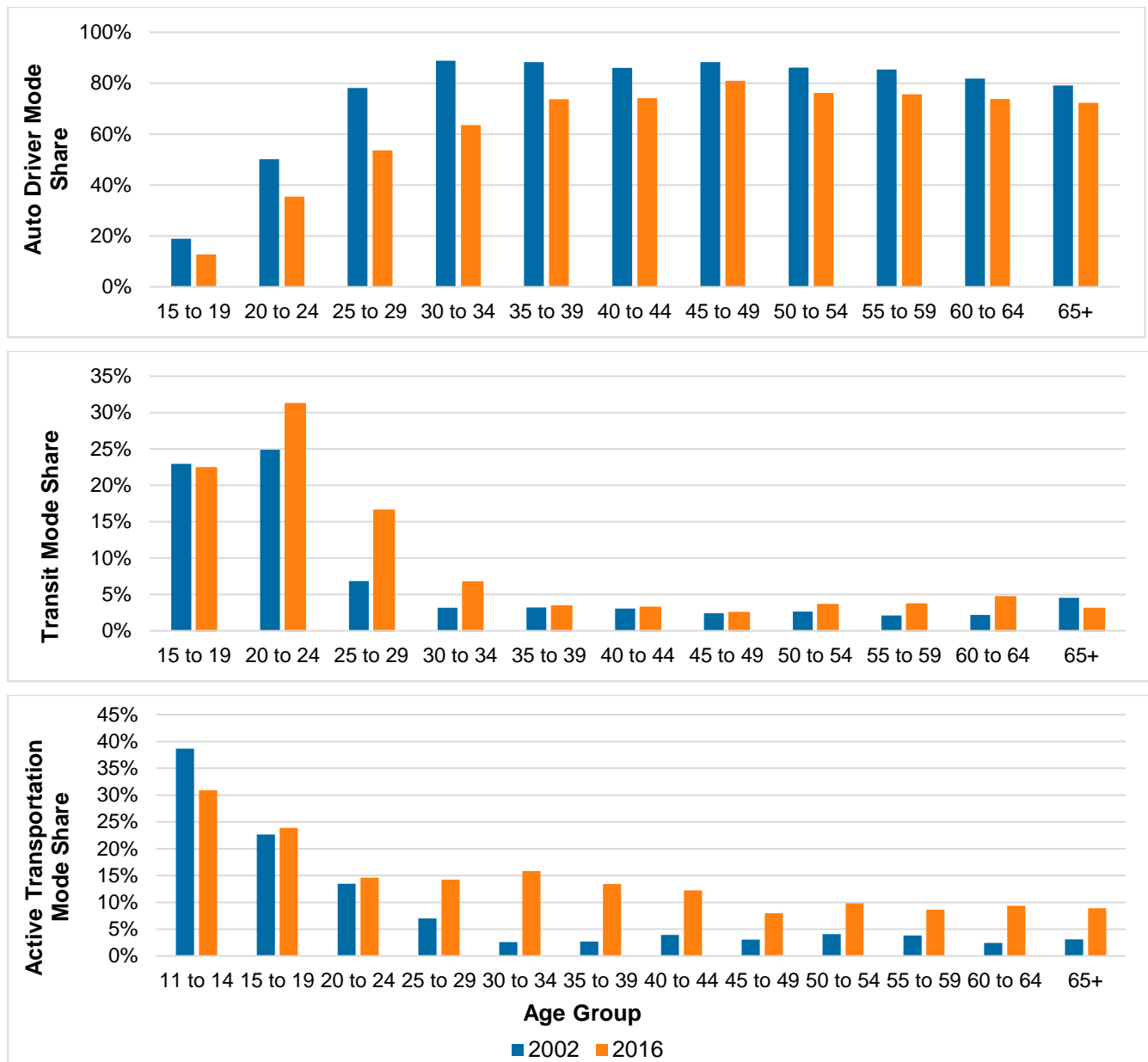


Source: Canadian Urban Transit Agency Factbooks; CANSIM Table 051-0056

Note: A labour disruption in 2009 substantially reduced transit ridership for that year. This chart treats 2009 as an interpolation between 2008 and 2010.

Exhibit 4.20 compares mode share by age for auto driver, transit, and active modes (cycling and walking) by age cohort respectively. There is a noticeable decrease in the auto driver mode share in 2016, especially for those in the 25 to 34 age cohort. The trends in transit are somewhat different. Middle age cohorts have experience little change in transit mode share, while those in the 25 to 29 cohort are using transit substantially more. While the middle age cohorts may not be taking transit more, active transportation mode share has increased substantially in all age groups

Exhibit 4.21: Mode Share Changes by Age, 2002 and 2016—City of London

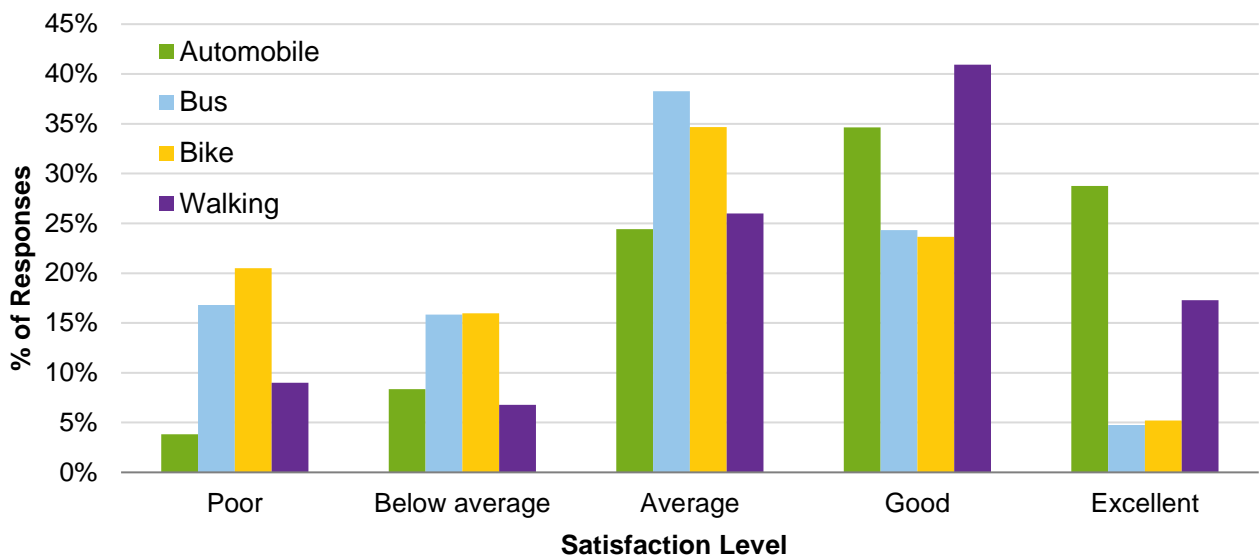


4.8 Attitudes and Perceptions

As part of the travel survey, optional attitudinal questions were provided at the end of the trip-making portion of the survey. This section discusses resident attitudes towards and perceptions of the transportation system. It is important to note that questions were asked at a household level, meaning that attitudes and perceptions may be reflective of the individual responding to the survey and not reflective of each member of the household. This section also excludes students living on campus.

Exhibit 4.21 highlights that the automobile continues to meet transportation needs for those with access to one. Approximately 65% felt that the car was either “excellent” or “good” at meeting their transportation needs, whereas fewer than 5% ranked it as “poor.” Cycling and walking received the highest percentage of “poor” rankings.

Exhibit 4.22: How well transportation trends are served by mode



Not surprisingly, convenience and travel time were among the most important factors influencing transportation decisions, as highlighted in Exhibit 4.23. For most, the car is the most convenient and provides the fastest travel time.

Exhibit 4.23: Top Five Most Important Factors Influencing Transportation Choice

Factors	% of Households
Convenience	82%
Travel time	75%
Weather	35%
Availability of parking	29%
Bus waiting time	24%

Exhibit 4.23 highlights the percentage of households that would consider changing modes. Of interest, almost half of households with auto as the primary mode said they would consider switching modes, as did almost half of households with bicycle as the primary mode. Transit riding households were those least likely to consider switching modes, however, there could be other factors at play, including the inability to access a car.

Exhibit 4.24: Percentage of Households that Would Not Consider Switching Modes

Primary Mode	% of Households
Auto	48%
Carpool	37%
Transit	33%
Bicycle	47%
Walk	45%

Exhibit 4.24 and Exhibit 4.25 examine households that would consider switching modes with auto driver and transit as the primary mode respectively. The car still dominates amongst drivers and transit riders willing to change modes with 29% of auto driver households stating that they would switch to carpool and 50% of transit riders stating that they would consider switching to car. Very few households would consider switching to cycling or walking.

Exhibit 4.25: Percentage of Auto Drivers Who Would Consider Switching Modes

Mode Switch	% of Households
To Carpool	29%
To Transit	14%
To Bicycle	8%
To Walk	2%

Exhibit 4.26: Percentage of Transit Riders Who Would Consider Switching Modes

Mode Switch	% of Households
To Auto	50%
To Carpool	11%
To Bicycle	4%
To Walk	2%

Households were asked to rank a variety of potential transportation system improvements, shown in Exhibit 4.26. While building new major roadways received the highest percentage of “very important” ratings out of all improvements at 38% and the lowest number of “not important” ratings at 11%, there are several transit improvements that received high ratings. These include developing a rapid transit system and improving the frequency of bus service, which were rated as “very important” by 32% and 31% of households respectively. Building more bike lanes was also rated 3 or above by 72% of respondents.

Exhibit 4.27: Ranking of Potential Improvements

Future Improvements	Rank				
	Not Important			Very Important	
	1	2	3	4	5
Transit					
Adding new transit routes	20%	9%	23%	19%	29%
Extending bus service later into the night	25%	12%	20%	19%	24%
Improving bus service with more frequent service	17%	8%	22%	22%	31%
Implementing a rapid transit system	20%	9%	18%	20%	32%
Providing financial incentives to encourage transit	22%	14%	26%	20%	18%
Extending bus service earlier in the morning	22%	14%	22%	18%	24%
Road					
Widening existing roadways	14%	13%	24%	23%	27%
Connecting missing parts of London streets	16%	12%	25%	23%	24%
Building new major roadways through and/or around London	11%	10%	19%	22%	38%
Adding High Occupancy Vehicle lanes on key arterial roads	32%	20%	23%	13%	11%
Building new carpool lots	30%	22%	28%	12%	8%
Providing financial incentives to encourage carpooling and other trip reduction programs	25%	17%	28%	18%	12%
Cycling					
Building more bike lanes and separated bikes lanes and multi-use pathways in London	17%	11%	20%	22%	30%
Providing bike parking at key destinations	20%	12%	23%	23%	23%
Providing bike sharing at key destinations	30%	17%	26%	15%	13%

5 Summary

The 2016 London Household Travel Survey was successful in meeting its survey objectives, providing detailed travel origin-destination and socioeconomic/demographic for 5,828 households, exceeding the survey target of 5,700 completed surveys. In addition, 1,596 surveys were completed by post-secondary school students at Western University and Fanshawe College, ensuring appropriate representation of a key market segment that is typically significantly under-reported in conventional household surveys. A total of 7,424 travel surveys were completed.

A new and next-generation web-based household travel survey approach was used, given increasing challenges in achieving adequate representation of all segments of the population and other survey bias issues with conventional telephone-based surveys. A web-based survey was felt to reduce respondent fatigue associated with completing long and detailed travel surveys (typically >15 minutes in duration) and allow better recall of all trips made by the individual responding and all other members of the household, compared to a telephone-based survey. This also addressed the decreased use of land-line telephones and increased cell-phone use, and was able to better capture young adults in the survey—traditionally a very difficult market segment to capture.

The survey process and methodology were designed to minimize survey bias and ensure good representation of all segments of the population, notably young adults and post-secondary students. The validation of the survey ensured that the survey sample and expansion of the survey to represent the total population is representative and reflects 2016 City of London population estimates. This ensured that the age, gender, employment status, place of residence, and place of work categories in the survey were representative of the total population.

Total daily trip making of 3.4 trips per household was higher than in previous London surveys. However, validation of the survey against third party data sources (e.g. traffic and transit counts) shows that this trip rate is appropriate, and likely more accurate than in previous surveys. The web-based survey instrument is thought to have reduces survey bias and survey under-reporting compared to previous telephone based approaches. Thus, an unknown portion of the increase in trip making rate may be due to the use of a different survey instrument that is better able to capture non-work, non-school trips (home-based-other and non-home-based trips) which are difficult to recall in a telephone survey with one person responding for all members of the household. Similarly, the 2016 web-based survey also resulted in significantly higher walk and bicycling trip rates, as these trips are typically under-reported in travel surveys, but the share of trips made by active modes is increasing.

The daily transit mode share for the City of London was estimated in the survey to be 7.6%. This shows an increase from 7.1% in the 2002 London travel survey. The annual transit trips per capita (total transit ridership divided by total

population) has also increased by 23% over this 14-year period from 35.9 to 44.1.

Overall, the 2016 London travel survey provides a solid information base for current and future transportation planning and supporting transportation infrastructure investment planning and decision making, policy and strategic-level analyses, and transportation model development, among other applications.

Appendix A

Survey Questionnaire

2016 London Travel Survey - Final October 28, 2016

The London Travel Survey is an important study to understand how Londoners move around in the London area—by car, bike, on foot or public transit. Your input will help us understand the City's transportation needs.

This data is being collected for the City of London by IBI Group, a transportation planning and engineering firm. All information collected will be completely confidential and protected under the *Municipal Freedom of Information and Protection of Privacy Act*, and will only be used anonymously to represent travel patterns.

To start, we need to collect some information about you and where you live. Please note, progress of this survey is saved after each question and you may resume your progress from where you left off at any time by using your survey passcode.

Please click on the > button below to start the survey.

A1. Please confirm that your place of residence is [address—pulled from pre-entered data associated with survey code]?

- Yes (go to A3)
- No

A2. What is your current place of residence?

Please enter your specific address.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- Address/Municipality

A3. What type of dwelling do you live in?

- Single-detached house
- Semi-detached house
- Row house / townhouse
- Apartment (including condominiums and houses divided into two or more units)
- Other (specify)

A4. How many people, including yourself, live in your household?

Please provide a numerical value from 1 to 10.

- [number: n_person from 1 to 10]

A5. How many motor vehicles are available to your household, including owned, leased, and company vehicles?

Please provide a numerical value from 0 to 20.

- [number from 0 to 20]

B2. How many bicycles are available in your household?

Please provide a numerical value from 0 to 20.

- [number from 0 to 20]

Now we need some details about all members of your household.

B1. To help keep track of the members of your household, provide a name or description for the next member of your household, (e.g. husband, daughter, roommate). We will use this name or description later in the survey. Please start with yourself.

Name	Relationship	Gender
------	--------------	--------

Text box: name of person 1	Drop down: Self	Drop do Male/Fe o Respo
Text box: name of person 2, 3, etc...	Drop down: Husband/Wife/Daughter/Son/Mother/Father/Grandmother/Grandfather/Grandchild/Roommate / Extended Family	Drop do Male/Fe o Respo

***Person loop start**

Now we are going to ask a few questions about [yourself/name of person 2/etc...].

B3.(Ask for each member Ag 16+) [Do you]/[Does he]/[Does she]/[Do they] have a driver's licence?
(choose pronoun based on person's gender response)

- Yes
- No

B4. How [do you]/[does he]/[does she]/[do they] pay for transit when taking public transportation? (choose pronoun based on person's gender response)

- Cash
- Tickets
- Monthly Pass
- Tuition Based Pass
- Other
- Do not use transit

B5. (Ask if B4 = Yes) [Do you]/[Does he]/[Does she]/[Do they] have a car-sharing membership in the City of London? (choose pronoun based on person's gender response)

- Yes
- No

B6. Ask for each member Ag 14+ [Are you]/[Is he]/[Is she]/[Are they] employed? (choose pronoun based on person's gender response)

- Full-time employee
- Part-time employee
- Stay at Home (skip to B12)
- Retired (skip to B12)
- Not employed (skip to B12)

B7. What is [your]/[his]/[her]/[their] occupation? (choose pronoun based on person's gender response)

Mouse over the term in blue for a definition if needed. (mouseover in paraenthesis)

- Management (Legislators, government officials, managers)
- Business, Finance & Administration (Accountants, consultants, administrators, clerical staff)
- Natural & Applied Sciences (Scientists, engineers, architects, planners, surveyors, IT, mathematicians, computer & science technicians)
- Health (Physicians, dentists, veterinarians, medical specialists, therapists, pharmacists, dieticians, nurses, medical technicians & assistants)
- Education, Law & Social, Community & Government Services (Professors, teachers, instructors, judges, lawyers, notaries, counsellors, psychologists, social workers, clergy, firefighters, police officers)
- Art, Culture, Recreation and Sport (Librarians, writers, creative and performing artists and technicians, creative designers and craftspersons, athletes, coaches and referees)

- Sales & Service (Retail & technical sales, insurance and real estate agents, chefs, cooks, cleaners, butchers, bakers, hairstylists, food & beverage, security, tourism, customer service, cashiers, clerks & attendants)
- Trades, Transport & Equipment Operators (Construction contractors, tradespeople, machinists, pilots, flight crew, drivers, equipment operators, vehicle maintenance, manual labourers)
- Natural Resources, Agriculture (Logging, forestry, farming, fishing, mining, and oil workers, logging machine operators, harvesters)
- Manufacturing & Utilities (Processing, manufacturing, assembly and fabrication activities and labourers)
- Other

B8. Where is [your/their] usual place of work?

Please enter a specific address, business, landmark, or point of interest.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]
- [Checkbox] [I/he/she/they] usually work from home [if checked, copy home location to usual work location]

B9. [Do you]/[Does he]/[Does she]/[Do they] have free parking at the usual place of work?

- Yes (skip to B11)
- No

B10. How much [do you]/[does he]/[does she]/[do they] pay for monthly parking?

- [numerical text entry]
- Park in other free parking
- Does not drive to work
- Don't know

B11. [Do you]/[Does he]/[Does she]/[Do they] have bike parking at the usual place of work?

- Yes
- No
- Don't know

B12. [Are you]/[Is he]/[Is she]/[Are they] a student? (choose pronoun based on person's gender response)

- Full-time student (If B6 indicates full-time employee, warn user this combination is not allowed)
- Part-time student
- Not a student (skip B13)
-

B13. Where is the location of the school?

- [drop down school list—see end of survey for the list used]

***LOOP to person loop to capture data about everyone in the household (n_person)**

Reporting date assignment

This concludes the first part of the survey. You will be asked to report ALL trips made by you and every member of your household (aged 11 and over) at a specified date that will be sent to you. Please have all members of your household aged 11 and over, including yourself, record all trips in the 24 hour period starting at 4:00 a.m. on the designated day and ending at 4:00 a.m. the following day.

Please enter an email address for us to contact you. We will send you a reminder email the day before the survey, on the day of the survey, and after the survey to remind you to complete the survey. We will also

use this email address to contact you if you are one of the winners of the lucky draw. Your email address will not be used for any other purpose, will not be shared with the City or any third-parties and will be deleted from the database once the lucky draw has been completed.

Enter Email:

- [text box]
-
-

Trip Reporting

Welcome back. In the following questions, we want to collect information on all trips made by members of your household aged 11 and over. In this section, a "trip" is considered to have one origin and one destination. Stops for shopping and dropping/picking up someone are considered separate destinations, and each stop is a new trip. Transfers on a trip for changing between one form of transportation and another are part of the same trip.

For instance – Wednesday, Morgan went to work. She walked her daughter to daycare, then returned home by bus. She drove to work, and on her way home, she drove to her son's school to pick him up. Later that evening she went out to pick up groceries. After that, she did not leave home for the rest of the day.

In this case, Morgan made seven trips on Wednesday:

- Trip 1. Home to Daycare (by walk)
- Trip 2. Daycare to Home (by bus)
- Trip 3. Home to Work (by car, as the driver)
- Trip 4. Work to Son's School (by car, as the driver)
- Trip 5. Son's School to Home (by car, as the driver)
- Trip 6. Home to Grocery Store (by car, as the driver)
- Trip 7. Grocery Store to Home (by car, as the driver)

As a reminder, this section is regarding the trips that you and the members of your household made on {SDAY}, record all trips starting at 4:00 a.m. on the designated day and ending at 4:00 a.m. the following day.

***trip person loop start**

(If first person) Beginning with your trips first.

OR

Now considering the trips made by [person name]

C1: Did [you/he/she/they] make any trips on [reporting date], between 4:00 a.m. and 4:00 a.m. the following day?

- Yes
- No [skip to next person]

C2: Did [your/his/hers/their] first trip start from home on [reporting date]?

- Yes [skip to C5]
- No

C3: Where did [you/he/she/they] start their day at or after 4:00 a.m on [reporting date]?

Enter the address or point of interest in the field below.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]

C4: What type of location is this?

- Work
- School
- Other (specify)

C5: Where did [you/he/she/they] next go from [previous location—defined as C3 (or C2 if home) to begin and updated to the selected value in C5 if C5-C17 repeated]?

- Home [skip to C8]
- School [skip to C8]
- Work
- Market or shopping [skip to C7]
- Drop off/pick up someone else [skip to C7]
- Daycare [skip to C7]
- Other (specify)

C6: Is this the usual place of work?

- Yes [skip to C8]
- No

C7: What was the specific location?

Enter the address or point of interest in the field below.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]

C8: At what time, to the nearest 5 minutes, did [you/he/she/they] leave [previous location] to go there? If you do not remember the exact time please estimate as closely as possible.

- [Hours: 1...12]
- Minutes: 0/5/10/15/20/25/30/35/40/45/50/55]
- AM/PM

C9: What was the main way [you/he/she/they] got there? If [you/he/she/they] rode the bus for any portion of the trip, please select transit as the main way [you/he/she/they] got there.

- Car, as the driver
- Car, as a passenger [skip to C14]
- Motorcycle [skip to C14]
- Uber [skip to C14]
- Taxi [skip to C14]
- Walk [skip to C14]
- Cycle [skip to C14]
- Transit [skip to C11]
- Schoolbus [skip to C14]
- Other [skip to C14] (specify)

C10: How many other passengers were in the car with [you/him/her/them]?

- 0
- 1
- 2
- 3

- 4
 - 5
 - 6 or more
- [skip to C14]

C11: How did [you/he/she/they] get to the bus stop?

- Car, as the driver
- Car, as a passenger
- Motorcycle
- Uber
- Taxi
- Walk
- Cycle
- Schoolbus
- Other (specify)

C12: What bus routes did you take?

- [multiple choice: route list—see end of survey for list]

C13: After leaving the bus/train, how did [you/he/she/they] get to the final destination?

- Car, as the driver
- Car, as a passenger
- Motorcycle
- Uber
- Taxi
- Walk
- Cycle
- Schoolbus
- Other (specify)

C14: If last destination (C5) = home, go to C15, otherwise go to C17

C15: Did [you/he/she/they] go anywhere after home?

- Yes [go back to C5 and repeat]
- No

C16: Can you think of any other trips [you/he/she/they] made yesterday either during the day or in the evening that we may have missed?

- Yes [go back to C5 and repeat]
- No [go to C19]

C17: Did [you/he/she/they] make any more trips?

- Yes [go back to C5 and repeat]
- No

C18: Did [you/he/she/they] return home before 4:00 a.m. the next day?

- Yes [go back to C5 and repeat]
- No [skip C19 and LOOP to next person]

C19: (if none of the stops (C4 and C5) were work and person is employed, ask)

[You/He/She/They] did not report going to work on [reporting date]. Which of the following is correct?

- [You/He/She/They] did not go to work
- [You/He/She/They] worked from home
- [You/He/She/They] did go to work

***LOOP to C1 to capture trips about everyone in the household (n_person)**

Attitudes

We're also looking to gather additional information regarding general attitudes towards transportation in the City of London. Please complete a few questions about how you feel towards transportation, and what areas the City could improve.

D1: Consider each of the different ways to travel in London. Please rate how well each of these meet your transportation needs:

- Automobile (excellent, good, average, below average, poor)
- Bus (excellent, good, average, below average, poor)
- Bike (excellent, good, average, below average, poor)
- Walking (excellent, good, average, below average, poor)

D2: Considering your usual trip to and from work/school, what are the most important factors that influence your choice of transportation (select up to five):

- Convenience
- Cost
- Travel time
- Incentives offered by my employer to encourage other transportation choices
- Bus waiting time
- Availability of parking
- Cost of parking
- Access to a car for emergencies
- Car required for work
- Environment/greenhouse gas emissions
- Weather
- Do not own a car
- No bus route available
- Personal health

D3: Consider the following modes of transportation. Which modes do you currently use and which modes would you consider using to travel to and from work?

- Auto
- Carpool (currently use, would consider using to travel to and from work)
- Transit
- Bicycle
- Walk

D4: (Show if D3 "transit" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would start to take transit to travel to and from work/school or other typical trips if retired. (options: no change, might change, will change, don't know, N/A)

- If you knew the bus routes and schedules better
- If the buses ran more frequency
- If you did not need to transfer between routes
- If the cost of parking at work or school increased
- If you were provided with financial support by your employer, the government or the City
- If you were able to use rapid transit

D5: (Show if D3 "carpool" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would start to carpool to travel to and from work/school or other typical

trips if retired.

(options: no change, might change, will change, don't know, N/A)

- If you could find someone to ride with
- If you could find a ride home in case of emergency
- If the cost of parking at work or school increased
- If you were provided with financial support by your employer, the government or the City

D6: (Show if D3 "bicycle" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would change to taking a bicycle to travel to and from work/school: (options: no change, might change, will change, don't know, N/A)

- If you could use bike lanes or bike paths on my ride to work/school
- If your employer provided showers
- If your employer provided bike locking/rack facilities

D7: To help the City plan its future transportation system, please rank the following potential improvements from 1 to 5, with 1 being not at all important to 5 being very important. (rate Not at all important 1/2/3/4/Very important 5)

- Adding new transit routes
- Extending bus service later into the night
- Improving bus service with more frequent service
- Implementing a rapid transit system
- Widening existing roadways
- Connecting missing parts of London streets
- Building new major roadways through and/or around London
- Building new carpool lots
- Adding High Occupancy Vehicle lanes on key arterial roads in the City
- Providing financial incentives to encourage transit
- Providing financial incentives to encourage carpooling and other trip reduction programs
- Building more bike lanes and separated bikes lanes and multi-use pathways in London
- Providing bike parking at key destinations
- Provide bike sharing at key destinations
- Extending bus service earlier in the morning

D8: Lastly, for statistical purposes, what is your total annual household income before taxes? (please be assured that your responses will only be reported in aggregate)

- Under \$50,000
- \$50,000-\$100,000
- Over \$100,000
- Prefer not to answer

The survey is complete and will automatically redirect. You may close this webpage now.

When complete, display thank you message "Thank you very much for your participation and completing both parts of the survey. Your name has been entered for a chance to win one of the following prizes:

- 3 bicycles from your choice of local bike store, worth up to \$600 each
- 5 iPad Air 2s
- 15 prepaid Visas of \$100 each
- 40 City of London Gift Cards for Spectrum programs worth \$50 each
- 75 Tim Horton's Gift Cards of \$25 each

School list

Fanshawe College
Western University
Huron University College (a Western University Affiliate)
King's University College (a Western University Affiliate)
Brescia University College
Collège Boréal
A.B. Lucas Secondary School
A.J. Baker Public School
Aberdeen Public School
Académie de la Tamise French First Language Public School
Adelaide-W.G. MacDonald Public School
Adventist Christian Elementary School
Agate Private School
Aldborough Public School (1025)
Algonquin Public School
Al-Taqwa Islamic School
Al-Taqwa Secondary School
Annandale School
Arthur Ford Public School
Arthur Stringer Public School
Arthur Voaden Secondary School
Ashley Oaks Public School
Assumption Catholic School
B. Davison Secondary School
Beal Secondary School
Bishop Townshend Public School
Blenheim District Public School
Blessed Kateri Separate School
Blessed Sacrament Separate School
Bonaventure Meadows Public School
Byron Northview Public School
Byron Somerset Public School
Byron Southwood Public School
Byron Woods Montessori School
C.C. Carrothers Public School
Caradoc North Public School
Caradoc Public School
Catholic Central Secondary School
Centennial Central Public School
Central Elgin Collegiate Institute
Central Public School
Central Secondary School
Chippewa Public School
Clara Brenton Public School
Clarke Road Secondary School
Cleardale Public School
College Avenue Secondary School
Covenant Christian School
Davenport Public School
Delaware Central Public School
Dunwich-Dutton Public School
Eagle Heights Public School
Ealing Public School
East Elgin Secondary School

East Oxford Central Public School
East Williams Memorial Public School
Eastdale Public School
Ecole Frere Andre (FFL) Separate School
Ecole Frere Andre French First Language Catholic Elementary School
Ecole Marie-Curie French First Language Public School
École secondaire catholique Notre-Dame
Ecole St Jean de Brebeuf French First Language Catholic Elementary School
Ecole Ste Jeanne d Arc (FFL) Separate School
Ecole Ste Jeanne d Arc French First Language Catholic Elementary School
Ekcoe Central Public School
Elgin Court Public School
Emily Carr Public School
Emily Stowe Public School
Evelyn Harrison Public School
F.D. Roosevelt Public School
Fairmont Public School
Forest Park Public School
G.A. Wheable Secondary School
Gabriel-Dumont French Secondary School
Gibbons Park Montessori School
Glen Cairn Public School
Glencoe District High School
Glendale High School
Harrisfield Public School
Hickson Central Public School
Hillcrest Public School
Holy Cross Catholic Secondary School
Holy Cross Separate School
Holy Family Catholic French Immersion School
Holy Family Separate School
Holy Rosary Separate School
Huron Heights French Immersion Public School
Huron Park Secondary School
Ingersoll District Collegiate Institute
Innerkip Central School
J.S. Buchanan French Immersion
Jack Chambers Public School
Jean Vanier Separate School
Jeanne Sauve French Immersion Public School
John Dearness Public School
John P. Robarts Public School
John Paul II Secondary School
John Wise Public School
June Rose Callwood Public School
Kensal Park French Immersion Public School
Knollwood Public School
Lambeth Public School
Laurie Hawkins Public School
Lester B. Pearson School For The Arts
Locke's Public School
London Christian Academy
London Christian Elementary School
London Community Hebrew Day School
London District Christian Secondary School
London Islamic School

London South Collegiate Institute
London Waldorf School
Lord Dorchester Secondary School
Lord Elgin Public School
Lord Nelson Public School
Lord Roberts French Immersion Public School
Lorne Avenue Public School
Louise Arbour French Immersion P.S
Madeline Hardy School
Mary Wright Public School
Masonville Public School
Matthews Hall Private School
McGillivray Central Public School
McGregor Public School
Medway High School
Mgr Bruyere Catholic French Secondary School
Mitchell Hepburn Public School
Monsignor J.H. Oneil Catholic School
Monsignor Morrison Catholic School
Montcalm Secondary School
Montessori Academy of London
Mosa Central Public School
Mother Teresa Secondary School
Mountsfield Public School
Nancy Campbell Collegiate Institute
New Sarum Public School
Nicholas Wilson Public School
North Meadows Public School
North Middlesex District High School
Northbrae Public School
Northdale Central Public School
Northdale Public School (Woodstock)
Northridge Public School
Notre Dame Separate School
Oakridge Secondary School
Oliver Stephens Public School
Orchard Park Public School
Our Lady Immaculate Catholic School
Our Lady of Lourdes Catholic School
Oxbow Public School
Parkhill-West Williams Public School
Parkside Collegiate Institute
Parkview Public School
Pierre Elliott Trudeau F.I.
Plattsville & District Public School
Port Burwell Public School
Port Stanley Public School
Prince Charles Public School
Princess Anne French Immersion Public School
Princess Elizabeth Public School
Regina Mundi Secondary School
Rick Hansen Public School
River Heights Public School
Riverbend Academy
Riverside Public School
Robarts School for the Deaf

Roch Carrier F.I.
Royal Roads Public School
Ryerson Public School
Sacred Heart CS
Saunders Secondary School
Sherwood Forest Public School
Sir Arthur Carty Separate School
Sir Frederick Banting Secondary School
Sir George Ross Secondary School
Sir Georges Etienne Cartier Public School
Sir Isaac Brock Public School
Sir John A. MacDonald Public School
Sir Wilfred Laurier Secondary School
South Dorchester Public School
South Ridge Public School
Southside Public School
Southwold Public School
Sparta Public School
Springbank Public School
Springfield Public School
St. Andre Bessette Catholic Secondary School
St. Anne Separate School
St. Anne's Catholic School St. Thomas
St. Anthony Separate School
St. Bernadette Separate School
St. Catherine of Siena
St. Charles CS
St. David CS Dorchester
St. Francis Separate School
St. George Separate School
St. George's Public School
St. John Separate School
St. Joseph Immersion Separate School
St. Josephs Catholic High School
St. Jude Separate School
St. Judes CS Ingersoll
St. Marguerite d'Youville Separate School
St. Mark Separate School
St. Martin Separate School
St. Mary Choir Separate School
St. Marys Catholic High School
St. Marys CS West Lorne
St. Michael Separate School
St. Michaels CS Woodstock
St. Nicholas Catholic School
St. Patrick Campus
St. Patrick CS Lucan
St. Patrick's CS Woodstock
St. Paul Separate School
St. Peter Campus
St. Pius X Separate School
St. Robert Separate School
St. Sebastian Separate School
St. Theresa Separate School
St. Thomas Aquinas Secondary School
St. Thomas More Separate School

St. Vincent de Paul Catholic School
Stoney Creek Public School
Stoneybrook Public School
Straffordville Public School
Strathroy District Collegiate Institute
Summers' Corners Public School
Tavistock Public School
Tecumseh Public School
Thamesford Public School
The London School
Trafalgar Public School
Tweedsmuir Public School
University Heights Public School
Valleyview Public School
Victoria Public School
W. Sherwood Fox Public School
West Elgin Secondary School
West Nissouri Public School
West Oaks French Immersion Public School
Westfield Public School
Westminster Central Public School
Westminster Secondary School
Westmount Public School
White Oaks Public School
Wilberforce Public School
Wilfrid Jury Public School
Wilton Grove Public School
Winchester Street Public School
Woodland Heights Public School
Woodstock Collegiate Institute
Wortley Road Public School
Zorra Highland Park Public School
Other

Bus route list

1 Thompson Kipps Lane - Kipps Lane - PondMills Rd/Kind Edward
2 Dundas - Nat Sci - Trafalgar Heights/Bonaventure
3 Hamilton Road - Downtown - Fairmont/Argyle Mall
4 Oxford East - Fanshawe College - White Oaks Mall
5 Springbank - Byron - Downtown
6 Richmond - Natural Science - Parkwood Institute
7 Wavell - Downtown - Argyle Mall
9 Whitehills - Downtown - Whitehills
10 Wonderland - Natural Science - White Oaks Mall
11 Southcrest - Downtown - Westmount Mall
12 Wharnccliffe - Downtown - Wharn. & Wonderland
13 Wellington - White Oaks Mall - Grenfell/Northridge
14 Highbury - White Oaks Mall - Barker & Huron
15 Westmount - Downtown - Westmount Mall
16 Adelaide - Masonville Mall - Pond M./Summerside
17 Oxford West - Argyle Mall - Bryron/Riverbend
19 Oakridge - Downtown - HydePark Power Centre
20 Cherryhill - Fanshawe College - Beaverbrook
21 Huron Heights - Downtown - Huron Heights
23 Berkshire - Downtown - Westmount Mall
24 Base Line - Talbot Village - Victoria Hospital
25 Kilally - Fanshawe College - Fan. Park/Highbury
26 Jalna Blvd - Downtown - White Oaks Mall
27 Fanshawe College - Fanshawe College - Kipps Lane
28 Lambeth - Westmount Mall - Lambeth
29 Capulet - National Science - Capulet
30 Newbold - White Oaks Mall - Cheese Factory Rd
31 Orchard Park - Hyde Park Power - Centre/Alumni Hall
32 Windermere - Alumni Hall - Huron & Highbury
33 Proudfoot - Alumni Hall - Proudfoot
34 Medway - Alumni Hall - Masonville Mall
35 Argyle - Argyle Mall - Trafalgar Heights
36 Airport Industrial - Fanshawe College - London Airport
37 Sovereign Road - Argyle Mall - Neptune Crescent
38 Stoney Creek - Masonville Mall - Stoney Creek
39 Fanshawe West - Masonville Mall - HydePark Power Centre
90 Express - Express Masonville - White Oaks
91 Express - Express Fanshawe - Oxford & Wonder
92 Express - Express Masonville - Victoria Hospital
102 Downtown - Natural Science
104 Ridout & Grand - Fanshawe College
106 Downtown - Natural Science
400 Fanshawe Getaway
51/53/54 Community Bus

Introduction

The London Travel Survey is an important study to understand how Londoners move around in the London area—by car, bike, on foot or public transit. Your input will help us understand the City’s transportation needs.

This data is being collected for the City of London by IBI Group, a transportation planning and engineering firm. All information collected will be completely confidential and protected under the *Municipal Freedom of Information and Protection of Privacy Act*, and will only be used anonymously to represent travel patterns.

To start, we need to collect some information about you and where you live. Please note, progress of this survey is saved only for a short time in your browser history, and you will not be able to return to it later.

Please click on the > button below to start the survey.

Personal/Household Data

A1. Where do you go to school?

- Western University
- Fanshawe College
- None of the above (Terminate if neither Western nor Fanshawe)

A2. Are you a full or part-time student?

- Full-time
- Part-time

A3. Do you currently live in on-campus housing?

- Yes
- No [skip to A5]

A4. Where do you currently live?

[Options if A1 = Western]

- Medway-Sydenham Hall [skip to A9]
- Saugeen-Maitland Hall [skip to A9]
- Delaware Hall [skip to A9]
- Perth Hall [skip to A9]
- Ontario Hall [skip to A9]
- Alumni House [skip to A9]
- Elgin Hall [skip to A9]
- Essex Hall [skip to A9]
- London Hall [skip to A9]
- University Apartments [skip to A9]
- Platt's Lane Estates [skip to A8 – family-oriented accomodation]

[Options if A1 = Fansahwe]

- Falcon House [skip to A9]
- Peregrine House [skip to A9]
- Merlin House [skip to A9]
- Kestrel Court [skip to A9]

A5. Where do you currently live?

Please enter your specific address.

Please select the location from the drop down list that appears below the location search box.

- Address/Municipality [map entry]

A6. What type of dwelling do you live in?

- Single-detached house
- Semi-detached house
- Row house / townhouse
- Apartment (including condominiums and houses divided into two or more units)
- Other (specify)

A7. Do you live with family, roommates, or alone?

- Live with family
- Live with roommates [skip to A9]
- Live alone [skip to A9]

A8. How many people, including yourself, live in your household?

Please provide a numerical value from 1 to 20.

- [number: n_person]

A9. How old are you?

- [drop down: 17/18...100/Over 100 years old]

A10. What is your gender?

- Male
- Female
- Other
- No Response

A11. Do you have a driver's licence?

- Yes
- No [skip to A14]

A12. Do you have access to a vehicle, either owned or leased?

- Yes
- No

A13. Do you have a car-sharing membership in the City of London?

- Yes
- No

A14. [if A2 = Part-time] How do you pay for transit when taking public transportation?

- Cash
- Tickets
- Monthly Pass
- Tuition Based Pass
- Other
- Do not use transit

A14. Do you have a bicycle?

- Yes
- No

B6. Are you employed?

- Employed full-time
- Employed part-time
- Not employed (skip to B11)

B7. What is your occupation?

Mouse over the term in blue for a definition if needed. (mouseover in parenthesis)

- Management (Legislators, government officials, managers)
- Business, Finance & Administration (Accountants, consultants, administrators, clerical staff)
- Natural & Applied Sciences (Scientists, engineers, architects, planners, surveyors, IT, mathematicians, computer & science technicians)
- Health (Physicians, dentists, veterinarians, medical specialists, therapists, pharmacists, dieticians, nurses, medical technicians & assistants)
- Education, Law & Social, Community & Government Services (Professors, teachers, instructors, judges, lawyers, notaries, counsellors, psychologists, social workers, clergy, firefighters, police officers)
- Art, Culture, Recreation and Sport (Librarians, writers, creative and performing artists and technicians, creative designers and craftspersons, athletes, coaches and referees)
- Sales & Service (Retail & technical sales, insurance and real estate agents, chefs, cooks, cleaners, butchers, bakers, hairstylists, food & beverage, security, tourism, customer service, cashiers, clerks & attendants)
- Trades, Transport & Equipment Operators (Construction contractors, tradespeople, machinists, pilots, flight crew, drivers, equipment operators, vehicle maintenance, manual labourers)
- Natural Resources, Agriculture (Logging, forestry, farming, fishing, mining, and oil workers, logging machine operators, harvesters)
- Manufacturing & Utilities (Processing, manufacturing, assembly and fabrication activities and labourers)
- Other

B8. Where is your usual place of work?

Please enter a specific address, business, landmark, or point of interest.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]
- [Checkbox] [I/he/she/they] usually work from home [if checked, copy home location to usual work location]

B9. Do you have free parking at the usual place of work?

- Yes (skip to B11)
- No

B10. How much do you pay for monthly parking?

- [numerical text entry]
- Park in other free parking
- Does not drive to work
- Don't know

B11. Do you have bike parking at the usual place of work?

- Yes
- No

Trip Reporting

[reporting date = yesterday]

For this second part of the survey, we want to collect information on all the trips you made yesterday. In this section, a "trip" is considered to have one origin and one destination. Stops for shopping and dropping/picking up someone are considered separate destinations, and each stop is a new trip. Transfers on a trip for changing between one form of transportation and another are part of the same trip.

For instance – yesterday, Andrea rode LTC from her home to school. At lunch, she went to have lunch with some friends and then went back to class. After class, she visited friends in residence and stayed with them until 2:00 a.m., when she took an Uber home.

In this case, Andrea made

Trip 1. Home to School

Trip 2. School to Restaurant

Trip 3. Restaurant to School

Trip 4. School to Residence

Trip 5. Residence to Home

As a reminder, this section is regarding the trips that you made on [reporting date], starting at 4:00 a.m. and ending at 4:00 a.m. the following day

C1: Did you make any trips on [reporting date], between 4:00 a.m. and 4:00 a.m. the following day?

- Yes
- No [skip to D1]

C2: Did your first trip start from home on [reporting date]?

- Yes [skip to C5]

- No

C3: Where did [you/he/she/they] start their day at or after 4:00 a.m on [reporting date]?

Enter the address or point of interest in the field below.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]

C4: What type of location is this?

- Work
- School
- Other (specify)

C5: Where did you next go from [previous location—defined as C3 (or C2 if home) to begin and updated to the selected value in C5 if C5-C17 repeated]?

- Home [skip to C8]
- School [skip to C8]
- Work
- Market or shopping [skip to C7]
- Drop off/pick up someone else [skip to C7]
- Daycare [skip to C7]
- Other (specify)

C6: Is this the usual place of work?

- Yes [skip to C8]
- No

C7: What was the specific location?

Enter the address or point of interest in the field below.

You can use the Pegman Icon on the bottom right to access the street view feature which can show you the address of a location.

Please select the location from the drop down list that appears below the location search box.

- [Location entry]

C8: At what time, to the nearest 5 minutes, did you leave [previous location] to go there? If you do not remember the exact time please estimate as closely as possible.

- [Hours: 1...12]
- Minutes: 0/5/10/15/20/25/30/35/40/45/50/55]
- AM/PM

C9: What was the main way you got there?

- Car, as the driver or driver of a carpool[skip to C13]
- Car, as a passenger or carpooling [skip to C13]
- Motorcycle [skip to C13]
- Uber [skip to C13]
- Taxi [skip to C13]
- Walk [skip to C13]
- Cycle [skip to C13]
- Transit
- Schoolbus [skip to C13]
- Other [skip to C13] (specify)
-

C10: How did you get to the bus stop?

- Car, as the driver or driver of a carpool
- Car, as a passenger or carpooling
- Motorcycle
- Uber
- Taxi
- Walk
- Cycle
- Schoolbus
- Other ((specify)

C11: What bus routes did you take?

- Multiple choice list of all bus routes

C12: After leaving the bus/train, how did you get to the final destination?

- Car, as the driver or driver of a carpool
- Car, as a passenger or carpooling
- Motorcycle
- Uber
- Taxi
- Walk
- Cycle
- Schoolbus
- Other (specify)

C13: If last destination (C5) = home, go to C14, otherwise go to C16

C14: Did you go anywhere after home?

- Yes [go back to C5 and repeat]
- No

C15: Can you think of any other trips [you/he/she/they] made yesterday either during the day or in the evening that we may have missed?

- Yes [go back to C5 and repeat]
- No [go to C19]

C16: Did you make any more trips?

- Yes [go back to C5 and repeat]
- No

C17: Did you return home before 4:00 a.m. the next day?

- Yes [go back to C5 and repeat]
- No [skip C18 and LOOP to next person]

C18: (if none of the stops (C4 and C5) were work and person is employed, ask)

You did not report going to work on [reporting date]. Which of the following is correct?

- You did not go to work
 - You worked from home
 - You did go to work
-
-

Attitudes

We're also looking to gather additional information regarding general attitudes towards transportation in the City of London. Please complete a few questions about how you feel towards transportation, and what areas the City could improve.

D1: Consider each of the different ways to travel in London. Please rate how well each of these meet your transportation needs:

- Automobile (excellent, good, average, below average, poor)
- Bus (excellent, good, average, below average, poor)
- Bike (excellent, good, average, below average, poor)
- Walking (excellent, good, average, below average, poor)

D2: Considering your usual trip to and from work/school, what are the most important factors that influence your choice of transportation (select up to five):

- Convenience
- Cost
- Travel time
- Incentives offered by my employer to encourage other transportation choices
- Bus waiting time
- Availability of parking
- Cost of parking
- Access to a car for emergencies
- Car required for work
- Environment/greenhouse gas emissions
- Weather
- Do not own a car
- No bus route available
- Personal health

D3: Consider the following modes of transportation. Which modes do you currently use and which modes would you consider using to travel to and from work?

- Auto
- Carpool (currently use, would consider using to travel to and from work)
- Transit
- Bicycle
- Walk

D4: (Show if D3 "transit" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would start to take transit to travel to and from work/school or other typical trips if retired. (options: no change, might change, will change, don't know, N/A)

- If you knew the bus routes and schedules better
- If the buses ran more frequency
- If you did not need to transfer between routes
- If the cost of parking at work or school increased
- If you were provided with financial support by your employer, the government or the City
- If you were able to use rapid transit

D5: (Show if D3 "carpool" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would start to carpool to travel to and from work/school or other typical trips if retired.

(options: no change, might change, will change, don't know, N/A)

- If you could find someone to ride with
- If you could find a ride home in case of emergency
- If the cost of parking at work or school increased

- If you were provided with financial support by your employer, the government or the City

D6: (Show if D3 "bicycle" NOT currently used AND would consider using) For the following scenarios, please rate how likely it is that you would change to taking a bicycle to travel to and from work/school: (options: no change, might change, will change, don't know, N/A)

- If you could use bike lanes or bike paths on my ride to work/school
- If your employer provided showers
- If your employer provided bike locking/rack facilities

D7: To help the City plan its future transportation system, please rank the following potential improvements from 1 to 5, with 1 being not at all important to 5 being very important. (rate Not at all important 1/2/3/4/Very important 5)

- Adding new transit routes
- Extending bus service later into the night
- Improving bus service with more frequent service
- Implementing a rapid transit system
- Widening existing roadways
- Connecting missing parts of London streets
- Building new major roadways through and/or around London
- Building new carpool lots
- Adding High Occupancy Vehicle lanes on key arterial roads in the City
- Providing financial incentives to encourage transit
- Providing financial incentives to encourage carpooling and other trip reduction programs
- Building more bike lanes and separated bikes lanes and multi-use pathways in London
- Providing bike parking at key destinations
- Provide bike sharing at key destinations
- Extending bus service earlier in the morning

Bus route list

- 1 Thompson Kipps Lane - Kipps Lane - PondMills Rd/Kind Edward
- 2 Dundas - Nat Sci - Trafalgar Heights/Bonaventure
- 3 Hamilton Road - Downtown - Fairmont/Argyle Mall
- 4 Oxford East - Fanshawe College - White Oaks Mall
- 5 Springbank - Byron - Downtown
- 6 Richmond - Natural Science - Parkwood Institute
- 7 Wavell - Downtown - Argyle Mall
- 9 Whitehills - Downtown - Whitehills
- 10 Wonderland - Natural Science - White Oaks Mall
- 11 Southcrest - Downtown - Westmount Mall
- 12 Wharnccliffe - Downtown - Wharn. & Wonderland
- 13 Wellington - White Oaks Mall - Grenfell/Northridge
- 14 Highbury - White Oaks Mall - Barker & Huron
- 15 Westmount - Downtown - Westmount Mall
- 16 Adelaide - Masonville Mall - Pond M./Summerside
- 17 Oxford West - Argyle Mall - Bryron/Riverbend
- 19 Oakridge - Downtown - HydePark Power Centre
- 20 Cherryhill - Fanshawe College - Beaverbrook
- 21 Huron Heights - Downtown - Huron Heights
- 23 Berkshire - Downtown - Westmount Mall
- 24 Base Line - Talbot Village - Victoria Hospital
- 25 Kilally - Fanshawe College - Fan. Park/Highbury
- 26 Jalna Blvd - Downtown - White Oaks Mall
- 27 Fanshawe College - Fanshawe College - Kipps Lane
- 28 Lambeth - Westmount Mall - Lambeth
- 29 Capulet - National Science - Capulet
- 30 Newbold - White Oaks Mall - Cheese Factory Rd
- 31 Orchard Park - Hyde Park Power - Centre/Alumni Hall
- 32 Windermere - Alumni Hall - Huron & Highbury
- 33 Proudfoot - Alumni Hall - Proudfoot
- 34 Medway - Alumni Hall - Masonville Mall
- 35 Argyle - Argyle Mall - Trafalgar Heights
- 36 Airport Industrial - Fanshawe College - London Airport
- 37 Sovereign Road - Argyle Mall - Neptune Crescent
- 38 Stoney Creek - Masonville Mall - Stoney Creek
- 39 Fanshawe West - Masonville Mall - HydePark Power Centre
- 90 Express - Express Masonville - White Oaks
- 91 Express - Express Fanshawe - Oxford & Wonder
- 92 Express - Express Masonville - Victoria Hospital
- 102 Downtown - Natural Science
- 104 Ridout & Grand - Fanshawe College
- 106 Downtown - Natural Science
- 400 Fanshawe Getaway
- 51/53/54 Community Bus

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Appendix B

Validation by Expansion Zone

Expansion Zone	Households				
	Sample	Census	Sample %	Expanded	Exp./Census
City of London					
1	108	1,873	5.8%	1,879	1.00
2	132	2,197	6.0%	2,249	1.02
3	104	7,009	1.5%	6,734	0.96
4	43	2,155	2.0%	2,155	1.00
5	112	7,144	1.6%	7,109	1.00
7	50	1,106	4.5%	1,116	1.01
8	69	2,207	3.1%	2,178	0.99
9	246	11,053	2.2%	10,923	0.99
12	70	3,236	2.2%	3,231	1.00
13	258	7,510	3.4%	7,507	1.00
14	255	7,311	3.5%	7,310	1.00
15	107	4,311	2.5%	4,306	1.00
16	168	6,951	2.4%	6,862	0.99
17	75	4,488	1.7%	4,409	0.98
18	107	2,849	3.8%	2,849	1.00
19	43	1,153	3.7%	1,163	1.01
20	33	1,560	2.1%	1,561	1.00
21	60	2,959	2.0%	2,947	1.00
23	320	10,834	3.0%	10,825	1.00
24	41	1,059	3.9%	1,060	1.00
25	71	3,585	2.0%	3,587	1.00
26	164	6,309	2.6%	6,309	1.00
27	94	2,531	3.7%	2,531	1.00
28	173	3,966	4.4%	3,970	1.00
29	64	1,378	4.6%	1,380	1.00
30	166	3,115	5.3%	3,121	1.00
31	63	2,067	3.0%	2,068	1.00
32	50	1,404	3.6%	1,404	1.00
33	46	1,346	3.4%	1,346	1.00
34	150	3,147	4.8%	3,158	1.00
35	131	3,690	3.6%	3,695	1.00
36	137	3,825	3.6%	3,831	1.00
37	78	2,265	3.4%	2,265	1.00
38	130	2,166	6.0%	2,188	1.01
39	61	1,101	5.5%	1,103	1.00
40	108	3,303	3.3%	3,303	1.00
41	144	3,898	3.7%	3,899	1.00
42	181	2,526	7.2%	2,526	1.00
43	205	3,199	6.4%	3,213	1.00
44	37	1,858	2.0%	1,858	1.00
45	138	4,180	3.3%	4,180	1.00

Expansion Zone	Households				
	Sample	Census	Sample %	Expanded	Exp./Census
City of London					
46	155	2,813	5.5%	2,824	1.00
47	114	2,265	5.0%	2,282	1.01
48	150	3,382	4.4%	3,382	1.00
49	51	1,696	3.0%	1,699	1.00
50	72	1,607	4.5%	1,609	1.00
51	48	1,503	3.2%	1,508	1.00
52	227	6,951	3.3%	6,879	0.99
58	88	1,780	4.9%	1,780	1.00
59	86	2,160	4.0%	2,165	1.00
71	76	1,576	4.8%	1,576	1.00
CITY TOTAL	5,859	175,557	3.3%	175,012	1.00
External					
65	95	6,573	1.4%	6,573	1.00
66	70	7,464	0.9%	7,464	1.00
67	90	9,787	0.9%	9,787	1.00
69	60	6,943	0.9%	6,943	1.00
70	65	3,918	1.7%	3,918	1.00
72	55	3,740	1.5%	3,740	1.00
75	70	5,794	1.2%	5,794	1.00
EXTERNAL TOTAL	505	44,219	1.1%	44,219	1.00
Total Survey					
TOTAL SURVEY	6,364	219,776	2.9%	219,231	1.00