

Executive Summary

This report is the third in a series developed to report the findings from the Calgary and Region Travel and Activity Survey (CARTAS) conducted in 2012. Household travel surveys have been conducted approximately every 10 years since 1964 and provide key information to decision makers on how travel behaviour and influences are changing over time. The primary purpose for the survey is to collect information to update the Regional Transportation Model (RTM), but these surveys offer a unique insight in the characteristics of travel in Calgary and the surrounding region.

This report will expand on the previous two reports with in-depth analyses of the active, transit and auto modes. It also includes analysis of where Calgarians travel and the time of travel during the week.

Key Findings

Here are the key findings from the five different analysis included in this report.

1. Calgary children are making significantly less active trips than the previous generation.

In 2001 Calgarians between the ages of 5 to 19 made an average of 0.85 active trips on weekdays. In 2011 that number dropped to 0.45 active trips per child. This change resulted in a 1.6% decrease in active mode share for all weekday travel.

2. Average auto occupancy is rising as a result of decreasing SOV travel

Between 1971 and 2011 auto occupancy increased from 1.28 to 1.39 persons per vehicle. Over the last ten years surveyed, average auto occupancy increased because Calgarians made 0.09 fewer single occupancy vehicle (SOV) trips per person but the same number of high occupancy vehicle (HOV) trips per person.

3. More workers are using transit.

The proportion of employed people using transit increased from 13% in 2001 to 17% in 2011. The transit trip rate per employed person increased from 0.24 to 0.31.

4. The distribution of transit users by person and household demographics is different from the general population.

Transit users are more likely to be younger, come from a larger household and are more likely to come from a household with fewer vehicles than licensed drivers or no vehicles at all. For example, while 27% of the city population reside in households with fewer vehicles than drivers, 40% of transit users come from those types of households.

5. Weather conditions have a larger impact on bike mode share than walk mode share.

The 2011 CARTAS was conducted over three months between February 5th and May 10th, over that period average weekday walk mode share varied from week to week but on average increased by 0.05% through the spring season. Over the same period the bike mode share increased at a rate of 0.07% per week.

6. Families with children make the majority of HOV trips.

In 2001 households with children generated 63.3% of all HOV travel. In 2011 that dropped to 58.5% as a result of a reduction in the percent of households with children.

7. Mode share in the City Centre has changed substantially since 2001.

Survey data collected in 2001 indicated individuals living in the Centre City made 41% of their weekday trips in private vehicles. In 2011 that number dropped to 23%, while the active mode share increased by 14% and transit increased by 4%.

8. Transit mode share peaks in the morning.

In 2011 transit mode share was at its highest between 6 am and 9 am on weekdays capturing 15% of all trips. The lowest transit mode share occurred during in the evening between 6pm and 10 pm.

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1 Changing Travel Behaviour in the Calgary Region: Volume 3

1.1 Report Purpose

This report is the third in a series of reports released in 2013 and 2014 to communicate the results of the Calgary and Region Travel and Activity Survey (CARTAS) and compare those results to travel surveys conducted in the past. This report includes information on the behaviour and characteristics of individuals using active, transit and auto modes; including both single occupant vehicle (SOV) and high occupant vehicle (HOV) travel. It also includes a study of travel behaviour based on the geographic origin & destination locations and a time of day study.

This report builds upon the information in Volumes 1 & 2 and continues the analysis into the who, what, when, where, why, and how of travel in the Calgary Region. Volume 1 in the series includes demographic information, household travel characteristics, trip rates, and city wide mode split. Volume 2 includes an in-depth examination of travel for work, school, & other purposes and a detailed analysis of auto ownership and auto availability. The previous reports in the series, Travel Behaviour Report Series, can be found on the Travel Surveys website (www.calgary.ca/travelsurveys).

CARTAS was conducted in 2012 and was expanded to a variety of demographic targets to represent the total study area population. The demographic targets for this survey were obtained from the 2011 Calgary Civic Census and 2011 Census of Canada as that is what was available at the time. As a result the information presented in this report represents travel behaviour conditions from 2011. This report will also examine travel from 1971, 1981, 1991, and 2001 where data is available.

1.2 Background

Approximately every 10 years, The City of Calgary conducts a comprehensive household travel and activity survey to collect travel behaviour information from City and Region residents. The CARTAS is the latest survey and was conducted from January to May 2012. Travel behaviour includes information about the trips people make, where they go, what they do, and any costs they incurred as well as a number of travel influences such as the number of people in the household, how old they are, how many vehicles they own, and the annual income of the household.

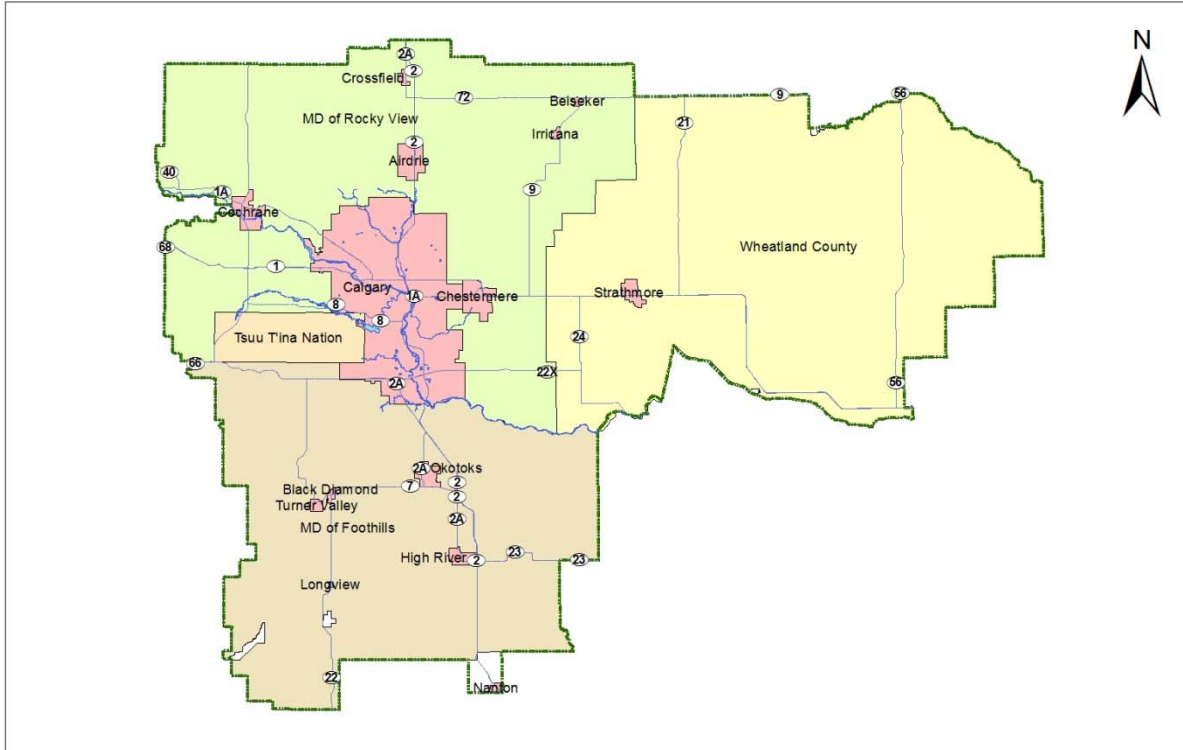
The travel behaviour information is used to update the Calgary Regional Transportation Model (RTM), a computer simulation of the city and surrounding region that is used to support transportation and land use planning decisions. The City of Calgary has maintained travel models since 1964 that have been updated approximately every 10 years. The data collected in CARTAS will be used to update the RTM to 2011 conditions so it can continue to support decision makers.

1.3 Study Area Description

The CARTAS study area includes The City of Calgary, the Municipal District of Foothills, Rockyview County, Wheatland County, and all the towns and villages within those boundaries including: Airdrie, Chestermere, Cochrane, High River, Okotoks, Nanton, and Strathmore. The Region is an important inclusion in the survey as regional travel, including travel between the City and the Region, continues to grow. For the purpose of this report, the Study Area refers to the entire area, City refers to the city of

Calgary, and the Region refers to the region surrounding Calgary. This volume will focus on travel by Calgary residents only. Regional travel will be examined in a subsequent report.

Figure 1: Study Area



1.4 Data Sources

One purpose of this report is to look at how travel has changed over time. This report compares information between surveys conducted in 1971, 1981, 1991, 2001 and 2011 as appropriate. Data from 1971, 1981, and 1991 were obtained from historical results reports and are detailed in Appendix B. The 1991 survey was conducted during the AM peak hour which limits the results that are available or appropriate for comparison. The 2001 travel behaviour data was retrieved from the 2001 Household Activity Survey Database and the 2011 data was retrieved from the CARTAS database. For more information on these historical surveys, please see the report “[Changing Travel Behaviour in the Calgary Region: Volume 1.](#)”

The data tables for the charts in this report are shown in Appendix C.

1.5 Data Availability and Release

The household travel survey datasets contain significant amounts of personal information and are protected by the Freedom of Information and Protection of Privacy Act. The database and the individual data records cannot be released outside of The City of Calgary Forecasting Division. If additional analysis is required, requests may be submitted to tranplanforecast@calgary.ca and the request will be assessed appropriately.

1.6 Survey Limitations

CARTAS is a comprehensive and detailed survey that captures significant amounts of travel behaviour information. However, there are some limitations to the data that must be considered. The survey asked respondents to provide an arrival and departure time; however, respondents tend to round their arrival and departure times to the nearest 5, 10 or 15 minute intervals. As a result, travel times directly from the survey have limited accuracy and are only used to assign trips to broad time periods for modelling purposes.

CARTAS does not include any information on trip distance. Each geographic location was collected, but respondents were not asked to provide travel route information. As a result, information on vehicle kilometres travelled (VKT) and VKT per capita are not a result that can be obtained from this survey.

This is a sample survey, not a census, and 2% of city and region households were sampled. This provides a statistically significant sample to develop travel models that are used to support decision making. However, sample sizes at fine geographies or for specific demographics may be too small to be able to provide statistically significant results. For example, trip rates may be possible for Downtown Calgary, but not for the community of Dalhousie.

1.7 Changes for Volume 3

Volume 1 in this series was prepared by one City of Calgary Forecasting employee and Volume 2 was prepared by two employees. To ensure all employees within The City of Calgary Forecasting Division are trained in use of the survey databases additional members were included for Volume 3.

Each of the five studies included in Volume 3 were prepared by a different member of The City of Calgary Forecasting Division. As a result the structure of the individual studies presented varies. Each researcher brings a different unique perspective to their analysis which allows for an overall increase in the quality of the data included.

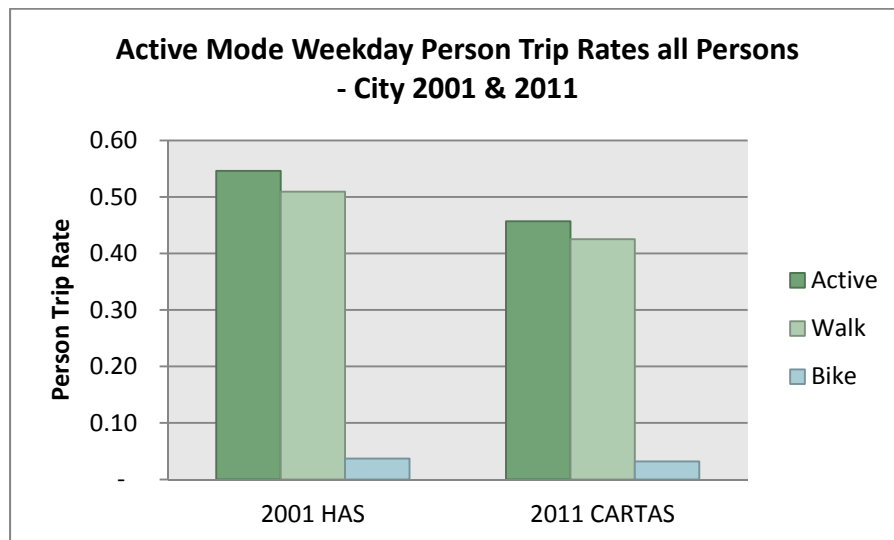
2 Active Mode Study

2.1 Introduction

For the purpose of this analysis the Active Mode includes walk, bike and other non-motorized modes. Bike Mode includes both, bike and other non-motorized trips. The analysis is focused on comparing the results of the 2011 CARTAS to the data collected during the 2001 HAS and includes weekday travel made by individuals living in households located within the City of Calgary.

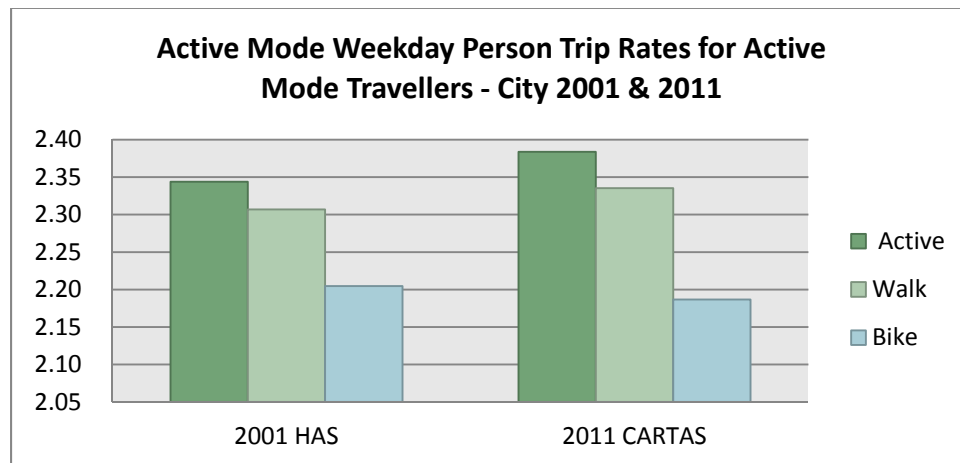
The overall Active Mode share decreased from 14.2% in 2001 to 12.6 % in 2011. While the bike mode remained approximately the same (1.0% in 2001 compared to 0.9% in 2011), the walk mode decreased from 13.2% in 2001 to 11.7% in 2011. Comparing the person walk trip rates supports this finding (see Figure 2). There was a statistically significant drop in the number of walk trips the average Calgarian made (0.51 in 2001 to 0.43 in 2011). The change in bike trip rates is statistically not significant.

Figure 2: Active Mode Weekday Person Trip Rates – City 2001 & 2011



Comparing walk trip rates including only persons making walk trips shows the rate actually slightly increased from 2.31 walk trips in 2001 to 2.34 walk trips per person in 2011. However the change is not statistically significant; meaning walkers did not make more walk trips per day than previously surveyed in 2001. The change in bike trip rate was not significant (Figure 3).

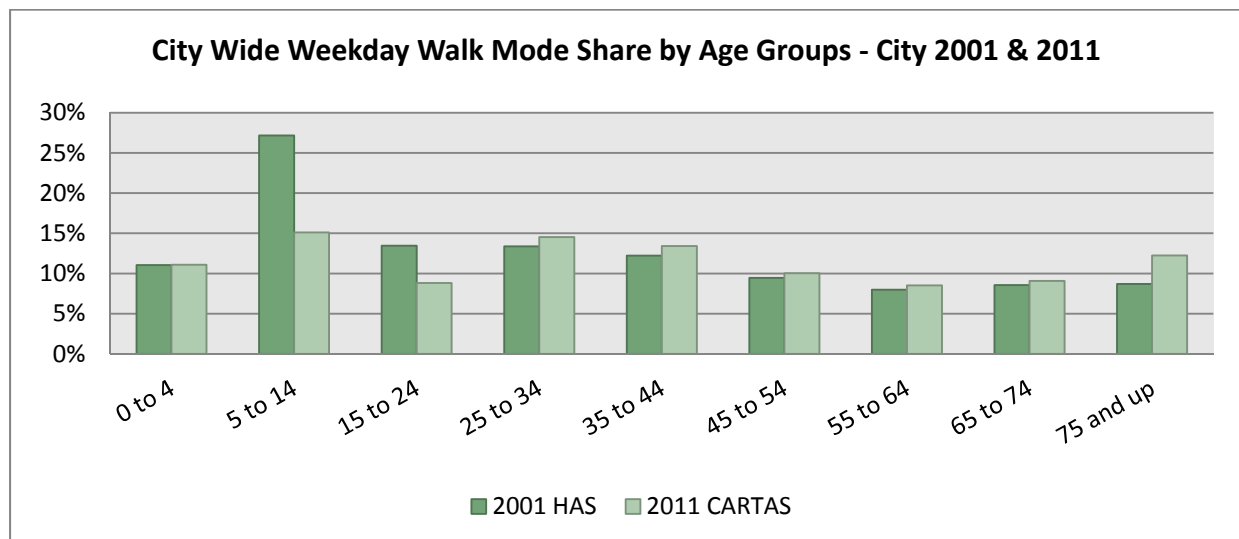
Figure 3: Active Mode Weekday Person Trip Rates for Active Mode Travellers - City 2001 & 2011



2.2 Active mode by Age Category

There was significant drop in walking mode share in the 5 - 14 and 15 – 24 years old groups (see Figure 4). This supports the findings previously reported in Volume 2 (Figure 18: Weekday Mode Share for Grade School Travel City Wide – City – 2001 & 2011). The walking mode share in other age groups remained stable except in the 75+ years old group where the mode share increased from 9% to almost 12%. However this change is not statistically significant.

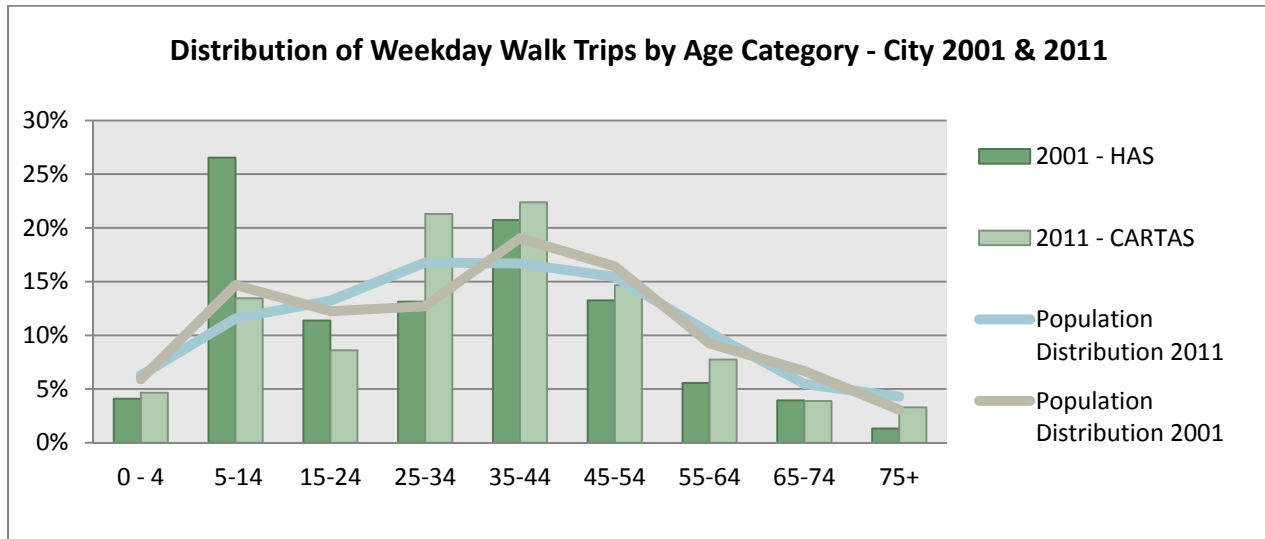
Figure 4: City Wide Weekday Walk Mode Share by Age Groups - City 2001 & 2011



The next figure (Figure 5) shows the distribution of weekday city walk trips by age category compared with population distribution in 2001 and 2011. In 2001 the most active age group by far was the 5-14 years old. While this age group made only 15% of population in the city, they made 27% of all walk trips. This age group was followed by 35-44 and 25-34 years; both of these groups exceeding walk trips shares compared to their population shares. In 2011 the most active age group was 35-44 years old that represented 17% of population and made 22% of the total walk trips followed closely by 25-34 years old

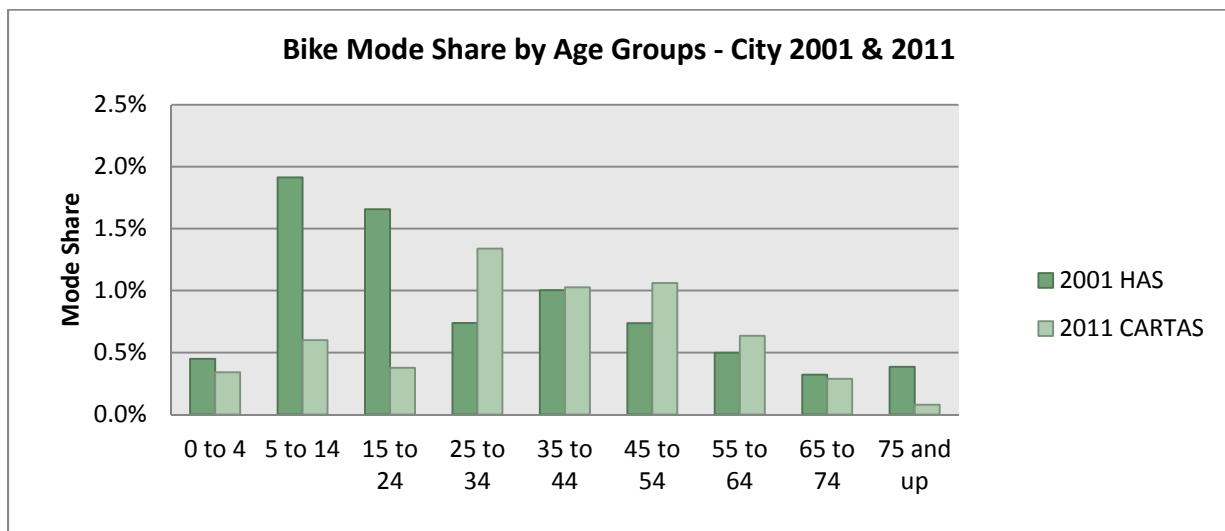
group that represented 17% of city population as well and was responsible for 21% of all city-wide walk trips. The age group of 5-14 years old represented 12% of population in 2011, down 3% compared to 15% in 2001; however their share of walk trips was only 13% a decrease of 14% compared with 2001.

Figure 5: Distribution of Weekday Walk Trips by Age Category - City 2001 & 2011



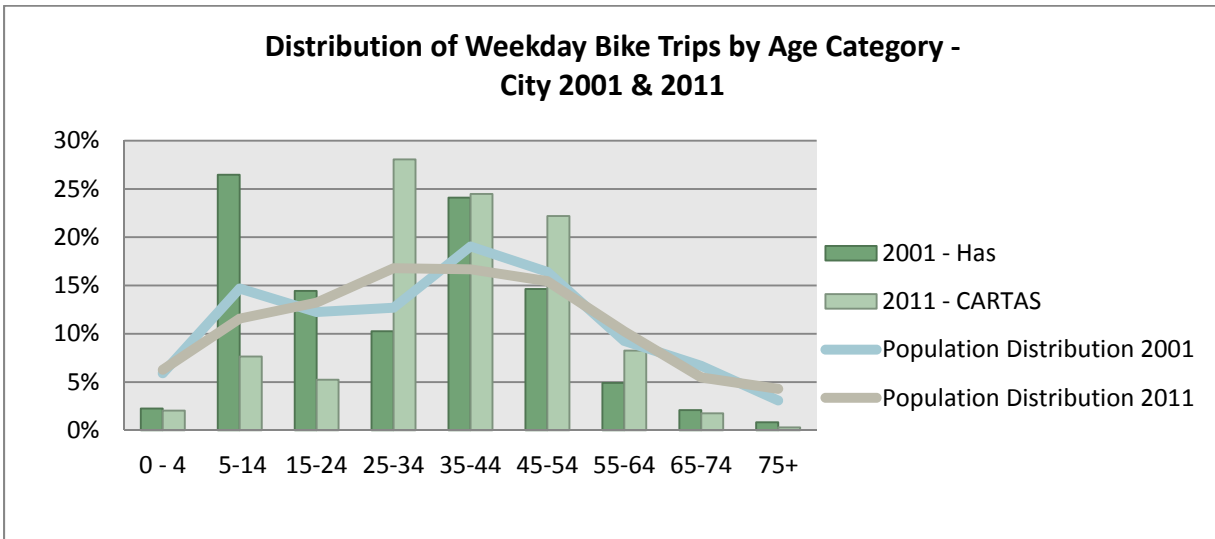
The comparison of bike mode share shows similar trends however due to the limited number of data the change in mode share for individual age groups is not statistically significant. Therefore the information presented in Figure 6 & Figure 7 below of bike mode share by age group should be taken only as a reference. It can be seen there was drop in biking mode share in the groups of 5 - 14 and 15 – 24 years old. The increase of the bike mode share in 24 – 34 and 45 – 54 years old groups compensate for the above decreases and overall bike mode share remained stable as noted in the introduction of this study.

Figure 6: Bike Mode Share by Age Group - City 2001 & 2011



The most active age group based on the data available was again 5-14 years old group followed by persons 35 – 44 and 15 – 24 years old in 2001. In 2011 the most active persons were those of 25 – 54 years old.

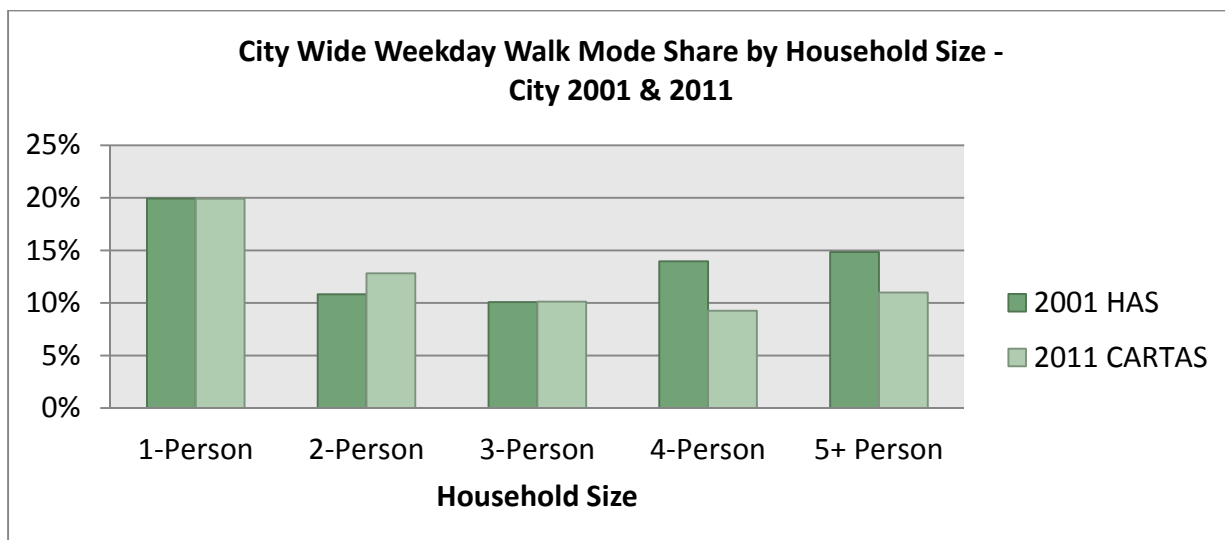
Figure 7: Distribution of Weekday Bike Trips by Age Category - City 2001 & 2011



2.3 Active Mode by Household Size

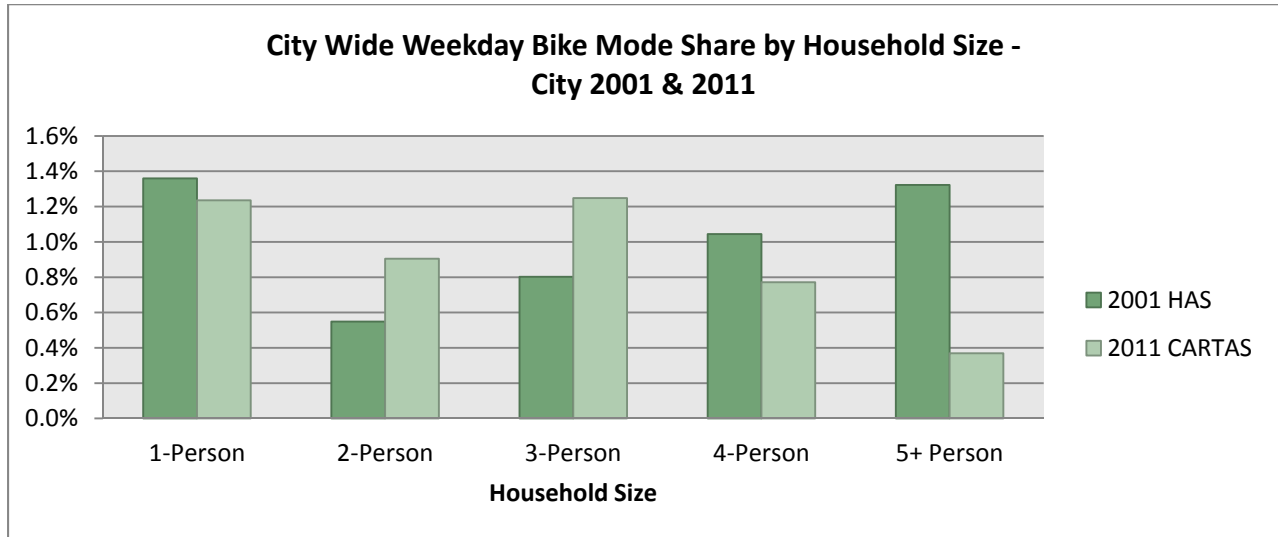
Figure 8 shows there wasn't statistically significant changes in walk mode share for one, two and three member households. The four and five member households shifted towards other modes with a statistically significant reduction in walk mode share. Four member households walk mode share dropped from 14% in 2001 to 9% in 2011. Five or more person households went from 15% walk mode share in 2001 to 11% in 2011.

Figure 8: City Wide Weekday Walk Mode Share by Household Size - City 2001 & 2011



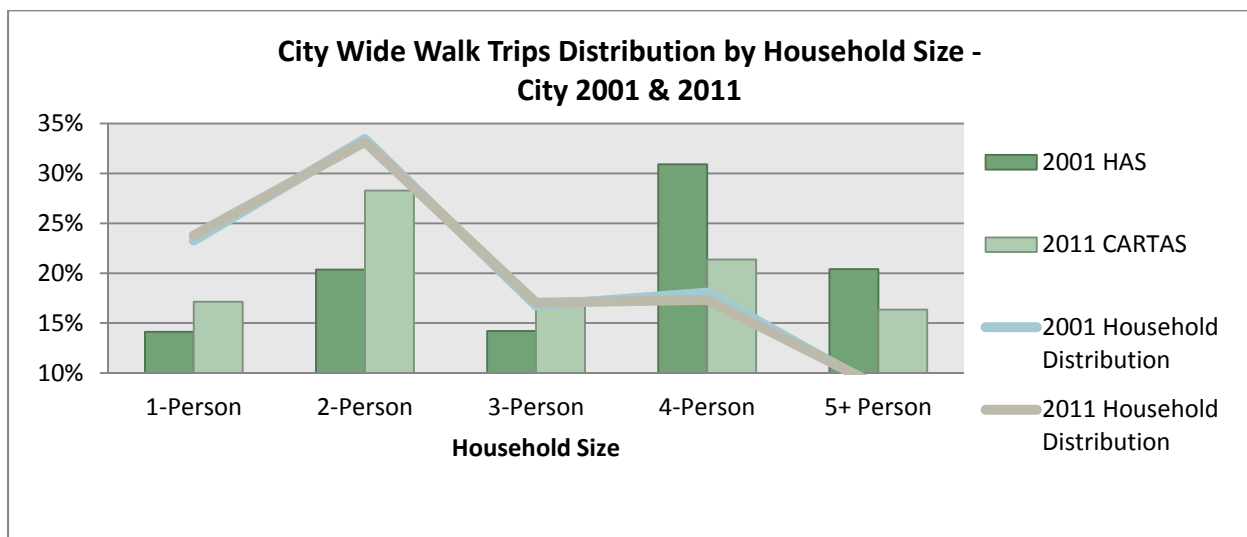
The comparison of bike mode share by household size shows a similar trend however due to the limited number of data the differences in mode share for individual household sizes is not statistically significant. Therefore the results presented below for the bike mode share should again be taken only as a reference. From Figure 9 there can be seen a drop in biking mode share for the 4 and 5 or more person households. The increase of the bike mode share for 2 and 3 person households compensate for the above decreases and overall bike mode share remained stable as noted previously.

Figure 9: City Wide Weekday Bike Mode Share by Household Size - City 2001 & 2011



Comparison of the active mode trips by household size shows an interesting change (Figure 10); while in 2001 over 30% of walking trips were made by households with 4 members and about 20% by 2 member households in 2011 it is the opposite way. 28% of city wide weekday walking trips were made by 2 person households and only 21% by 4 person households.

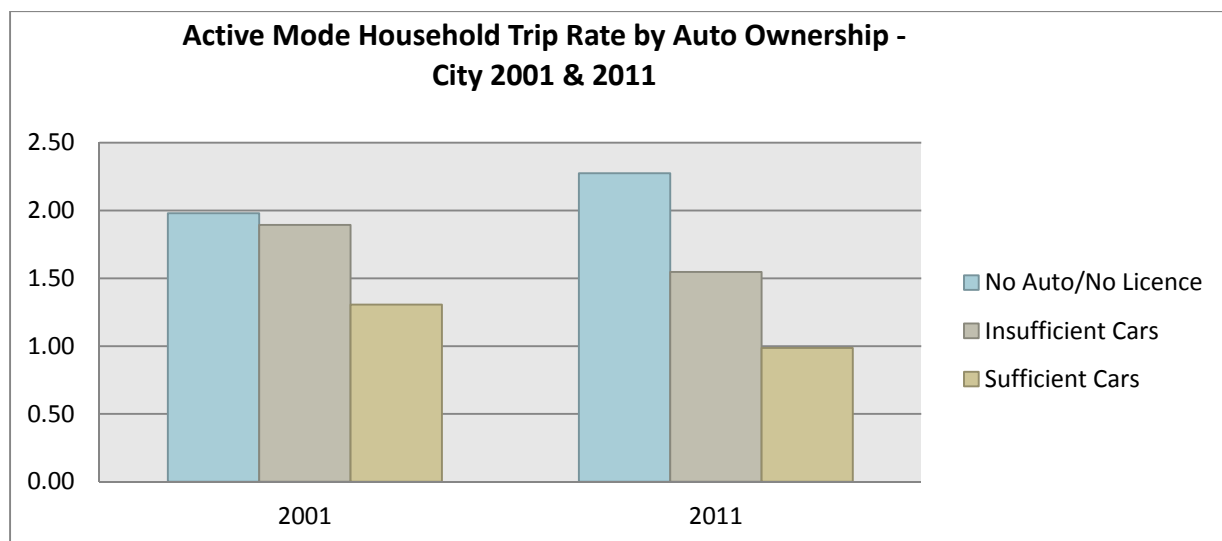
Figure 10: City Wide Walk Trips Distribution by Household Size - City 2001 & 2011



2.4 Active Mode by Auto Ownership and Driver Licenses

In general the active mode trips rates were the highest for households with no autos and/or no driver's licenses and lowest for the household with one or more cars per licensed driver (sufficient cars). Insufficient cars refers to household with fewer cars than persons with a driver's license. The active mode trip rates for no auto/no licence household increased from 1.98 in 2001 to 2.28 in 2011 this change is statistically not significant though. The drop in rates for insufficient and sufficient cars household is statistically significant.

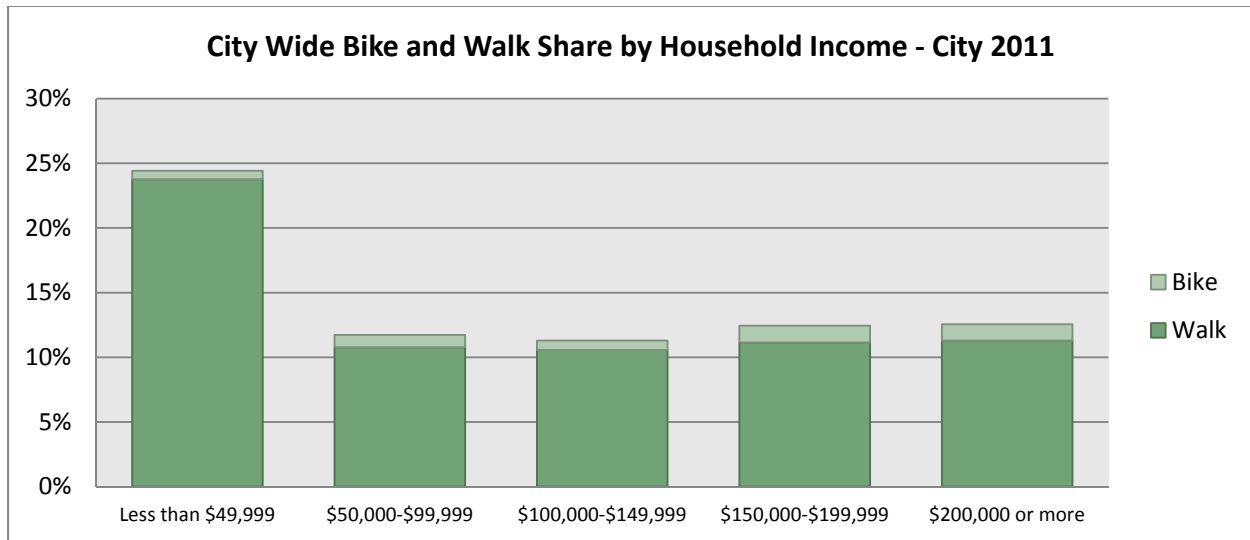
Figure 11: Active Mode Household Trip Rate by Auto Ownership - City 2001 & 2011



2.5 Active mode by Household Income (2011 CARTAS only)

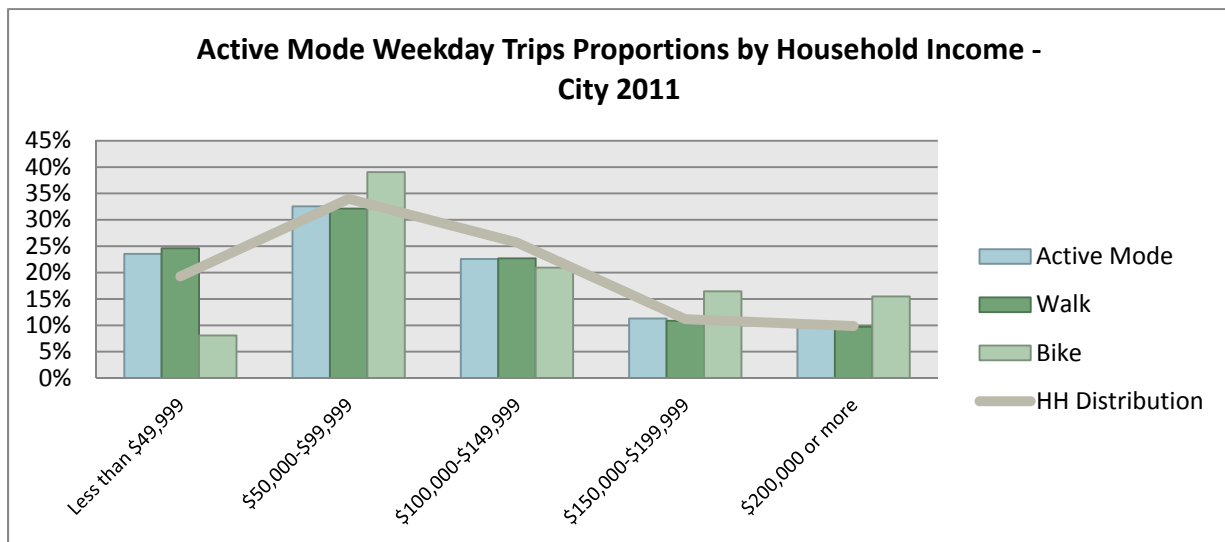
In this section we will look only at 2011 CARTAS data because income information from the 2001 HAS cannot accurately be compared due to inflation and variation in the income ranges collected. The households with less than \$49,999 annual income had the highest walk mode share of close to 25%. The walk mode share for the remaining four income levels was around 11% and the variation in the walk mode share between these groups is not statistically significant. The bike mode share was around 1% for all income levels and the variation between them is not statistically significant.

Figure 12: City Wide Bike and Walk Share by Household Income - City 2011



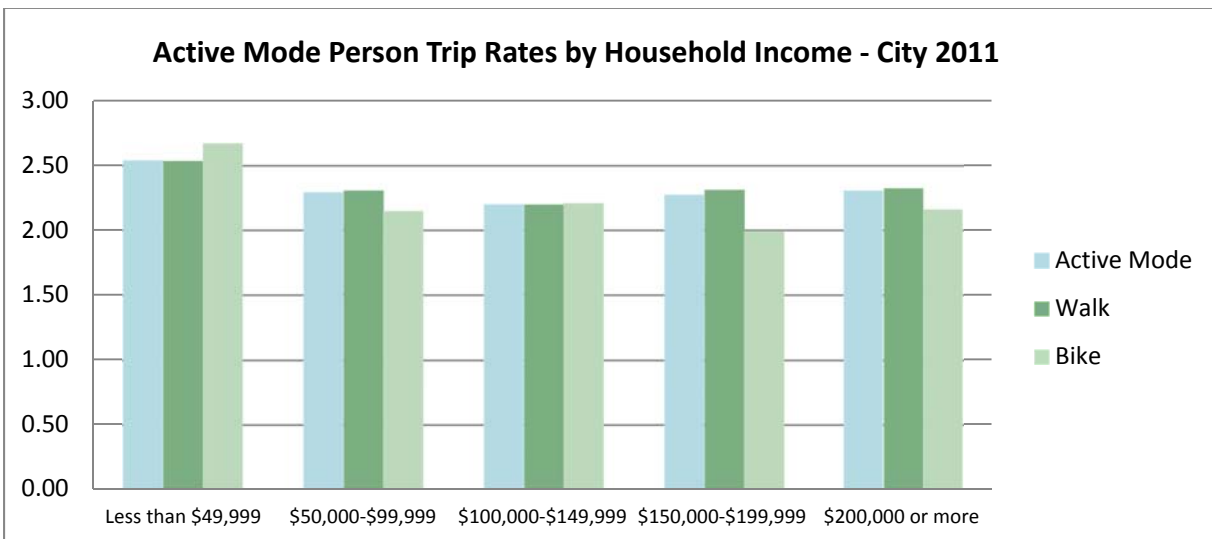
The proportion of active mode trips by household income distribution follows the overall city household income distribution. The most active “walkers” are the households with annual income level less than \$49,999. While they represented 19% of all City households, they accounted for up to 24% of walking trips. On the other side they account only for 8% of total bike trips.

Figure 13: Active Mode Weekday Trips Proportions by Household Income - City 2011



When comparing person trip rates the lowest income level household members (less than \$49,999) made a higher number of active mode trips per day than the members of higher income level households.

Figure 14: Active Mode Person Trip Rates by Household Income - City 2011



2.6 Active Mode by Week

This section will look at how weather patterns affected the weekday active mode shares during the CARTAS data collection. CARTAS was conducted from February to May which the change in seasons from winter to spring. It is important to note that due to the small number of active trips surveyed per week much of the weekly variation seen is not statistically different to a 95% confidence interval. As a result the figures and data presented in this section cannot be used to conclusively quantify the affect of slight temperature and precipitation changes on active mode share and instead provide for general understanding.

The survey data appears to suggest the walk mode (Figure 15) is less sensitive to temperature changes than the bike mode (Figure 16) as the share of walk trips did not vary significantly relative to changes in average weekly temperature. The data available shows precipitation however has a more significant impact on individual's decision to make either bike or walk trip (Figure 15 & Figure 16). The confidence intervals (or error bars) are displayed on each figure.

Figure 15: Weekday Walk Mode Share by Week - City 2011

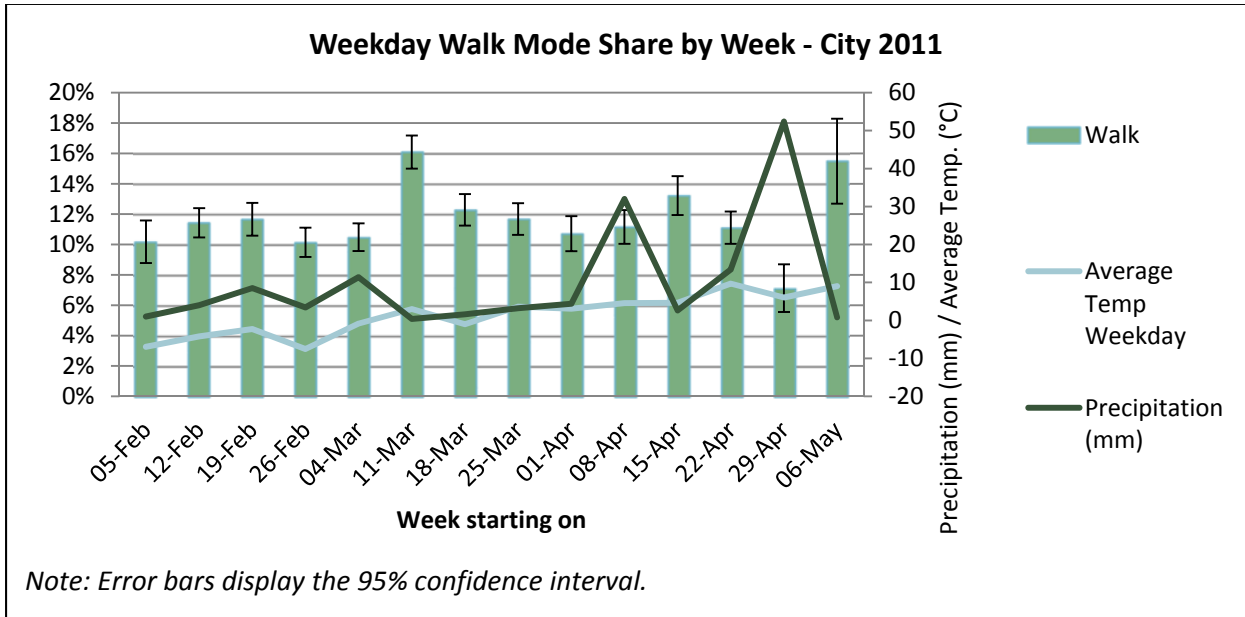
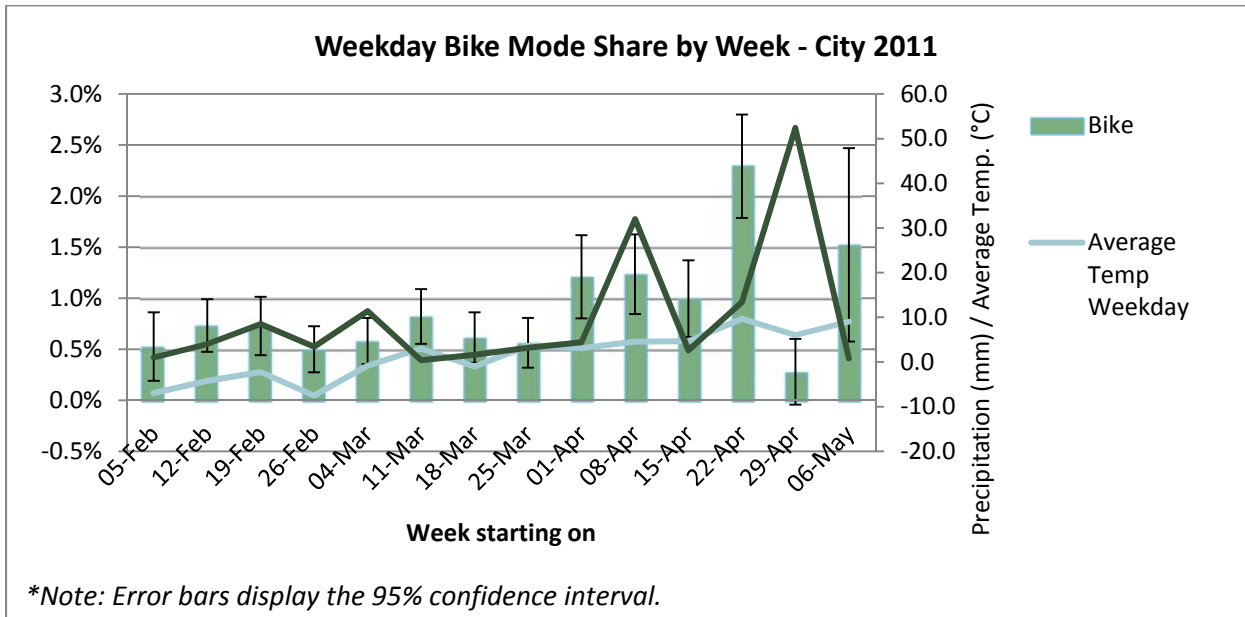


Figure 16: Weekday Bike Mode Share by Week - City 2011



2.7 Conclusion

While overall participation in biking has not changed since 2001 the share of walking trips is decreasing. The biggest drop was seen in the age category of 5-14 years old which represent elementary and junior high students. Their daily trip rates decreased from 2.32 in 2001 to 1.91 trips per person in 2011. This supports the findings from Travel Behaviour Report Series: Volume 2.

The dramatic change can be seen in size of household whose members are making active mode trips. The 1 to 2 member households make more active mode trips than they did decade ago (2.52 in 2001 versus 2.31 active mode trips per day in 2011) and their share of active mode trips increased from 35% in 2001 to 55% in 2011.

The active mode trip rate is the highest for the household with no auto ownership or/and with no licenses in the household. It grew from 1.98 trips per day in 2001 to 2.28 trips in 2011. The share of active mode trips for the household with no auto ownership or/and with no licenses in the household also increased from 9% in 2001 to almost 14% in 2011.

The walk mode share for household with annual income less than \$49,999 is more than double of the mode share for households with higher income. The income level seems to have little impact on biking mode as the biking mode share remains doesn't change for different income level households.

Breaking down the Walk and Bike trips by week in which they were made showed that the number of walking trips is less sensitive to the outside temperature than the number of biking trips. While walk trips show only slight increase with the increasing outside temperature it is obvious from Table 1 that outside temperature has significant impact on biking trips. Precipitation and the amount of precipitation on the travel day seem to have a big impact on the decision to walk and/or bike.

Table 1: Active Mode City Wide Trips by Week and Average Mean Temperature - City 2011

Week #	Average Temperature	Walk Trips	Bike trips	Walk Share	Bike Share
7 - 10	-5.00	130,354	7,585	10.9%	0.6%
15 - 18	6.90	117,845	15,100	11.5%	1.5%

3 Transit Travel Study

3.1 Introduction

The Calgary household activity surveys provide some relevant information related to transit. In particular, it is possible to examine transit users and compare them to the general population. This goes beyond mode share and allows us to draw conclusions about who uses transit and how often they use it.

For the purpose of this report, transit includes Calgary Transit, school buses (both charter transportation and Calgary Transit), Access Calgary buses and inter-city transit routes (e.g. Airdrie commuter). Additionally, this report only considers people living within the City of Calgary and does not include any residents from the Region.

This analysis will look at household and personal variables and compare transit users to the general population to look for differences. Additionally, transit trip rates will be examined, looking at both trips per person and trips per transit user for both the entire population and only employed people. There are a number of statistically significant differences which will be highlighted.

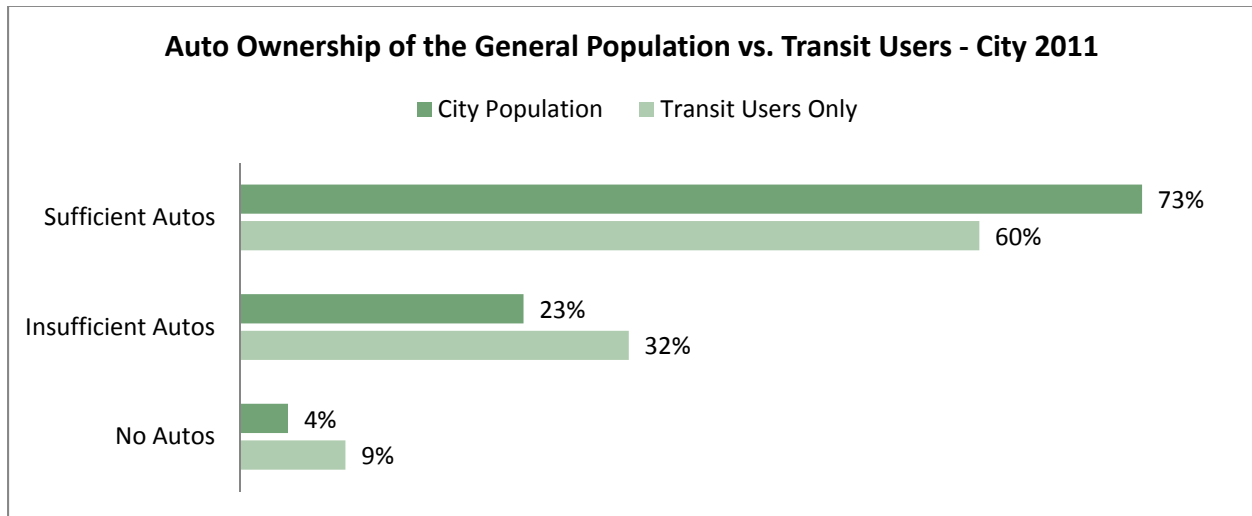
3.2 Proportions in the general population compared to transit users

The 2011 CARTAS provides survey information that can be used to compare the composition of the transit user population to the general population. This is done by choosing a characteristic, such as household size or age, and comparing the proportion of transit users with that characteristic to the proportion of the overall city population with that characteristic. Several different characteristics were chosen for comparison, and the results of that analysis are shown in the following sections.

3.2.1 Auto Ownership

Auto ownership is one indicator showing the difference between transit users and the general city population. In the city population as a whole, 73% of people live in a household with sufficient autos, which means there are at least as many vehicles as licensed drivers in the household. Looking only at transit users, 60% of those people live in a household with sufficient autos. The rest of the people live in households with either fewer autos than licensed drivers, or no autos at all.

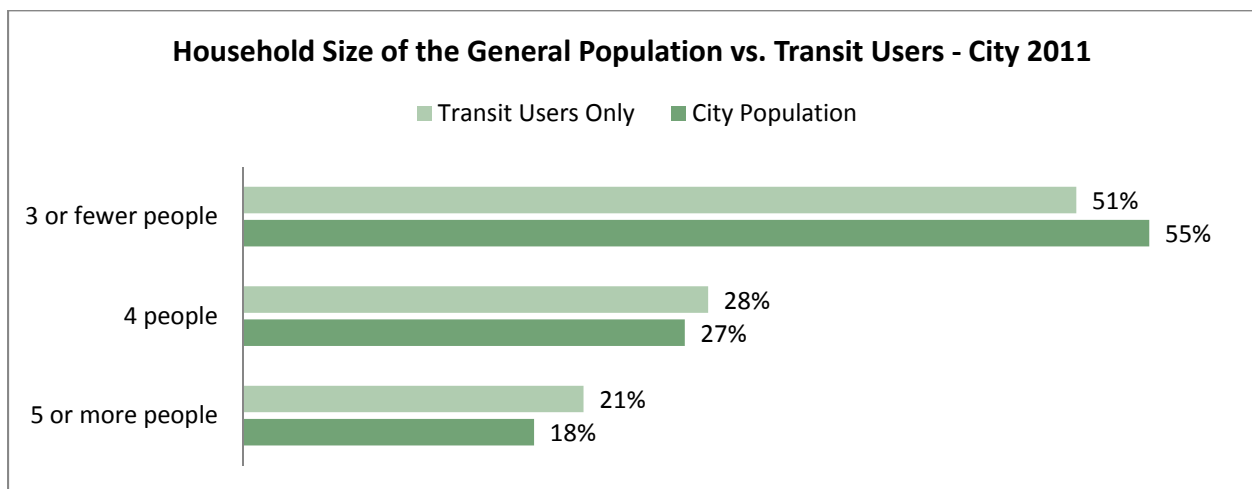
Figure 17: Auto Ownership of the General Population vs. Transit Users – City 2011



3.2.2 Household Size

Examining household size shows another difference between transit users and the general population. 55% of the City population lives in households or 3 people or fewer, 27% live in 4 person households and 18% live in households of 5 or more people. By comparison, only 50% of transit users live in households of 3 people or fewer, while 21% of transit users live in households on 5 or more people. The remaining 28% live in 4 person households, but this is not a statistically significant difference from the overall city population.

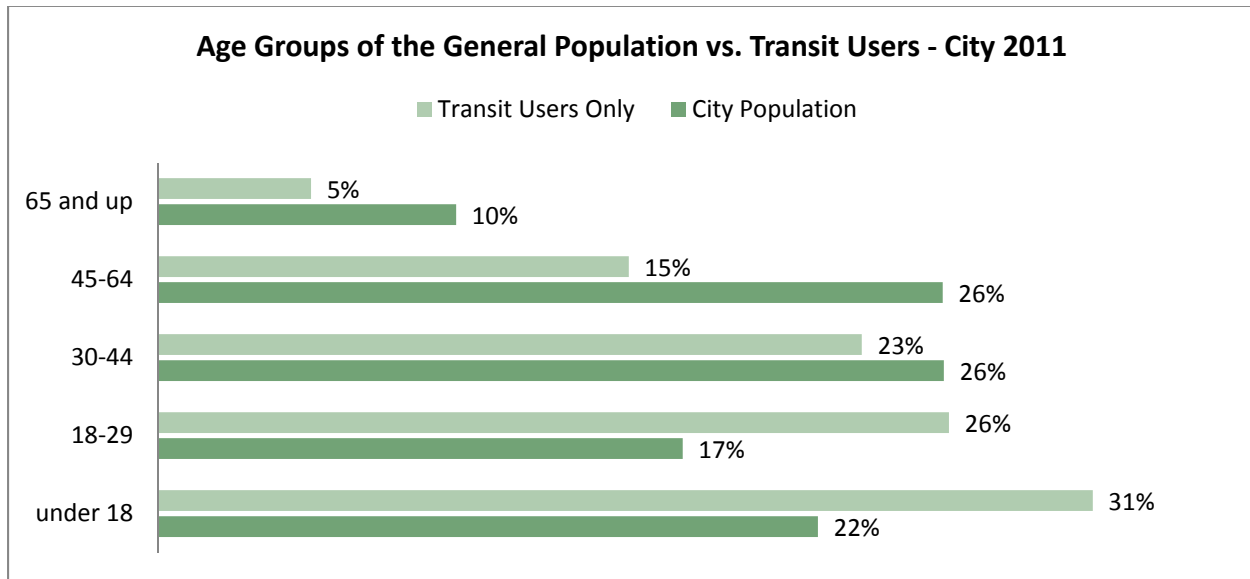
Figure 18: Household Size of the General Population vs. Transit Users - City 2011



3.2.3 Age Groups

Age groups provide another difference between transit users and the general population, as seen in Figure 19 below. The most significant difference is that while 39% of the city population are people under 30 years old and 36% is people over 45 years, 57% of transit users are under 30 and only 20% are over 45.

Figure 19: Age Groups of the General Population vs. Transit Users - City 2011



3.2.4 Household Income & Household Workers

Household income data from the 2011 HAS indicates that the breakdown of transit users compared to the city population is statistically different in the \$50k to \$200k income range. Specifically, the percentage of transit users from households making between \$50k and \$100k is smaller than for the city population overall. Additionally, the percentage of transit users from households making between \$100k and \$200k is greater than for the city population overall. The proportion of households making less than \$50k or more than \$200k are not statistically different from each other when comparing transit users and the overall city population.

This finding implies that the median household income of a transit user is higher than the median household income of the overall city population.

When considering the number of workers in a household, there is also a statistically significant difference between transit users and the overall city population. Households with one or no workers are less represented among transit users than in the general population, whereas households with two or more workers are more represented among transit users than the general population.

Figure 20: Household Income of the General Population vs. Transit Users - City 2011

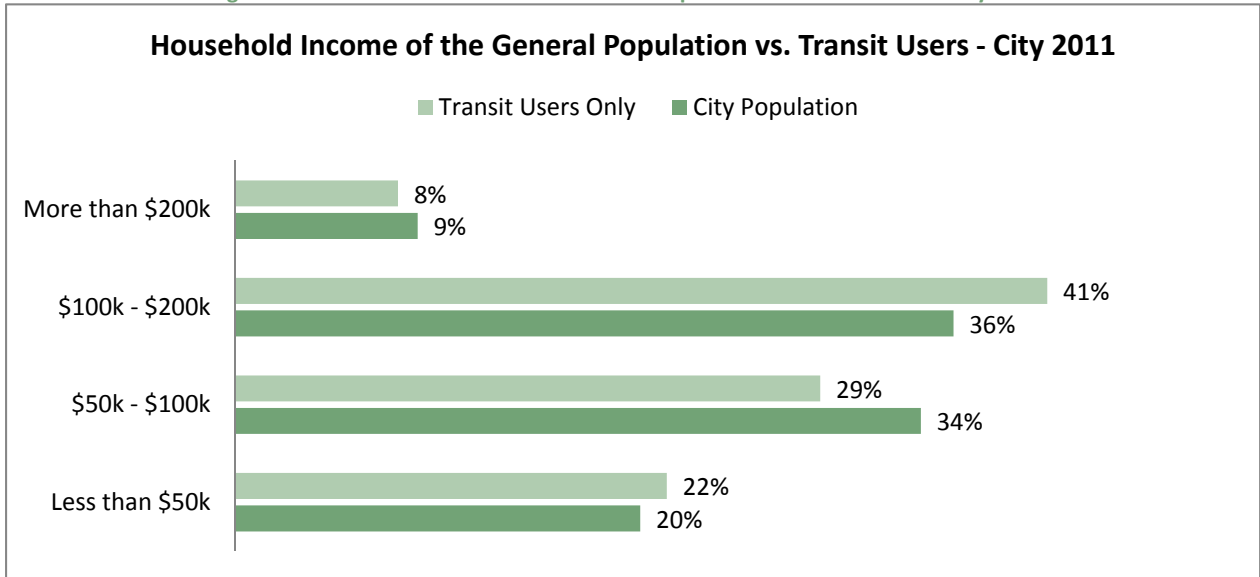
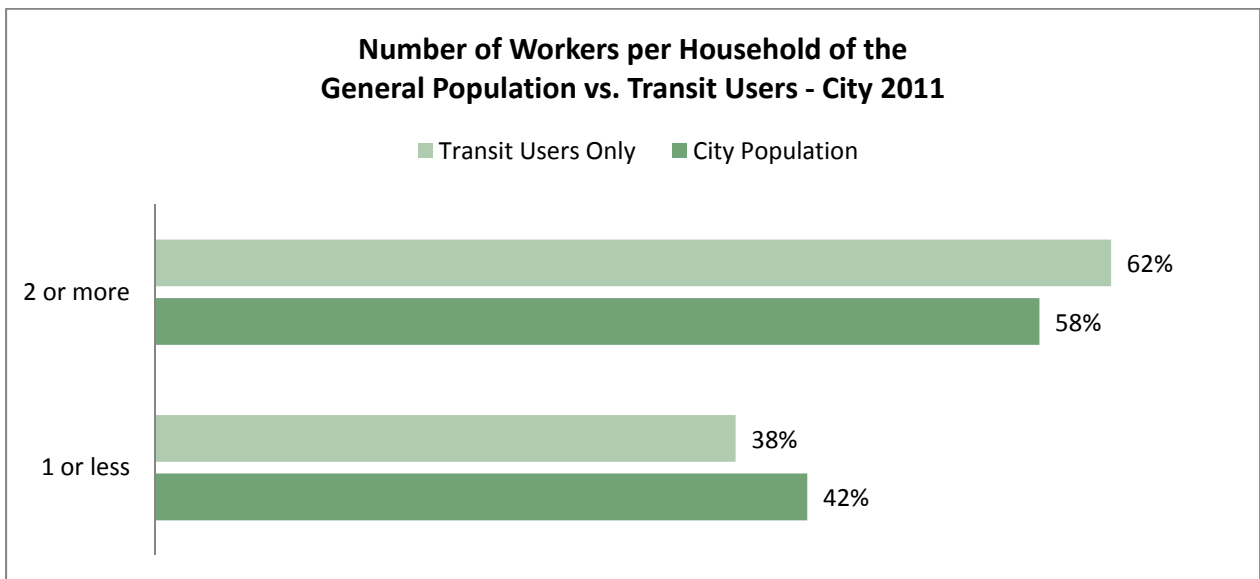


Figure 21: Number of Workers per Household of the General Population vs. Transit Users - City 2011



Households with income between \$100k and \$200k are more likely to have multiple workers in the household than those with incomes between \$50k and \$100k. The fact that transit users are more likely to be from a household with multiple workers and the fact that transit users are more likely to have a household income between \$100k and \$200k are correlated, and so it is clear that the previous two findings (\$100k-\$200k household income and 2 or more household workers), while valid, are not independent of each other.

3.3 Trip Rates

The HAS provides good information about trip rates. Two kinds of trip rates will be discussed in this section. The first is the trip rate per person. This is the number of transit trips taken by everyone in the city divided by the number of people in the city. The second number is the trip rate per traveller. This is the number of transit trips taken by everyone in the city divided by the number of people who take any transit trips.

The two trip rate indicators can provide useful information both independently and when considered together. Trip rate per person gives an idea of how much a given mode (transit in this case) is used by the general population (or a specific sub-population if that is being considered). Trip rate per traveller gives an idea of how much the typical user of that mode uses it. In the case of transit, the most common pattern of transit travellers is two trips per day – typically one trip from home to work or school and a return trip home.

Comparing trip rates between 2011 and 2001, we see that the overall transit trip rate per traveller has decreased by a small but statistically significant amount. In 2001, the trip rate per traveller was 1.90 trips per transit user. By 2011, the trip rate per traveller had decreased to 1.86 trips per transit user. The decrease is not large but it is statistically significant. This implies that more transit users are taking a single transit trip per day in 2001 compared to 2011.

The city-wide transit trip rate per person did not change by a statistically significant amount between 2001 and 2011. The 2011 trip rate per person was 0.31.

3.3.1 Employed Population

Trip rates can be calculated for smaller groups of people as well. In this report, the trip rates for employed persons were calculated and were found to be different from those for the general population.

The transit trip rate per employed person increased from 2001 to 2011, going from 0.24 trips per employed person in 2001 to 0.31 trips per employed person in 2011. However, the transit trip rate per employed transit user decreased, going from 1.89 in 2001 to 1.82 in 2011. This implies that while each employed person using transit is making slightly fewer transit trips on average, the proportion of employed persons in the overall population making any transit trips has increased from 2001 to 2011.

Examining the expanded population from the HAS we see that in 2001 the percentage of employed persons using transit was 13%, while in 2011 that number increased to 17% of employed persons. This means that the transit usage proportion for employed persons increased by 30% between 2001 and 2011, which is a statistically significant increase.

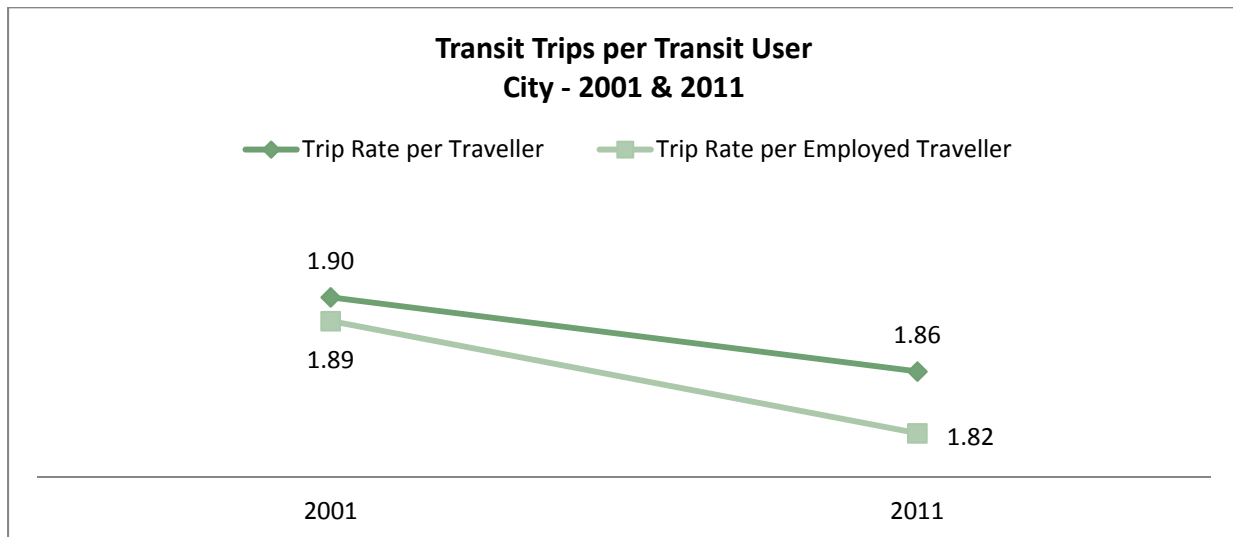
In the previous HAS report, report 2, section 7.5.4 shows that transit mode share for home to work trips to the CBD increased from 36% to 46% from 2001 to 2011. Since the CBD accounts for 27% of home to work trips, as stated in report 2, this is a significant increase. The rest of the city saw an increase in

transit mode share for home to work trips from 6% to 9% over the same period. While this does not translate into as many additional transit trips as with the CBD, this is still a significant increase. Overall, when considering the results from the previous report as well as the finding that the proportion of employed people using transit has increased, we can determine that the proportion of people who work in the CBD and use transit has increased from 2001 to 2011, and also (to a lesser extent) the proportion of employed people in the city as a whole who use transit has also increased.

Figure 22: Transit Trip Rate per Person – City 2001 & 2011¹



Figure 23: Transit Trip rate per Transit User



¹ Note that trip rate per person for the general city population does not show a statistically significant change from 2001 to 2011

3.4 Conclusion

It can be seen from the above results that transit using population is, taken overall, different from the general population. They are more likely to be young, live in large households and have fewer cars than drivers than the general population. However, these differences are not extreme and transit is still used by individuals within all income categories, age ranges and household types.

The total number of transit trips per person in the population is statistically the same as in 2001. On the other hand, each person using transit takes slightly fewer transit trips in a day than in 2001. Overall though, most transit users (73%) are still making two transit trips per day.

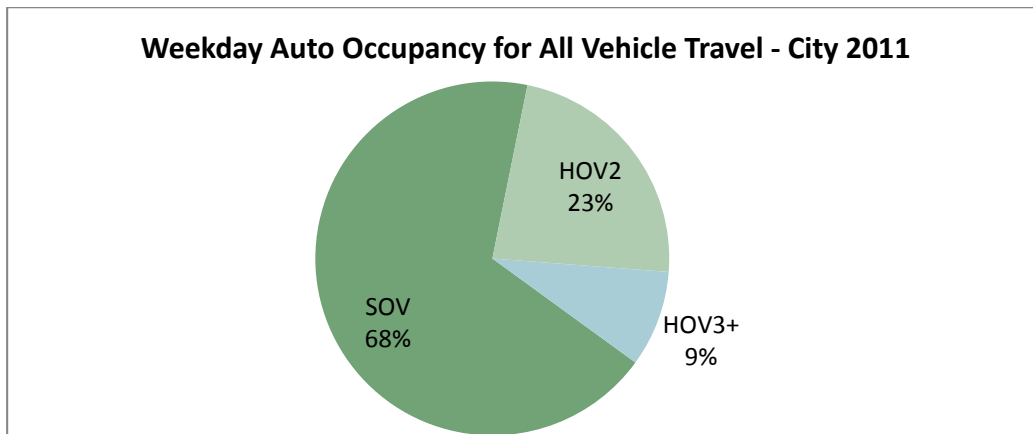
The proportion of employed people using transit has increased since 2001. Despite this, the average number of trips taken by employed people has decreased over the same time. However, as with the general population, most employed (72%) people are still making two transit trips per day. The average is slightly lower, but the patterns are similar.

4 Auto Occupancy and Carpooling Study

4.1 Introduction

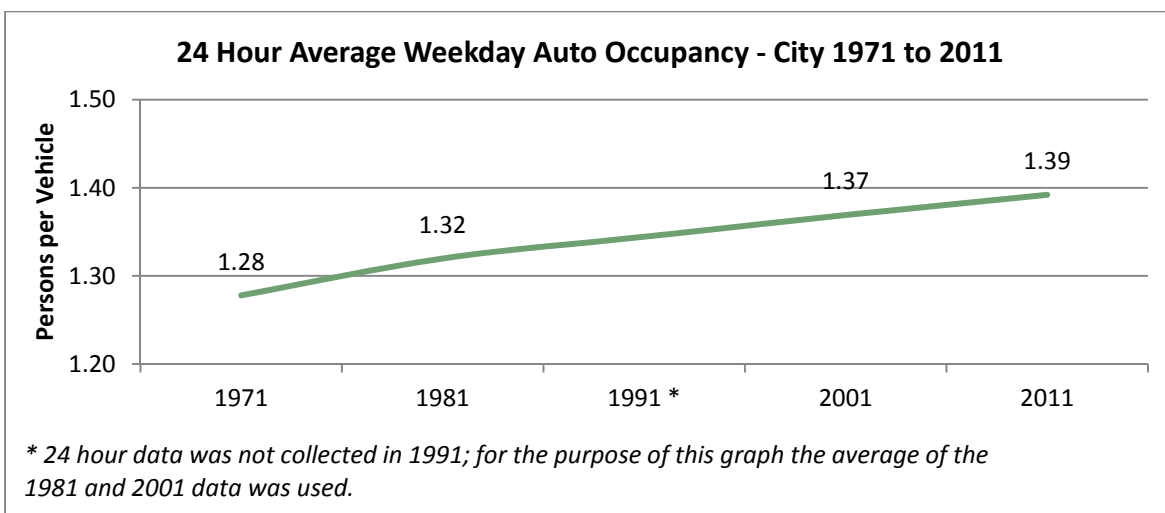
Auto travel makes up the largest portion of all personal travel in the city of Calgary. While the vast majority of personally owned vehicles on the road have seating capacity for 5 or more people the majority of trips include only a single occupant (see Figure 24 below). This report focuses solely on auto travel and through analysis of the survey data available discusses some of the differences in single occupant vehicle (SOV) and high occupant vehicle (HOV) personal travel.

Figure 24: Weekday Auto Occupancy for All Vehicle Travel - City 2011



The demographics of the household, specifically number of members and ages has a significant impact on whether household (HH) members will make a HOV trip. The data collected in 2011 showed that 76% of all HOV trips included only passengers who reside within the household. Despite a reduction in average household size and increases in auto ownership over the past few decades as previously reported in Report 1 of this series, average auto occupancy has gradually increased over the same time period as shown in Figure 25 below.

Figure 25: 24 Hour Average Weekday Auto Occupancy - City 1971 to 2011



4.1.1 Analysis Method and Data Sources

This report will focus on the different behaviour of SOV and HOV travel made by residents living in the city of Calgary only. In the previous reports in this series travel was only included at the person level with no inclusion of vehicle trips. For this report the total number of vehicle trips is assumed to equal the number of auto driver trips and the distribution of SOV and HOV trips are defined by the auto occupancy recorded for the driver trips. Passenger trip records were primarily excluded from this analysis to avoid duplicate counting of trips.

The data presented in this report varies from totals published in Report 2 which reported that auto trips made up 78.9% of all weekday person trips in 2011 or 3,122,600 person trips. For this analysis some of the trips from that total have been excluded. These include 19,800 trips made by taxi which were previously included in the auto passenger mode and 12,200 motorized other trips (e.g. motorcycle, electric scooter) which were included in the auto driver mode.

Due to changes in the survey instrument between 2001 and 2011 the data presented for each horizon will vary within this report. In 2001 respondents were asked to provide the number of occupants in the vehicle for each trip and no further passenger information. In 2011 the survey instrument was revised to improve analysis of HOV trips by asking respondents to provide the total number of occupants in the vehicle and the number of household members in the vehicle. They were also asked to identify which household members were in the car making it possible to identify the ages of household passengers within the vehicle.

4.2 Daily Vehicle Trips by Auto Occupancy

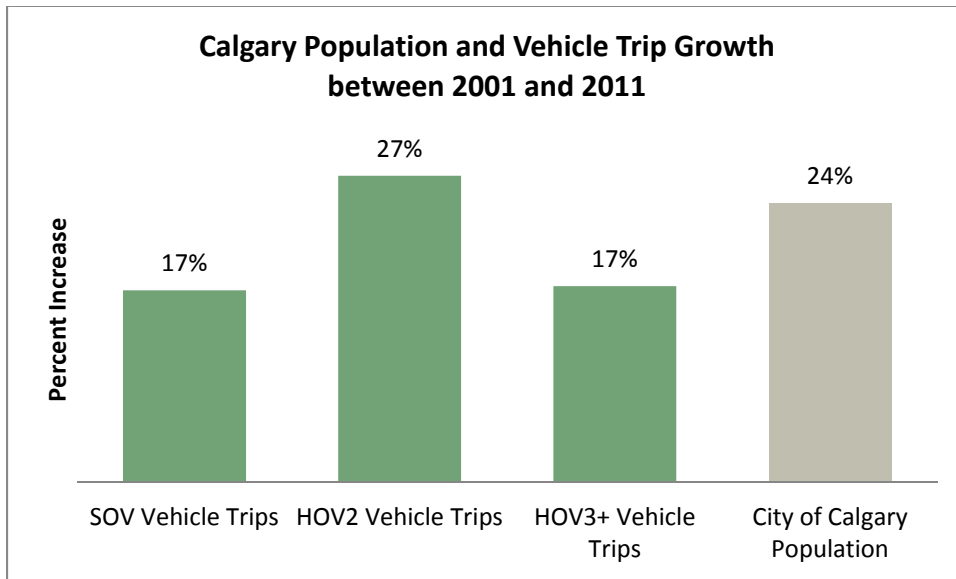
The distribution of vehicle trips by auto occupancy can be seen in Table 2 below. Small changes in portion of SOV and HOV2 trips can be seen. The change in HOV3+ travel between time horizons is not statistically significant.

Table 2: Weekday Vehicle Trips by Auto Occupancy - City 2001 & 2011

Auto Occupancy	2001		2011	
SOV	1,303,800	69.5%	1,521,500	68.2%
HOV2	405,600	21.6%	513,700	23.0%
HOV3+	167,300	8.9%	195,800	8.8%
Total Vehicle Trips	1,876,700		2,231,000	

An interesting pattern can be seen when comparing the percent increase of vehicle trips to the population growth over the same time period as seen in Figure 26 below. It's interesting to note that the growth of SOV vehicle trips is substantially lower than population growth. The lower increase in HOV3+ vehicle trips is likely related to the reduction in average household size over the same period.

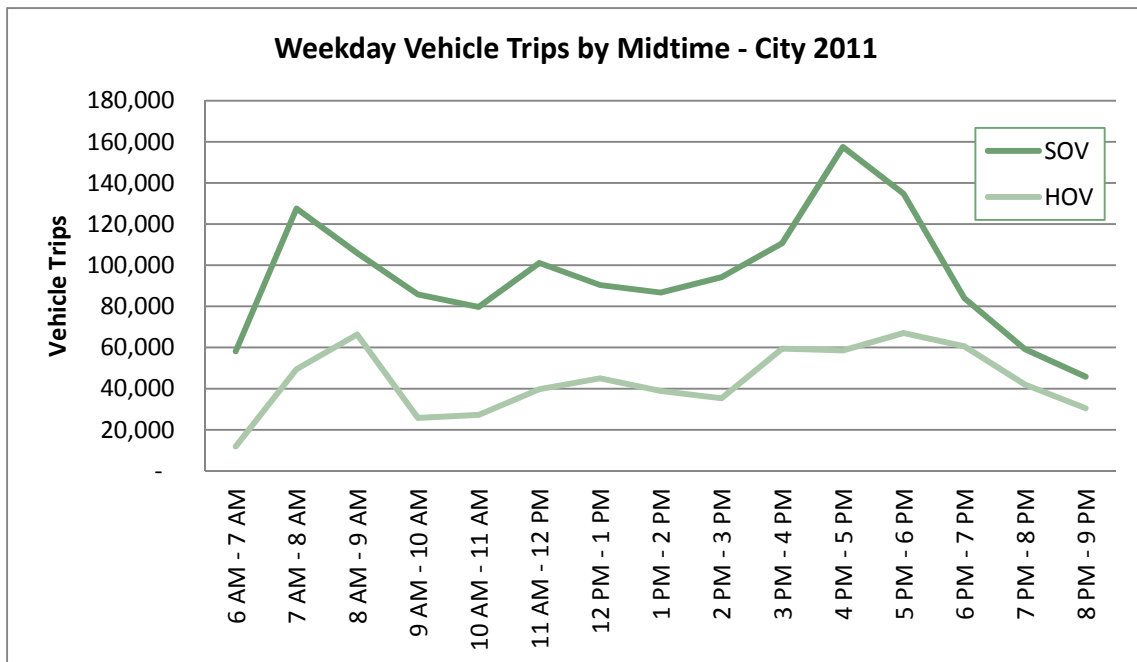
Figure 26: Calgary Population and Vehicle Trip Growth between 2001 and 2011



4.3 Time of Travel

The daily travel patterns of SOV and HOV trips are quite different as seen in Figure 27 below. Each mode experiences an AM, mid day and PM peak however SOV travel experiences a more pronounced peak in the midday and evening. The AM Peak for HOV travel is also later in the morning correlating closely with school start times.

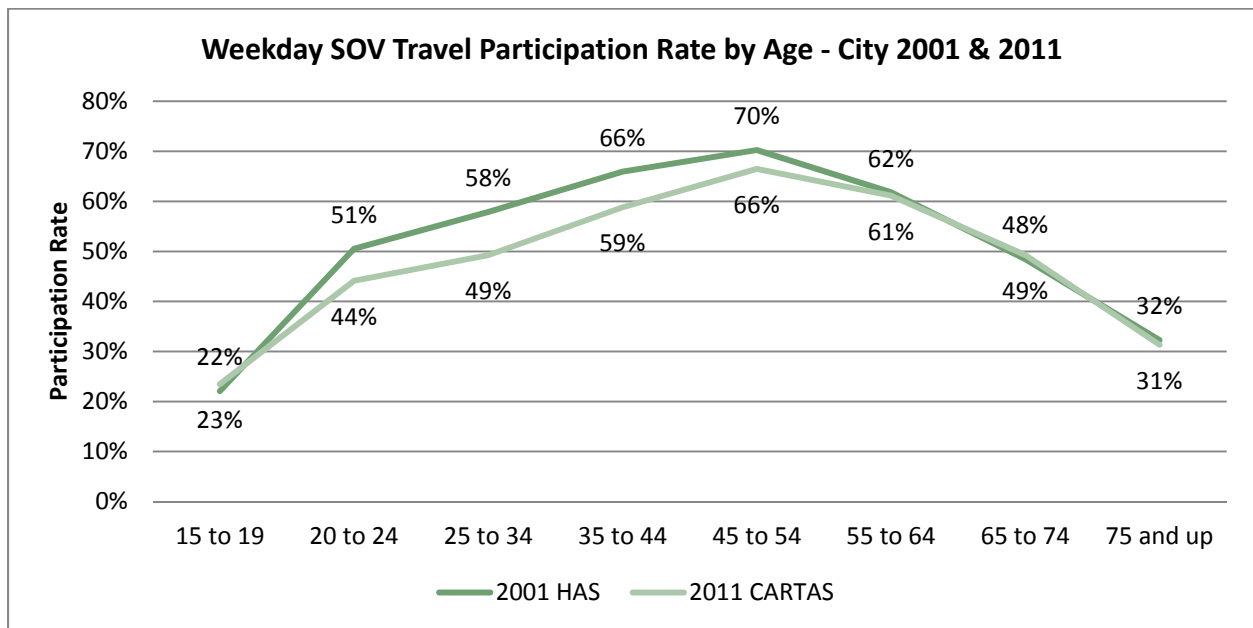
Figure 27: Weekday Vehicle Trips by Midtime – City 2011



4.4 Auto Driver and Passenger Ages

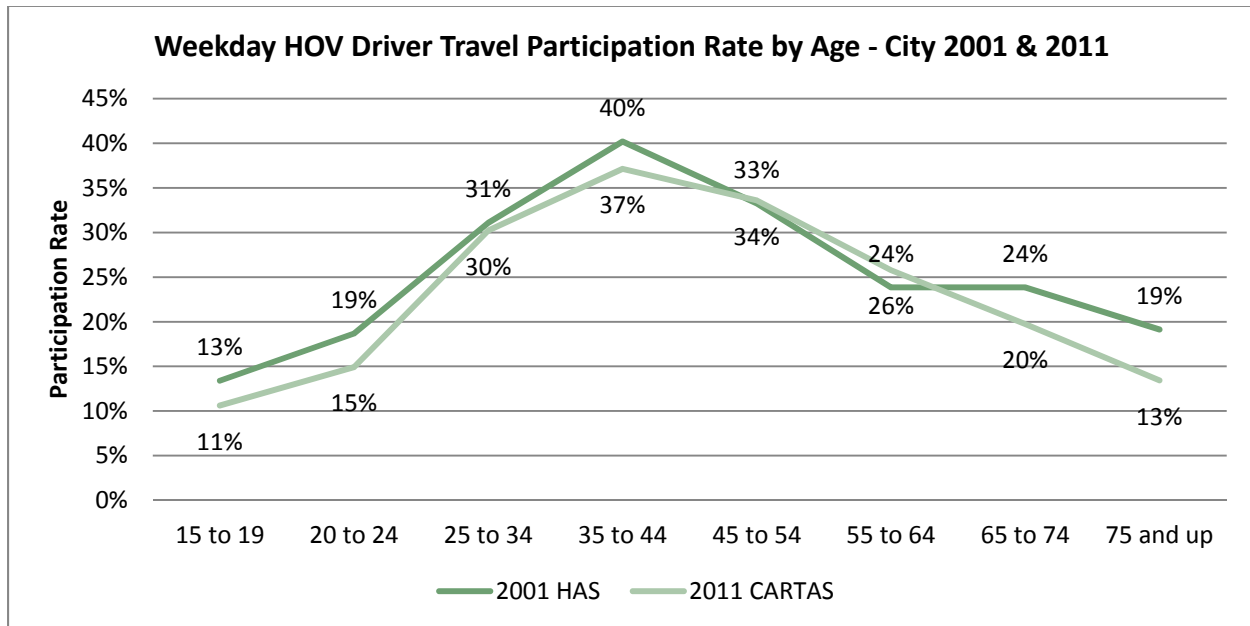
When looking at travel by driver age some noticeable changes have occurred between 2001 and 2011. Fewer young Calgarians made SOV and HOV driver trips in 2011 than a decade earlier. What has actually occurred with SOV drivers is the behaviour of the younger adult age cohorts did not change substantially as they aged resulting in a horizontal shift of the participation rate shown in Figure 28. For example in 58% of 25 to 34 year olds made one or more SOV trips on a weekday in 2001, a decade later a similar SOV participation rate of 59% was reported for the same age cohort group who were then 35 to 44 years old.

Figure 28: Weekday SOV Travel Participation Rate by Age - City 2001 & 2011



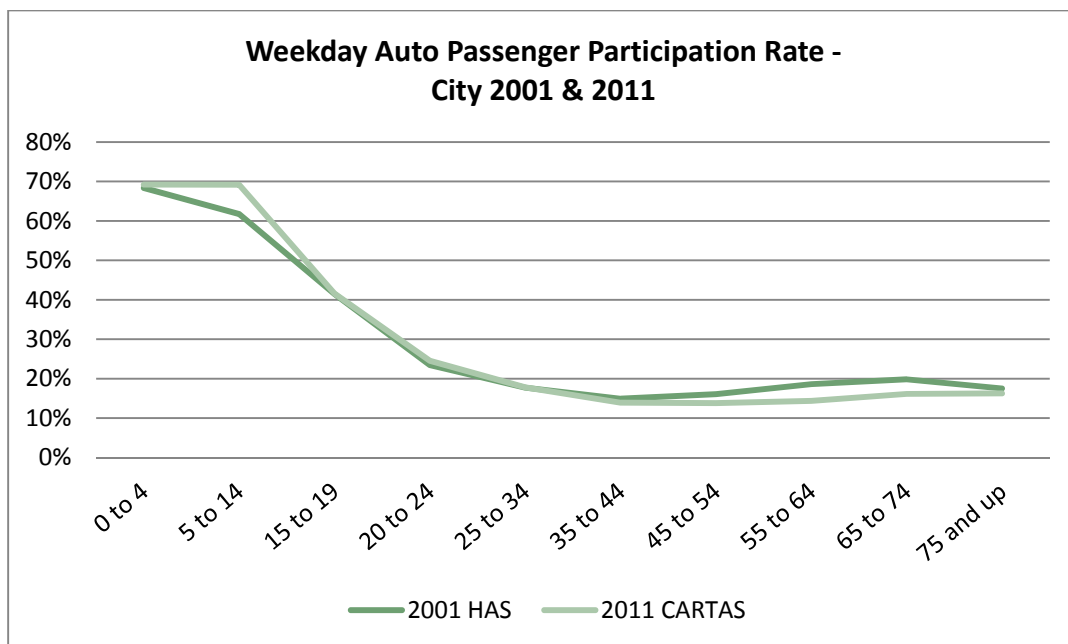
The participation rate of HOV drivers declined for all age ranges with the exclusion of 45 to 64 year olds, as seen in Figure 29. The shifting of age cohort behaviour found for SOV drivers cannot be seen for HOV drivers.

Figure 29: Weekday HOV Driver Travel Participation Rate by Age – City 2001 & 2011



There was very little change in passenger participation rates by age group between 2001 and 2011, as seen in Figure 30.

Figure 30: Weekday Auto Passenger Participation Rate – City 2001 & 2011



4.5 Who are HOV Passengers?

To analyze travel behaviour based on the type of passengers the HOV driver trip data recorded for 2011 was grouped into one of three categories based on Table 3 below. These groupings were used for the

next three sections of this study. The 2001 HAS data was not included in this analysis because the necessary passenger information was not collected.

Table 3: HOV Passenger Types

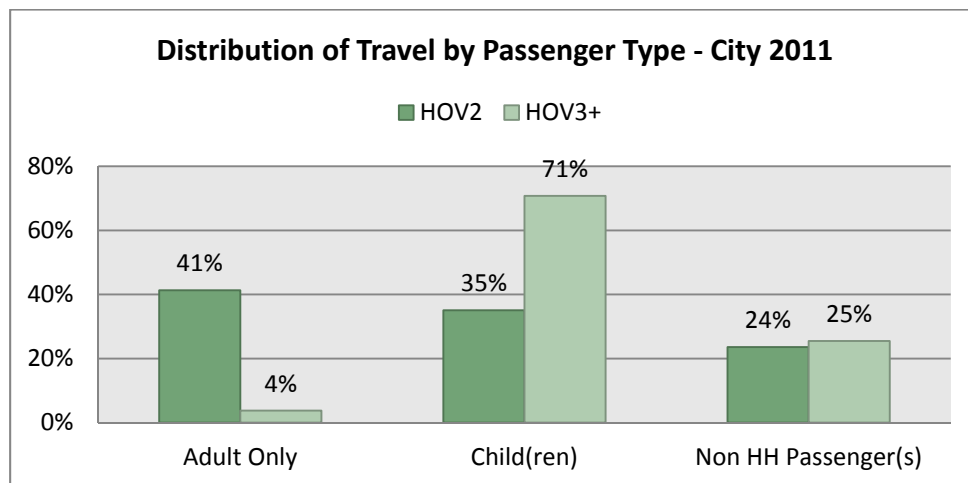
HOV Type	Description
Adult Only	All passengers are household members and over the age of 18
Child(ren)	All passengers are household members and least one of the passengers is under the age of 18
Non-HH Passenger(s)	One or more of the passengers are not household members (may include HH or non HH child passengers)

4.5.1 Carpooling and Children

When observing auto occupancy around Calgary a large portion of the HOV3+ one will observe are families travelling with minors. This section will look to explain how much of the traffic those trips really account for during a typical weekday. Households with one or more children under 18 years of age accounted for 32.3% of Calgary households in 2011. This is significantly lower than 2001 when 35.6% of households had one or more children. These households however generated 58.5% of all HOV travel in 2011 and 63.3% in 2001.

When looking at the breakdown of trips the vast majority (70.8%) of all HOV3+ travel includes one or more household child passengers (as seen in Figure 31 below). Additionally, a portion of the trips with non-household members include child passengers. In 2011 there were 318,700 HOV trips which included only household members and one or more child passengers on a typical weekday.

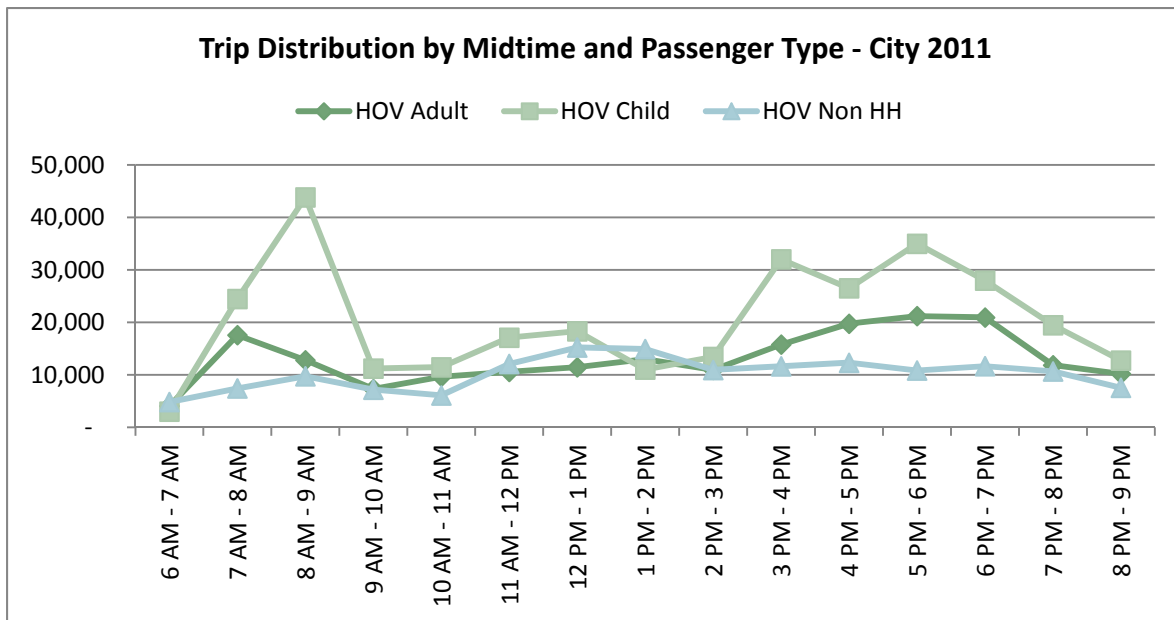
Figure 31: Distribution of HOV Travel by Passenger Type - City 2011



The travel time distribution of HOV trips with child passengers is heavily influenced by school start and end times. This can be seen clearly in Figure 32 below. Calgary schools tend to start between 8 am – 9

am and finish between 3 pm – 4 pm. Early dismissal is common on Fridays and likely accounts for some of the lunch peak observed.

Figure 32: Trip Distribution by Midtime and Passenger Type - City 2011



4.5.2 AM Peak Adult HOV Travel

While families are logistically forced to carpool with their minor children, adult HOV trips are often made by choice. To attempt to identify household level carpool commuter behaviour this section will focus on households which made one or more weekday trips during the AM peak period (6 am – 9 am) which contained only adult household passengers. The AM peak period was selected to avoid including households which only took evening social and recreational trips.

On the following page a number of graphs are included in Figure 33 that display the characteristics of households that made one or more AM peak adult only HOV trip. Only households with 2 or more adult members were included in the set of eligible households. Overall 10% of the eligible households made an AM peak adult only HOV trip. Based on the results shown the following household characteristics increase the likelihood a morning carpool trip will be made:

- Three workers within the household,
- over \$200,000 annually,
- Fewer autos than driver licences within the household (i.e. insufficient auto ownership), and;
- No children in the household.

Additionally, carpool behaviour was more prevalent on Fridays.

Figure 33: Percent of Eligible Households that made an Adult Only HOV Trip in AM Peak - City 2011



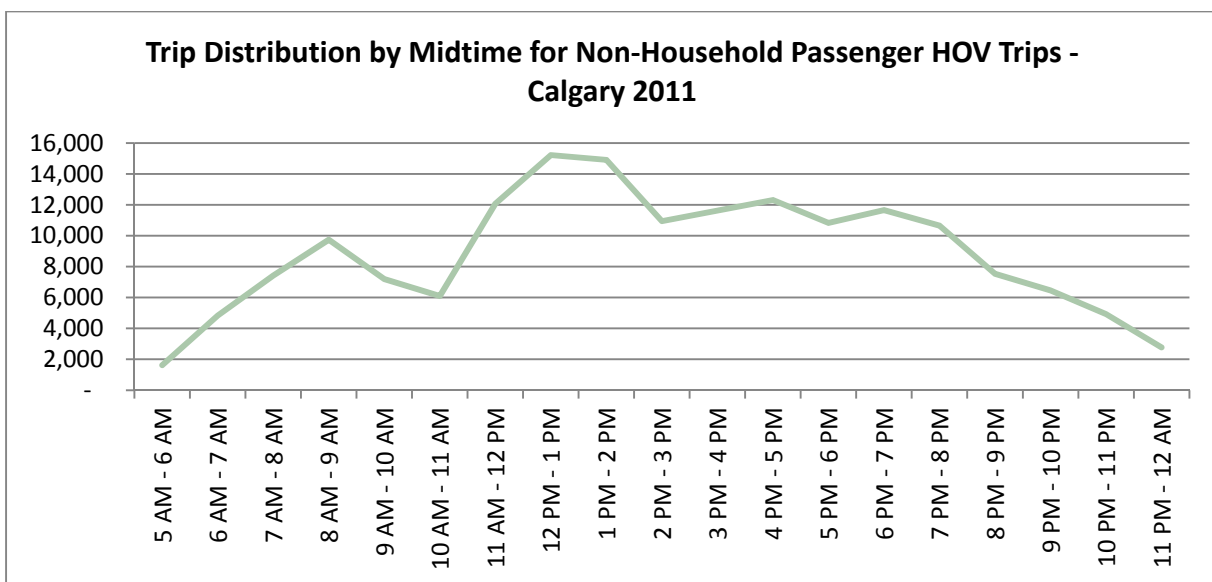
* No instances were observed for these household

4.5.3 Non Household Passengers

As previously shown in Figure 31 about a quarter of all HOV trips are made with passengers who live outside the household. These include a variety of different types of trips; some examples include school carpool, a social trip with a friend or a morning commute trip with a neighbour. In all cases the driver resides within the household surveyed but the passengers can be any combination of household members and non-members providing a minimum of one non-member is present.

The time distribution of these non-household passenger trips is quite different from the overall city wide travel patterns. The daily peak for this type of travel occurs over between 11 am – 2 pm as shown in Figure 34.

Figure 34: Trip Distribution by Midtime for Non-Household Passenger HOV Trips - City 2011



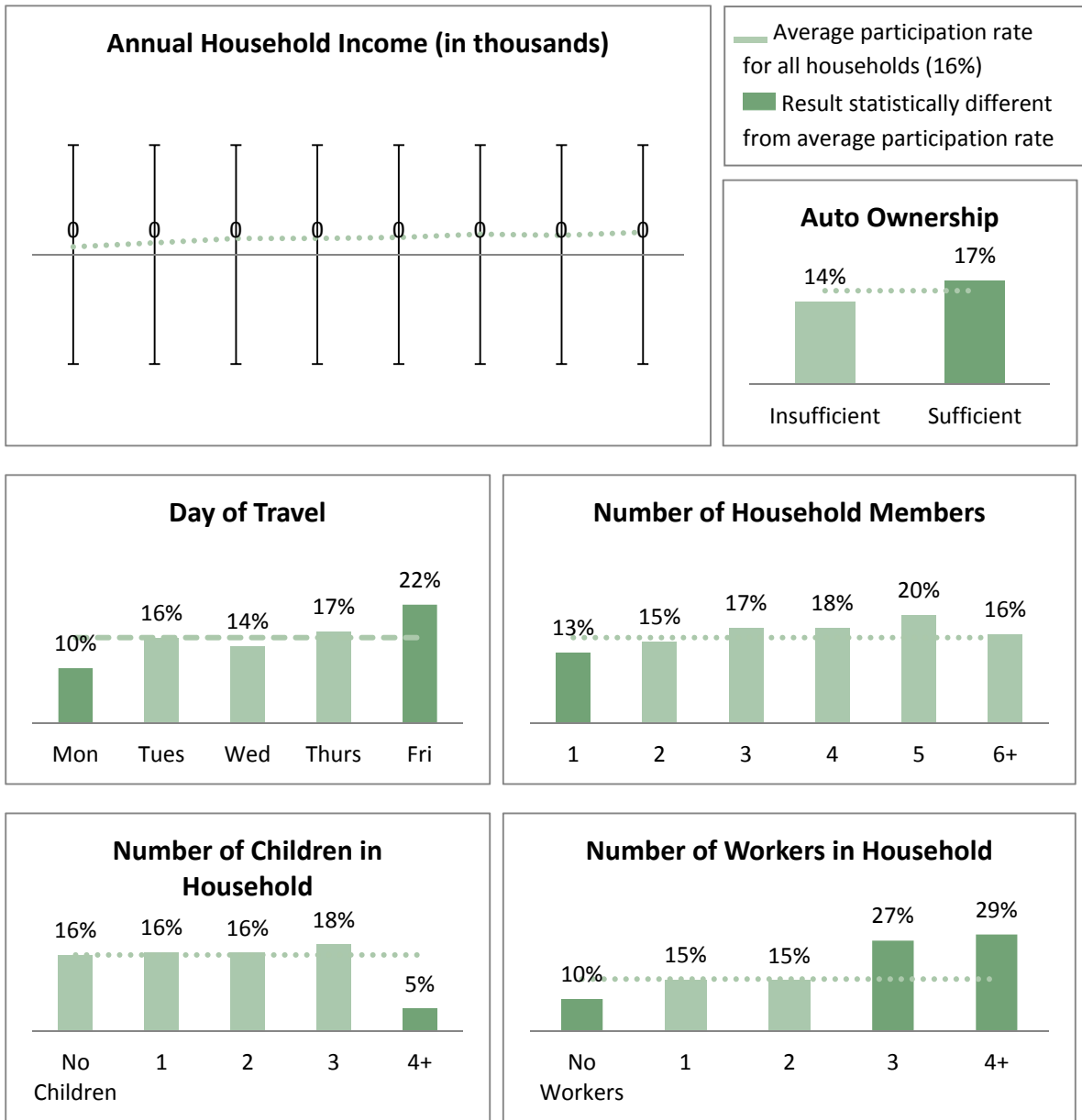
On the following page a number of graphs are included in Figure 33 that display the characteristics of households which made one or more weekday HOV trips with a non-household passenger. All households in the City of Calgary were included in the analysis. City-wide 16% of all households made a non-household passenger HOV trip. Based on the results shown the following household characteristics increase the likelihood a non-household carpool trip will be made:

- Household income over \$100,000 annually,
- One or more vehicles for each licensed driver in household (i.e. sufficient auto ownership), and;
- Three or more workers in the household.

Similar to household only adult travel, non-household member carpool behaviour is more prevalent on Fridays.

It should be noted that these results are based on the household demographics of the auto driver only, not the external passenger.

Figure 35: Percent of Households that made an HOV Trip with a Non-Household Passenger - City 2011



4.6 Conclusion

The results seen in this study show that weekday auto travel behaviour in Calgary is changing. Over the last 40 years average auto occupancy has gradually increased. The data does not however indicate that the change is primarily related to an increase in carpooling behaviour. While HOV2 trips per capita increased slightly, HOV3+ trips per capita decreased resulting in an insignificant change in HOV trips per capita. The higher average auto occupancy is primarily related to a 0.09 vehicle trips per capita decrease in SOV trips.

Looking at auto travel behaviour by age cohorts appears to show that Calgarians are not actually changing their patterns so much as younger generations are travelling differently than the generations before them. This was seen in Figure 28: Weekday SOV Travel Participation Rate by Age. Further analysis of the 2011 CARTAS and 2001 HAS data is needed to determine if that was the case for all travel modes and to identify whether the age cohorts are traveling less or shifting to alternative modes. In the future data collected by the upcoming Continuous Household Activity Survey Program (CHASP) could be reviewed observe the behaviour shifts of the different generations of Calgarians on an ongoing basis.

5 Trip Distribution across Calgary Study

5.1 Introduction

This study reports the survey results observed and how they differ by geographic area of Calgary. The areas used for analysis in this study are groupings of the Calgary Transportation Plan (CTP) typology, described Section 5.1.1 below. Data from the 2001 household activity survey is also reported where applicable and available.

5.1.1 Calgary Transportation Plan Land Use Typologies

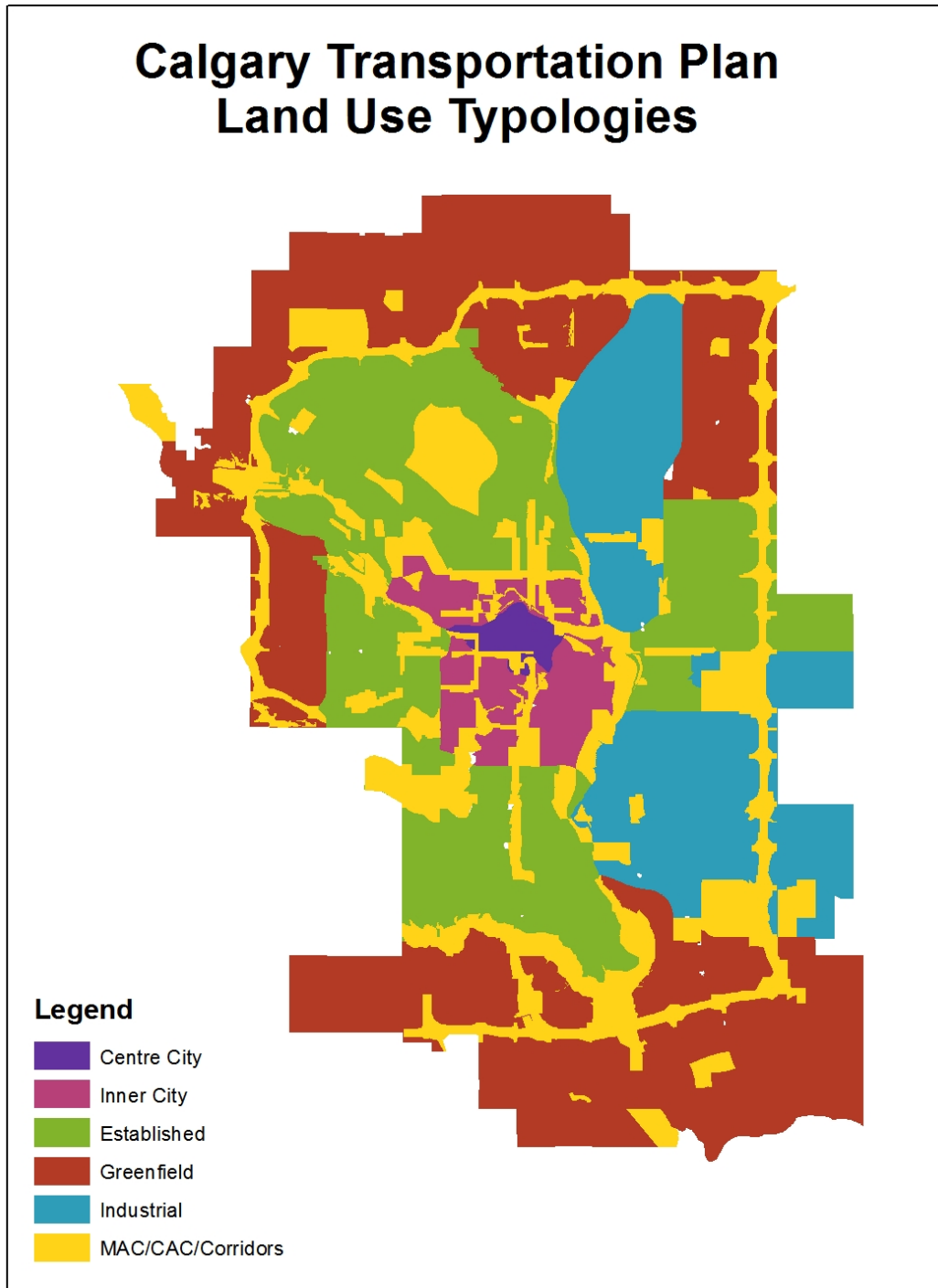
As part of the development of the Calgary Transportation Plan (CTP) and Municipal Development Plan (MDP) a series of broad geographic areas called typologies were developed to group areas with similar characteristics. Attributes like land use patterns, road layout, age, and stage of community lifecycle help to define an area and also influence travel behaviour patterns and decisions. Investigating how travel behaviour changes with respect to different typologies can provide insight into the progress that is being made towards CTP/MDP targets. Some of the typologies have a limited number of survey samples and were combined to ensure the results were statistically valid.

Table 4: CTP/MDP Typology Descriptions contains information on the different typologies examined in this study and how they were combined to reduce sample error. Figure 35 shows the geographic area represented by each typology.

Table 4: CTP/MDP Typology Descriptions

CTP/MDP Typology	Report Typology
Centre City	Centre City
MAC/CAC/Corridors	All Activity Centres and Corridors
Inner City	Inner City
Established	Established
Greenfield	Planned and future Greenfield
Industrial	Standard, Employee Intensive, and Greenfield Industrial

Figure 36: Map of CTP Typologies



5.2 Total Population and Households by CTP Typologies

Population and household quantities are provided in Table 5: Total Population and Households in CTP Areas - City 2011 below. The Established Area represents more than half of the City’s population and therefore the data reported for this area is generally consistent with trends reported at a city wide level.

However, the remaining CTP typology areas each exhibit unique deviations from the city wide data and city wide trends.

Table 5: Total Population and Households in CTP Areas - City 2011

CTP/MDP Typology	2011 Population	%	2011 Households	%
Centre City	35,800	3%	21,500	5%
Inner City	105,900	10%	48,600	12%
MAC/CAC/Corridors	50,400	5%	29,500	7%
Established	659,100	60%	242,500	57%
Greenfield	238,900	22%	79,600	19%
Industrial	100	0%	100	0%

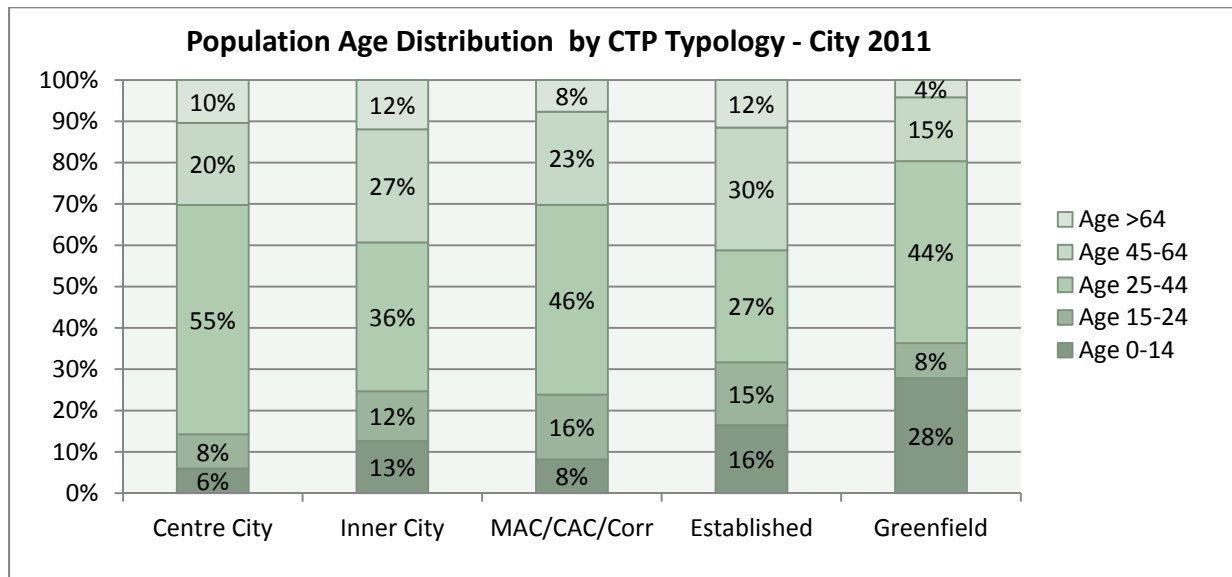
Due to the negligible population living in the Industrial area of Calgary it has been excluded from many of the subsequent sections and figures within this report.

5.3 Demographic Information by CTP Typology

5.3.1 Age Distribution

The following chart reports the age distribution observed by the CTP area type groups.

Figure 37: Population Age Distribution by CTP Typology - City 2011

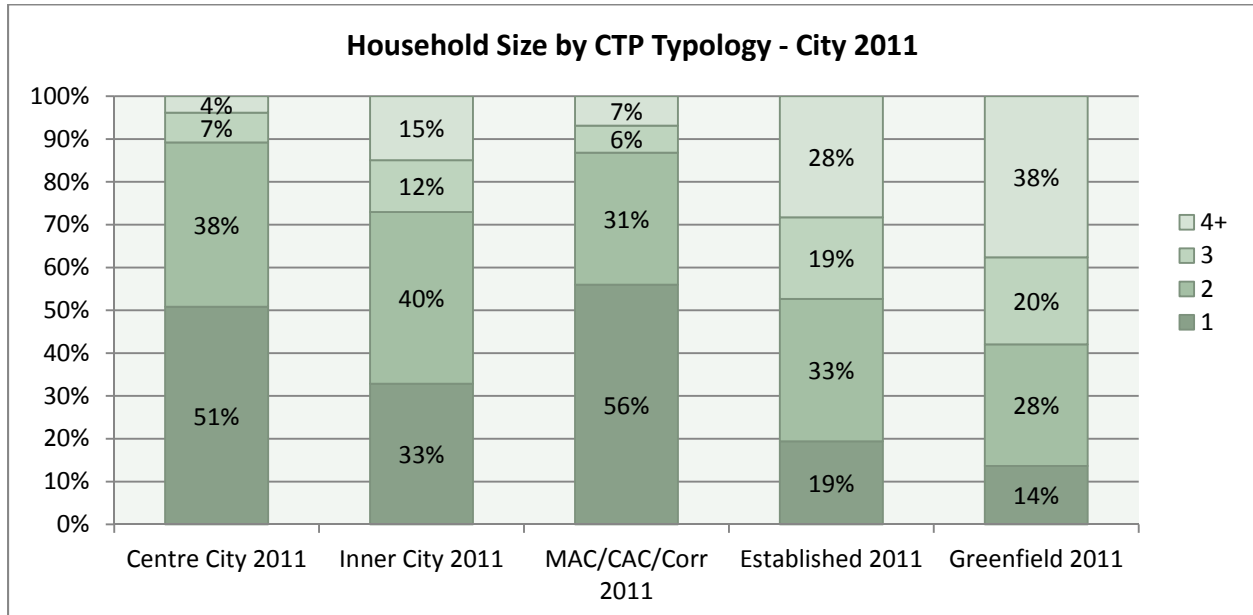


The Greenfield area contains the highest proportions of household members under the age of 25. The Established area contains the highest proportion of households over age 44. The Established area contains the lowest proportion of household members within the age of 25 to age 44. The Established area contains the lowest proportion of those within the age range of 25 to 44. The inner city age distribution is similar to the age distribution in the established areas.

5.3.2 Household Size

The following chart reports the survey results for household size according to CTP area type groups.

Figure 38: Household Size by CTP Typology - City 2011

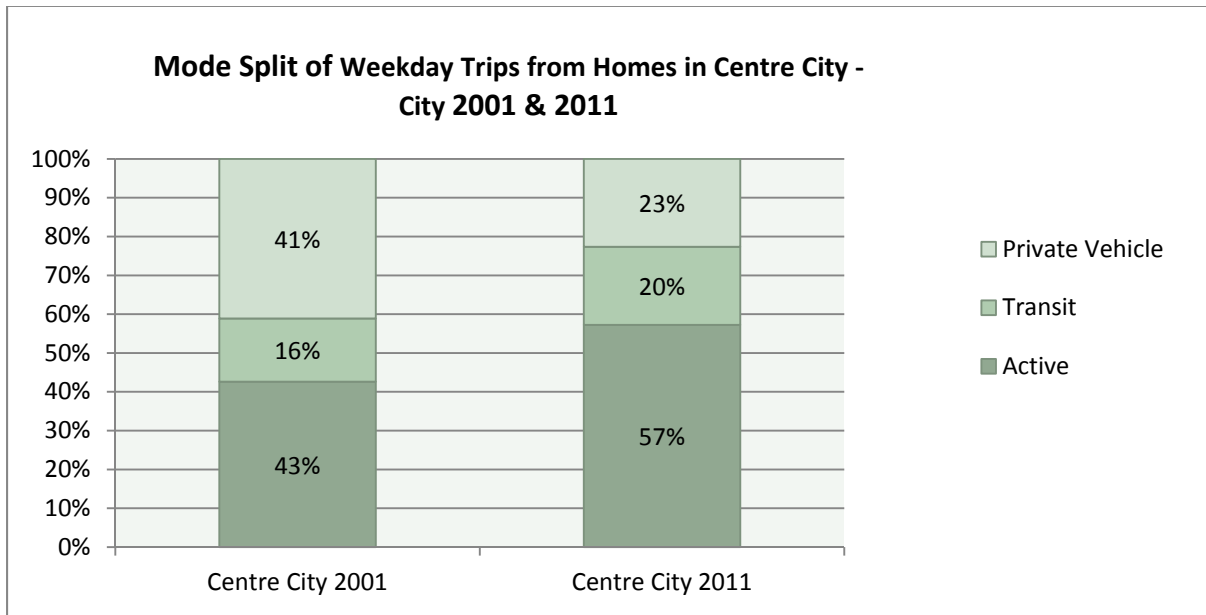


Further demographic information by CTP typologies can be found in Report 2 of this series, Changing Travel Behaviour in the Calgary Region, including a household income breakdown by CTP typologies found in figure 34 on page 35. In the Centre City, Inner City and Mac/CAC/Corridor, more than 70% of the households are made up of 1 or 2 members. In the Established areas 47% of households have 3 or more members. In the Greenfield areas, 57% of households have 3 or more members.

5.4 Mode Split by CTP Typology

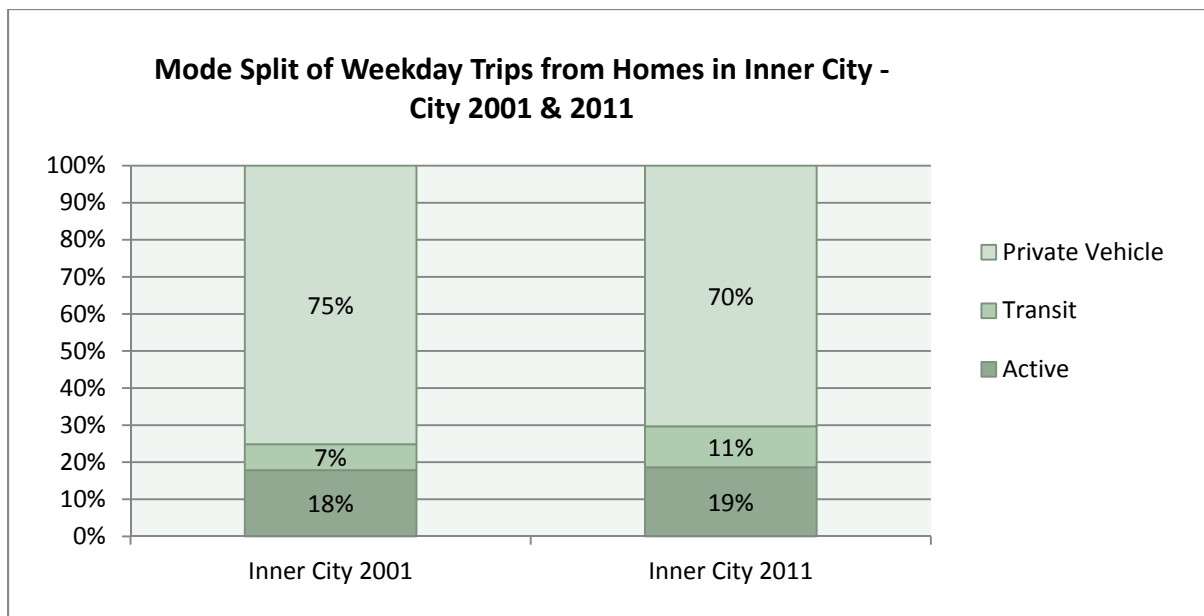
The following data is based on trips originating from a home in the CTP area type group specified. The active mode in the chart below includes walk trips and bike trips as defined in section 7.2 of Report 2. These modes have been combined to improve the quality of the results at this analysis level. The active mode is generally composed primarily of walk trips and a small portion of bike trips. Refer to the Active Mode report for further information.

Figure 39: Mode Split of Weekday Trips from Homes in Centre City - City 2001 & 2011



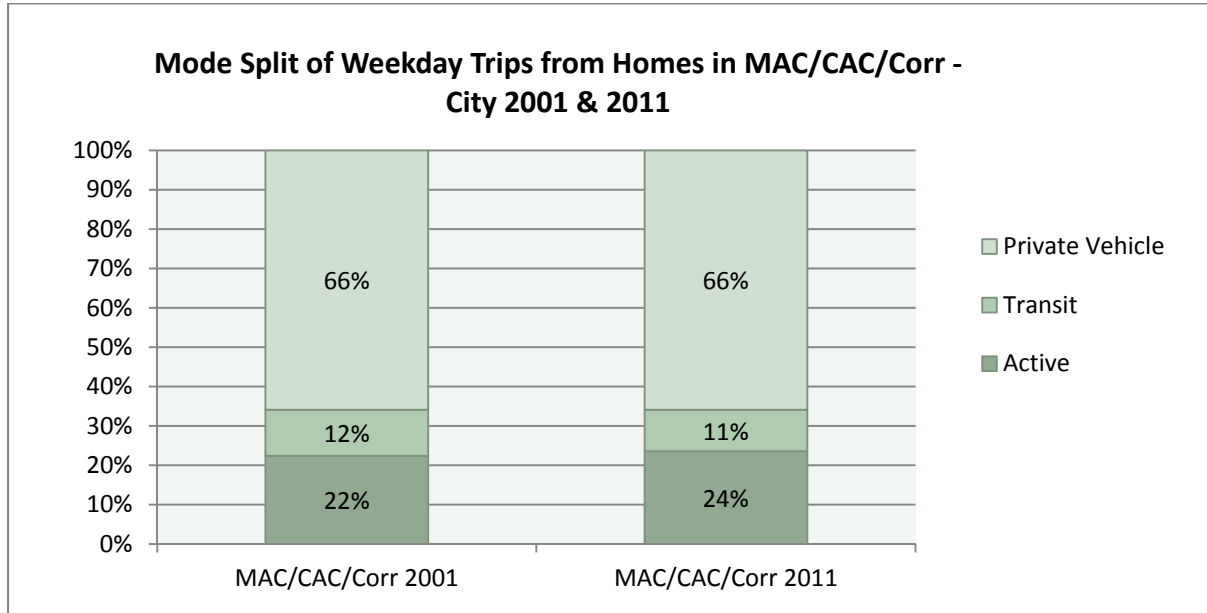
In the Centre City chart above, the change in private vehicle mode share and the change in active mode share are statistically significant. The change in transit mode share between 2001 and 2011 is not statistically significant. The changes in this area are by the far the most dramatic of any area reviewed and include a reduction in the use of private vehicles by 18%. The ratio of Transit mode to active mode has remained relatively constant between 2001 and 2011.

Figure 40: Mode Split of Weekday Trips from Homes in Inner City - City 2001 & 2011



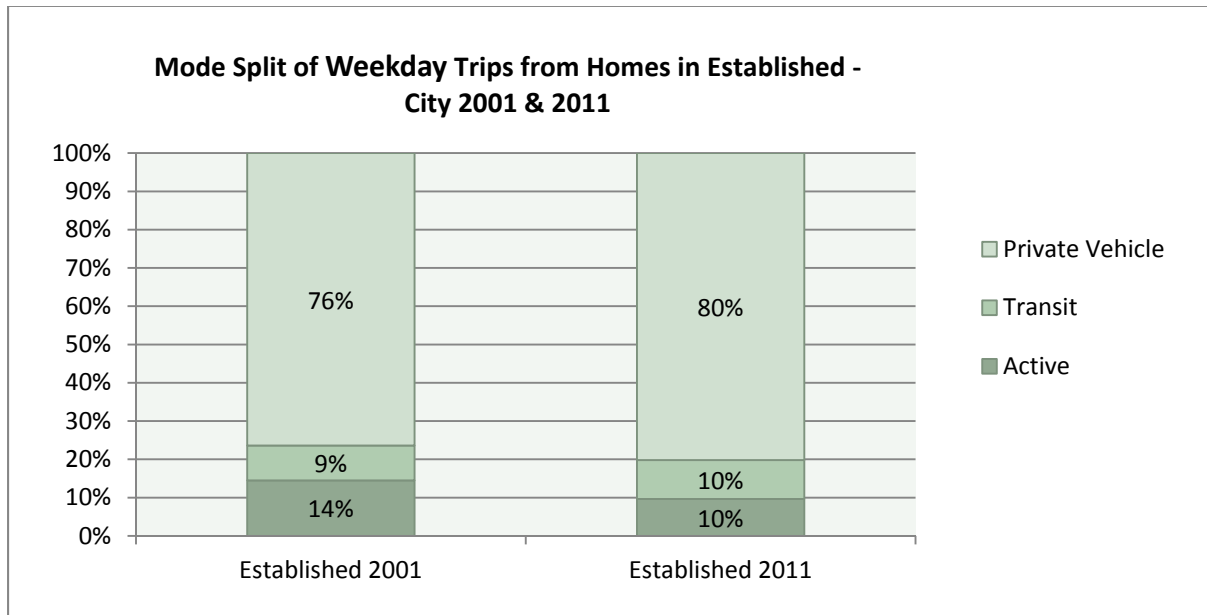
In the Inner City chart above, the change in private vehicle mode share and the change in transit mode share are statistically significant. The change in active mode share between 2001 and 2011 is not statistically significant. There has been a shift from private vehicle mode to transit mode in the Inner City.

Figure 41: Mode Split of Weekday Trips from Homes in MAC/CAC/Corr - City 2001 & 2011



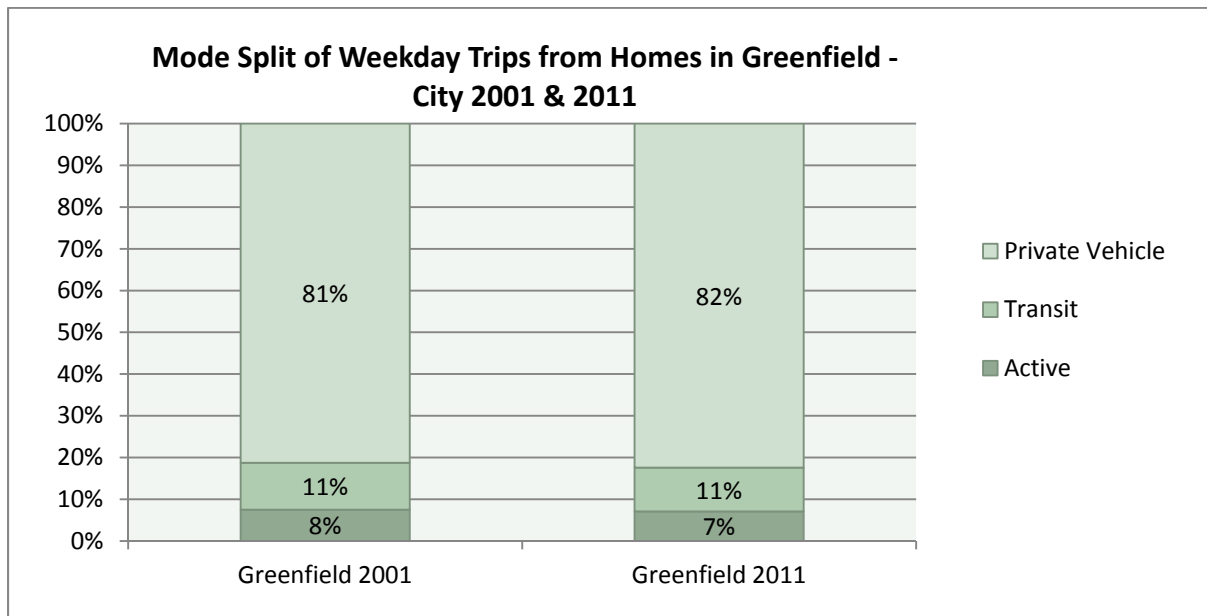
In the MAC/CAC/Corr chart above, there are no statically significant changes in any mode share between 2001 and 2011. However in both 2001 and 2011 the portion of active mode trips from home is quite high compared to other CTP areas. The only area with a higher active mode portion is the Centre City.

Figure 42: Mode Split of Weekday Trips from Homes in Established - City 2001 & 2011



In the Established areas chart above, the changes in all the mode shares between 2001 and 2011 are statistically significant. There has been a 4% increase in the use of private vehicles for weekday trips from homes and a 5% drop in the active mode for the same type of trip. The established areas represent 60% of the population of the City of Calgary.

Figure 43: Mode Split of Weekday Trips from Homes in Greenfield - City 2001 & 2011

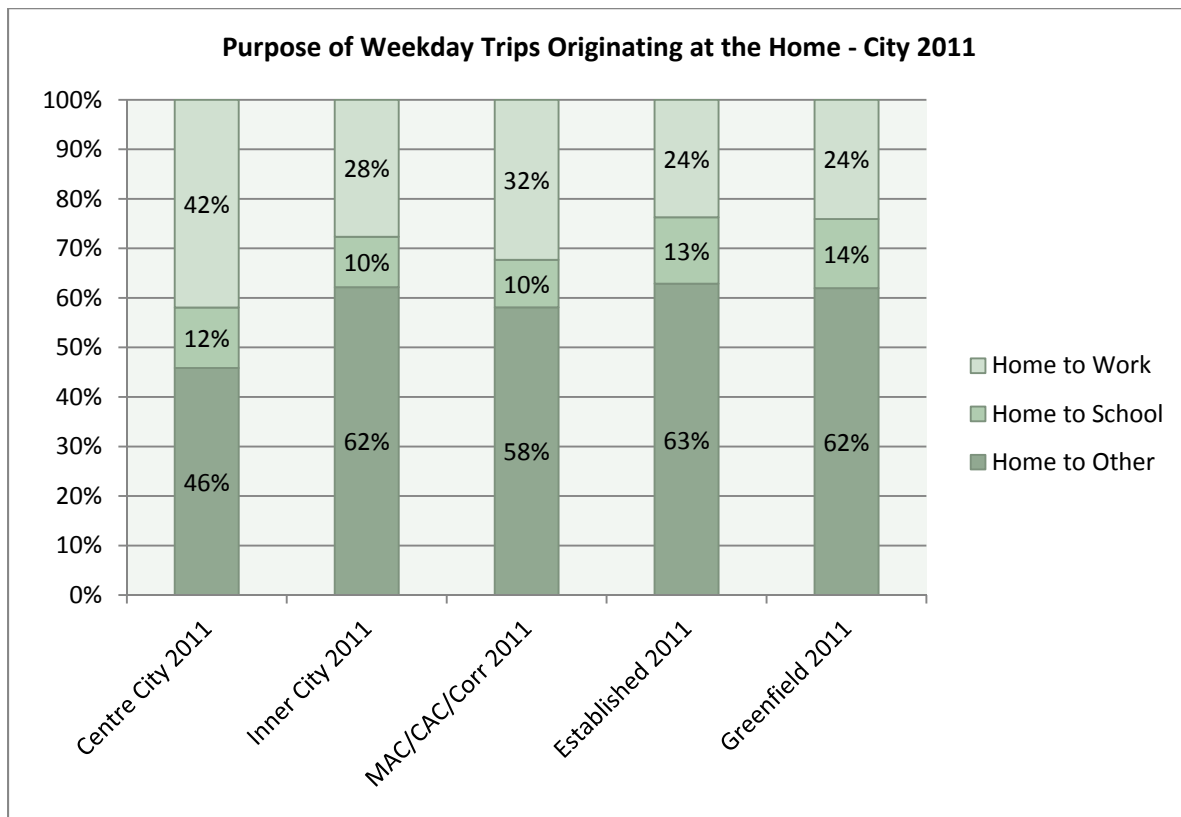


In the Greenfield chart above, there is no statistically significant change in any mode share between 2001 and 2011. The mode split of weekday trips from home in the Greenfield area closely resembles the mode split of the same type of trip from home in the Established Areas.

5.5 Purpose of Home Based Trips

The following chart divides daily trips from home by the CTP area groups into 3 purposes: Home to work, Home to School and Home to Other. For reference, the Home to Other category is composed of shopping, recreation, socializing, personal business, or escorting. For more detail on the trip purpose categories see section 7.1 in Changing Travel Behaviour in the Calgary Region: Volume 2.

Figure 44: Purpose of Weekday Trips Originating at the Home - City 2011



A contributing factor to the lower Home to School portion in the inner city than in the established areas and Greenfield areas may be that inner City households include fewer children on average.

While the Centre city also has less kids, a contributing factor to explain why the Centre City Home to School portion is not lower than the Greenfield areas and the inner City areas may be that the Centre City has a higher average proportion of post-secondary students per household than all other areas.

A contributing factor to higher Home to Work portion in the Centre City may be that Centre City households include more workers on average.

5.6 Origin and Destination of Travel by CTP Typology

For more information about origin and destinations please see appendix C.

5.7 Conclusion

The mode choice of each area is changing in some unique ways. The Centre City area and the Inner City area both exhibit increased trips using active modes and increased trips using transit modes. However the Established area, which contains 60% of the population in Calgary, exhibits increased trips using private vehicles.

The demographics in the CTP types showed some similarities and differences between the groups. The Centre City, Inner City and MAC/CAC/Corr areas, which together make up 12% of population in Calgary, contain mostly 1 or 2 person households, and fewer people under the age of 25. The Greenfield area and the Established area contain the larger households with the Greenfield area tending to contain the largest and youngest households.

Trips from the Centre City and the MAC/CAC/Corr areas tend to be for the purpose of work more than any of the other areas.

6 Time of Day Study

6.1 Introduction

This part of analysis focuses on shifts in time of day travel for different geographic areas and modes over the ten year period from 2001 to 2011. The analysis results presented here are based on weekday travel within the City of Calgary. The 24-hour weekday is divided into seven time periods and the time of day analysis is conducted to study distribution of trips within these time periods. Table 6 lists the seven time periods.

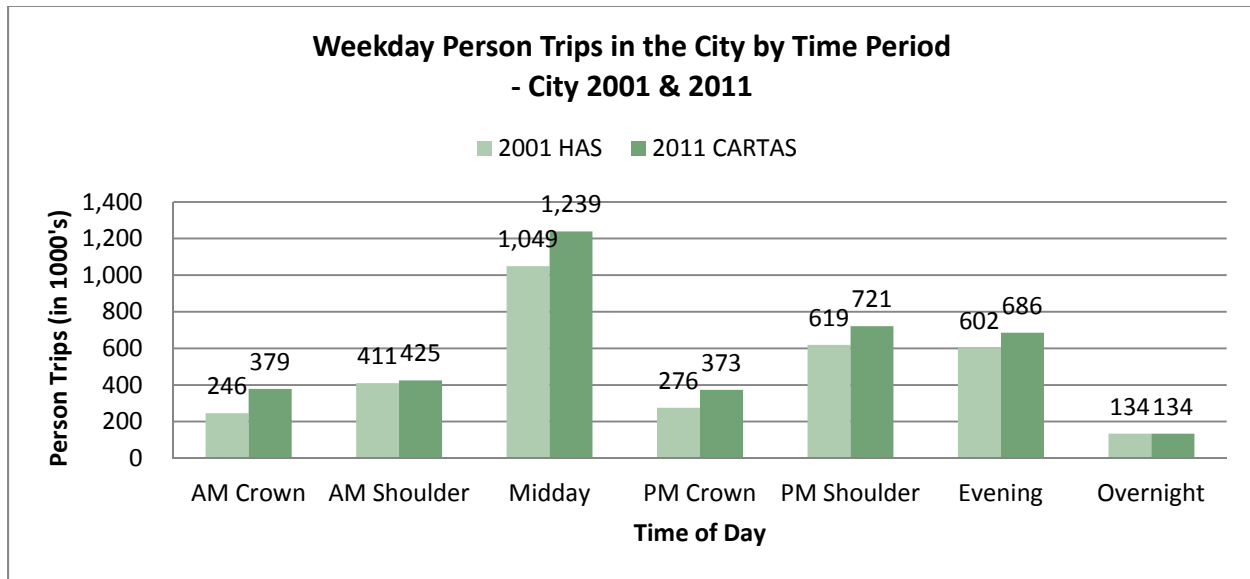
Table 6: Time Periods for a 24-hour Weekday

Time Period	Time Duration
AM Crown	07:00 – 07:59
AM Shoulder	06:00 – 06:59 and 08:00 – 08:59
Midday	09:00 – 14:59
PM Crown	16:00 – 16:59
PM Shoulder	15:00 – 15:59 and 17:00 – 17:59
Evening	18:00 – 21:59
Overnight	22:00 – 05:59

This analysis includes data from the 2001 HAS and the 2011 CARTAS. This includes an expanded total of 3,957,000 daily weekday city-wide trips in 2011 and 3,351,000 trips in 2001. As a result portions of this report will only include 3,336,000 daily weekday city-wide trips for 2001.

The weekday trip distribution within the city for each time period is shown in Figure 45 below. From 2001 to 2011, city-wide trips increased for all time periods with the exception of the Overnight which had approximately 134,000 in both 2001 and 2011.

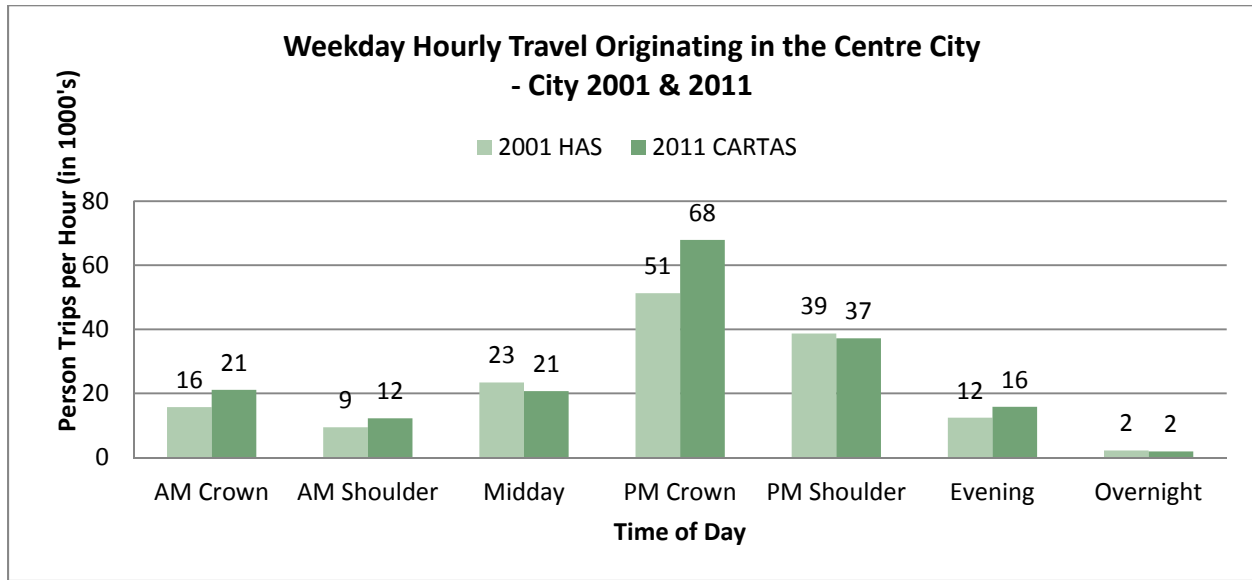
Figure 45: Weekday Person Trips in the City by Time Period - City 2001 & 2011



6.2 Weekday Hourly Trips by Area

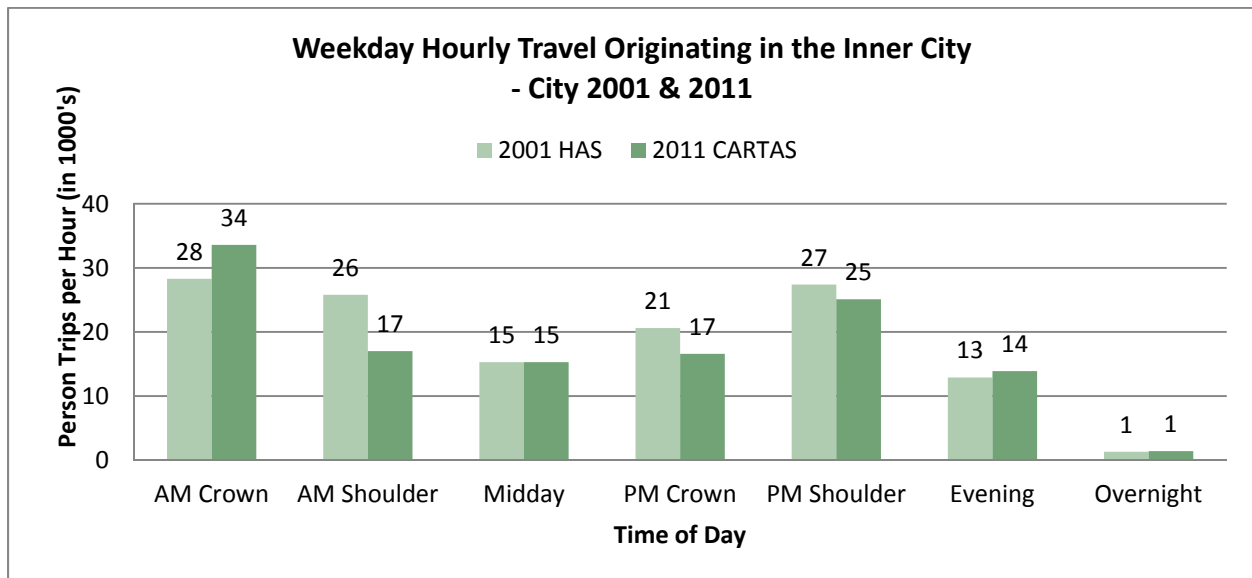
Weekday hourly trips originating in different geographic areas by time of day are shown in Figure 46 to Figure 51. Figure 46 shows the time distribution for hourly trips originating in the Centre City. While the hourly trips increased from 2001 to 2011 for the periods of AM Crown, AM Shoulder, PM Crown, and Evening, they decreased for the periods of Midday, PM Shoulder and Overnight. The biggest increase occurred in the PM Crown period (51,300 trips per hour in 2001 vs. 67,900 trips per hour in 2011) and the biggest decrease is for the Midday period (23,400 trips per hour in 2001 vs. 20,700 trips per hour in 2011).

Figure 46: Weekday Hourly Travel Originating in the Centre City – City 2001 & 2011



For weekday hourly trips starting from the Inner City (see Figure 47), there was no significant changes from 2001 to 2011 for the Midday, Evening, and Overnight periods. The AM Crown is the only period that experienced a large increase (28,300 trips per hour in 2001 vs. 33,600 trips per hour in 2011). The other periods observed decreases from 2001 to 2011 with the largest decrease of 8,800 trips per hour in the AM Shoulder period (25,800 trips per hour in 2001 vs. 17,000 trips per hour in 2011).

Figure 47: Weekday Hourly Travel Originating in the Inner City - City 2001 & 2011



The time distribution for hourly trips originating in the Major Activity Centres/Community Activity Centres/Urban and Neighbourhood Corridors (MAC/CAC/Corr) is shown in Figure 48. Over the 10 year

period from 2001 to 2011, trip rates increased for all time periods with the exception of the Overnight period. The PM Crown period has the largest increase of 28,000 trips per hour (70,800 trips per hour in 2001 vs. 98,800 trips per hour in 2011). The trip rate for the Overnight period had a small decrease of 300 trips per hour (4,100 trips per hour in 2001 vs. 3,800 trips per hour in 2011).

Figure 48: Weekday Hourly Travel Originating in the MAC/CAC/CORR - City 2001 & 2011

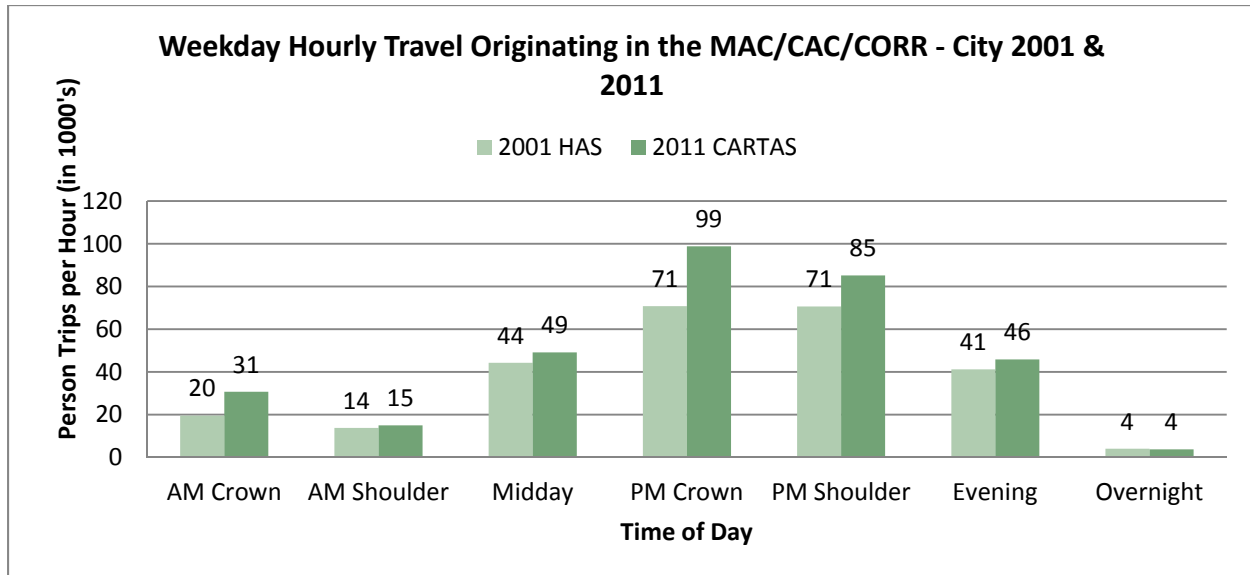


Figure 49 shows the time distribution for hourly trips starting from the Established Communities. Compared with 2001, there were higher trips rate in the periods of AM Crown, Midday, PM Crown and PM Shoulder and lower trip rates in the periods of AM Shoulder, Evening and Overnight in 2011. It appears that more people prefer to travel in the AM Crown instead of the AM Shoulder in 2011 than in 2001.

Figure 49: Weekday Hourly Travel Originating in the Established Communities - City 2001 & 2011

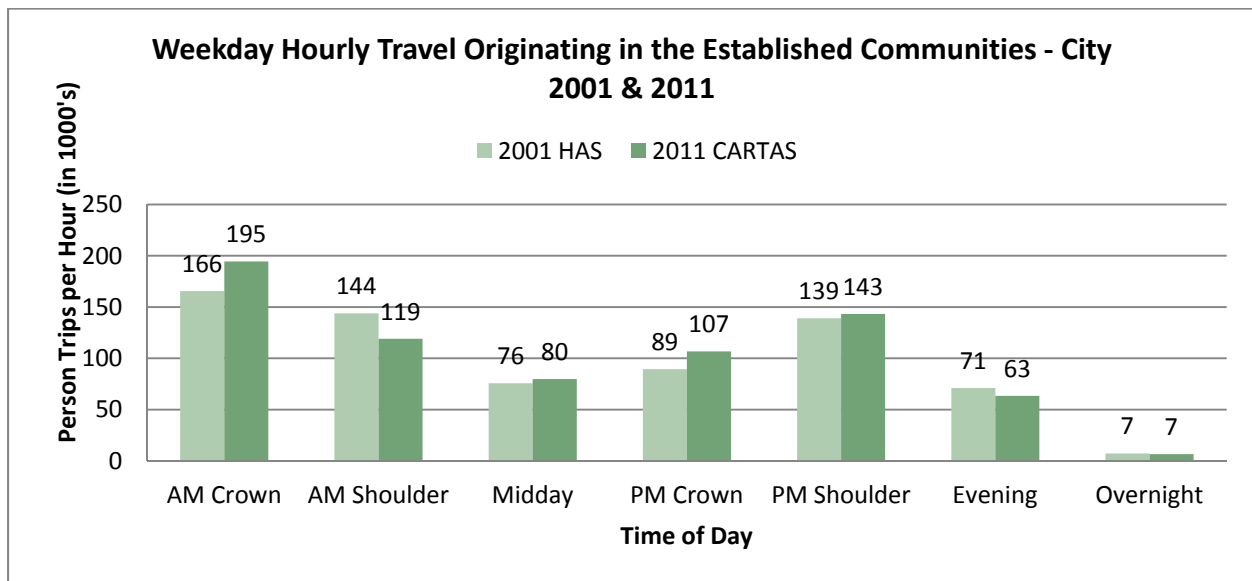
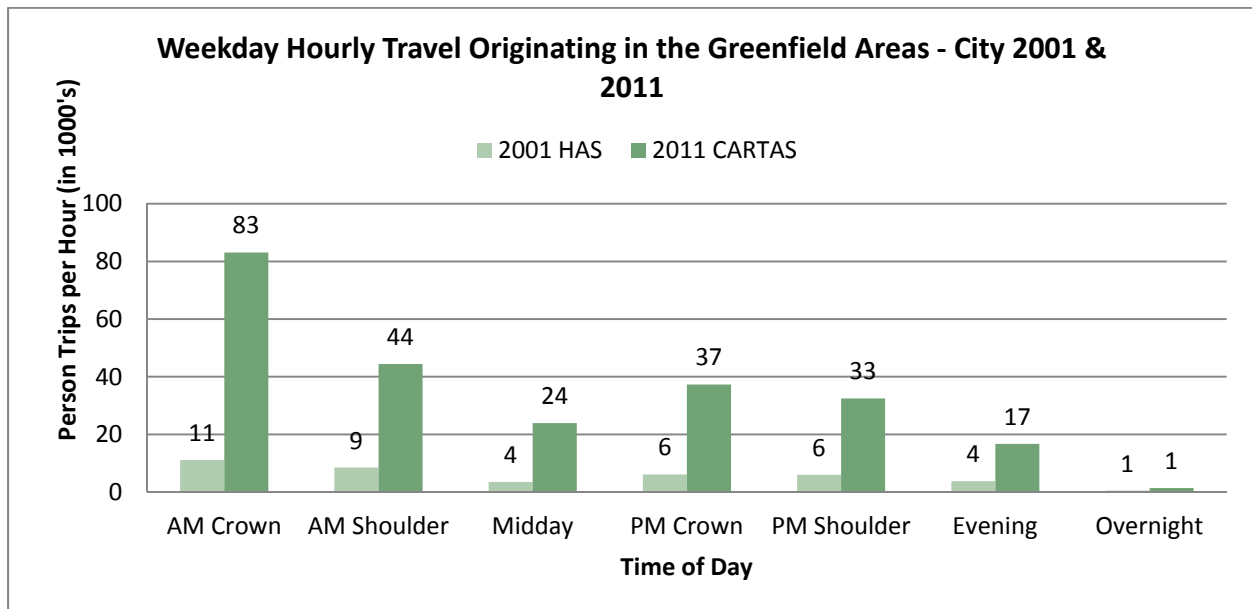


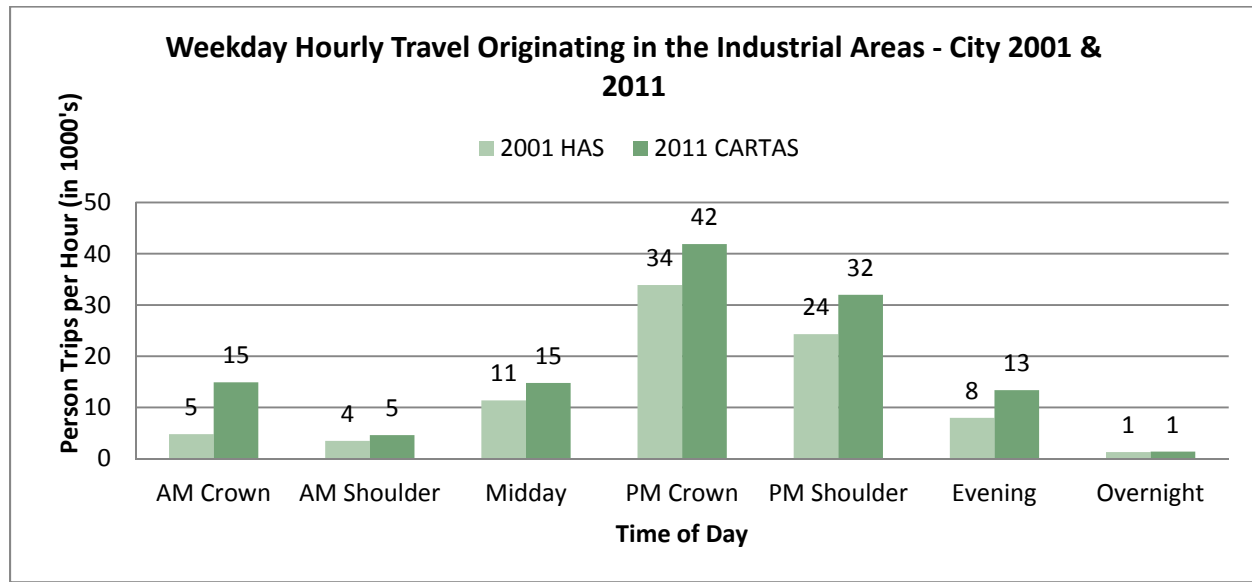
Figure 50 shows the time distributions for hourly trips originating in the Greenfield Areas. The hourly trip rates for all time periods were significantly higher in 2011 than in 2001. This is related to population growth in the area over the ten year period. Another observation is that most trips starting from the Greenfield Areas occur in the morning (AM Crown and AM Shoulder periods)

Figure 50: Weekday Hourly Travel Originating in the Greenfield Areas - City 2001 & 2011



The time distribution for hourly trips starting from the Industrial Areas is shown in Figure 51. Similar to the case for Greenfield Areas, the hourly trip rates for all time periods was higher in 2011 than in 2001 probably because there were more job opportunities in the Industrial Areas in 2011 than in 2001. Most trips from the Industrial Areas start after the Midday period because the majority of the personal trips leaving the Industrial Areas are individuals leaving work for the day.

Figure 51: Weekday Hourly Travel Originating in the Industrial Areas - City 2001 & 2011



6.3 Weekday Trips by Mode

The mode shares of weekday trips by time period are shown in Figure 52 for 2001 and Figure 53 for 2011.

For Walk trips, while there were decreases in mode share from 2001 to 2011 for the AM Shoulder and the PM Shoulder, the mode shares for the AM Crown and the PM Crown increased in 2011 compared with 2001. In 2011 there was a lower Walk mode share in the Midday period than in 2001 and more people used Walk mode for evening trips than in 2001.

When looking at the time distribution for Bike trips, they are pretty evenly distributed from the AM Crown period to the Overnight period. In 2001 the Bike mode shares were 1% for all the seven time periods. In 2011 the Bike mode share ranged from as less than 0.5% in the Midday to as high as 2% in both the AM Shoulder and PM Crown.

Auto Driver mode is predominant for all time periods in both 2001 and 2011 as shown in Figures 3.1 and 3.2 above. In 2001 Auto Driver mode share varied from the lowest share of 50% during the AM Shoulder to as high as 68% during the Overnight period. In 2011 the lowest share of 50% occurred during the AM Crown and the highest share of 65% occurred during the Overnight Period. Compared with 2001, only two time periods in 2011 had an increase in Auto Drive mode share (50% for the AM Shoulder and 58%

for the Midday in 2001 versus 55% for the AM Shoulder and 61% for the Midday in 2011). All other time periods observed decreases in Auto Drive mode share over the ten year period from 2001 to 2011. The largest decrease of 7% occurred in the AM Crown (57% in 2001 vs. 50% in 2011).

An increase in Auto Passenger mode share occurred from 2001 to 2011. In 2011 there were six time periods with increased Auto Passenger mode share over 2001. The AM Shoulder was the only one that remained the same with 19% Auto Passenger mode share in 2001 and 2011. The largest increase was 6% for the AM Crown from 15% in 2001 to 21% in 2011.

While the total trips by Transit mode increased for all time periods from 2001 to 2011, the mode share remained the same or decreased for all time periods except the Overnight (which experienced a 2% increase in Transit mode share).. Over the ten year period from 2001 to 2011 Transit mode shares decrease for the time periods of AM Crown, PM Crown, and PM Shoulder or keep the same for the periods of AM Shoulder, Midday, and Evening.

Figure 52: Weekday Travel Mode Share in the City by Time Period - City 2001

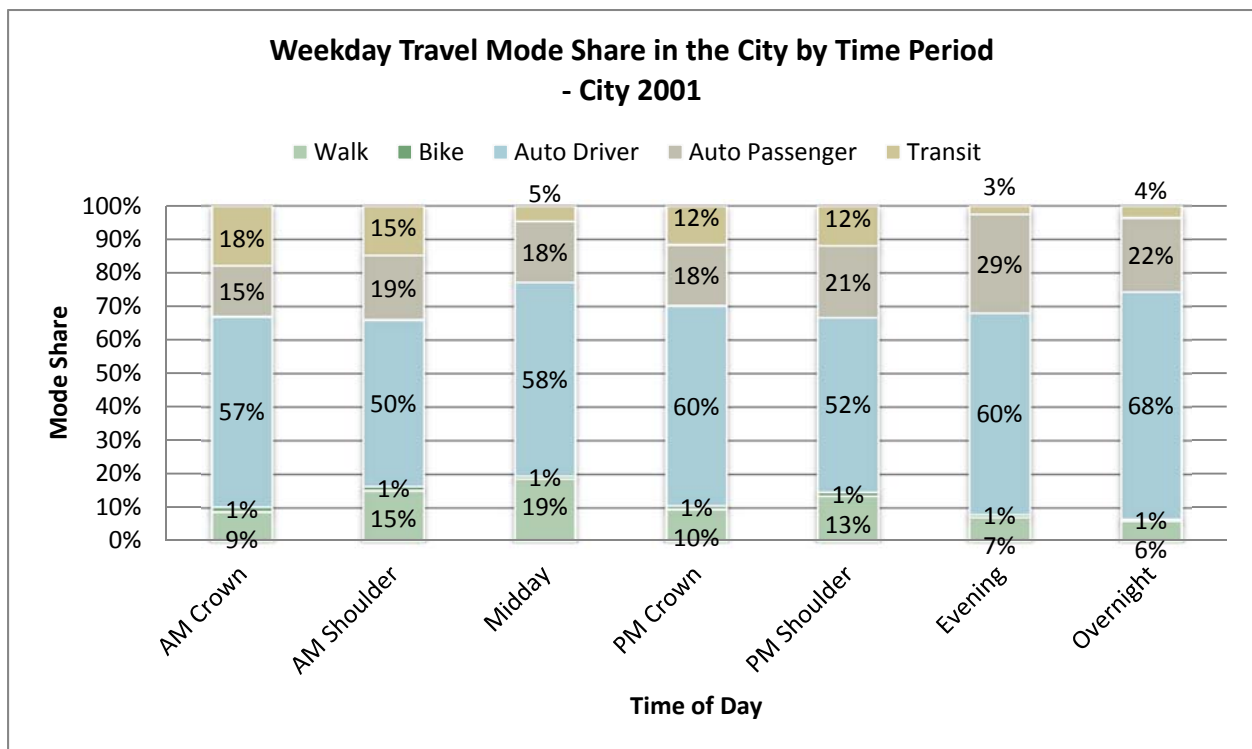
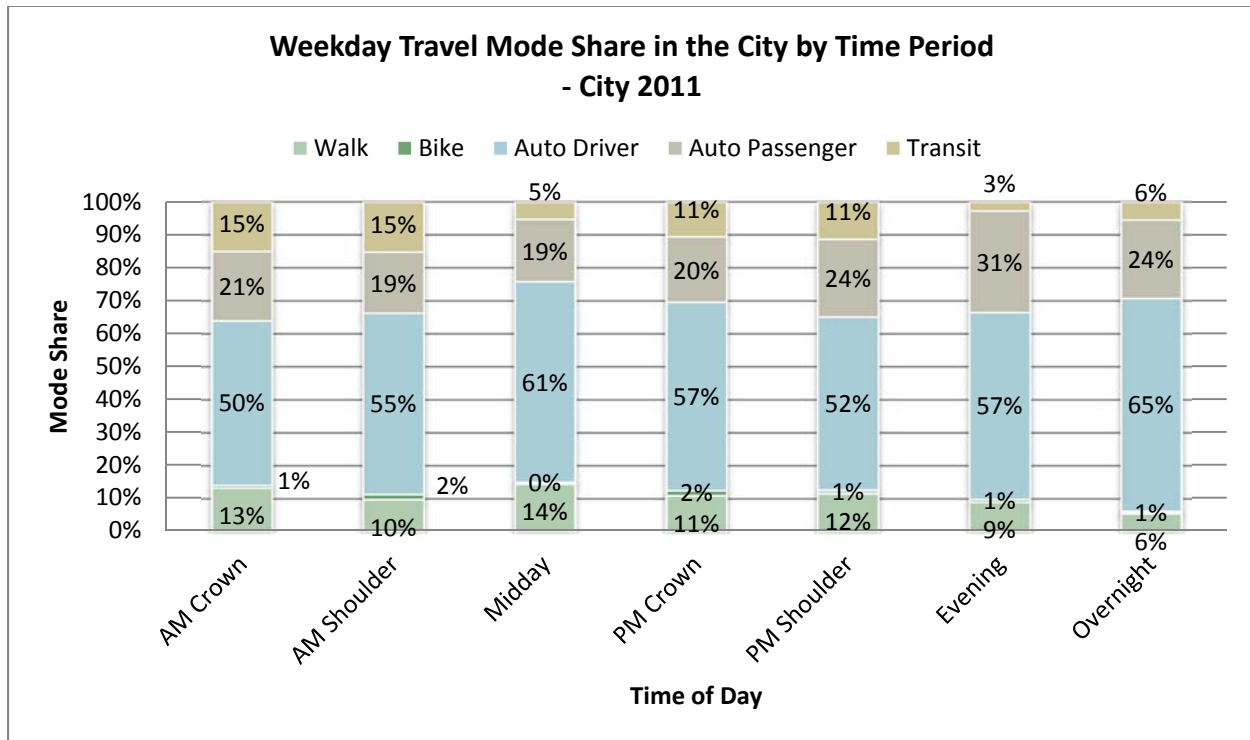


Figure 53: Weekday Travel Mode Share in the City by Time Period - City 2011



6.4 Conclusion

Time distribution of weekday trips are discussed for the seven time periods of AM Crown, AM Shoulder, PM Crown, PM Shoulder, Midday, Evening, and Overnight. The time distribution patterns of hourly trips originating from different geographic areas and mode shares of weekday trips within the city are compared between 2001 and 2011.

Over the ten year period from 2001 to 2011, hourly trip rate for the AM Crown increased in all geographic areas. There were more hourly trips originating in the Major Activity Centres/Community Activity Centres/Urban and Neighbourhood Corridors (MAC/CAC/Corr) in 2011 than in 2001 for all time periods except the Overnight. The Greenfield areas and the Industrial areas observed large increases in hourly trip rate for all seven time periods due to residential development and job growth in the areas.

For mode shares of weekday travel, Auto Drive mode had more than 50% shares for any time period in 2001 and 2011 and the highest shares occurred in the Overnight period in both 2001 (68%) and 2011 (65%). Auto Passenger mode shares increased from 2001 to 2011 for all time periods except the AM shoulder which has the same share (19%) in both 2001 and 2011.

Appendices

7 Appendix A – Glossary of Terms

Term	Definition
24 Hour Trips	All trips that occurred in one day from 00:00 to 23:59
All Purpose Trips	Trips that are made for any purposes which may include work, school, shopping, pick up/drop off etc.
Auto Ownership	The number of cars, pickup trucks, SUVs, or motorcycles owned by a household as reported by the household. Does not include recreation vehicles, commercial vehicles or vehicles that are not operational
Average Household Size	The average number of people who live in the same household and share a kitchen.
Calgary Area	The city of Calgary and the surrounding Region. (See Region below)
CATI	Computer Aided Telephone Interview is a process used by survey companies to collect information from survey respondents over the telephone to ensure high quality data.
CBD	Central Business District
Census of Canada	A survey of all Canadians that is conducted by Statistics Canada every 5 years.
Central Business District	In Calgary, and for the purposes of this report this is the central area of the city bounded by the Bow River on the North and East, 17 Avenue to the South, and Bow Trail to the West.
City	Area located within the 2012 city of Calgary boundary.
Civic Census	An annual survey of all residents in Calgary conducted by The City of Calgary.
Cordon Study	A study that counts vehicles, bikes, and pedestrians as they cross a particular boundary.
CTP / MDP	The Calgary Transportation Plan and Municipal Development Plan approved by Calgary City Council in 2009.
Dataset	A collection of data, usually presented in tabular form, where each column represents a particular variable.
Demographics	Statistical data relating to the population and particular groups within it such as household size, income, age, and gender.
Downtown	The same area as the Central Business District

Employment	The number of people who are employed in an area.
Established Communities	Residential communities that were planned and developed between the 1950s and 1990s. They are primarily residential communities containing a mix of low- and medium-density housing with support retail in relatively close proximity as defined in the Municipal Development Plan.
Expanded Survey Results	Results obtained from the survey using expansion factors developed from demographic targets
Expansion Factor	Weighting factor developed from demographic targets so the survey distributions match the actual population distributions.
Greenfield Communities	Residential communities that have been planned since the 1990s and are still being developed as defined in the Municipal Development Plan.
Household Income	Total annual pre-tax income for all members of the household.
Household Size	The number of people that live at an address and share a kitchen.
Household Travel Survey	Survey to collect information from households describing their travel choices and travel influences.
Income	See Household Income
Industrial Area	Areas that include a broad variety of industrial uses and intensities that support business in Calgary as defined in the Municipal Development Plan.
Inner City	Residential communities that were primarily subdivided and developed prior to the 1950s as defined in the Municipal Development Plan.
Jobs Per Capita	The number of employed people divided by the total population.
Migration	Population increase or decrease due to people moving into or out of the Calgary Area.
Mode Share	The percentage of trips that are made by different travel modes.
Mode Split	The percentage of trips that are made by different travel modes.
New Communities	Residential communities that have been planned since the 1990s and are still being developed as defined in the Municipal Development Plan.
Peak Periods	Periods where travel demand in the study area is highest. Typically there is a peak in the morning from 6:00AM to 9:00AM and in the afternoon from 3:00PM to 6:00PM.

Place of Work Survey	Survey conducted in conjunction with the Civic Census that collects employment information including the work location, industry, and occupation.
Population	The number of people living in an area.
Region	The area surrounding the City of Calgary that includes the MD of Foothills, Rockyview County, Wheatland County. It also includes all the towns and villages within that area such as Airdrie, Chestermere, Cochrane, Okotoks, Strathmore, and High River.
Regional Transportation Model	Computer simulation of the city and surrounding region that is used to support transportation and land use decisions.
RTM	See “Regional Transportation Model”
Sample	A set of data collected and/or selected from a population by a defined procedure.
Statistically Significant	A statistical assessment of whether observations reflect a pattern rather than just chance.
Study Area	Includes The city of Calgary and the surrounding Region. (See Region above).
Travel Mode	Different methods of travelling about the Study Area. Includes walk, bike, transit, and auto.
Trip	Travel between two points by any mode. In cases of transit trips where the travel mode changed between two points, such as a park and ride trip or a walk to the bus stop, the trips were linked together to form one transit trip.
Trip Distance	The distance travelled on the road network when going between two points.
Trip Purpose	The reason the trip was made and includes, work, school, shopping, etc and is primarily defined by the destination purpose unless otherwise specified.
Trip Rate	The number of trips made per person or per household.
Vehicle Kilometres Travelled	The total number of kilometres travelled by all vehicles on the road network.
Vehicle Kilometres Travelled per Capita	The total number of kilometres travelled by all vehicles on the road network divided by total population.

8 Appendix B - Bibliography

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9 Appendix C – Data Tables

The figure numbers listed above each table in this section reference the figures within the report. Note due to rounding totals may vary.

9.1 Data Tables: Active Mode Study

Figure 2: Active Mode Weekday Person Trip Rates – City 2001 & 2011

Figure 3: Active Mode Weekday Person Trip Rates for Active Mode Travellers - City 2001 & 2011

	Weekday Person Trip Rate			
	2001 HAS		2011 CARTAS	
	All Persons	Travellers	All Persons	Travellers
Walk	0.5	2.3	0.4	2.3
Bike	0.04	2.2	0.03	2.2
Total Active	0.5	2.3	0.5	2.4

Figure 4: City Wide Weekday Walk Mode Share by Age Groups - City 2001 & 2011

Figure 6: Bike Mode Share by Age Group - City 2001 & 2011

Age	Walk Mode Share		Bike Mode Share	
	2001	2011	2001	2011
0 to 4	11%	11%	0%	0%
5 to 14	27%	15%	2%	1%
15 to 24	13%	9%	2%	0%
25 to 34	13%	15%	1%	1%
35 to 44	12%	13%	1%	1%
45 to 54	9%	10%	1%	1%
55 to 64	8%	9%	0%	1%
65 to 74	9%	9%	0%	0%
75 and up	9%	12%	0%	0%

Figure 11: Active Mode Household Trip Rate by Auto Ownership - City 2001 & 2011

Household Trip Rate		
Auto Ownership	2001 HAS	2011 CARTAS
No Auto/No Licence	2.0	2.3
Insufficient Cars	1.9	1.5
Sufficient Cars	1.3	1.0

Figure 12: City Wide Bike and Walk Share by Household Income - City 2011

Household Income	Walk		Bike	
	Mode Share	95% Confidence Limits +/-	Mode Share	95% Confidence Limits +/-
Less than \$49,999	23.8%	0.011	0.7%	0.002
\$50,000-\$99,999	10.8%	0.005	1.0%	0.002
\$100,000-\$149,999	10.6%	0.005	0.7%	0.001
\$150,000-\$199,999	11.1%	0.008	1.3%	0.003
\$200,000 or more	11.3%	0.008	1.3%	0.003

Figure 15: Weekday Walk Mode Share by Week - City 2011

Week Starting on	Walk Mode Share	Average Temperature	Precipitation (mm)	95% Confidence Limits +/-
February 5, 2012	10.2%	-7.0	1.0	1.4%
February 12, 2012	11.4%	-4.2	4.0	1.0%
February 19, 2012	11.7%	-2.3	8.5	1.1%
February 26, 2012	10.1%	-7.5	3.4	1.0%
March 4, 2012	10.5%	-0.8	11.4	0.9%
March 11, 2012	16.1%	3.0	0.4	1.1%
March 18, 2012	12.3%	-1.0	1.6	1.0%
March 25, 2012	11.7%	3.6	3.2	1.0%
April 1, 2012	10.7%	3.1	4.4	1.2%
April 8, 2012	11.2%	4.6	32.0	1.1%
April 15, 2012	13.2%	4.7	2.6	1.3%
April 22, 2012	11.1%	9.7	13.4	1.1%

April 29, 2012	7.1%	6.0	52.4	1.6%
May 6, 2012	15.5%	9.0	0.8	2.8%

Figure 16: Weekday Bike Mode Share by Week - City 2011

Week Starting on	Bike Mode Share	Average Temperature	Precipitation (mm)	95% Confidence Limits +/-
February 5, 2012	0.5%	-7.0	1.0	0.3%
February 12, 2012	0.7%	-4.2	4.0	0.3%
February 19, 2012	0.7%	-2.3	8.5	0.3%
February 26, 2012	0.5%	-7.5	3.4	0.2%
March 4, 2012	0.6%	-0.8	11.4	0.2%
March 11, 2012	0.8%	3.0	0.4	0.3%
March 18, 2012	0.6%	-1.0	1.6	0.2%
March 25, 2012	0.6%	3.6	3.2	0.2%
April 1, 2012	1.2%	3.1	4.4	0.4%
April 8, 2012	1.2%	4.6	32.0	0.4%
April 15, 2012	1.0%	4.7	2.6	0.4%
April 22, 2012	2.3%	9.7	13.4	0.5%
April 29, 2012	0.3%	6.0	52.4	0.3%
May 6, 2012	1.5%	9.0	0.8	0.9%

9.2 Data Tables: Transit Travel Study

Table 1: Auto Ownership

	City Population		Transit Users		Statistical Analysis of Difference		
	% of people	95% Confidence Limits +/-	% of people	95% Confidence Limits +/-	City Pop vs. Transit Users Diff	95% Confidence Limits +/-	Difference Significant
NoCar	3.89%	0.021	8.54%	0.049	4.65%	0.053	no
InsCar	22.98%	0.016	31.52%	0.041	8.54%	0.044	yes
SuffCar	73.13%	0.008	59.94%	0.028	-13.19%	0.030	yes

Table 2: Household Size

Household Size	City Population		Transit Users		Statistical Analysis of Difference		
	% of people	95% Confidence Limits +/-	% of people	95% Confidence Limits +/-	City Pop vs. Transit Users Diff	95% Confidence Limits +/-	Difference Significant
1	9.62%	0.016	10.94%	0.043	1.32%	0.016	no
2	25.85%	0.012	24.49%	0.038	-1.36%	0.013	yes
3	19.82%	0.016	15.41%	0.039	-4.41%	0.016	yes
4	26.96%	0.016	28.38%	0.039	1.43%	0.016	no
5+	17.76%	0.020	20.78%	0.050	3.02%	0.021	yes

Table 3: Age

Age	City Population		Transit Users		Statistical Analysis of Difference		
	% of people	95% Confidence Limits +/-	% of people	95% Confidence Limits +/-	City Pop vs. Transit Users Diff	95% Confidence Limits +/-	Difference Significant
under 18	21.61%	0.017	30.61%	0.040	9.00%	0.017	yes
18-24	9.45%	0.021	15.57%	0.051	6.12%	0.022	yes
25-29	7.73%	0.024	10.33%	0.063	2.60%	0.024	yes
30-34	9.06%	0.021	8.14%	0.053	-0.92%	0.022	no
35-44	16.68%	0.017	14.91%	0.043	-1.77%	0.018	no
45-54	15.45%	0.015	9.78%	0.036	-5.67%	0.015	yes
55-64	10.25%	0.012	5.64%	0.029	-4.61%	0.012	yes
65 and up	9.76%	0.012	5.01%	0.039	-4.75%	0.013	yes

Table 4: Household Income

Household Income	City Population		Transit Users		Statistical Analysis of Difference		
	% of people	95% Confidence Limits +/-	% of people	95% Confidence Limits +/-	City Pop vs. Transit Users Diff	95% Confidence Limits +/-	Difference Significant
Less than \$15,000	3.57%	0.022	3.08%	0.053	-0.50%	0.057	no
\$15,000-\$29,999	5.77%	0.018	7.00%	0.056	1.22%	0.059	no
\$30,000-\$49,999	10.99%	0.018	11.60%	0.052	0.61%	0.055	no
\$50,000-\$74,999	15.56%	0.015	13.75%	0.043	-1.81%	0.045	no
\$75,000-\$99,999	18.87%	0.017	15.62%	0.046	-3.25%	0.050	no
\$100,000-\$149,999	24.88%	0.014	28.43%	0.037	3.54%	0.039	no
\$150,000-\$199,999	11.19%	0.015	12.36%	0.041	1.17%	0.043	no
\$200,000 or more	9.15%	0.014	8.16%	0.038	-0.99%	0.040	no

Table 5: Trip Rates

	2001 HAS		2011 CARTAS		Statistical Analysis of Difference		
	Trip Rate	95% Confidence Limits +/-	Mode Share	95% Confidence Limits +/-	Change 2001 to 2011	95% Confidence Limits +/-	Difference Significant
All Persons	0.32	0.012	0.31	0.012	0.02	0.017	no
Employed Person	0.24	0.014	0.31	0.017	-0.06	0.022	yes
Transit User	1.90	0.025	1.86	0.027	0.04	0.037	yes
Employed Transit User	1.89	0.040	1.82	0.034	0.06	0.052	yes

Table 6: Household Workers

Number of Household Workers	City Population		Transit Users		Statistical Analysis of Difference		
	% of people	95% Confidence Limits +/-	% of people	95% Confidence Limits +/-	City Pop vs. Transit Users Diff	95% Confidence Limits +/-	Difference Significant
0	10.73%	0.013	6.39%	0.044	4.34%	0.046	no
1	31.71%	0.014	31.39%	0.037	0.32%	0.040	no
2	40.49%	0.013	43.16%	0.034	-2.66%	0.037	no
3	12.09%	0.019	13.77%	0.046	-1.68%	0.050	no
4	4.47%	0.023	5.13%	0.061	-0.65%	0.065	no
5	0.50%	0.025	0.16%	0.046	0.33%	0.052	no
0,1	42.45%	0.012	37.78%	0.035	4.66%	0.037	yes
2,3,4,5	57.55%	0.012	62.22%	0.029	-4.66%	0.031	yes

9.3 Data Tables: Auto Occupancy and Carpooling Study

Figure 24: Weekday Auto Occupancy for All Vehicle Travel - City 2011

	2011	
	% of Vehicle Trips	95% Confidence Limits +/-
SOV	68.2%	0.006
HOV2	23.0%	0.005
HOV3+	8.8%	0.003

Figure 25: 24 Hour Average Weekday Auto Occupancy - City 1971 to 2011

1971	1981	2001	2011
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Vehicle Driver Trips	805,300	1,511,400	1,899,000	2,243,200
Vehicle Passenger Trips	223,800	483,300	700,700	879,400
Auto Occupancy	1.28	1.32	1.37	1.39

Figure 27: Weekday Vehicle Trips by Midtime – City 2011

Trip Midtime	SOV	HOV
6 AM - 7 AM	58,200	11,900
7 AM - 8 AM	127,600	49,400
8 AM - 9 AM	105,900	66,400
9 AM - 10 AM	85,700	25,700
10 AM - 11 AM	79,700	27,200
11 AM - 12 PM	101,100	39,700
12 PM - 1 PM	90,400	45,000
1 PM - 2 PM	86,700	38,900
2 PM - 3 PM	94,200	35,300
3 PM - 4 PM	110,700	59,400
4 PM - 5 PM	157,500	58,600
5 PM - 6 PM	134,800	67,000
6 PM - 7 PM	84,000	60,600
7 PM - 8 PM	59,200	42,000
8 PM - 9 PM	45,800	30,500

Figure 28: Weekday SOV Travel Participation Rate by Age - City 2001 & 2011

Age	2001		2011		Difference Significant at 95% Confidence
	Participation Rate	95% Confidence Limits +/-	Participation Rate	95% Confidence Limits +/-	
15 to 19	22.1%	0.026	23.5%	0.033	no
20 to 24	50.5%	0.036	44.1%	0.042	yes
25 to 34	57.9%	0.022	49.2%	0.029	yes
35 to 44	65.9%	0.017	58.8%	0.023	yes
45 to 54	70.3%	0.017	66.5%	0.019	yes
55 to 64	61.8%	0.024	61.1%	0.019	no
65 to 74	48.5%	0.030	49.3%	0.026	no
75 and up	32.3%	0.041	31.3%	0.031	no

Figure 29: Weekday HOV Driver Travel Participation Rate by Age – City 2001 & 2011

Age	2001		2011		Difference Significant at 95% Confidence
	Participation Rate	95% Confidence Limits +/-	Participation Rate	95% Confidence Limits +/-	
15 to 19	13.4%	0.021	10.6%	0.024	no
20 to 24	18.7%	0.028	14.9%	0.030	no
25 to 34	31.1%	0.020	30.2%	0.026	no
35 to 44	40.2%	0.018	37.1%	0.023	yes
45 to 54	33.3%	0.018	33.6%	0.019	no
55 to 64	23.8%	0.021	25.8%	0.017	no
65 to 74	23.8%	0.025	19.7%	0.021	yes
75 and up	19.1%	0.035	13.4%	0.023	yes

Figure 30: Weekday Auto Passenger Participation Rate – City 2001 & 2011

Age	2001		2011		Difference Significant at 95% Confidence
	Participation Rate	95% Confidence Limits +/-	Participation Rate	95% Confidence Limits +/-	
0 to 4	68.4%	0.031	69.2%	0.034	no
5 to 14	61.7%	0.021	69.1%	0.026	yes
15 to 19	41.5%	0.031	41.6%	0.039	no
20 to 24	23.4%	0.030	24.5%	0.037	no
25 to 34	17.7%	0.017	17.8%	0.022	no
35 to 44	14.9%	0.013	13.9%	0.016	no
45 to 54	16.0%	0.014	13.8%	0.014	yes
55 to 64	18.6%	0.020	14.3%	0.013	yes
65 to 74	19.8%	0.024	16.1%	0.019	yes
75 and up	17.5%	0.034	16.2%	0.025	no

Figure 31: Distribution of HOV Travel by Passenger Type - City 2011

	Adult Only		Child(ren)		Non HH Passenger(s)	
	% of Vehicle Trips	95% Confidence Limits +/-	% of Vehicle Trips	95% Confidence Limits +/-	% of Vehicle Trips	95% Confidence Limits +/-
HOV2	41.3%	0.013	35.1%	0.012	23.6%	0.011
HOV3+	3.8%	0.009	70.8%	0.021	25.5%	0.020

Figure 32: Trip Distribution by Midtime and Passenger Type - City 2011

Number of Vehicle Trips by Passenger Type			
Midtime of Trip	HOV Adult	HOV Child	HOV Non HH
6 AM - 7 AM	4,100	3,000	4,800
7 AM - 8 AM	17,600	24,500	7,400
8 AM - 9 AM	12,800	43,800	9,700
9 AM - 10 AM	7,300	11,200	7,200
10 AM - 11 AM	9,600	11,500	6,100
11 AM - 12 PM	10,600	17,100	12,100
12 PM - 1 PM	11,500	18,300	15,200
1 PM - 2 PM	13,000	11,000	14,900
2 PM - 3 PM	11,000	13,400	10,900
3 PM - 4 PM	15,800	32,000	11,600
4 PM - 5 PM	19,700	26,500	12,300
5 PM - 6 PM	21,200	35,000	10,800
6 PM - 7 PM	20,900	28,000	11,700
7 PM - 8 PM	11,900	19,500	10,700
8 PM - 9 PM	10,200	12,700	7,500

Figure 54: Percent of Eligible Households that made an Adult Only HOV Trip in AM Peak - City 2011

Household Category	Participation Rate of Eligible HHs	95% Confidence Limits +/-	Statistically Different from Average Participation Rate
Annual Household Income			
Less than \$15,000	16.4%	0.089	no
\$15,000-\$29,999	5.0%	0.034	yes
\$30,000-\$49,999	6.7%	0.026	yes
\$50,000-\$74,999	8.8%	0.021	no
\$75,000-\$99,999	11.0%	0.024	no
\$100,000-\$149,999	8.9%	0.016	no
\$150,000-\$199,999	9.0%	0.023	no
\$200,000 or more	14.8%	0.031	Yes
Auto Ownership			
Insufficient	14.3%	0.023	Yes
Sufficient	8.4%	0.009	No
Day of Travel			
Monday	9.9%	0.021	no
Tuesday	7.4%	0.017	yes
Wednesday	7.8%	0.018	no
Thursday	10.0%	0.020	no
Friday	13.0%	0.023	yes
Number of Household Members			
2	9.3%	0.012	no
3	10.9%	0.022	no
4	8.5%	0.020	no
5	12.2%	0.045	no
6+	5.3%	0.060	no
Number of Children in Household			
No children	11.9%	0.012	yes
1	7.1%	0.022	yes
2	5.5%	0.018	yes
3	8.9%	0.051	no
4+			yes
Number of Workers in Household			
No workers	9.1%	0.020	no
1	4.9%	0.012	yes
2	9.0%	0.013	no
3	25.5%	0.049	Yes

4+	7.4%	0.059	No
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Figure 34: Trip Distribution by Midtime for Non-Household Passenger HOV Trips - City 2011

Household Description	Participation Rate	95% Confidence Limits +/-	Statistically Different from Average Participation Rate
Annual Household Income			
Less than \$15,000	7.1%	0.040	yes
\$15,000-\$29,999	10.8%	0.030	yes
\$30,000-\$49,999	14.8%	0.027	no
\$50,000-\$74,999	14.8%	0.021	no
\$75,000-\$99,999	15.7%	0.025	no
\$100,000-\$149,999	18.7%	0.021	yes
\$150,000-\$199,999	17.7%	0.031	no
\$200,000 or more	20.5%	0.034	yes
Auto Ownership			
Insufficient	13.9%	0.023	no
Sufficient	17.4%	0.011	yes
Day of Travel			
Monday	10.0%	0.018	yes
Tuesday	15.6%	0.021	no
Wednesday	14.1%	0.020	no
Thursday	16.8%	0.022	no
Friday	21.7%	0.024	yes
Number of Household Members			
1	13.0%	0.018	yes
2	14.9%	0.014	no
3	17.4%	0.026	no
4	17.5%	0.027	no
5	19.8%	0.055	no
6+	16.2%	0.099	no
Number of Children in Household			
No children	15.6%	0.011	no
1	16.1%	0.030	no
2	16.1%	0.029	no
3	17.7%	0.068	no
4+	4.6%	0.080	yes

Number of Workers in Household			
No workers	9.6%	0.016	yes
1	15.3%	0.016	no
2	15.2%	0.016	no
3	27.2%	0.050	yes
4+	29.0%	0.103	Yes

9.4 Data Tables: Trip Distribution across Calgary Study

Origin and Destination of Travel by CTP Typology

The tables below report the total travel between and within CTP typology areas in the City of Calgary on a typical 2011 weekday. They include all personal travel including home-based and non home-based trips.

The number of trips by Active, Transit and Auto modes can be seen in Table 7 to Table 11. The mode share they represent is displayed in parenthesis below the trip totals.

The Industrial category is included in this section because the travel is being reported based on the origin and destination of the trip not the home location.

Table 7: 2011 Weekday All Daily Trips

		Destination						Total
		Centre City	Inner City	MAC/CAC/Corr	Established	Greenfield	Industrial	
Origin	Centre City	169,800	28,000	44,000	102,900	34,400	10,000	389,100
	Inner City	28,000	69,500	81,800	81,100	10,300	17,650	288,350
	MAC/CAC/Corr	52,300	78,500	228,600	350,200	82,700	44,700	837,000
	Established	92,700	81,000	349,200	837,600	115,000	117,200	1,592,700
	Greenfield	32,000	11,600	90,600	109,100	198,200	43,700	485,200
	Industrial	13,800	21,400	41,600	115,000	46,000	48,200	286,000
	Total	388,600	290,000	835,800	1,595,900	486,600	281,450	3,878,350

Table 8: 2011 Weekday All Trips Distribution

		Destination						Total
		Centre City	Inner City	MAC/CAC/Corr	Established	Greenfield	Industrial	
Origin	Centre City	4%	1%	1%	3%	1%	0%	10%
	Inner City	1%	2%	2%	2%	0%	0%	7%
	MAC/CAC/Corr	1%	2%	6%	9%	2%	1%	22%
	Established	2%	2%	9%	22%	3%	3%	41%
	Greenfield	1%	0%	2%	3%	5%	1%	13%
	Industrial	0%	1%	1%	3%	1%	1%	7%
	Total	10%	7%	22%	41%	13%	7%	

Table 9: 2011 Weekday Active Daily Trips and Mode Share

		Destination					
		Centre City	Inner City	MAC/CAC/Corr	Established	Greenfield	Industrial
Origin	Centre City	134,600 (79.3%)	7,100 (25%)	9,100 (21%)	2,600 (3%)	<50 (0%)	400 (4%)
	Inner City	7,600 (27%)	25,300 (36%)	9,500 (12%)	3,100 (4%)	0 (0%)	50 (0%)
	MAC/CAC/Corr	9,600 (18%)	9,500 (12%)	35,600 (16%)	14,900 (4%)	3,200 (4%)	1,100 (2%)
	Established	2,400 (3%)	2,700 (3%)	16,700 (5%)	145,500 (17%)	2,100 (2%)	900 (1%)
	Greenfield	<50 (0%)	0 (0%)	2,900 (3%)	1,400 (1%)	42,600 (21%)	<50 (0%)
	Industrial	400 (3%)	100 (0%)	1,200 (3%)	1,700 (1%)	<50 (0%)	4,400 (9%)
	Total	154,600 (40%)	44,700 (15%)	75,000 (9%)	169,200 (11%)	47,900 (10%)	6850 (2%)

Table 10: 2011 Weekday Transit Daily Trips and Mode Share

		Destination						Total
		Centre City	Inner City	MAC/CAC/Corr	Established	Greenfield	Industrial	
Origin	Centre City	5,500 (3.2%)	6,400 (23%)	9,800 (22%)	40,500 (39%)	14,500 (42%)	900 (9%)	77,600 (20%)
	Inner City	6,700 (24%)	1,900 (3%)	6,000 (7%)	7,900 (10%)	1,400 (14%)	700 (4%)	24,600 (9%)
	MAC/CAC/Corr	15,400 (29%)	6,300 (8%)	6,600 (3%)	24,600 (7%)	5,400 (7%)	200 (0%)	58,500 (7%)
	Established	36,300 (39%)	8,200 (10%)	22,500 (6%)	47,200 (6%)	14,300 (12%)	3,100 (3%)	131,600 (8%)
	Greenfield	12,200 (38%)	1,800 (16%)	5,200 (6%)	14,500 (13%)	2,400 (1%)	100 (0%)	36,200 (7%)
	Industrial	1,900 (14%)	900 (4%)	500 (1%)	2,800 (2%)	300 (1%)	<50 (0%)	6,400 (2%)
	Total	78,000 (20%)	25,500 (9%)	50,600 (6%)	137,500 (9%)	38,300 (8%)	5000 (2%)	334,900

Table 11: 2011 Weekday Auto Daily Trips and Mode Share

		Destination						Total
		Centre City	Inner City	MAC/CAC/Corr	Established	Greenfield	Industrial	
Origin	Centre City	29,700 (17.5%)	14,500 (52%)	25,100 (57%)	59,800 (58%)	19,900 (58%)	8,700 (87%)	157,700 (41%)
	Inner City	13,700 (49%)	42,300 (61%)	66,300 (81%)	70,100 (86%)	8,900 (86%)	16,900 (96%)	218,200 (76%)
	MAC/CAC/Corr	27,300 (52%)	62,700 (80%)	186,400 (82%)	310,700 (89%)	74,100 (90%)	43,400 (97%)	704,600 (84%)
	Established	54,000 (58%)	70,100 (87%)	310,000 (89%)	644,900 (77%)	98,600 (86%)	113,200 (97%)	1,290,800 (81%)
	Greenfield	19,800 (62%)	9,800 (84%)	82,500 (91%)	93,200 (85%)	153,200 (77%)	43,600 (100%)	402,100 (83%)
	Industrial	11,500 (83%)	20,400 (95%)	39,900 (96%)	110,500 (96%)	45,700 (99%)	43,800 (91%)	271,800 (95%)
	Total	156,000 (40%)	219,800 (76%)	710,200 (85%)	1,289,200 (81%)	400,400 (82%)	269,600 (96%)	3,045,200

9.5 Data Tables: Time of Day Study

A1.1. Weekday Person Trips in the City by Time Period – 2001 HAS & 2011 CARTAS

	AM Crown	AM Shoulder	Midday	PM Crown	PM Shoulder	Evening	Overnight	Total Trips
2001 HAS	245.7	410.6	1,048.8	275.7	619.4	602.0	133.8	3,336.0
2011 CARTAS	378.7	425.3	1,238.6	373.2	721.4	685.6	133.8	3,956.6

Notes: 1. Numbers in the table are in 1000's.

A2.1. Weekday Hourly Person Trips Originated in Different Areas by Time Period – 2001 HAS

	AM Crown	AM Shoulder	Midday	PM Crown	PM Shoulder	Evening	Overnight	Total Trips
Centre City	15.7	9.4	23.4	51.3	38.7	12.4	2.2	153.1
Inner City	28.3	25.8	15.3	20.6	27.4	12.9	1.3	131.6
MAC/CAC/Corr	19.6	13.8	44.3	70.8	70.7	41.2	4.1	264.5
Established	165.6	143.9	75.7	89.4	139.1	71.0	7.1	691.8
Greenfield	11.1	8.5	3.5	6.1	6.0	3.8	0.5	39.5
Industrial	4.8	3.5	11.4	33.9	24.3	8.0	1.3	87.2
Other	0.7	0.4	1.3	3.6	3.5	1.2	0.2	10.9

Note: Numbers in the table are in 1000's.

A2.2. Weekday Hourly Person Trips Originated in Different Areas by Time Period – 2011 CARTAS

	AM Crown	AM Shoulder	Midday	PM Crown	PM Shoulder	Evening	Overnight	Total Trips
Centre City	21.1	12.2	20.7	67.9	37.2	15.8	1.9	176.8
Inner City	33.6	17.0	15.3	16.6	25.1	13.9	1.4	122.9
MAC/CAC/Corr	30.7	15.0	49.2	98.8	85.2	45.9	3.8	328.6
Established	194.5	119.0	79.8	106.8	143.2	63.4	6.6	713.3
Greenfield	83.1	44.4	23.9	37.3	32.5	16.7	1.4	239.3
Industrial	14.9	4.6	14.8	41.9	32.0	13.4	1.4	123.0
Other	0.9	0.5	2.8	3.9	5.6	2.3	0.2	16.2

Note: Numbers in the table are in 1000's.

A3.1. Weekday Person Trip Mode Shares by Time Period – 2001 HAS

Mode Description	AM Crown	AM Shoulder	Midday	PM Crown	PM Shoulder	Evening	Overnight	Total Trips
Walk	21.6	62.0	196.7	26.5	83.8	43.2	8.1	441.9
Bike	3.5	5.2	6.9	2.9	7.6	5.2	0.7	32.0
Auto Drive	139.4	203.9	608.2	165.4	324.1	363.8	92.1	1,896.9
Auto Passenger	37.2	79.1	191.3	50.5	133.2	178.3	29.9	699.5
Transit	44.0	60.7	49.1	32.3	74.0	15.4	4.9	280.4

Note: Numbers in the table are in 1000's.

