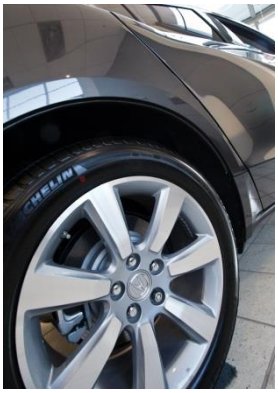
Modal Shift in the Boulder Valley

1990 to 2012

January 2013



Prepared for the

City of Boulder

Transportation Division

by

National Research Center, Inc.

2955 Valmont Road, Suite 300
Boulder, CO 80301
(303) 444-7863
www.n-r-c.com

NATIONAL RESEARCH CENTER INC

Table of Contents

Executive Summary ..... **i**

Study Results **1**

Background 1

Modal Shift of All Trips 3

Modal Split of the Work Commute 9

Telecommuting 13

Modal Split of University of Colorado Students 16

Trip Characteristics 18

Summary Characteristics of All Trips 18

Trip Characteristics of the Work Commute 19

Automobile Trip Characteristics 20

Vehicle Miles Traveled per Capita 21

Vehicle Occupancy 21

Vehicle Ownership and Availability 22

Transit Trip Characteristics 23

Non-Vehicle Trip Characteristics: Walking and Biking 26

Biking for Work, Errands and Recreation 27

Trip Distance 28

Trip Start Times 29

Deliveries to the Home or Office 30

Purpose of Travel 31

Appendix A. National Travel Data **36**

Appendix B. Modal Split by Trip and Respondent Characteristics **40**

Appendix C. Transportation Market Segmentation **47**

Appendix D. References **54**

Appendix E. Study Methodology **55**

Study Design 55

Analysis of Results 57

Appendix F. Data Collection Materials **61**

Executive Summary

Background

2012 Travel Diary Study is the ninth replication of the survey since the 1990 baseline survey. This study is a periodic survey of Boulder Valley residents' travel patterns and mode selection, and is designed to provide feedback to City staff and council members on the effectiveness of City programs aimed at reducing single-occupancy vehicle (SOV) travel and information on travel patterns useful for future transportation planning.

The long trend line generated by the multiple implementations of the study is useful in measuring the City's progress in mode shift away from SOV trips, which was one of the original 1989 Transportation Master Plan's (TMP) major objectives. In 1990, the first year of the travel diary study, 44% of all trips were made by driving alone. Later updates of the TMP modified the objective to a target of reducing the SOV modal share to 25% of all trips by the year 2025. Achieving an SOV modal share of 25% by the year 2025 would mean a 19% shift in the proportion of SOV trips made from 1990 to 2025, or a 0.54% shift per year.

Participants in the Travel Diary Study are asked to keep a log or "diary" of their travel for one randomly assigned day during the third week of September (or a replacement week if necessary). For every trip made during the 24 hour period, respondents record the origin and destination of the travel, the travel mode used, the time of day, the number of people in the vehicle (if applicable), and the number of miles or blocks traversed during the 24 hour period. A trip is defined for participants as any "one-way travel from one point to another that takes you farther than one city block (about 200 yards) from the original location."

The study members were also asked to complete a survey regarding their household characteristics such as number of vehicles and bicycles present in the household, receipt of deliveries, work location, and other general socioeconomic demographics.

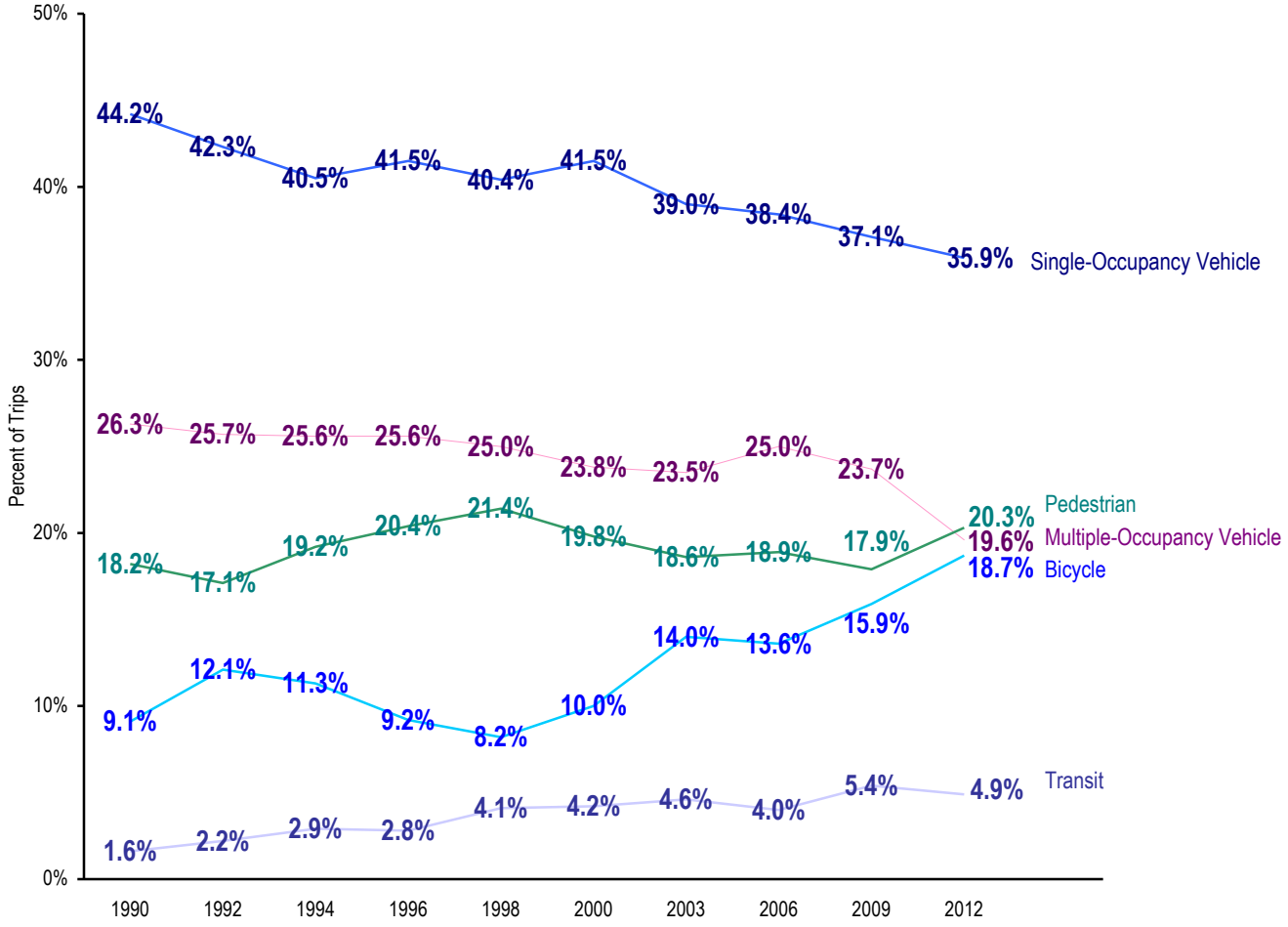
The 2012 Travel Diary Study results are based on approximately 1,100 Boulder Valley residents' records of their travel. With a sample size of 1,000 or more in each study year, the margin of error around the results is ±1.3% per year. Thus, for a difference to be statistically significant between years there must be a shift of at least 2.6% (1.3% around each study year).

Modal Shift of All Trips

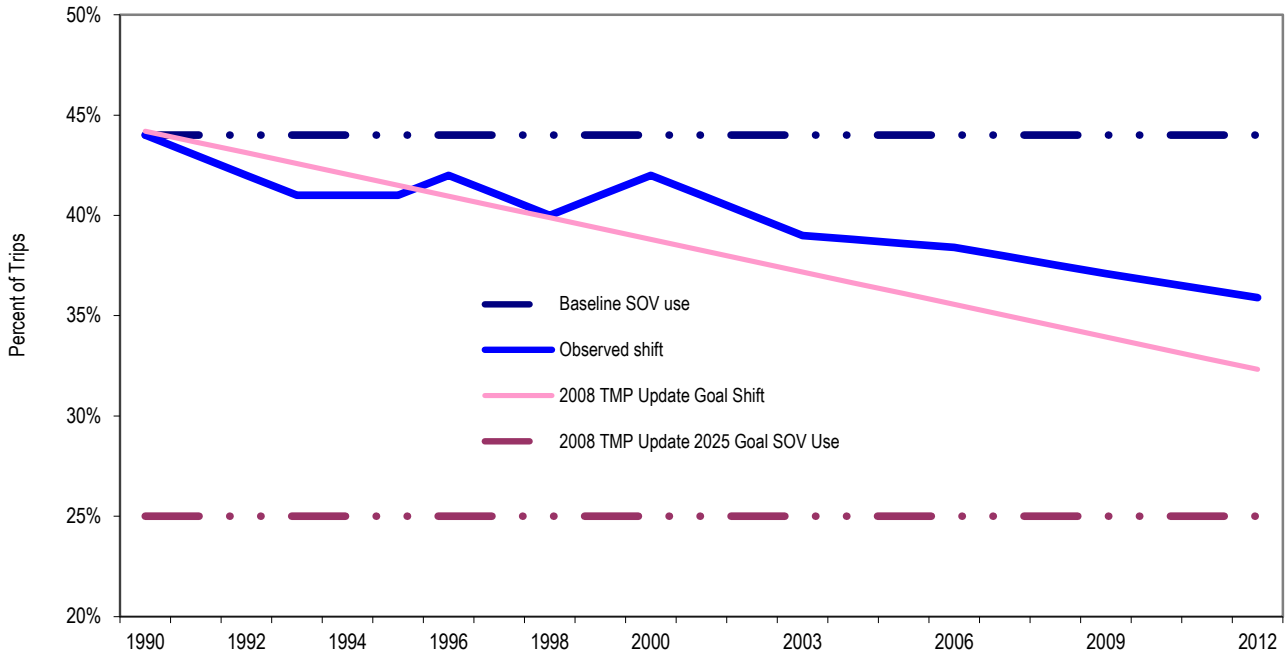
"Modal split" or "modal share," can be defined as a method of dividing travel into all available transportation modes and determining the percent of trips made or miles traveled by each mode. For the Boulder Valley Travel Diary Study the transportation modes are classified as single-occupancy vehicle (SOV), multiple-occupancy vehicle (MOV) , transit or high-occupancy vehicle, school bus, foot and bicycle. A comparison of the mode choices from 1990 to 2012 provides information on modal "shift," that is, the shift of trips or miles traveled from one mode to another. This "shift" was measured as the difference in the proportion of trips from 1990 to 2012 (change in percents).

The figure below shows the modal split of all trips made by respondents in every study year. Compared to 1990, significant shift in trips was observed in four categories:

- Single-Occupancy Vehicle, -8.3%
- Multiple-Occupancy Vehicle, -6.7%
- Transit, +3.3%
- Bicycle, +9.6%



The 2008 TMP includes the objective of achieving an SOV modal share of 25% by the year 2025; this would mean a 19% shift in the proportion of SOV trips made from 1990 to 2025, or an average annual shift of 0.54%, assuming equal progress throughout the thirty-five year span. In the figure below, the 2008 TMP target is plotted with the observed shift. As can be seen, the observed modal shift, while indicating decreasing SOV modal share, has not kept pace with the 2008 TMP objective.



Changes in Boulder citizens' travel behavior cannot be solely attributed to the City's interventions, as regional and national transportation trends also impact travel behavior.

- Nationwide, there was a 0.23% annual shift away from trips made via private vehicles (87.7% in 1990, 83.4% in 2009) over the last two decades. However, among Boulder Valley residents, there was a 9.7% shift observed in the same period (70.5% in 1990, 60.8% in 2009), an average annual decrease of 0.51%. From 2009 to 2012, the proportion of trips made by private vehicle continued to decrease in Boulder, to 55.5% of trips.
- The proportion of trips made on transit remained virtually unchanged nationally, (1.8% in 1990; 1.9% in 2009) while in Boulder there was a 3.8% shift toward public transit in the same period (1.6% in 1990; 5.4% in 2009). However, the estimated proportion of Boulder resident trips made by transit in 2012 was 4.9%, a statistically **in**significant decrease.
- When the modal split of miles traveled is examined, there was virtually no change from 1990 to 2009 nationally, while in Boulder there was a 4.5% shift ***away*** from miles traveled via private vehicles (87.7% in 1990, 82.0% in 2009). From 2009 to 2012, the proportion of miles traveled by private vehicle by Boulder residents decreased slightly more, to 80.1%.

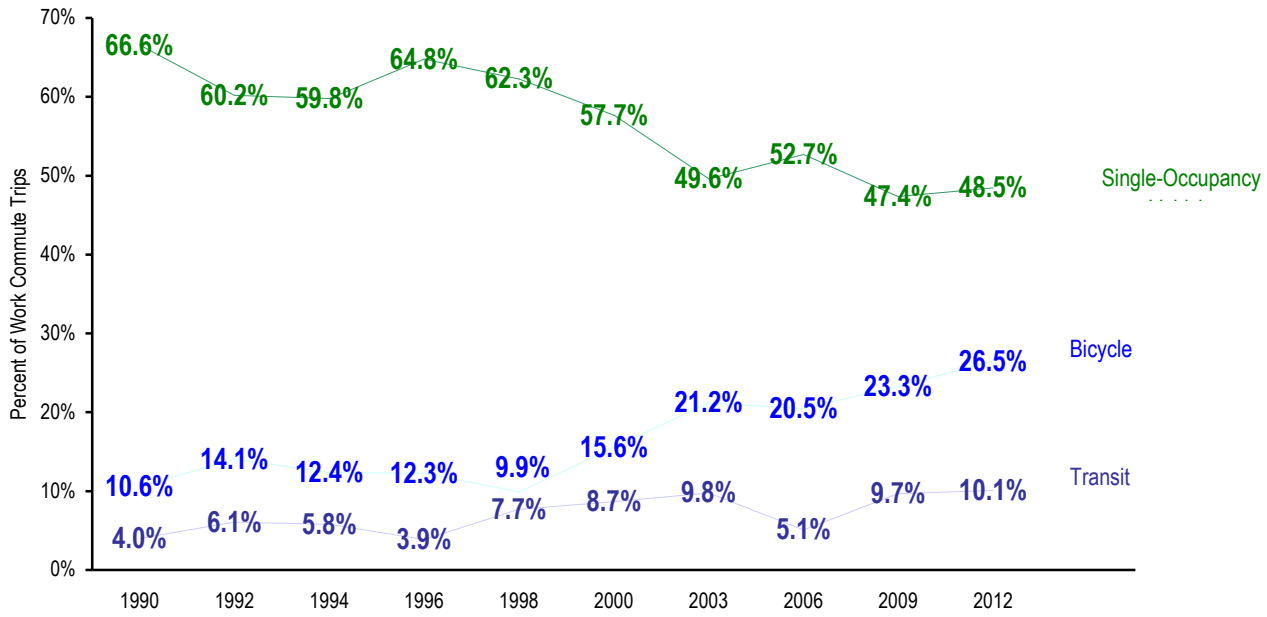
- The proportion of miles traveled via transit stayed relatively flat nationwide, 2.1% in 1990 to 1.5% in 2009, while in Boulder the percent of miles traveled via transit increased, from 4.1% in 1990 to 6.9% in 2009. From 2009 to 2012, the proportion of miles traveled by transit remained steady among Boulder residents.

Modal Split of the Work Commute

The figure below shows the percent of work commute trips made by respondents via SOV, bicycle and transit in every study year. Little change was observed over the study period in multiple-occupancy vehicle trips (between 8% and 11%) or pedestrian trips (also between 8% and 11% of work commute trips). Compared to 1990, significant shift was observed in three categories in 2012:

- Single-Occupancy Vehicle, -18.1%
- Transit, +6.1%
- Bicycle, +15.9%

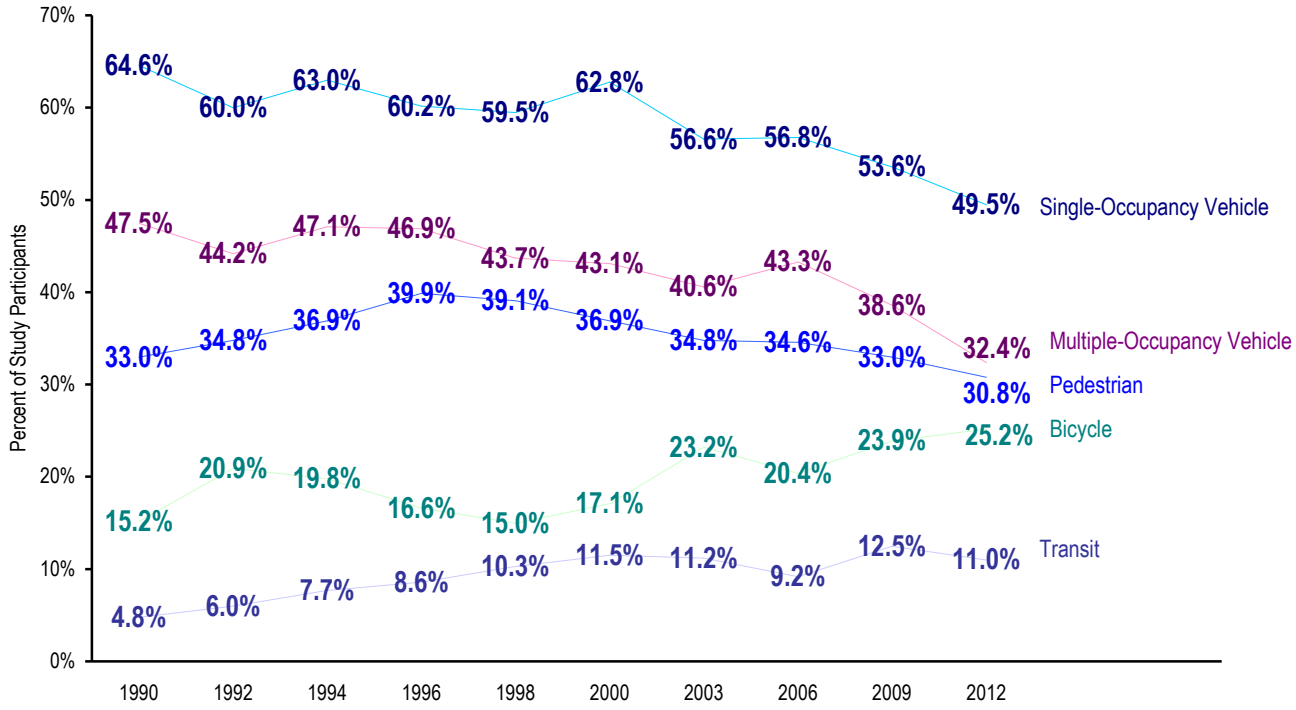
Transit trips, which had been increasing in modal share of work commute trips, have remained relatively flat since 2003, with a decline in 2006 and a rebound in 2009 and 2012 to 2003 levels.



Use of a private vehicle for the work trips has remained constant across the U.S., as measured in trips and miles, while Boulder has experienced a decline in work trips made via private vehicles.

Mode Use

The proportion of people making at least one trip on the assigned travel day by each mode throughout the study period is shown below. Over the study period, the percent of participants making any trips by SOV or MOV has declined, while the proportion making any trips via transit or by bicycle has increased.



Trip Characteristics

The information recorded on the travel diary can be used to characterize the trip-making behavior of Boulder residents. In 2012:

- The average number of trips per day per person was 4.9.
- The average number of miles traveled per day per person was 18.8 miles.
- The percent of people who did not leave the house on assigned travel day was 5.7%
- The average estimated trip distance was 3.8 miles.
- The average estimated trip duration in was 15.8 minutes.

The average number of trips per day has decreased somewhat over the study period, from 5.9 in 1990 to 4.9 in 2012. The average number of miles traveled per day decreased quite a bit in 2012, from 24.3 miles in 1990 and 24.7 miles in 2009 to 18.7 miles in 2012.

Compared to national data, Boulder residents make shorter trips (4.9 miles for Boulder residents in 2012 compared to 9.8 miles in 2009 for U.S. residents).

The average work commute trip for Boulder residents in 2012 was 6.0 miles in distance and 18 minutes in duration. The average work commute for U.S. residents in 2009 was 11.8 miles and 24 minutes.

Study Results

Background

The Travel Diary Study is a periodic survey of Boulder Valley residents' travel patterns and mode selection. The baseline study was conducted in 1990 and has been re-implemented every two to three years since then. The study is designed to provide feedback to City staff and Council members on the effectiveness of City programs aimed at reducing single-occupancy vehicle (SOV) travel, and to provide information on travel patterns useful for future transportation planning.

The 2012 Travel Diary Study is the tenth replication of the survey since the baseline study. This long trend line is useful in measuring the City's progress in mode shift away from SOV trips, as one of the original Transportation Master Plan's (TMP) major objectives was to shift "15% of all trips currently made by single-occupant autos to other forms of transportation, including ridesharing, transit, walking, and bicycling" by the year 2010. In 1990, the first year of the travel diary study, 44% of all trips were made by driving alone. The 1996 TMP modified the objective to a target of reducing the SOV modal share to only 25% of all trips by the year 2020 and the 2003 update extended the target year to 2025. This target is now the standard against which these study results are measured. Achieving an SOV modal share of 25% by the year 2025 would mean a 19% shift in the proportion of SOV trips made from 1990 to 2025, or a 0.54% shift per year.

Participants in the study were asked to keep a log or "diary" of their travel for one randomly assigned day during the third week of September (or a replacement week if necessary). For every trip made during the 24 hour period, they recorded the origin and destination of the travel, the travel mode used, the time of day, the number of people in the vehicle (if applicable), and the number of miles or blocks traversed during each trip. A trip was defined as any "one-way travel from one point to another that takes you farther than one city block (about 200 yards) from the original location."

The participants were also asked to complete a survey regarding their adult household members' typical primary modes of travel, locations of work/school, number of vehicles, and general socioeconomic information about the household and the study participant (see *Appendix F. Data Collection Materials* for copies of the survey materials).

The 2012 Travel Diary Study results are based on 1,1,01 Boulder Valley residents' records of their travel. Seven thousand randomly selected households were contacted to participate in the study; 376 of the packets were returned as undeliverable, resulting in 6,624 eligible households. From these eligible households, 1,075 completed household surveys and/or travel diaries were returned, for a response rate of 16.2%. Additionally, 700 students in CU-Boulder dormitories were contacted to participate in the study; completed surveys were returned from 26 of them for a response rate of 3.8%.

Results were statistically weighted so that demographics of respondents matched population demographics. More information about the study methodology is contained in *Appendix E. Study Methodology*.

With a sample size of 1,000 or more in each study year, the margin of error around the results is ±1.3% per year. Thus, for a difference to be statistically significant between years there must be a shift of at least 2.6% (1.3% around each study year).

Modal Shift of All Trips

Transportation mode choice, referred to as "modal split" or "modal share," can be defined as a method of classifying travel into all available transportation modes and can refer to the number of modes, number of trips or number of miles traveled. This study uses the number of trips and number of miles when calculating modal split, and classifies the modes as single-occupancy vehicle (SOV), multiple-occupancy vehicle (MOV)[1], transit or high-occupancy vehicle, school bus, foot and bicycle. A comparison of the mode choices from 1990 to 2012 provides information on modal "shift," that is, the shift of trips or miles traveled from one mode to another. This "shift" was measured as the difference in the proportion of trips from 1990 to 2012 (change in percents). The modal split of trips as observed in the 2012 Travel Diary is shown in Figure 2 on the next page, while the modal shift of trips from 1990 to 2012 by Boulder Valley residents is presented in Figure 1.

Over the entire study period, the proportion of all trips made by driving alone has shifted 8%, about half of which occurred in the early 1990s. In 2012, SOV trips accounted for about 36% of all trips made by Boulder residents, down from about 44% in 1990. Transit trips have more than doubled over that same period, increasing from less than 2% in 1990 to about 5% in 2012. Large gains were observed in the proportion of trips made by bicycle over the previous 2 decades, from 9% in 1990 to 19% in 2012.

The proportion of trips made via MOV has remained fairly constant since 1990 until 2009. However, in 2012, a decrease in MOV trips was seen. In 2012, about one in five of all trips were made in personal vehicles with more than one person. About a third of those MOV trips included at least one child in the vehicle, while about two-thirds included only adults (see Figure 2 on the next page).

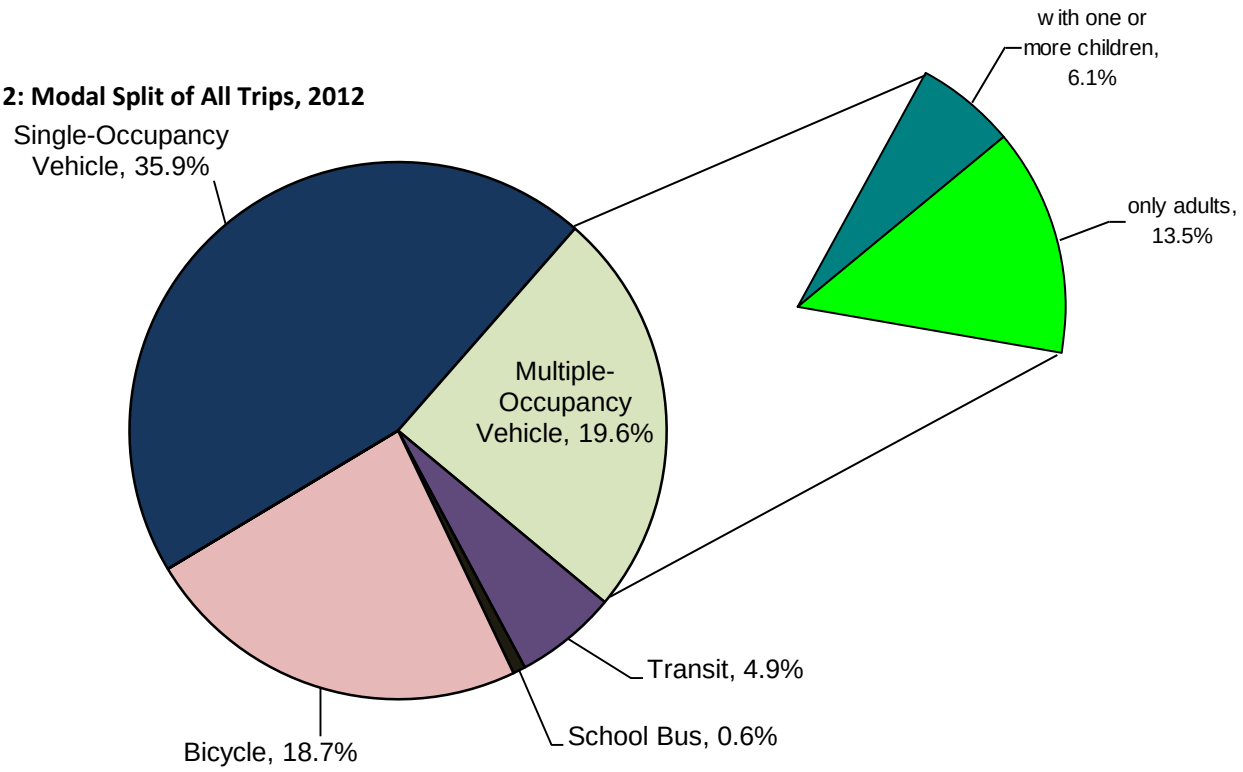
Figure 1: Modal Split of Trips for Boulder Valley, 1990-2012

	Percent of Trips*										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	35.9%	37.1%	38.4%	39.0%	41.5%	40.4%	41.5%	40.5%	42.3%	44.2%	-8.3%
Multiple-Occupancy Vehicle	**19.6%**	**23.7%**	25.0%	23.5%	23.8%	25.0%	25.6%	25.6%	25.7%	26.3%	-6.7%
Transit	4.9%	5.4%	4.0%	4.6%	4.2%	4.1%	2.8%	2.9%	2.2%	1.6%	+3.3%
School Bus	0.6%	0.1%	0.1%	0.3%	0.7%	0.7%	0.5%	0.5%	0.7%	0.6%	0.0%
Bicycle	**18.7%**	**15.9%**	13.6%	14.0%	10.0%	8.2%	9.2%	11.3%	12.1%	9.1%	+9.6%
Foot	20.3%	17.9%	18.9%	18.6%	19.8%	21.4%	20.4%	19.2%	17.1%	18.2%	+2.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Trips	*4,835*	*5,505*	*6,081*	*6,380*	*6,791*	*5,987*	*6,454*	*6,723*	*6,681*	*7,355*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.
** These estimates have a margin of error of ±1.3% using a 95% confidence interval.*

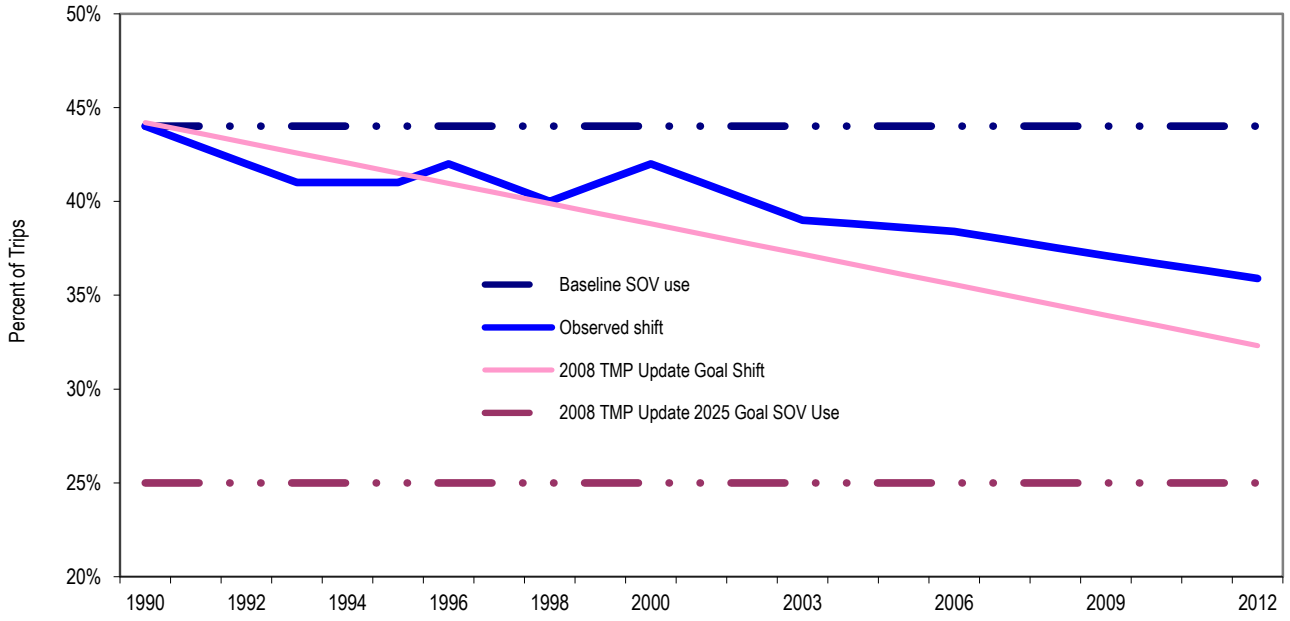
[1] A single-occupancy vehicle refers to an automobile, van, truck or motorcycle which has only one occupant; a multiple-occupancy vehicle is an automobile, truck or motorcycle with more than one occupant. (Truck and motorcycle trips make up a very small proportion of the trips made.)

Figure 2: Modal Split of All Trips, 2012



The 2008 TMP update includes an objective of achieving an SOV modal share of 25% by the year 2025; this would mean a 19% shift in the proportion of SOV trips made from 1990 to 2025, or an average annual shift of 0.54%, assuming equal progress throughout the thirty-five year span. In Figure 3, the 2008 TMP target is plotted with the observed shift. As can be seen, the observed modal shift has not quite kept pace with the 2008 TMP objective in recent years.

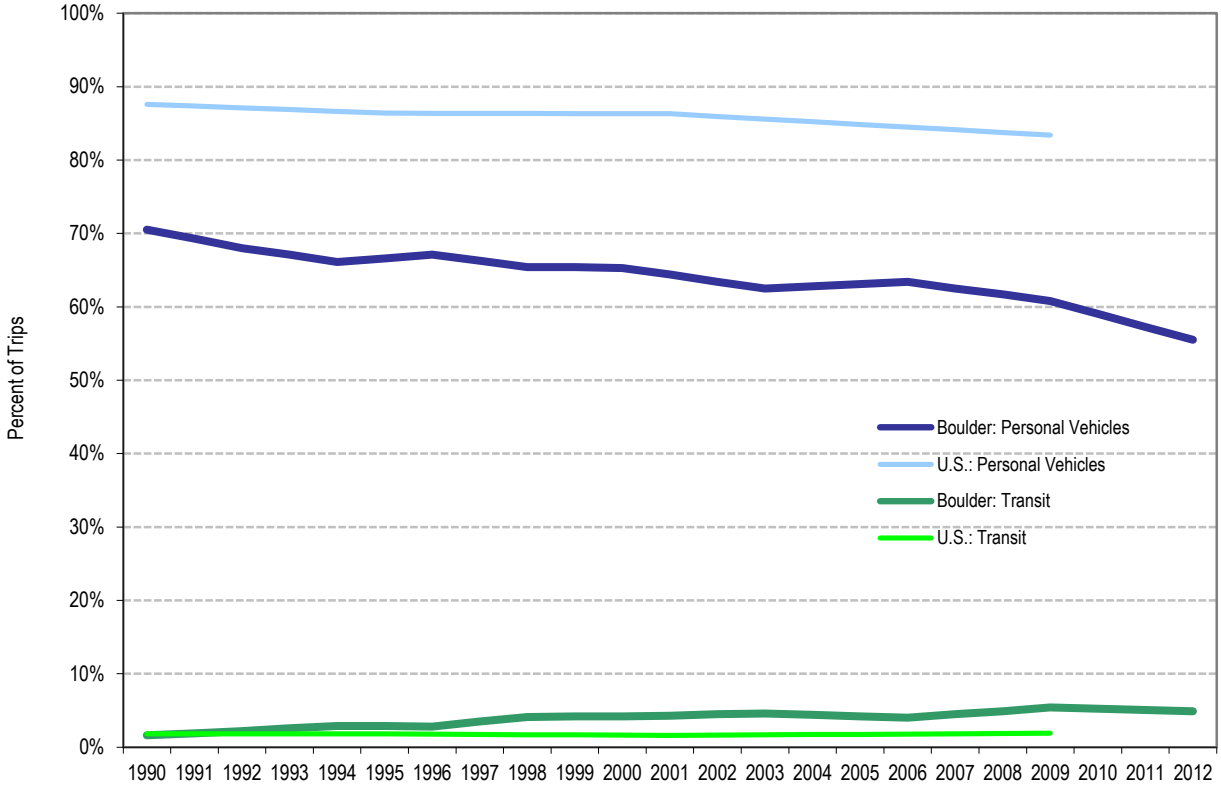
Figure 3: Percent of SOV Trips from 1990-2012: Observed Versus Desired Shift



Changes in Boulder citizens' travel behavior cannot be solely attributed to the City's interventions, as regional and national transportation trends also impact travel behavior. However, the national trends observed demonstrated only a slight reduction in "privately owned vehicle" (POV) use, which includes both SOVs and MOVs, between 1990 and 2009.[2] Figure 4 below compares the change observed in Boulder from 1990 to 2012 to that observed in the nation from 1990 to 2009. Nationwide, there was a 4.2% shift away from trips made via private vehicles (87.6% in 1990, 83.4% in 2009) over a 19 year period, which translates to an average annual decrease of 0.22%. However, among Boulder Valley residents, there was a 15% shift observed (70.5% in 1990, 55.5% in 2012) in POV use over a 22 year period, an average annual decrease of 0.79%.

The proportion of trips made on transit remained virtually unchanged nationally, (1.8% in 1990; 1.9% in 2009) while in Boulder there was a 3.3% shift toward public transit (1.6% in 1990; 4.9% in 2012), representing an average annual increase of 0.17%.

Figure 4: Percent of All Trips from 1990 to 2009/2012: Boulder Compared to the U.S.



[2] *Appendix A. National Travel Data* contains additional detail on the comparisons made in Figure 4.These data come from the 1990 and 1995 Nationwide Personal Transportation Study and the 2001 and 2009 National Household Travel Study (NHTS).

Modal share estimates using miles traveled show larger shares for the motorized vehicles because these vehicles are used to traverse greater distances. From 1990 to 2012, there has been no significant change observed in the SOV share of miles traveled, with some mild variation from year to year. There has been a shift of about 4% in the proportion of miles traveled by bicycles in the study period, increasing from 4.9% of miles in 1990 to 9.3% of miles in 2012. The share of transit miles has also increased (2.5%), but not as much as the share of total trips, perhaps indicating that much of the increase in the modal share of transit trips is on shorter rides, such as those that would be taken on Community Transit Network buses (such as the HOP, SKIP or JUMP).

Figure 5: Modal Split of Miles for Boulder Valley, 1990-2012

	Percent of Miles*										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	**49.6%**	**46.1%**	46.9%	44.0%	49.1%	48.1%	45.2%	46.2%	48.0%	50.0%	-0.4%
Multiple-Occupancy Vehicle	**30.5%**	**35.9%**	36.3%	39.5%	35.9%	35.6%	41.3%	38.6%	37.3%	37.7%	-7.2%
Transit	6.6%	6.9%	5.7%	5.5%	6.5%	7.0%	5.7%	6.4%	6.2%	4.1%	+2.5%
School Bus	0.5%	0.5%	0.1%	0.2%	0.4%	0.6%	0.2%	0.2%	0.5%	0.2%	+0.3%
Bicycle	9.3%	8.1%	7.2%	7.7%	4.7%	4.6%	4.3%	5.6%	5.4%	4.9%	+4.4%
Foot	3.4%	2.5%	3.7%	3.0%	3.5%	4.1%	3.2%	2.9%	2.5%	3.0%	+0.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Miles	*18,269*	*27,016*	*25,756*	*31,248*	*28,689*	*25,562*	*30,042*	*30,300*	*29,761*	*29,634*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.
** These estimates have a margin of error of ±1.3% using a 95% confidence interval.*

As with the modal split of trips, the reduction in SOV miles can be compared to the 2008 TMP objective (Figure 6), assuming that the objective of a 19% shift in the proportion of trips made by SOV can also be translated as an objective of a 19% shift in the proportion of miles traveled by SOV. When miles are used as the unit of analysis, it can again be observed that the modal shift of miles has not yet met the TMP objective, and in fact, in 2012 the proportion of trips made by driving alone returned to levels observed at baseline in 1990.

Figure 6: Percent SOV Miles 1990-2012: Observed Versus Expected Shift

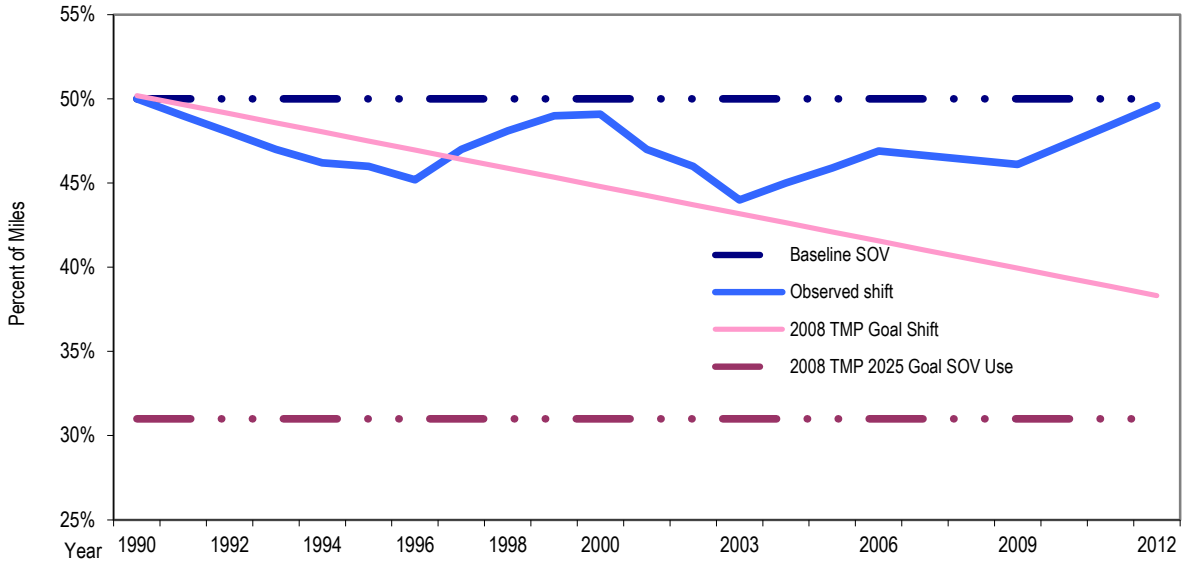
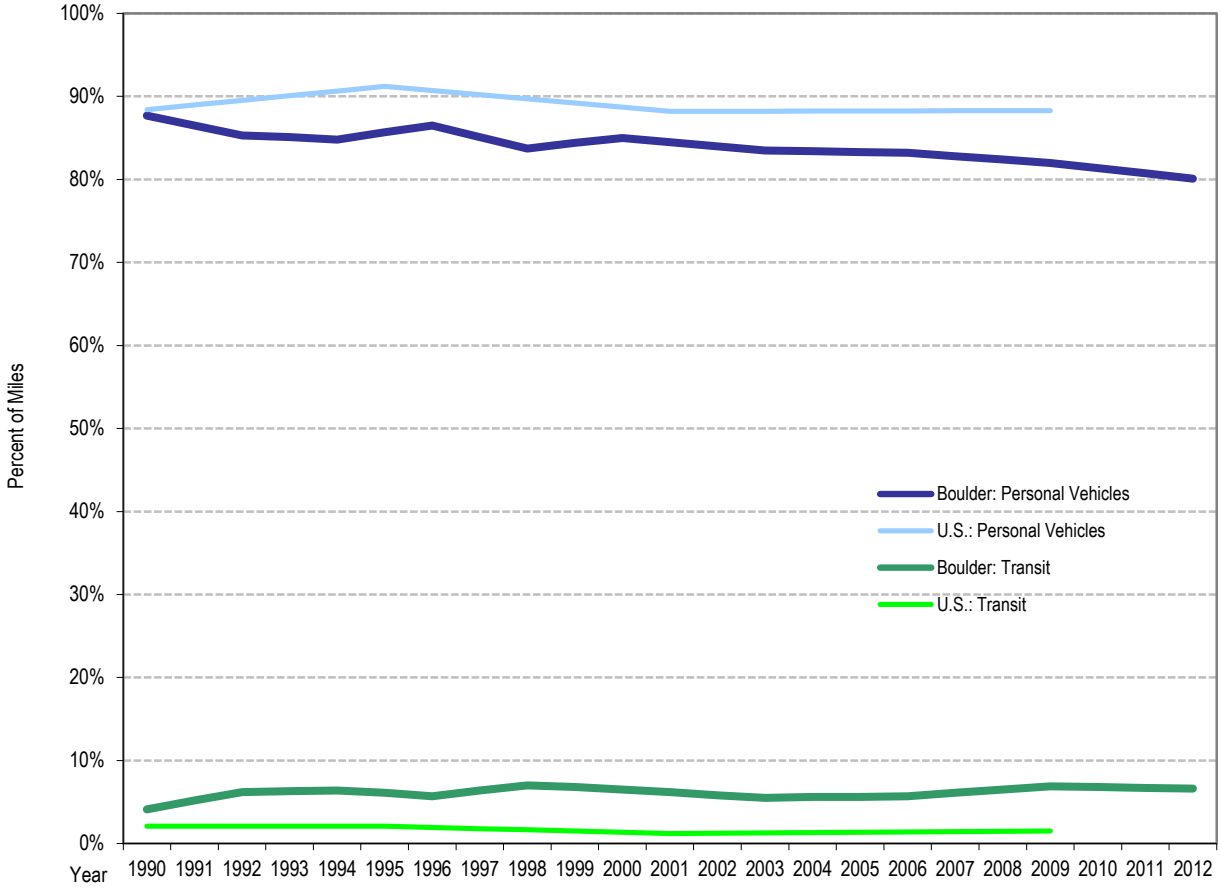


Figure 7 shows a comparison of the percent of miles traveled in the nation between 1990 and 2009, and in Boulder Valley between 1990 and 2012, by mode. The proportion of miles traveled by private vehicles stayed the same in the U.S., from 88% of miles, while in Boulder the trend was a declining one, from 88% of miles in 1990 to 80% in 2012. The proportion of miles traveled via transit actually decreased nationwide, from 2.1% in 1990 to 1.5% in 2009, while in Boulder the percent of miles traveled via transit increased slightly, from 4.1% in 1990 to 6.6% in 2012.

Figure 7: Percent of All Miles from 1990 to 2009/2012: Boulder Compared to the U.S.



Modal Split of the Work Commute

Trips made as part of the work commute were identified for special analysis, including trips directly between home and work and trips linked during the work commute.[3] As not all respondents had a work commute, the data in the following tables are based on a smaller number of respondents and trips, are less stable from year to year and have a higher margin of error (about ±4%).

The SOV modal share of work commute trips decreased from 1990 to 2012 by 18% over the study period (see Figure 8). However, little change was observed from 2009 to 2012. The transit share, which had been increasing from 1990 to 2003, declined in 2006 to levels not statistically significantly higher than 1990 levels, but increased again in 2009 to 9.7% and to 10.1% in 2012. The proportion of work commute trips made by bicycling remained high, at about 27% of all work commute trips, about 16% higher than what had been observed in 1990. This also represented a gain compared to 2009.

Figure 8: Modal Split of Trips for the Work Commute, 1990-2012

	Percent of Work Commute Trips										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	48.5%	47.4%	52.7%	49.6%	57.7%	62.3%	64.8%	59.8%	60.2%	66.6%	-18.1%
Multiple-Occupancy Vehicle	**5.7%**	**8.5%**	10.7%	9.2%	7.6%	8.2%	10.8%	10.1%	9.8%	9.9%	-4.2%
Transit	10.1%	9.7%	5.1%	9.8%	8.7%	7.7%	3.9%	5.8%	6.1%	4.0%	+6.1%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.1%	0.2%	0.0%	0.0%
Bicycle	**26.5%**	**23.3%**	20.5%	21.2%	15.6%	9.9%	12.3%	12.4%	14.1%	10.6%	+15.9%
Foot	9.2%	11.1%	11.0%	10.3%	10.4%	11.8%	8.2%	11.8%	9.6%	8.9%	+0.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Work Commute Trips	*754*	*1,021*	*1,101*	*951*	*1,161*	*947*	*1,192*	*1,146*	*1,111*	*1,302*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.

[3] See page 32 for a description of how trips were categorized. Using the trip classification scheme displayed in *Figure 48: Types of Trips*, the "home-based work" commute trips could be determined. Still, a small percentage of the work commute would not be accounted for when a work trip was "linked," that is, a trip where the person makes a stop on the way to or from work. For example, if the participant stopped at the post office on the way to work, the first trip would be classified as "home-based other" and the second trip would be categorized as "non-home based". Neither of these legs of the trip would be counted as the work commute. Similarly, if a participant drove to the Park-n-Ride, and then took a bus to work, neither trip would be classified as "home-based work;" the first would be coded as "home-based other" the second as "non-home based." To be sure trips were identified as part of the work commute, another code was created which allowed the trips to be distinguished as "linked". All the linked trips are included in the analysis of "work commute" trips.

The modal split in miles for the work commute did not change much in 2012 compared to 1990. A decrease in the miles traveled by single-occupancy vehicle had been observed in 2009, down to about 60% of work commute miles, but it increased again in 2012 to about 70% of work commute miles. Also in 2009, an increase in miles traveled for the work commute was observed, but then it decreased again in 2012. In 2009, there may have been some longer distance work commutes made by respondents that influenced the modal split of work commute miles, as the proportion of work commute trips made by SOV and transit were similar in 2009 and 2012.

Since 1990, the proportion of miles traveled by bicycle increased. The initial decreases observed in the proportion of work commute miles traveled via SOV, and the initial increases in transit miles may reflect the emphasis of GO Boulder's programs. At the time of GO Boulder's inception, a great deal of emphasis was placed on the work commute. The Eco-Pass program provided RTD bus passes to many employees in the Boulder Valley. Over time, though, additional emphases and programs were implemented, which may have led to other changes in trip-making behavior. For example, the modal shift of miles traveled by bicycle for the work commutes has increased about 6% since 1990, with much of the change occurring between 2000 and 2003. This shift in bicycle travel (trip and miles) may be due to the addition of bike/pedestrian underpasses and the continued progress in completing the facilities of the Bicycle System Plan.

Figure 9: Modal Split of Miles for the Work Commute, 1990-2012

	Percent of Work Commute Miles										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	**69.7%**	**59.7%**	66.6%	63.6%	68.8%	66.7%	71.5%	66.6%	64.5%	71.9%	-2.2%
Multiple-Occupancy Vehicle	10.9%	9.1%	10.3%	12.8%	6.3%	11.2%	11.9%	14.9%	10.1%	10.9%	0.0%
Transit	**8.7%**	**19.5%**	11.8%	12.6%	17.4%	16.2%	11.2%	12.7%	16.5%	11.2%	-2.5%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.6%	0.0%	0.0%
Bicycle	9.6%	10.6%	10.2%	10.0%	6.0%	4.4%	4.3%	4.6%	6.9%	4.7%	+4.9%
Foot	1.1%	1.1%	1.2%	1.0%	1.5%	1.3%	1.0%	1.2%	1.4%	1.3%	-0.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Work Commute Miles	*4,411*	*6,215*	*5,980*	*5,607*	*6,637*	*5,846*	*6,326*	*7,111*	*6,412*	*6,818*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.

Figure 10 compares the change in Boulder's modal split of the work commute to the national trends. Use of a private vehicle for the work trips has remained constant across the U.S., as measured in trips and miles, while Boulder has experienced a decline in work trips traveled for the work commute made via private vehicles, although the proportion of miles traveled has remained about the same. The trend line for the proportion of work trips made via transit has been volatile in Boulder, but the overall trend for trips is an increasing one. Nationally, no change has been observed in transit use for work trips or miles.

Figure 10: Percent of Work Commute Trips and Miles from 1990 to 2009/2012: Boulder Compared to the U.S.

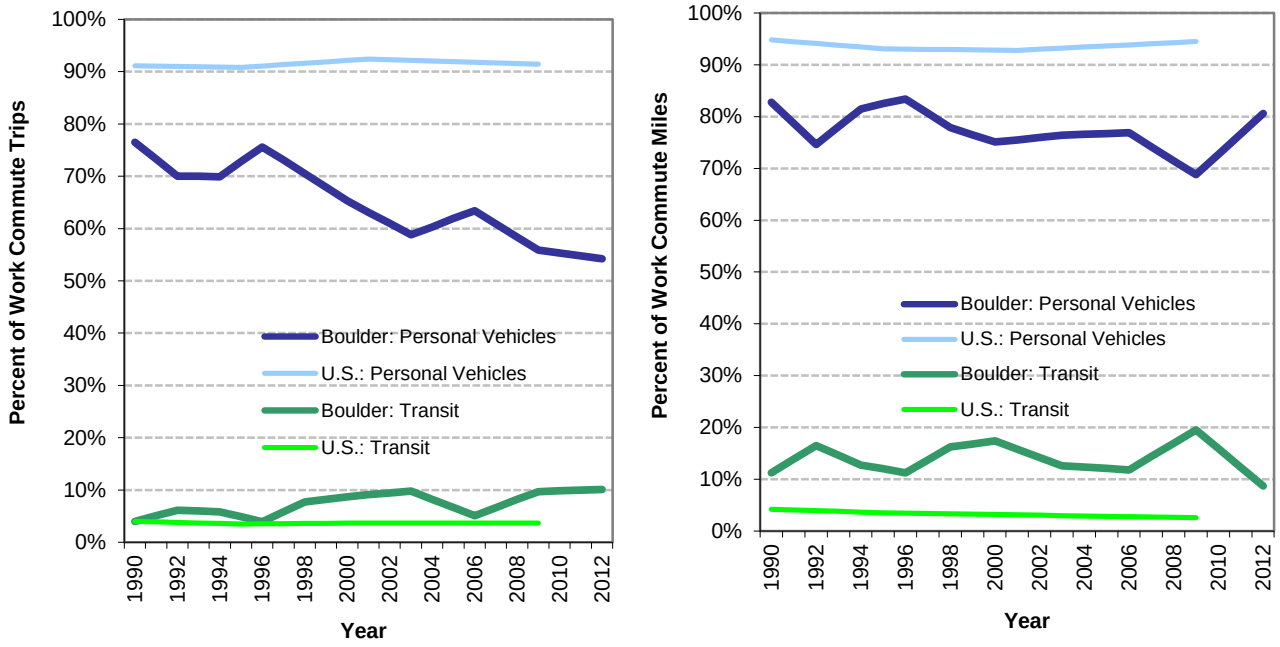


Figure 11 displays the work commute trip made on the assigned travel study day by study participants' workplace location. Those who worked in Boulder were least likely to have used an SOV for any part of their work commute compared to those who worked in other cities. A greater proportion of the work commute trips made by Boulder Valley residents who worked in Boulder or in Denver were made via transit, indicating the high availability of service within Boulder and between Boulder and Denver, while transit use for the work commute for those who worked in other locations was much lower. Among travel diary study participants who worked in Boulder, about 12% of the trips made for the work commute were made using transit. This represents an increase transit use for the work commute since the study inception in 1990 among employed study participants who worked in Boulder (see Figure 12).

Figure 11: Modal Split of Work Commute Trips by Location of Workplace, 2012

	Location of Workplace		
Travel Mode	**Boulder**	**Denver**	**Other**
Single-Occupancy Vehicle	40.2%	66.7%	84.0%
Multiple-Occupancy Vehicle	3.5%	6.7%	10.6%
Transit	11.5%	13.3%	3.2%
Bicycle	33.3%	6.7%	2.1%
Foot	11.5%	6.7%	
Total	100.0%	100.0%	100.0%
Number of Work Commute Trips	*574*	*45*	*94*

The modal split of the work commute trips of study participants from all study years who worked in Boulder is shown in Figure 12. The shift of these workers away from drive alone trips for the work commute was 26% since 1990. Three large shifts occurred in 1992, 2000 and 2003, while the proportion of Boulder Valley residents who work in Boulder using an SOV for the work commute remained fairly constant between 1992 and 1998, and increased slightly from 2003 to 2006 before decreasing again in 2009. Transit use had increased from 1990 to 2003, but declined in 2006 then rose again in 2009. Bicycle use for the work commute among study participants employed in Boulder, however, increased over the study period, with some increase observed again in 2012.

Figure 12: Modal Split of Work Commute Trips for Boulder Valley Residents Who Work in Boulder, 1990-2012

	Percent of Work Commute Trips for BV Residents Who Work in Boulder										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	40.2%	41.5%	48.9%	44.0%	55.0%	59.7%	61.8%	58.3%	59.5%	65.9%	-25.7%
Multiple-Occupancy Vehicle	3.5%	5.7%	8.6%	7.1%	7.6%	8.3%	10.0%	11.1%	9.6%	9.7%	-6.2%
Transit	**11.5%**	**7.6%**	3.5%	7.7%	5.4%	6.3%	2.8%	3.6%	3.7%	2.4%	+9.1%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.2%	0.0%	0.0%	0.0%
Bicycle	**33.3%**	**30.4%**	26.6%	27.8%	21.6%	13.4%	16.0%	16.1%	16.0%	12.5%	+20.8%
Foot	**11.5%**	**14.8%**	12.4%	13.4%	10.4%	11.9%	9.4%	10.7%	11.3%	9.6%	+1.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Work Commute Trips	*574*	*648*	*758*	*646*	*786*	*647*	*874*	*856*	*810*	*1,048*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.

Telecommuting

Telecommuting was defined as follows: "Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or telephone) for work-related travel." Respondents were asked whether they had telecommuted on the day assigned to them to record their travel. Since this question was first asked in 1996, about 10% of the respondents in every study year has reported that they telecommuted on their assigned travel day (see Figure 14). Of those who telecommuted, only about 40% indicated that telecommuting reduced the number of SOV trips they made on the day they completed the travel diary (see Figure 15).

Figure 13: Teleworking Status 2009-2012

Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or phone) for work-related travel. How often, if ever, do you telecommute for work? (Note: do not include times you take work home to do in the evenings, only times you work from home instead of traveling to a workplace.)	Percent of Respondents	
	2012	2009
Every work day (I always work from my home)	12.7%	7.9%
3 to 4 times per week	3.1%	3.9%
2 to 3 times per week	5.1%	5.6%
Once or twice a month	8.9%	9.8%
Occasionally	21.1%	17.2%
Never	49.1%	55.7%
Total	100.0%	100.0%
Number of Respondents	*749*	*839*

Figure 14: Telecommuting on Assigned Travel Day, 1996-2012

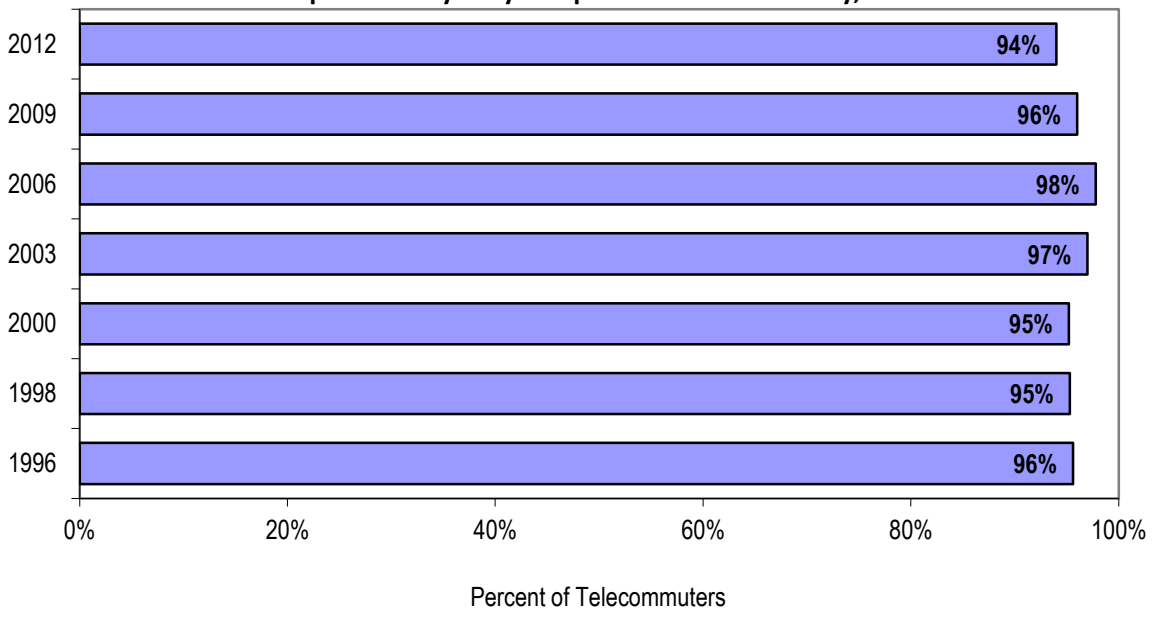
Did you telecommute on the day you completed the travel diary?	Percent of Respondents						
	2012	2009	2006	2003	2000	1998	1996
Yes	10.8%	8.1%	12.0%	12.2%	10.4%	11.0%	13.6%
No	89.2%	91.9%	88.0%	87.8%	89.6%	89.0%	86.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	*742*	*829*	*882*	*890*	*1,160*	*1,010*	*1,056*

Figure 15: Did Telecommuting Replace Drive Alone Trips, 2000-2012

Did working at home reduce the number of single-occupancy vehicle (drive alone) trips you made on the day you completed the travel diary compared to days you do not telecommute? (2009 wording)	Did telecommuting reduce the number of single-occupancy vehicle trips you made on the day you completed the travel diary? (2000-2006 wording)	Percent of Respondents Who Telecommuted						
		2012		2009		2006	2003	2000
Yes, reduced about 2 drive-alone trips	Yes	21.9%	39.4%	17.8%	38.0%	44.8%	44.0%	36.9%
Yes, reduced more than 2 drive-alone trips		17.5%		10.2%				
No, I made the same number of drive alone trips	No	60.6%		72.0%		55.2%	56.0%	63.1%
Total		100.0%		100.0%		100.0%	100.0%	100.0%
Number of Respondents		*137*		*156*		*106*	*106*	*144*

Almost all respondents who reported telecommuting on their assigned travel day and who made any trips on their assigned travel day made at least one work-related trip (Figure 16). Given that only about four in ten thought telecommuting replaced SOV trips, telecommuting may not yet be a big replacement of work day trips.

Figure 16: Percent of Telecommuters Who Made Any Trip Who Made a Work-Related Trip on the Day They Completed Their Travel Diary, 1996-2012



Modal Split of University of Colorado Students

In fall 2009 (the latest year for which data are available), 30,196 on-campus degree-seeking students were enrolled at CU-Boulder. Students accounted for just under 21,000 or about 20% of Boulder Valley residents during the school year. The other 9,000 lived outside of Boulder Valley. About 6,000 students, primarily freshmen, lived in 22 campus residence halls, while another approximately 1,500 live in a sorority or fraternity, and the remainder lived in residential units within the Valley. The transportation choices made by the students for all trips are displayed in Figure 17 and for the school commute in Figure 18 on the next page.[4]

The modal split for this group is traditionally quite different than the rest of Boulder's population due to the students' high use of alternate modes. In all years, SOVs were used for about 20% to 25% of all CU students' trips, and for 5% to 10% of the trips made to school. This low use may be attributed to the lower vehicle availability of students (in 2012, 0.72 vehicles per driver for CU students versus 0.93 vehicles per driver for non-students) and the scarcity and cost of parking on campus. It may also be due to the fact that some students must park more than a block from school, and thus recorded the purpose of the automobile portion of their trip as "change travel mode," and the walk from the car to school as "school" (see footnote 4 below).

In 1998, there was a large increase in the proportion of trips made by students via transit. This may be due to the introduction of the SKIP service, which directly serves the campus along Broadway. Bicycle use has also increased, with a marked increase in 2006 compared to 2003.

Figure 17: Modal Split of All Trips Made by CU Students, 1990-2012

	Percent of Trips Made by CU Students										Change 1990 to 2012
Travel Mode	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	
Single-Occupancy Vehicle	**19.6%**	**22.9%**	19.1%	26.0%	22.3%	21.0%	17.0%	19.8%	20.6%	24.8%	-5.2%
Multiple-Occupancy Vehicle	**9.6%**	**16.3%**	17.0%	17.5%	13.3%	17.0%	19.2%	17.3%	19.3%	19.7%	-10.1%
Transit	10.3%	10.2%	10.8%	9.7%	10.1%	12.2%	6.2%	5.9%	4.7%	5.7%	+4.6%
Bicycle	26.5%	22.9%	25.1%	15.5%	17.0%	11.3%	18.2%	19.2%	23.1%	17.6%	+8.9%
Foot	**33.9%**	**27.7%**	27.8%	31.4%	37.3%	38.5%	39.3%	37.8%	32.4%	34.2%	-0.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Trips	*1,168*	*1,140*	*1,072*	*1,747*	*1,696*	*1,400*	*1,379*	*1,572*	*1,734*	*1,901*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.

[4] Included in this table are trips for which the recorded purpose was "school". School trips were not linked as work commute trips were, so parts of the trip that were linked would not be included. For example, if a student walked 2 blocks to the bus, rode the bus for 1 mile, and then walked 3 blocks to school, only the last leg of that trip would be recorded as "school". The other two legs would be recorded as "change travel mode."

Figure 18: Modal Split of School Commute Trips Made by CU Students, 1990-2012

Travel Mode	Percent of School Commute Trips Made by CU Students										Change 1990 to 2012
	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	**4.5%**	**11.0%**	5.2%	13.0%	8.7%	12.6%	5.7%	7.9%	8.8%	10.1%	-5.6%
Multiple-Occupancy Vehicle	**1.9%**	**7.3%**	1.2%	1.2%	3.6%	5.1%	3.0%	3.0%	1.7%	3.2%	-1.3%
Transit	**16.8%**	**12.8%**	19.9%	18.9%	10.4%	20.3%	8.0%	7.5%	8.5%	8.9%	+7.9%
Bicycle	33.0%	35.3%	42.9%	22.8%	22.7%	15.4%	30.9%	25.9%	31.5%	24.2%	+8.8%
Foot	**43.8%**	**33.5%**	30.8%	44.0%	54.6%	46.7%	52.4%	55.7%	49.5%	53.6%	-9.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of School Commute Trips	*267*	*218*	*181*	*259*	*341*	*296*	*241*	*299*	*364*	*334*	

Modes with shifts that are statistically significantly different between 1990 and 2012 are shaded.
Modes with shifts that are statistically significant different between 2009 and 2012 are bolded.

Trip Characteristics

Summary Characteristics of All Trips

This section of the report explores the characteristics of the trips made by Boulder Valley residents. Figure 19, below, displays summary trip characteristics for all trips, regardless of mode of travel. These trip characteristics have remained fairly steady over the study period, although the average number of miles traveled per day decreased from 2009 to 2012.

On average, respondents traveled about 19 miles per day and made about 5 trips during the 24-hour period assigned to them in 2012, with an average trip length of four miles. While the average trip distance has not changed much since 1990, the average trip duration has increased about a minute and a half on average, from 14.4 minutes in 1990 to 15.8 minutes in 2012. About 6% of respondents made no trips on their assigned travel day, an increase from the 4% who did so in 1990.

Figure 19: Summary Trip Characteristics, All Trips, 1990-2012

	Year										Change
Summary Travel Characteristics	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	**1990-2012**
Average number of trips per day per person	4.9	5.1	5.7	5.5	6.1	5.9	6.2	6.1	6.0	5.9	-1.0
Average number of miles per day per person	**18.8**	**24.7**	24.1	27.0	25.2	26.0	27.8	26.9	25.4	24.3	-5.5
Percent of people who did not leave the house on assigned travel day	5.7%	5.8%	5.4%	5.2%	4.7%	4.9%	5.2%	4.1%	4.6%	4.1%	+1.6%
Average estimated trip length in miles[5]	3.8	5.0	4.3	5.1	4.3	4.3	4.7	4.5	4.6	4.0	-0.2
Average estimated trip time in minutes	15.8	17.0	16.0	15.4	13.5	11.4	13.3	11.8	14.9	14.4	+1.4
Average miles per hour	13.8	15.7	15.7	16.0	15.4	15.5	15.2	15.9	15.7	15.1	-1.3

Characteristics with changes that are statistically significantly different between 1990 and 2012 are shaded.
Characteristics with changes that are statistically significant different between 2009 and 2012 are bolded.

[5] Travel Diary Study participants are asked to record the estimated distance in miles or blocks of every trip they make. Thus, trip distance is not measured objectively, but is determined by the respondents' self report. See *Appendix E. Study Methodology* for a note on the adjustments made to these figures.

Trip Characteristics of the Work Commute

The travel characteristics of work commute trips are displayed in Figure 20. Figure 21 makes comparisons to the national commute. The average work commute of Boulder residents was 6.0 miles in 2012, while the average work commute duration was about 18 minutes. As with all trips, the work trips made by Boulder residents were shorter in length and duration than observed nationally. However, while the distance of the work commute has increased at a slighter faster pace for Boulder residents than for the nation as a whole, the duration of the commute has increased at a slower rate.

Figure 20: Summary Work Commute Trip Characteristics, All Travel Modes, 1990-2012

	Year										Change
Summary Travel Characteristics	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**	**1990-2012**
Average estimated trip length in miles	6.0	6.1	5.5	6.2	5.7	6.2	5.3	6.2	5.9	5.2	+0.8
Average estimated trip time in minutes	17.7	17.1	17.1	16.7	16.3	12.1	13.7	20.4	16.7	15.1	+2.6
Average miles per hour	17.1	18.3	17.8	18.6	17.9	18.6	18.1	18.9	19.6	18.4	-1.3

Characteristics with changes that are statistically significantly different between 1990 and 2012 are shaded.
Characteristics with changes that are statistically significant different between 2009 and 2012 are bolded.

Figure 21: Summary Work Commute Trip Characteristics, Boulder Compared to the U.S. , 1990-2012

	Boulder			U.S.		
Summary Travel Characteristics	**2012**	**1990**	**Annual Percent Change**	**2009**	**1990**	**Annual Percent Change**
Average estimated trip length in miles	6.0	5.2	0.70%	11.79	10.65	0.56%
Average estimated trip time in minutes	17.7	15.1	0.78%	23.85	19.60	1.14%

A household travel survey that accompanied the diary asked respondents to identify where they worked if they were employed. In all years, about eight in ten employed respondents work in Boulder.

Figure 22: Location of Respondent's Workplace, 1990-2012

	Percent of Respondents									
Location of Workplace	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990**
Boulder	80.6%	76.7%	73.2%	77.4%	62.9%	78.7%	81.7%	80.4%	81.5%	83.1%
Denver	6.3%	6.2%	6.3%	6.2%	5.4%	8.7%	8.3%	8.3%	1.0%	8.3%
Longmont	2.3%	3.4%	4.8%	3.8%	1.8%	2.5%	1.9%	1.8%	2.2%	1.2%
Broomfield	4.1%	2.5%	3.9%	2.4%	2.2%	1.3%	2.5%	2.3%	3.3%	1.3%
Louisville	0.8%	2.5%	3.0%	2.3%	2.0%	3.3%	2.2%	2.2%	0.5%	1.8%
Lafayette	0.8%	1.8%	1.6%	1.0%	1.0%	0.6%	0.6%	1.7%	2.1%	0.7%
Other location	5.1%	6.7%	7.1%	6.8%	24.6%	4.8%	2.9%	3.2%	9.5%	3.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Employed Respondents	*710*	*787*	*897*	*911*	*1,182*	*839*	*895*	*942*	*973*	*1,109*

Automobile Trip Characteristics

Figure 23 and Figure 24 summarize the trip characteristics for automobile trips. The proportion of respondents making at least one SOV trip on their assigned travel day has decreased from 65% in 1990 to 50% in 2012; the proportion making at least one MOV trip decreased from 48% in 1990 to 32% in 2012. On average, participants in the 2012 study made 1.7 SOV trips per day; those who made at least one SOV trip made 3.3 trips on average. The average number of carpool trips per respondent in 2012 was about 1. The average trip distance was about 5 miles for SOV trips and about 6 miles for MOV trips. The average trip duration in minutes was about 16 minutes for SOV trips, and about 18 minutes for MOV trips.

Figure 23: Summary Trip Characteristics, SOV Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of SOV trips per day per person	1.65	1.80	2.03	2.00	2.36	2.28	2.41	2.37	2.34	2.49
Percent of people making at least one SOV trip	**49.5%**	**53.6%**	56.8%	56.6%	62.8%	59.5%	60.2%	63.0%	60.0%	64.6%
Average number of SOV trips per day per person who made at least one SOV trip	3.34	3.36	3.57	3.52	3.76	3.83	4.00	3.77	3.90	3.85
Average estimated trip length in miles	5.3	6.1	5.2	5.7	5.0	5.1	5.1	5.2	5.2	4.6
Average estimated trip time in minutes	15.8	16.3	14.6	13.3	11.5	9.6	12.6	11.4	13.7	12.9
Average miles per hour of SOV trips	19.5	21.1	20.3	21.0	19.7	20.0	19.4	20.5	20.2	19.3

Characteristics with changes that are statistically significantly different between 1990 and 2012 are shaded.
Characteristics with changes that are statistically significant different between 2009 and 2012 are bolded.

Figure 24: Summary Trip Characteristics, MOV Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of MOV trips per day per person	0.94	1.14	1.40	1.26	1.38	1.44	1.52	1.49	1.44	1.52
Percent of people making at least one MOV trip	**32.4%**	**38.6%**	43.3%	40.6%	43.1%	43.7%	46.9%	47.1%	44.2%	47.5%
Average number of MOV trips per day per person who made at least one MOV trip	2.90	2.95	3.23	3.10	3.20	3.30	3.23	3.16	3.26	3.19
Average estimated trip length in miles	6.0	7.5	6.2	8.6	6.4	6.1	7.5	6.8	6.6	5.8
Average estimated trip time in minutes	18.1	17.6	16.4	18.4	14.5	9.8	13.4	12.3	17.1	16.0
Average miles per hour of MOV trips	19.6	21.0	20.9	21.4	20.1	19.9	19.9	20.3	19.2	18.5

Characteristics with changes that are statistically significantly different between 1990 and 2012 are shaded.
Characteristics with changes that are statistically significant different between 2009 and 2012 are bolded.

Vehicle Miles Traveled per Capita

An estimate was created of per capita vehicle miles traveled (VMT) per adult Boulder Valley resident. This estimate includes miles traveled in a single-occupancy vehicle and in a multiple occupancy vehicle. (This means that some of the MOV miles are "double-counted" because the miles traveled are being assigned to all those in the vehicle.)

Figure 25: Vehicle Miles Traveled per Capita, 1990-2012

Calculating per capita VMT	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of SOV trips per day per person	1.65	1.80	2.03	2.00	2.36	2.28	2.41	2.37	2.34	2.49
Average estimated SOV trip length in miles	5.3	6.1	5.2	5.7	5.0	5.1	5.1	5.2	5.2	4.6
Estimated SOV VMT per capita per day (average number of trips x average trip length)	8.75	10.98	10.56	11.40	11.80	11.63	12.29	12.32	12.17	11.45
Average number of MOV trips per day per person	0.94	1.14	1.40	1.26	1.38	1.44	1.52	1.49	1.44	1.52
Average estimated MOV trip length in miles	6.0	7.5	6.2	8.6	6.4	6.1	7.5	6.8	6.6	5.8
Estimated MOV VMT per capita per day (average number of trips x average trip length)	5.64	8.55	8.68	10.84	8.83	8.78	11.40	10.13	9.50	8.82
TOTAL VMT per capita per day (SOV VMT + MOV VMT)	14.39	19.53	19.24	22.24	20.63	20.41	23.69	22.46	21.67	20.27
TOTAL annual VMT per capita per day (assumes 48 weeks a year)	4,833	6,562	6,463	7,471	6,932	6,858	7,960	7,545	7,282	6,811

Vehicle Occupancy

The average number of people in an automobile has not changed significantly from 1990 to 2012 (see Figure 26). The average vehicle occupancy for all automobile trips was about 1.5 persons; for MOV trips the average vehicle occupancy was about 2.4 persons. Just over 60% of all automobile trips were made with only one person in the vehicle.

Figure 26: Vehicle Occupancy, 1990-2012

	Percent of Total Auto Trips									
Number of Occupants	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
1	64.1%	60.6%	58.9%	61.3%	62.8%	60.9%	60.9%	60.8%	61.3%	61.5%
2	27.4%	26.8%	29.3%	28.4%	26.5%	27.3%	27.9%	28.0%	27.2%	26.6%
3	5.7%	7.5%	6.8%	6.7%	6.5%	6.7%	7.0%	7.3%	6.5%	7.7%
4	2.1%	4.1%	3.6%	2.2%	3.1%	3.8%	3.5%	2.9%	3.6%	2.9%
5 or more	0.7%	1.0%	1.3%	1.4%	1.1%	1.3%	0.7%	1.0%	1.4%	1.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Vehicle Occupancy for all Automobiles	1.48	1.58	1.60	1.55	1.55	1.58	1.56	1.56	1.57	1.56
Average Vehicle Occupancy for Autos with at Least Two Passengers	2.34	2.48	2.46	2.41	2.47	2.47	2.42	2.43	2.47	2.46
Number of Trips	*2,640*	*3,573*	*4,212*	*4,722*	*4,589*	*4,067*	*4,375*	*4,524*	*4,564*	*5,310*

Vehicle Ownership and Availability

Households can be classified according to their ratio of number of vehicles to eligible drivers. If the ratio is 1:1 or greater, this household can be considered to have "high vehicle availability".[6] Persons in households with high vehicle availability tend to drive alone more often.

Vehicle availability and ownership for all study years are shown in Figure 27. The average number of bicycles per household is also displayed in the table. Vehicle availability has declined slightly since 1990, when the average was 1.0 vehicles for every household member age 16 and over to 0.9 vehicles per household member aged 16 and older. The average number of motorized vehicles per household has also declined somewhat, from 1.83 vehicles per household in 1990 to 1.59 vehicles per household in 2012. Bicycles per household has increased somewhat over the study period, from 1.98 bicycles per household in 1992 (the 1990 household survey did not ask about bicycles) to 2.48 bicycles per household in 2012.

Figure 27: Vehicle Availability, Vehicles per Household and Bicycles per Household, 1990-2012

Vehicle and Bicycle Availability	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average vehicle availability (per person in household 16 or older)	0.89	0.93	0.90	0.89	0.96	0.92	0.89	0.99	0.98	1.00
Average number of motorized vehicles per household	1.59	1.66	1.60	1.69	1.79	1.73	1.63	1.78	1.83	1.83
Average number of bicycles per household	2.48	2.26	2.19	2.21	2.09	2.04	2.00	2.00	1.98	*not asked*

[6] Puget Sound Council of Governments: "Household Travel Surveys, 1985-1988 Puget Sound Region"; June 1990.

Transit Trip Characteristics

The characteristics of trips made on the assigned travel day via transit are shown in Figure 28. The proportion of people who made at least one trip on the bus increased from about 5% in 1990 to about 11% in 2012. The average bus trip was about 6 miles, a decrease since 1990, primarily since 1996. This may be due to the increasing number of Community Transit Network routes (such as the SKIP, HOP and JUMP), which tend to serve shorter trips within town.

Figure 28: Summary Trip Characteristics, Transit Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of bus trips per day per person	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1
Percent of people making at least one bus trip	11.0%	12.5%	9.2%	11.2%	11.5%	10.3%	8.6%	7.7%	6.0%	4.8%
Average number of bus trips per day per person who made at least one bus trip	2.0	2.1	2.3	2.1	2.2	2.4	2.0	2.2	2.1	1.9
Average estimated trip length in miles	5.5	7.9	6.2	6.3	6.6	7.2	9.7	10.1	13.2	10.4
Average estimated trip time in minutes	22.1	23.8	21.1	20.9	16.6	18.1	18.4	28.3	29.7	29.7
Average miles per hour of transit trips	13.5	17.0	15.6	15.3	14.9	17.1	17.9	18.1	24.5	18.9

Eco-Pass Status

In previous implementations of the travel diary, study participants were asked whether they had an Eco-Pass, and what kind they held. In 2009, participants were first asked if they were eligible to have an Eco-Pass. Over half in 2009 and 2012 (see Figure 29) said they were eligible for an Eco-Pass. However, 16% of those eligible for a pass in 2009 and nearly 20% in 2012 had not picked up their pass (see Figure 30).

Figure 29: Eco-Pass Eligibility, 2009-2012

Are you eligible to have an Eco-Pass, an annual pass that allows you unlimited bus rides? (Please check all that apply.)*	2012	2009
yes, through my employer	20.2%	17.6%
yes, through my neighborhood	11.4%	12.0%
yes, a CU Boulder student Buff One pass	20.2%	18.0%
yes, CU Boulder faculty/staff Buff One pass	5.2%	7.1%
yes, other pass	1.6%	1.7%
no, I am not eligible for an Eco-Pass	46.1%	47.6%
Number of Respondents	*1,084*	*1,157*

** Percents may add to more than 100% as respondents could give more than one answer.*

Figure 30: Eco-Pass Pick-up Status, 2009-2012

Did you pick up a pass (or passes)?**	2012	2009
Yes	80.5%	84.4%
No	19.5%	15.6%
Total	100.0%	100.0%
Number of Respondents	*560*	*577*

*** Only asked of those eligible for an Eco-Pass.*

To compare Eco-Pass possession over time, those who were eligible for an Eco-Pass and reported that they had picked one up were considered to have an Eco-Pass. As shown in Figure 31, about 44% of study participants in 2009 and in 2012 held some kind of an Eco-Pass, and increase compared to previous years. In 2012, about 18% of respondents had an Eco-Pass through their employer (including the University of Colorado faculty/staff BuffOne pass). About 7% held an Eco-Pass through their neighborhood.

Figure 31: Eco-Pass Status, 1998-2012

Do you have an Eco-Pass?	2012†	2009†	2006	2003	2000	1998
no	56.3%	55.9%	61.9%	53.9%	60.7%	61.0%
yes, through employer	13.1%	12.4%	12.3%	12.6%	11.2%	10.2%
yes, through neighborhood	7.0%	8.4%	4.7%	2.6%	3.9%	3.5%
yes, a CU Boulder student BuffOne Pass	17.6%	15.3%	15.9%	23.2%	20.4%	21.2%
yes, a CU Boulder faculty/staff BuffOne pass	4.7%	6.5%	3.7%	4.6%	2.9%	4.2%
yes, other pass	1.4%	1.4%	1.4%	3.1%	0.9%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	*1,044*	*1,157*	*1,154*	*1,278*	*1,191*	*1,035*

† This percent is an estimate, based on respondent's Eco-Pass eligibility and pick-up status. Since the question asked in 1998 through 2006 was changed in 2009, results may not be directly comparable.

Beginning in 2009, survey participants with an Eco-Pass were asked how often, on average, they used their Eco-Pass. About 8 in 10 of those with an Eco-Pass use it at least once a month.

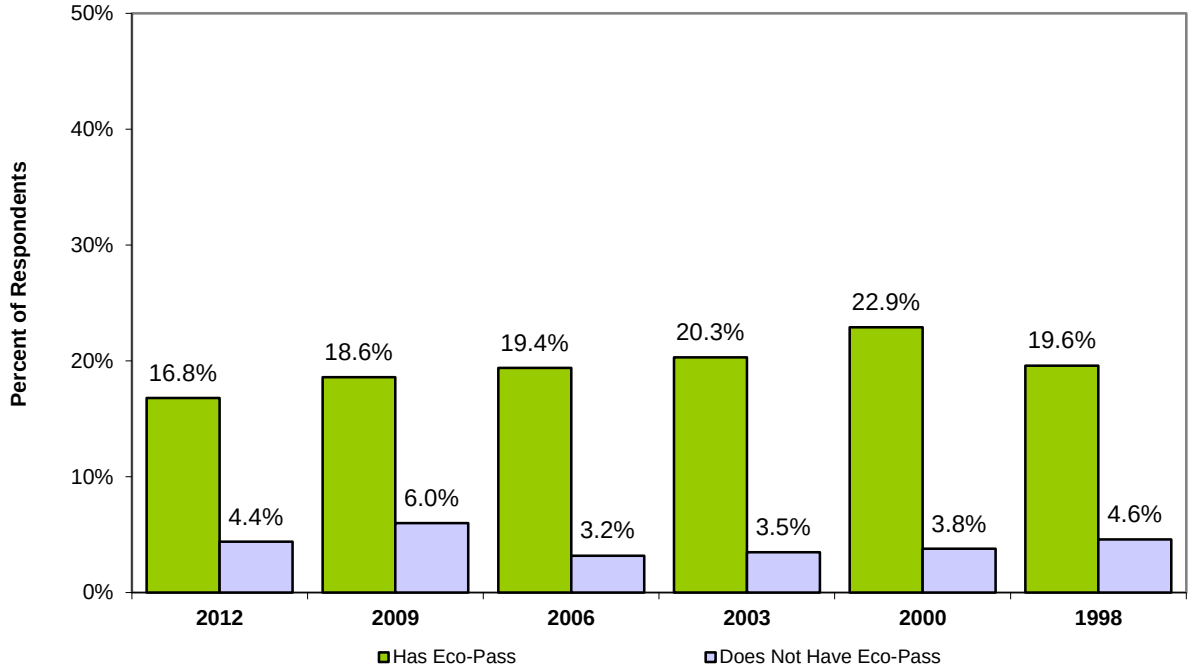
Figure 32: Use of the Eco-Pass, 2009-2012

About how often, on average, do you use your Eco-Pass?**	2012	2009
More than once a week	32.6%	41.3%
About once a week	11.9%	15.5%
About once every two weeks	15.3%	10.4%
About once a month	18.1%	10.8%
Less often than once a month	22.1%	21.9%
Total	100.0%	100.0%
Number of Respondents	*445*	*485*

*** Only asked of who have an Eco-Pass.*

Bus ridership has been positively associated with having an Eco-Pass. Since 1998, between 3% and 6% of non-Eco-Pass holders made at least one bus trip compared to 17% to 23% of Eco-Pass holders (Figure 33).

Figure 33: Bus Ridership by Eco-Pass Status: Percent of Respondents Who Made at Least One Trip on the Bus



School Bus Trips

Very few study participants (less than 1%) made trips on school buses. In 2009, the few trips made were rather lengthy, about 24 miles in distance, and about 49 minutes in duration (see Figure 34). However, in 2012, the school bus trips observed were more similar to those seen in 2006 and earlier.

Figure 34: Summary Trip Characteristics, School Bus Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of school bus trips per day per person	0.03	0.01	0.01	0.02	0.04	0.04	0.03	0.03	0.04	0.03
Percent of people making at least one school bus trip	0.9%	0.6%	0.6%	0.8%	1.1%	1.1%	1.5%	0.8%	1.1%	1.3%
Average number of school bus trips per day per person who made at least one school bus trip	3.14	1.19	1.93	1.97	3.50	3.46	1.99	3.13	3.27	2.55
Average estimated school bus trip length in miles	2.9	23.5	4.2	3.6	2.8	3.5	1.5	2.1	3.3	1.7
Average estimated school bus trip time in minutes	15.4	48.6	19.4	16.6	13.5	9.5	12.4	9.8	11.3	11.3
Average miles per hour of school bus trips	13.8	23.7	12.3	13.5	12.7	22.1	7.9	14.8	17.8	11.3

Non-Vehicle Trip Characteristics: Walking and Biking

In all study years about a third of respondents made at least one walking trip on their assigned travel day (see Figure 35). Walking trips have tended to be quite short in distance; the average trip length was 0.7 miles. The proportion of respondents making one or more trips by bicycle on their assigned travel day increased from 15% in 1990 to 25% in 2012 (see Figure 36). In 2012, the average distance of a bike trip was about 2 miles and took about 15 minutes to complete.

Figure 35: Summary Trip Characteristics, Pedestrian Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of pedestrian trips per day per person	0.92	0.86	0.99	0.98	1.15	1.21	1.21	1.11	0.97	1.04
Percent of people making at least one pedestrian trip	30.8%	33.0%	34.6%	34.8%	36.9%	39.1%	39.9%	36.9%	34.8%	33.0%
Average number of pedestrian trips per day per person who made at least one pedestrian trip	2.99	2.62	2.85	2.81	3.11	3.09	3.04	3.00	2.78	3.16
Average estimated pedestrian trip length in miles	0.7	0.7	0.9	0.9	0.7	0.8	0.7	0.7	0.7	0.7
Average estimated pedestrian trip time in minutes	13.2	14.9	17.3	13.6	14.8	15.3	15.1	15.1	13.6	14.4
Average miles per hour of pedestrian trips	3.7	3.2	3.6	3.9	2.8	3.5	3.3	3.6	3.4	3.3

Figure 36: Summary Trip Characteristics, Bicycle Trips, 1990-2012

Summary Travel Characteristics	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of bicycle trips per day per person	0.84	0.72	0.70	0.70	0.55	0.45	0.52	0.65	0.66	0.50
Percent of people making at least one bicycle trip	25.2%	23.9%	20.4%	23.2%	17.1%	15.0%	16.6%	19.8%	20.9%	15.2%
Average number of bicycle trips per day per person who made at least one bike trip	3.31	3.01	3.44	3.02	3.24	3.00	3.16	3.28	3.14	3.28
Average estimated bicycle trip length in miles	1.9	2.5	2.2	2.8	2.0	2.4	2.2	2.3	2.0	2.1
Average estimated bicycle trip time in minutes	14.6	18.3	16.3	16.9	15.4	13.6	14.3	9.5	14.1	15.1
Average miles per hour	7.8	8.1	8.1	8.8	8.2	8.7	8.4	8.4	7.7	8.2

Biking for Work, Errands and Recreation

Beginning in 2000, respondents have been asked about their bicycle use for work and for recreation. People surveyed were asked how many times each week, if at all, they biked to work. Additionally, they were asked the number of times per week they used a bike for recreational trips. In 2009, the question was changed to ask about three types of trips: commuting, shopping/meals/errands and fun or exercise. In 2009 and 2012, over 40% of respondents said they had ridden a bicycle for fun or exercise at least once in the previous week, while just under 40% had ridden a bicycle at least once to shop, get a meal or run an errand, and about a third had ridden a bicycle at least once for the work commute.

Figure 37: Use of Bicycle in Previous Week for Shopping/Errands, Fun/Exercise and Commuting, 2009-2012

In the last week, about how frequently have you ridden a bicycle:	to shop, get a meal or run errands		for commuting		for fun or exercise	
	2012	2009	2012	2009	2012	2009
5 or more times	8.9%	8.3%	19.0%	17.3%	2.6%	4.3%
3 to 4 times	10.9%	9.5%	7.8%	9.7%	11.5%	13.3%
Once or twice	17.4%	21.0%	9.9%	9.3%	27.0%	23.6%
Not at all	62.9%	61.2%	63.3%	63.7%	59.0%	58.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	*1,047*	*1,120*	*1,047*	*1,120*	*1,047*	*1,120*

Figure 38: Bicycle Trips for Work and Recreation, 2000-2012

Number of Times a Bicycle was used	Bicycle trips for work (commuting)					Bicycle trips for recreation /fun or exercise/shop/meals/errands				
	2012	2009	2006	2003	2000	2012	2009	2006	2003	2000
5 or more times per week	19.0%	17.3%	16.0%	18.5%	14.1%	10.5%	10.0%	6.9%	6.1%	6.7%
4 times per week or less	17.7%	19.0%	24.7%	22.1%	21.0%	43.5%	43.3%	53.6%	48.5%	50.4%
Not at all	63.3%	63.7%	59.3%	59.4%	64.9%	45.9%	46.7%	39.5%	45.5%	42.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	*1,047*	*1,121*	*1,154*	*1,269*	*1,180*	*1,047*	*1,121*	*1,154*	*1,269*	*1,180*

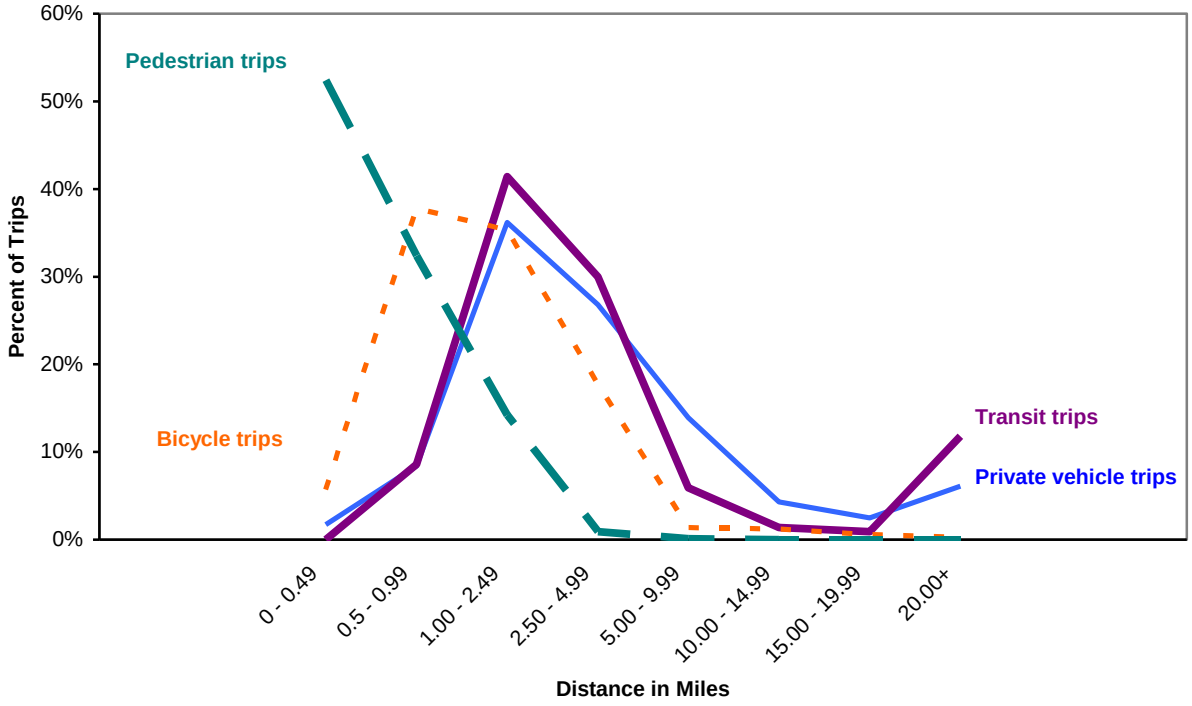
Figure 39: Bicycle Trips in Previous Week or Month, 2000-2012

Ever use a bike to shop/run errands, fun/exercise, or commuting in the last week (2009) or month (2000-2006)?	2012	2009	2006	2003	2000
Yes	58.0%	58.2%	65.0%	61.7%	61.9%
No	42.0%	41.8%	35.0%	38.3%	38.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	*1,047*	*1,121*	*1,154*	*1,269*	*1,180*

Trip Distance

In Figure 40, trip distances are exhibited by mode of travel. For motorized vehicle trips, private and transit, distances tend to be either of middle distance, between one and two-and-a-half miles, or over a longer length (20 or more miles). These "peaks" are even more evident for bus trips than for drive alone or carpool trips. Bike and walk trips, on the other hand, tend to be much shorter, especially for walking trips.

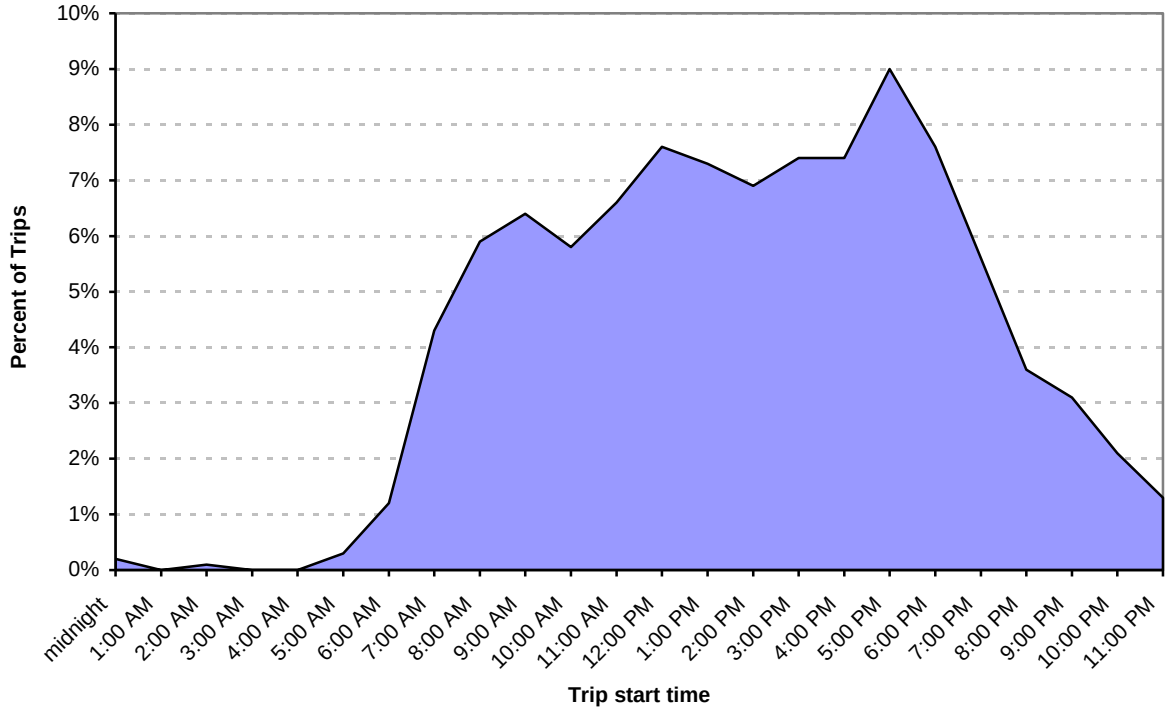
Figure 40: Trip Distance by Mode of Travel, 2012



Trip Start Times

Trip start and end times were recorded by respondents as they kept track of their travel throughout their assigned travel day. The graph in Figure 41 shows when travel activity took place. Most travel occurred between 6:00 am and 8:00 pm, with a large spike during the afternoon commute time (about 4:00 pm to 6:00 pm), and smaller peaks for the morning commute time and the noontime lunch hour.

Figure 41: Time When Trip Began, 2012



Deliveries to the Home or Office

Beginning in 1998, study participants were asked about certain behaviors which might replace trips. They were asked whether they had any goods or services delivered to their work or home and whether they had telecommuted on their assigned travel day (see page 13 for information on telecommuting).

About 8% of respondents in 1998 had received at least one delivery on their assigned travel day, and about 6% received a delivery in 2012 (see Figure 42). Fewer respondents who had received a delivery in 2012 felt that the delivery took the place of a drive alone a trip compared to previous years (see (Figure 43).

Figure 42: Deliveries Received by Respondents, 1998-2012

Percent of Respondents Who Received Any Deliveries On Their Assigned Travel Day	2012	2009	2006	2003	2000	1998
No, did not receive deliveries	93.7%	94.9%	93.6%	93.8%	94.6%	92.1%
Yes, received deliveries	6.3%	5.1%	6.4%	6.2%	5.4%	7.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of respondents	*1,036*	*1,107*	*1,130*	*1,262*	*1,150*	*1,008*

Figure 43: Did Deliveries Replace Any Drive Alone Trips, 2000-2012

Did the delivery substitute for a travel trip you might have made to seek the good or service?**	2012	2009	2006	2003	2000
Yes	36.4%	46.3%	41.8%	43.7%	44.2%
No	63.6%	53.7%	58.2%	56.3%	55.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number of respondents	*67*	*54*	*72*	*81*	*97*

***Question only asked of those who had received deliveries.*

Purpose of Travel

In addition to recording information about the time of day and mode of transportation used for each trip, respondents were also asked to document the purpose of each trip they made. Figure 44 (below) and Figure 45 (on the next page) show the reasons for travel by trips made and by miles traveled, respectively. Patterns of trip purpose were fairly similar over the entire study period. Aside from the "go home" trips (about a third of all trips and miles) and work-related trips (14% of trips and 19% of miles in 2012), recreational trips account for one of the largest proportion of trip purposes; 13% of trips and 15% of miles in 2012. Shopping accounted for about 11% of trips and 8% of miles.

Figure 44: Purpose of Trips, 1990-2012

Trip Purpose		2012	2009		2006		2003		2000		1998		1996	1994	1992	1990
Go Home		34.7%	33.7%		33.1%		33.3%		33.7%		32.0%		31.6%	32.8%	32.3%	33.6%
Work	Work Commute	9.2%	8.6%		8.5%		9.2%		9.0%		8.8%					
		13.8%		13.9%		13.9%		13.2%		13.1%		13.1%	15.5%	14.4%	14.1%	15.1%
	Other Work/ Business	4.6%	5.3%		5.4%		4.0%		4.1%		4.3%					
Social/Recreation		13.4%	16.2%		14.8%		16.2%		12.9%		14.4%		13.9%	13.5%	12.6%	12.3%
Shopping		11.1%	10.3%		11.5%		10.8%		11.0%		10.2%		11.3%	10.6%	11.7%	11.0%
Personal Business		6.3%	6.5%		8.6%		8.1%		8.7%		9.5%		10.1%	9.4%	11.1%	11.9%
School		6.3%	4.6%		3.8%		5.5%		5.5%		6.0%		4.6%	5.4%	6.5%	5.6%
Eat a Meal		7.1%	6.3%		5.4%		5.0%		5.3%		5.9%		6.1%	3.5%	5.4%	4.6%
Drive a Passenger		4.8%	3.9%		4.7%		4.5%		5.0%		4.7%		4.3%	4.4%	3.8%	4.0%
Change Travel Mode		2.5%	4.2%		3.5%		3.1%		4.8%		4.2%		2.7%	5.4%	2.0%	1.7%
Other		0.0%	0.4%		0.7%		0.2%		0.0%		0.1%		0.0%	0.5%	0.6%	0.1%
Total		100.0%	100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	100.0%	100.0%	100.0%
Number of trips		*4,830*	*5,496*		*6,076*		*6,373*		*6,773*		*5,981*		*6,446*	*6,711*	*6,672*	*7,350*

Figure 45: Purpose of Trips Miles, 1990-2012

Trip Purpose		2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Go Home		35.4%	34.3%	35.5%	30.3%	32.5%	31.7%	32.1%	32.7%	33.8%	34.3%
Work	Work Commute	14.9%	10.7%	11.1%	11.0%	11.8%	10.5%	16.6%	19.2%	18.1%	18.1%
		18.6%	15.6%	15.6%	15.6%	18.3%	18.1%				
	Other Work/ Business	3.7%	4.9%	4.5%	3.8%	7.3%	7.6%				
Social/Recreation		15.0%	21.4%	15.2%	25.8%	16.4%	18.3%	18.6%	17.9%	18.1%	16.8%
Shopping		8.4%	6.9%	8.5%	7.0%	8.7%	6.6%	7.0%	5.7%	7.3%	7.8%
Personal Business		5.7%	6.3%	7.6%	7.5%	6.9%	7.5%	10.2%	7.9%	8.4%	11.1%
School		3.4%	1.6%	2.6%	2.8%	1.8%	2.8%	1.6%	2.4%	3.1%	2.5%
Eat a Meal		4.0%	3.1%	4.2%	2.8%	3.4%	3.3%	3.6%	5.9%	3.4%	2.7%
Drive a Passenger		6.6%	5.4%	5.5%	4.7%	5.6%	5.8%	6.2%	4.8%	3.8%	3.8%
Change Travel Mode		2.7%	5.0%	4.2%	3.4%	6.4%	5.9%	4.2%	3.1%	3.4%	3.0%
Other		0.0%	0.4%	1.1%	0.1%	0.0%	0.1%	0.0%	0.4%	0.5%	0.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of miles		*18,251*	*26,983*	*25,742*	*31,195*	*28,657*	*25,538*	*30,033*	*30,282*	*29,710*	*29,587*

Trip purpose by travel mode is exhibited in Figure 46, while Figure 47, which is similar to Figure 46, displays the modal split of trips by the trip purpose. The types of trips most likely to have been made by driving alone in 2012 were work-related trips and shopping trips. The trips most likely to be made by transit were "change travel mode," school and work. The work commute and school commute were a popular choice for bicycle trips.

Figure 46: Purpose of Trips by Travel Mode, 2012

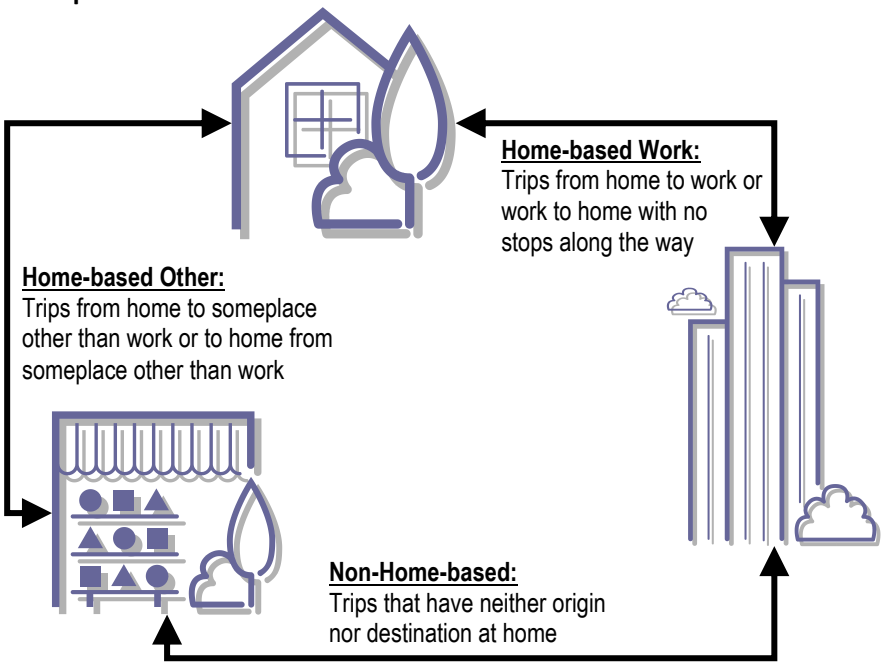
	Percent of Trips by Travel Mode				
Trip Purpose	**Single-Occupancy Vehicle**	**Multiple-Occupancy Vehicle**	**Transit**	**Bicycle**	**Foot**
go home	35.4%	35.3%	31.4%	38.8%	30.1%
personal business	10.0%	5.8%	4.2%	3.9%	3.1%
shopping	14.0%	16.2%	1.3%	8.4%	6.0%
school	1.1%	.7%	14.8%	10.2%	14.0%
work or work commute	12.7%	3.2%	19.5%	12.2%	4.2%
other work/business	5.5%	2.7%	2.5%	4.3%	5.3%
social/recreation	11.4%	14.2%	4.2%	14.1%	18.1%
change travel mode	1.2%	0.1%	16.1%	1.0%	5.2%
drive a passenger	4.3%	13.2%	0.4%	1.9%	1.4%
eat a meal	4.4%	8.6%	5.5%	5.2%	12.7%
other	0.1%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number of trips	*1,733*	*946*	*236*	*902*	*980*

Figure 47: Modal Split of All Trips by Trip Purpose, 2012

	Percent of Trips by Trip Purpose									
Modal Split of All Trips	**go home**	**personal business**	**shopping**	**School**	**work or work commute**	**other work/business**	**social/ recreation**	**change travel mode**	**drive a passenger**	**eat a meal**
SOV	36.6%	57.1%	45.4%	6.2%	49.2%	43.4%	30.6%	16.7%	32.0%	22.5%
MOV with adults	13.1%	10.9%	23.7%	2.0%	6.0%	10.9%	15.5%	.8%	20.3%	19.0%
MOV with children	6.8%	7.3%	5.0%	0.3%	0.7%	0.9%	5.1%	0.0%	33.8%	4.7%
Transit	4.4%	3.3%	0.6%	11.5%	10.3%	2.7%	1.6%	31.7%	0.4%	3.8%
School Bus	0.6%	0.0%	0.0%	4.9%	0.0%	0.9%	0.0%	0.8%	0.0%	0.0%
Bicycle	20.9%	11.6%	14.2%	30.2%	24.6%	17.6%	19.7%	7.5%	7.4%	13.7%
Foot	17.6%	9.9%	11.0%	44.9%	9.2%	23.5%	27.5%	42.5%	6.1%	36.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	1,676	*303*	*535*	*305*	*447*	*221*	*644*	*120*	*231*	*342*

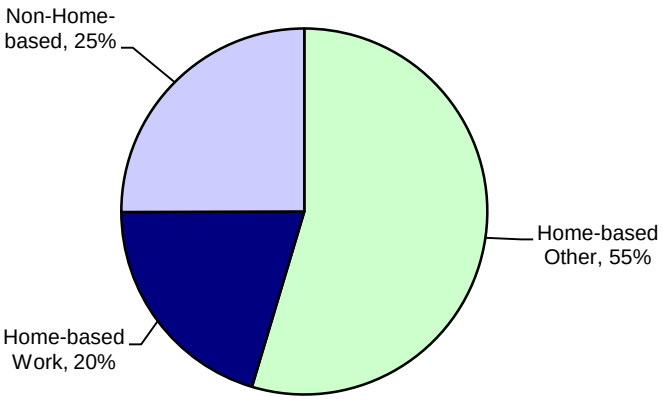
Traditional transportation planning has often focused on origins and destinations of trips, particularly those based at home or work, to study trends regarding trip purpose. Thus trips have often been classified in more aggregated categories of purpose depicting "home-based work" trips, "home-based other" trips and "non-home" trips. The following figure with definitions describes the classification scheme.[7]

Figure 48: Types of Trips



Boulder residents' trips were categorized using this model. The proportion of trips made with origins and destinations of "home work", "home other" and "non-home" was similar for all study years. A majority of trips were made between respondents' homes and a destination other than work. One quarter of trips neither began nor ended at home. About 20% of trips were direct travel between work and home.

Figure 49: Types of Trips Made, 2012



[7] This coding scheme was taken from the Puget Sound Council of Governments Travel Study, 1985. Some small alterations were made to the scheme.

The typology of trips by travel mode used is presented in Figure 50, while Figure 51 shows the modal split of all trips by the trip type category. Among all modes, home-other trips were the most common, except for the transit trips, which were often non-home based (probably due to the use of another mode to get to or from the bus). Home-work trips were the type most likely to have been made via SOV, while alternate mode use was a bit higher for home-other and non-home trips.

Figure 50: Type of Trips by Mode of Trip, 2012

	Percent of Trips by Travel Mode				
Trip Type	**Single-Occupancy Vehicle**	**Multiple-Occupancy Vehicle**	**Transit**	**Bicycle**	**Foot**
Home-based Other	55.0%	68.8%	42.8%	58.1%	59.9%
Home-based Work	16.9%	3.1%	19.9%	20.8%	3.9%
Non-home Based	28.1%	28.1%	37.3%	21.1%	36.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number of trips	*1,726*	*946*	*236*	*902*	*980*

Figure 51: Modal Split of All Trips by Type of Trip, 2012

	Percent of Trips by Type of Trip		
Modal Split of All Trips	**Home-based Other**	**Home-based Work**	**Non-home Based**
SOV	33.4%	49.2%	35.0%
MOV with adults	15.3%	4.2%	13.8%
MOV with children	7.6%	0.5%	5.4%
Transit	3.6%	7.9%	6.3%
School Bus	0.9%	0.0%	0.1%
Bicycle	18.5%	31.7%	13.7%
Foot	20.7%	6.4%	25.6%
Total	100.0%	100.0%	100.0%
Number of trips	*2,838*	*593*	*1,386*

Appendix A. National Travel Data

This appendix contains data from other sources about travel behavior in the nation as whole, to which the travel behavior of Boulder Valley residents can be compared. The data sources included are the National Household Transportation Survey and the U.S. Census.

The 2009 National Household Transportation Survey (NHTS, formerly the National Personal Transportation Study (NPTS)), commissioned by the U.S. Department of Transportation, is a study of the travel patterns of the nation as a whole using a diary methodology similar to the one used in this research project.

The NHTS was conducted previously in 2001, and the NPTS in 1995, 1990, 1983, 1977 and 1969. Comparisons are made in this report between the 1990 NPTS and the 2009 NHTS to the Boulder Travel Diary Study of 1990 and 2009 so that the time periods between the national study and the Boulder study overlap. This way, comparisons can be made between temporal trends and point-in-time observations, to understand how Boulder's travel patterns may differ from those seen nationally.

In general, Boulder Valley residents made somewhat more trips per day compared to the U.S. population. The average trip distance of Boulder Valley residents was about half of that observed among residents in the nation as a whole. Work commute distances and durations of Boulder residents were somewhat lesser than that of U.S. residents. The number of personal vehicles per household decreased among Boulder residents from 1.83 in 1990 to 1.66 in 2009, while it increased slightly among U.S. residents.

Figure 52: Household and Travel Characteristics, Boulder Compared to the U.S.

	Boulder				U.S.			
Characteristic	2009	2000	1996	1990	NHTS 2009	NHTS 2001	NPTS 1995	NPTS 1990
Average number of trips	5.1	6.1	6.2	5.9	3.79	3.74	4.30	3.76
Average trip distance, all trips	5.0	4.3	4.7	4.0	9.75	10.04	9.13	9.47
Average work-related trip distance	6.1	5.7	5.3	5.2	11.79	12.11	11.63	10.65
Average work-related trip duration	17.1	16.3	13.7	15.1	23.85	23.32	20.65	19.60
Personal vehicles per household	1.66	1.79	1.63	1.83	1.86	1.89	1.78	1.77

Over the period of 1990 to 2009, the proportion of trips made by Boulder Valley residents in a private vehicle have decreased from 70.5% to 60.8%, an average annual decrease of 0.51%. In the U.S. as a whole, the decline was from 87.7% in 1990 to 83.4% in 2009, an average annual decrease of 0.23%.

Figure 53: Modal Split of All Trips, Boulder Compared to the U.S.

	Boulder				NHTS/NPTS	
Travel Mode	**2009**		**1990**		**2009**	**1990**
SOV	37.1%	60.8%	44.2%	70.5%	83.4%	87.7%
MOV	23.7%		26.3%			
Public Transportation/Transit	5.4%		1.6%		1.9%	1.8%
Walk	17.9%		18.2%		10.4%	7.2%
School Bus	0.1%	16.0%	0.6%	9.9%	4.2%	3.3%
Bike	15.9%		9.1%			
Total	100.0%		100.0%		100.0%	100.0%

The proportion of miles traveled by private vehicle was similar in Boulder and the nation in 1990, about 88% (see Figure 54). From 1990 to 2009, however, the proportion of miles traveled by Boulder residents dropped to 82%, a 6% shift away from private vehicles, while it remained unchanged among U.S. residents. Miles traveled by public transit was somewhat higher among Boulder residents in 1990 and 2009 compared to national residents, and increased slightly in Boulder over the time period, while remaining relatively stable in the nation.

Figure 54: Modal Split of All Miles, Boulder Compared to the U.S.

	Boulder				NHTS/NPTS	
Travel Mode	**2009**		**1990**		**2009**	**1990**
SOV	46.1%	82.0%	50.0%	87.7%	88.4%	88.4%
MOV	35.9%		37.7%			
Public Transportation/Transit	6.9%		4.1%		1.5%	2.1%
Walk	2.5%	11.1%	3.0%	8.1%	10.2%	9.5%
School Bus	0.5%		0.2%			
Bike	8.1%		4.9%			
Total	100.0%		100.0%		100.0%	100.0%

In examining the proportion of work commute trips made by personal vehicle, a decrease from 76.5% in 1990 to 55.9% in 2009 was observed among Boulder Valley residents, representing an average annual decrease of 1.08%. However, in the U.S., from 1990 to 2009, a small increase in the proportion of work commute trips made by personal vehicle was observed.

Figure 55: Modal Split of Work Commute Trips, Boulder Compared to the U.S.

	Boulder				NHTS/NPTS*	
Travel Mode	**2009**		**1990**		**2009**	**1990**
SOV	47.4%	55.9%	66.6%	76.5%	89.4%	87.8%
MOV	8.5%		9.9%			
Public Transportation/Transit	9.7%		4.0%		5.1%	5.3%
Walk	11.1%		8.9%		2.8%	4.0%
Bike/Other	23.3%		10.6%		2.7%	2.9%
Total	100.0%		100.0%		100.0%	100.0%

** This represents usual commute mode, not mode used on travel day.*

Likewise, in examining the number of miles traveled for the work commute, an average annual decrease of 0.74% was observed among Boulder Valley residents from 1990 to 2009, while the proportion of miles traveled for the work commute by personal vehicle remained steady from in the same time frame among the U.S. as a whole.

Figure 56: Modal Split of Work Commute Miles, Boulder Compared to the U.S.

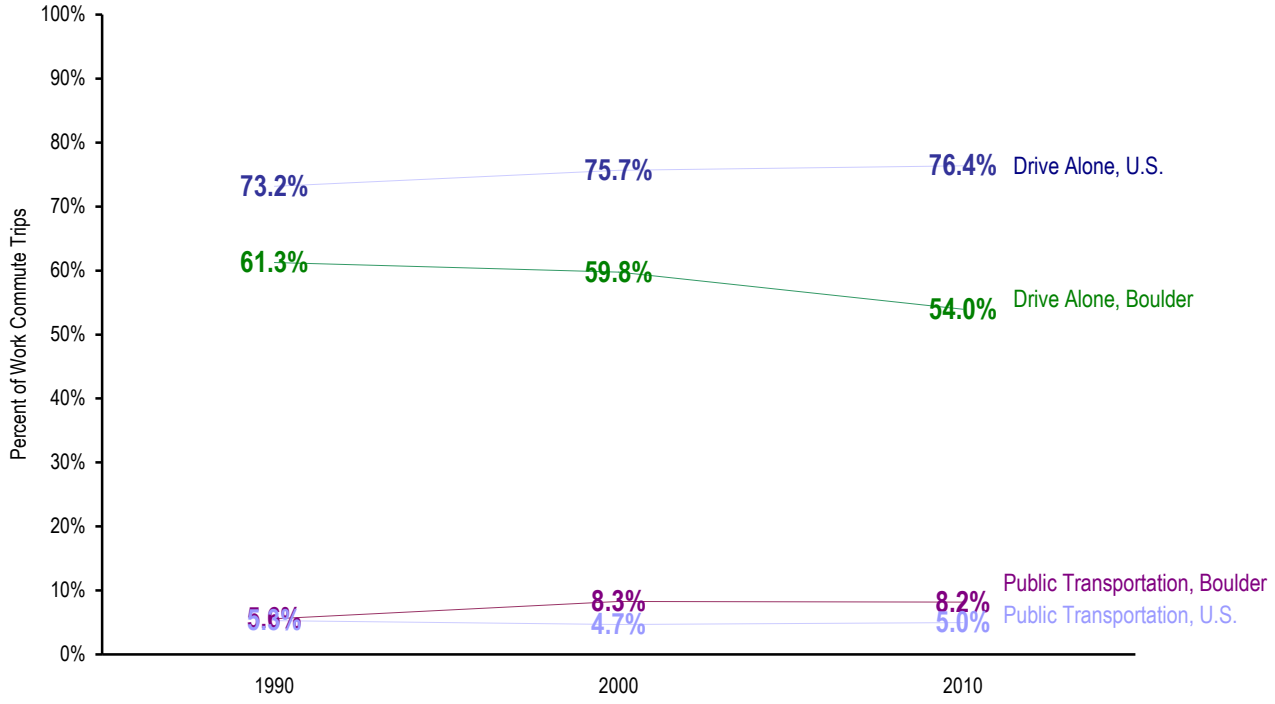
	Boulder				NHTS/NPTS	
Travel Mode	**2009**		**1990**		**2009**	**1990**
SOV	59.7%	68.8%	71.9%	82.8%	94.9%	94.5%
MOV	9.1%		10.9%			
Public Transportation/Transit	19.5%		11.2%		4.2%	2.6%
Walk	1.1%	11.7%	1.3%	6.0%	0.9%	2.9%
Bike	10.6%		4.7%			
Total	100.0%		100.0%		100.0%	100.0%

The 1990, 2000 and 2010 Census report modal split estimates for the "Journey to Work". The data are derived by asking residents about their usual mode of travel to work. As one might expect, Boulder residents used SOVs far less and alternate modes more frequently for the work commute when compared to the rest of the nation. Additionally, while a slight increase was seen in the proportion of work commutes made by driving alone in the U.S. as a whole, in Boulder a decrease was observed (see Figure 58). An increase was also observed in the proportion of work commutes in Boulder made by public transportation, bicycling, walking and working at home.

Figure 57: Census Journey to Work Data, Boulder Compared to the U.S., 1990-2010

	Percent of People Using Mode						Difference Between Boulder and U.S.
	Boulder			U.S.			
Travel Mode	**2010**	**2000**	**1990**	**2010**	**2000**	**1990**	**2010**
Drive alone	54.0%	59.8%	61.3%	76.4%	75.7%	73.2%	-22.4%
Carpool	6.3%	8.7%	9.5%	9.7%	12.2%	13.4%	-3.4%
Public transportation (bus, trolley, subway, etc.)	8.2%	8.3%	5.6%	5.0%	4.7%	5.3%	+3.2%
Worked at home	11.8%			4.3%			+7.5%
Walked	9.0%	15.5%	15.8%	2.8%	6.2%	6.9%	+6.2%
Bicycle	9.6%			0.6%			+9.0%
Other means (motorcycle, etc.)	1.1%	7.6%	7.8%	1.2%	1.2%	1.3%	-0.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Figure 58: Census Journey to Work: Boulder Compared to the U.S., 1990-2010/2012



Appendix B. Modal Split by Trip and Respondent Characteristics

This section contains breakdowns of modal split of all trips, and modal split of work commute trips by respondent characteristics. It also displays the percent of respondents making at least one trip by each mode on the assigned travel day by respondent characteristics. Figure 59 below displays the proportions of survey participants in each of the categories displayed on the following pages. Where differences between subgroups are statistically significant, they are highlighted in grey.

Figure 59: Respondent Characteristics

Survey Respondent Characteristic		Percent of Respondents
Sex	Male	52%
	Female	48%
Age	16-34	51%
	35-54	26%
	55+	23%
CU Student Status	Not a Student	78%
	Student at CU-Boulder	22%
Tenure	Owner-Occupied	49%
	Renter-Occupied	51%
Type of Housing Unit	Attached housing unit	58%
	Single family, detached	42%
Children in Household	No	84%
	Yes	16%
Vehicles to Driver Ratio	Less than one car per driver	33%
	One or more cars per driver	67%
Any bikes in household?	Yes, at least one bike	84%
	No bikes	16%
Eco-Pass Status	No, do not have an Eco-Pass	45%
	Yes, have an Eco-Pass	55%
Day of Week	Weekday	73%
	Weekend	27%

Figure 60: Modal Split of All Trips by Respondent Characteristics, part 1

	Sex of Respondent		Age of Respondent			CU Student?	
Modal Split of All Trips	**male**	**female**	**16-34**	**35-54**	**55+**	**CU student**	**NOT a student**
Single-Occupancy Vehicle	29.2%	41.9%	26.8%	40.8%	55.5%	40.8%	19.6%
Multiple-Occupancy Vehicle with Adults Only	13.5%	13.4%	13.2%	9.8%	20.2%	14.9%	9.3%
Multiple-Occupancy Vehicle with Children	4.4%	8.2%	2.4%	16.7%	1.9%	8.2%	.3%
Bus (Transit), including School Bus	5.9%	5.3%	6.5%	5.0%	3.5%	4.0%	10.4%
Bicycle	25.6%	12.4%	25.7%	14.1%	5.3%	16.6%	26.6%
Foot	21.5%	18.7%	25.3%	13.6%	13.6%	15.5%	33.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=2360	*N=2264*	*N=2601*	*N=1262*	*N=778*	*N=3473*	*N=1168*

Figure 61: Modal Split of All Trips by Respondent Characteristics, part 2

	Have Children?		Tenure Status		Type of Housing Unit	
Modal Split of All Trips	**No children**	**Have children**	**Owner-Occupied**	**Renter-Occupied**	**Attached (Multi-Family Housing)**	**Detached (Single-Family)**
Single-Occupancy Vehicle	43.9%	31.9%	36.6%	41.3%	43.9%	31.9%
Multiple-Occupancy Vehicle with Adults Only	15.3%	13.0%	13.8%	14.8%	15.3%	13.0%
Multiple-Occupancy Vehicle with Children	11.3%	2.8%	2.6%	13.2%	11.3%	2.8%
Bus (Transit), including School Bus	3.4%	7.2%	5.6%	2.8%	3.4%	7.2%
Bicycle	13.2%	21.5%	21.1%	13.7%	13.2%	21.5%
Foot	12.9%	23.6%	20.2%	14.3%	12.9%	23.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=1972	*N=2356*	*N=2523*	*N=1682*	*N=1972*	*N=2356*

Figure 62: Modal Split of All Trips by Respondent Characteristics, part 3

	Ratio of Autos to Drivers		HH own any bikes?	
Modal Split of All Trips	**Less than 1 vehicle per driver**	**1 or more vehicles per driver**	**Yes**	**No**
Single-Occupancy Vehicle	18.5%	45.6%	34.6%	41.6%
Multiple-Occupancy Vehicle with Adults Only	14.6%	12.8%	13.5%	13.9%
Multiple-Occupancy Vehicle with Children	4.1%	7.6%	7.0%	1.2%
Bus (Transit), including School Bus	10.5%	2.5%	4.6%	12.4%
Bicycle	27.2%	14.4%	21.9%	.0%
Foot	25.1%	17.2%	18.4%	30.9%
Total	100.0%	100.0%	100.0%	100.0%
	N=1670	*N=2860*	*N=4008*	*N=601*

Figure 63: Modal Split of All Trips by Respondent Characteristics, part 4

	Have an Eco-Pass?		Day of the Week	
Modal Split of All Trips	**No, don't have**	**Yes, have Eco-Pass**	**weekend**	**weekday**
Single-Occupancy Vehicle	47.9%	26.5%	33.5%	35.8%
Multiple-Occupancy Vehicle with Adults Only	12.7%	14.0%	25.2%	10.1%
Multiple-Occupancy Vehicle with Children	10.4%	3.3%	6.2%	5.8%
Bus (Transit), including School Bus	2.1%	8.1%	1.6%	6.8%
Bicycle	14.7%	22.3%	17.9%	19.1%
Foot	12.1%	25.8%	15.6%	22.4%
Total	100.0%	100.0%	100.0%	100.0%
	N=1928	*N=2713*	*N=1087*	*N=3485*

Figure 64: Modal Split of Work Commute Trips by Respondent Characteristics, part 1

	Sex of Respondent		Age of Respondent			CU Student?	
Modal Split of Work Commute Trips	**male**	**female**	**16-34**	**35-54**	**55+**	**CU student**	**NOT a student**
Single-Occupancy Vehicle	43.1%	54.4%	39.5%	53.7%	70.1%	50.0%	29.3%
Multiple-Occupancy Vehicle with Adults Only	3.1%	5.4%	4.5%	3.7%	3.1%	3.8%	6.0%
Multiple-Occupancy Vehicle with Children	1.4%	1.7%	.3%	3.7%	.9%	1.7%	.0%
Bus (Transit), including School Bus	10.9%	9.6%	9.6%	12.8%	7.7%	9.9%	14.3%
Bicycle	32.5%	19.0%	33.8%	21.1%	10.5%	26.5%	29.4%
Foot	9.1%	10.0%	12.3%	5.0%	7.8%	8.1%	21.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=427	*N=308*	*N=409*	*N=235*	*N=91*	*N=658*	*N=77*

Figure 65: Modal Split of Work Commute Trips by Respondent Characteristics, part 2

	Have Children?		Tenure Status		Type of Housing Unit	
Modal Split of Work Commute Trips	**No children**	**Have children**	**Owner-Occupied**	**Renter-Occupied**	**Attached (Multi-Family Housing)**	**Detached (Single-Family)**
Single-Occupancy Vehicle	51.0%	45.6%	45.4%	53.3%	51.0%	45.6%
Multiple-Occupancy Vehicle with Adults Only	3.5%	4.5%	4.8%	2.7%	3.5%	4.5%
Multiple-Occupancy Vehicle with Children	3.1%	.1%	.7%	3.0%	3.1%	.1%
Bus (Transit), including School Bus	10.0%	10.8%	11.4%	8.6%	10.0%	10.8%
Bicycle	25.8%	26.9%	27.5%	24.2%	25.8%	26.9%
Foot	6.7%	12.0%	10.3%	8.0%	6.7%	12.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=343	*N=388*	*N=479*	*N=251*	*N=343*	*N=388*

Figure 66: Modal Split of Work Commute Trips by Respondent Characteristics, part 3

	Ratio of Autos to Drivers		HH own any bikes?	
Modal Split of Work Commute Trips	**Less than 1 vehicle per driver**	**1 or more vehicles per driver**	**Yes**	**No**
Single-Occupancy Vehicle	24.4%	57.4%	45.2%	69.7%
Multiple-Occupancy Vehicle with Adults Only	4.3%	4.0%	4.2%	2.3%
Multiple-Occupancy Vehicle with Children	.9%	1.8%	1.6%	.6%
Bus (Transit), including School Bus	25.0%	3.7%	9.8%	15.6%
Bicycle	32.8%	24.9%	29.9%	.0%
Foot	12.7%	8.3%	9.1%	11.8%
Total	100.0%	100.0%	100.0%	100.0%
	N=205	*N=523*	*N=658*	*N=74*

Figure 67: Modal Split of Work Commute Trips by Respondent Characteristics, part 4

	Have an Eco-Pass?		Day of the Week	
Modal Split of Work Commute Trips	**No, don't have**	**Yes, have Eco-Pass**	**weekend**	**weekday**
Single-Occupancy Vehicle	66.5%	35.2%	60.5%	46.9%
Multiple-Occupancy Vehicle with Adults Only	4.6%	3.6%	5.2%	4.2%
Multiple-Occupancy Vehicle with Children	1.9%	1.2%	.0%	1.6%
Bus (Transit), including School Bus	3.8%	14.8%	1.3%	10.6%
Bicycle	20.4%	31.2%	29.7%	26.7%
Foot	2.8%	13.9%	3.1%	10.1%
Total	100.0%	100.0%	100.0%	100.0%
	N=297	*N=438*	*N=55*	*N=672*

Figure 68: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 1

	Sex of Respondent		Age of Respondent			CU Student?	
Travel Mode	**male**	**female**	**16-34**	**35-54**	**55+**	**CU student**	**NOT a student**
Single-Occupancy Vehicle	44.0%	54.6%	41.7%	60.6%	52.9%	54.5%	30.3%
Multiple-Occupancy Vehicle with Adults Only	25.8%	29.2%	28.1%	29.0%	24.8%	28.4%	24.6%
Multiple-Occupancy Vehicle with Children	7.7%	14.0%	6.4%	26.3%	2.6%	13.0%	2.6%
Bus (Transit), including School Bus	12.0%	11.6%	14.6%	11.5%	5.8%	8.8%	22.1%
Bicycle	34.5%	16.8%	36.4%	23.0%	6.2%	23.1%	36.2%
Foot	30.0%	31.6%	38.7%	27.4%	17.4%	25.9%	48.5%
Number	*N=544*	*N=506*	*N=538*	*N=272*	*N=243*	*N=820*	*N=233*

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 69: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 2

	Have Children?		Tenure Status		Type of Housing Unit	
Travel Mode	**No children**	**Have children**	**Population in Owner-Occupied Home**	**Population in Renter-Occupied Home**	**Attached (Multi-Family Housing)**	**Detached (Single-Family)**
Single-Occupancy Vehicle	49.5%	61.3%	55.6%	46.8%	49.1%	57.3%
Multiple-Occupancy Vehicle with Adults Only	27.3%	31.9%	29.2%	26.6%	26.0%	30.7%
Multiple-Occupancy Vehicle with Children	2.3%	56.2%	16.7%	5.4%	5.0%	19.8%
Bus (Transit), including School Bus	11.7%	10.1%	7.7%	15.5%	13.1%	6.9%
Bicycle	24.9%	27.1%	18.7%	30.2%	29.0%	19.5%
Foot	29.9%	27.7%	21.1%	37.8%	32.7%	24.0%
Number	*N=828*	*N=160*	*N=486*	*N=511*	*N=563*	*N=406*

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 70: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 3

	Ratio of Autos to Drivers		HH own any bikes?	
Travel Mode	**Less than 1 vehicle per driver**	**1 or more vehicles per driver**	**Yes**	**No**
Single-Occupancy Vehicle	29.6%	59.9%	50.8%	42.6%
Multiple-Occupancy Vehicle with Adults Only	28.2%	27.4%	28.8%	22.7%
Multiple-Occupancy Vehicle with Children	8.1%	11.8%	12.6%	1.8%
Bus (Transit), including School Bus	24.0%	5.6%	10.8%	17.2%
Bicycle	38.3%	20.3%	31.0%	0.0%
Foot	41.0%	26.5%	30.5%	32.0%
Number	*N=334*	*N=681*	*N=872*	*N=169*

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 71: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 4

	Have an Eco-Pass?		Day of the Week	
Travel Mode	**No, don't have**	**Yes, have Eco-Pass**	**weekend**	**weekday**
Single-Occupancy Vehicle	58.5%	41.3%	45.4%	54.0%
Multiple-Occupancy Vehicle with Adults Only	27.3%	27.7%	40.4%	24.4%
Multiple-Occupancy Vehicle with Children	15.1%	7.0%	10.1%	10.7%
Bus (Transit), including School Bus	4.6%	17.7%	3.6%	15.4%
Bicycle	17.5%	32.9%	24.4%	28.0%
Foot	21.0%	38.9%	25.9%	35.5%
Number	*N=478*	*N=578*	*N=271*	*N=714*

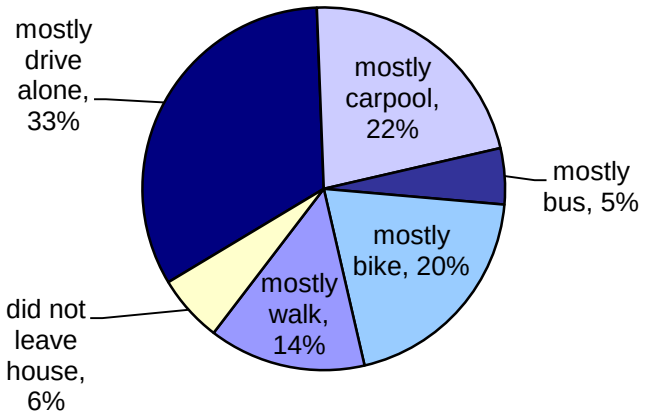
Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Appendix C. Transportation Market Segmentation

In order to better understand the types of "markets" in respect to Boulder residents' transportation mode choices, the 2012 travel diary dataset was analyzed using an analysis technique referred to as cluster analysis or market segmentation. This analysis sorts respondents into the "clusters," that is, groups in which respondents' responses are most similar to other respondents within the same group and different from respondents' responses in other groups. A brief description of the analysis procedure can be found in *Appendix E. Study Methodology*. For this analysis, the variables used were the percent of trips made on the Travel Diary day by each of five modes: drive alone (single-occupancy vehicle), carpool (multiple-occupancy vehicle), bus (transit and school bus), bicycle and walk. Five groups emerged, with the preponderance of trips being made by each of the five modes in each of the five groups. A sixth group was formed of those study participants who had not left the house on their assigned travel day. These six groups were:

- The "*mostly drive alone*" group represented the largest proportion of the population with 33% of respondents. This group made 89% of their trips on the assigned travel day by driving alone. This group had the highest proportion of households with one or more vehicles per driver, and the highest proportion of members who were employed full-time. Employed members were more likely to work outside Boulder compared to other groups.
- The "*mostly carpool*" segment, representing 22% of the population made 55% of their trips on the assigned travel day by carpooling. This group had the highest proportion of households that included children. They also had a high proportion living in owner-occupied housing and had the highest proportion of households with annual incomes of $100,000 or more (49%).

Figure 72: Percent of Respondents in Each Transportation Segment



- The "*mostly bus*" group, which was quite small, representing only 5% of the population, made 71% of their trips via transit. A high proportion of them had an Eco-Pass, and they were the most likely to have used their Eco-Pass in the last week (73%). This group, along with the "mostly walk" group, had the highest proportion of CU students, and the lowest median annual household income.
- The "*mostly bike*" sector comprised 20% of the population. This group made the large majority of their trips (79%) by bike. This group was also the most likely to have ridden a bicycle in the previous week to commute, to shop or run errands, or for fun or exercise. This group had the highest proportion of male members (71%), and the lowest proportion of members age 55 or more.
- The "*mostly walk*" group represented 14% of the population. They made 76% of their trips by walking. They were among the youngest group (61% were age 16-34), and had a high proportion of CU students (45%).
- Six percent of respondents "*did not leave the house*" on their assigned travel day. This group was the least likely to be employed. Among those who were employed, a significantly larger proportion said they telecommuted to work every day compared to the other group, and 33% had telecommuted on their assigned travel day. This group was the most likely to have received any goods or services by delivery on the day of the survey. This group had the highest proportion of members age 55 or more (68%).

Key Characteristics of the Transportation Segments

The key characteristics of the six transportation segments are shown in the table below. Detailed tables showing selected survey results by transportation segment are presented on the pages following.

Figure 73: Key Characteristics of the Transportation Segments

Transportation Segment	Percent of Population	Average Percent of Trips Made Via Each Mode	Other Characteristics
mostly drive alone	33%	SOV, 89% MOV, 5% Bus, 0% Bike, 1% Foot, 4%	• This group had the highest proportion of households with one or more vehicles per driver (85%). • This group had among the highest proportion of female members (57%). • This group had the second highest proportion of households with annual incomes of $100,000 or more (33%). • This group was the most likely to be employed full-time (61%). • Those employed were more likely to work outside Boulder (25%).
mostly carpool	22%	SOV, 16% MOV, 70% Bus, 3% Bike, 4% Foot, 7%	• This group had the highest proportion of households that included children (33%). • This group had a higher proportion of persons living in owner-occupied housing (55%). • This group had the highest proportion of households with annual incomes of $100,000 or more (49%).
mostly bus	5%	SOV, 7% MOV, 2% Bus, 71% Bike, 4% Foot, 16%	• This group had a high proportion of members with an Eco-Pass (78%). • This group was the most likely to have used their Eco-Pass in the last week (73%). • This group had the highest proportion of members whose households had less than one vehicle per drive (79%). • This group had among the highest proportion of CU students (45%), along with the "mostly walk" group. • This group had the lowest median annual household income ($30,000 to $39,999)
mostly bike	20%	SOV, 5% MOV, 4% Bus, 1% Bike, 79% Foot, 11%	• This group had the highest proportion of households that owned a bicycle (100%). • This group was the most likely to have ridden a bicycle in the last week for commuting (88%), for shopping/errands (88%), or for fun or exercise (68%). • This group had the highest proportion of male members (71%). • This group had the lowest proportion of members aged 55+ (4%).
mostly walk	14%	SOV, 11% MOV, 5% Bus, 5% Bike, 4% Foot, 76%	• This group had among the highest proportion of members with an Eco-Pass (75%). • This group was among the youngest; 61% were age 16-34. • This group had among the highest proportion of CU students (45%), along with the "mostly bus" group. • This group had among the lowest median annual household income, with 38% having incomes less than $30,000.
did not leave house	6%	No trips made	• This group was the least likely to be employed (75% were not employed). • Among those who were employed, 36% said they telecommuted every day for work, and 33% had telecommuted on their assigned travel day. • This group was the most likely to have received any goods or services by delivery on the day of the survey (10%). • This group had the highest proportion of members aged 55+ (68%). • This group was more likely than other groups to own their residence and to live in a detached single-family home.

Figure 74: Percent of Trips Made on Assigned Travel Day by Transportation Segment

Percent of Trips Made by:	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
SOV	89%	16%	7%	5%	11%	0%	35%
MOV	5%	70%	2%	4%	5%	0%	19%
Bus	0%	3%	71%	1%	5%	0%	6%
Bike	1%	4%	4%	79%	4%	0%	18%
Foot	4%	7%	16%	11%	76%	0%	17%

Figure 75: Frequency of Bike Use for Shopping, Meals and Errands by Transportation Segment

How frequently in last week ridden a bicycle to shop, get a meal or run errands?	mostly drive alone	mostly carpool	mostly bus	mostly bike	Mostly walk	did not leave house	OVERALL
5 or more times	3%	4%	4%	30%	6%	2%	9%
3 to 4 times	3%	8%	2%	36%	6%	2%	11%
Once or twice	15%	20%	15%	22%	23%	2%	18%
Not at all	79%	69%	79%	12%	65%	94%	62%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 76: Frequency of Bike Use for Commuting by Transportation Segment

How frequently in last week ridden a bicycle for commuting?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
5 or more times	5%	12%	6%	65%	10%	6%	20%
3 to 4 times	2%	6%	6%	18%	11%	4%	8%
Once or twice	10%	15%	10%	6%	12%	2%	10%
Not at all	83%	67%	79%	12%	66%	88%	62%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 77: Frequency of Bike Use for Fun or Exercise by Transportation Segment

How frequently in last week ridden a bicycle for fun or exercise?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
5 or more times	1%	1%	0%	7%	4%	0%	3%
3 to 4 times	8%	9%	6%	24%	9%	10%	12%
Once or twice	28%	29%	10%	38%	23%	8%	28%
Not at all	63%	61%	85%	32%	64%	82%	58%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 78: Employment Status by Transportation Segment

Are you employed?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	21%	34%	28%	21%	26%	75%	28%
Yes, part-time	18%	19%	21%	23%	31%	8%	21%
Yes, full-time	61%	47%	51%	56%	44%	18%	52%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 79: City of Employment by Transportation Segment

City where respondent works	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Boulder	75%	82%	87%	87%	88%	86%	82%
Other	25%	18%	13%	13%	12%	14%	18%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 80: Frequency of Telecommuting by Transportation Segment

How often, if ever, do you telecommute for work?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Every work day (I always work from my home)	12%	12%	22%	10%	13%	36%	13%
3 to 4 times per week	3%	8%	0%	2%	1%	7%	3%
2 to 3 times per week	3%	6%	0%	6%	6%	14%	5%
Once or twice a month	7%	7%	14%	16%	6%	0%	9%
Occasionally	20%	28%	16%	19%	26%	0%	21%
Never	55%	39%	49%	48%	49%	43%	49%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 81: Telecommuting Status on Assigned Travel Day by Transportation Segment

Telecommuted on the day of the survey?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	90%	89%	78%	91%	93%	67%	89%
Yes	10%	11%	22%	9%	7%	33%	11%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 82: Receipt of Goods or Services via Delivery by Transportation Segment

Receive any goods or services by delivery?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	92%	94%	94%	95%	95%	90%	94%
Yes	8%	6%	6%	5%	5%	10%	6%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 83: Substitution of Travel by Deliveries by Transportation Segment

Did deliveries substitute for travel?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	68%	36%	100%	90%	71%	60%	66%
Yes	32%	64%	0%	10%	29%	40%	34%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 84: Eco-Pass Status by Transportation Segment

Eco-Pass status	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No, don't have an Eco-Pass	71%	58%	22%	32%	25%	71%	51%
Yes, have an Eco-Pass	29%	42%	78%	68%	75%	29%	49%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 85: Frequency of Use of Eco-Pass by Transportation Segment

Number of times use Eco-pass	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
more than once a week	24%	33%	73%	23%	34%	23%	32%
about once a week	2%	18%	18%	11%	14%	15%	12%
about once every two weeks	16%	9%	3%	20%	23%	0%	16%
about once a month	23%	17%	8%	25%	12%	0%	18%
less than once a month	34%	23%	0%	21%	16%	62%	22%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 86: Ratio of Autos to Drivers by Transportation Segment

Ratio of Autos to Drivers	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Less than 1 vehicle per driver	15%	32%	79%	50%	42%	19%	33%
1 or more vehicles per driver	85%	68%	21%	50%	58%	81%	67%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 87: Household Bicycle Ownership by Transportation Segment

Household own any bicycles?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Yes	83%	87%	69%	100%	76%	53%	84%
No	17%	13%	31%	0%	24%	47%	16%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 88: Sex of Respondent by Transportation Segment

Sex of Respondent	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Male	43%	48%	54%	71%	55%	45%	52%
Female	57%	52%	46%	29%	45%	55%	48%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 89: Age of Respondent by Transportation Segment

Age of Respondent	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
16-34	39%	46%	60%	78%	69%	15%	53%
35-54	31%	35%	27%	18%	18%	17%	26%
55+	30%	19%	13%	4%	14%	68%	21%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 90: CU Student Status by Transportation Segment

CU Student Status	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
NOT a student	90%	88%	55%	65%	55%	88%	77%
CU student	10%	12%	45%	35%	45%	12%	23%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 91: Housing Tenure by Transportation Segment

Tenure	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Rent	45%	45%	71%	65%	67%	30%	52%
Own	55%	55%	29%	35%	33%	70%	48%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 92: Type of Housing Unit by Transportation Segment

Type of Housing Unit	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Attached (Multi-Family)	57%	47%	76%	71%	69%	41%	59%
Detached (Single-Family)	43%	53%	24%	29%	31%	59%	41%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 93: Annual Household Income by Transportation Segment

Annual Household Income	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Less than $10,000	5%	9%	11%	20%	22%	7%	12%
$10,000 to $19,999	3%	2%	17%	7%	9%	5%	5%
$20,000 to $29,999	6%	9%	11%	4%	7%	12%	7%
$30,000 to $39,999	6%	4%	17%	12%	3%	7%	7%
$40,000 to $49,999	10%	10%	2%	8%	5%	5%	8%
$50,000 to $74,999	19%	10%	21%	18%	20%	12%	17%
$75,000 to $99,999	18%	17%	2%	10%	7%	33%	14%
$100,00 to $149,999	15%	22%	4%	13%	15%	10%	15%
$150,000 or more	18%	17%	15%	9%	12%	10%	15%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 94: Presence of Children in Household by Transportation Segment

Presence of Children in Household?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No children	87%	67%	84%	88%	91%	96%	83%
Have children	13%	33%	16%	12%	9%	4%	17%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 95: Day of Assigned Travel by Transportation Segment

Day of the Week	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Weekend	24%	40%	4%	25%	25%	35%	27%
Weekday	76%	60%	96%	75%	75%	65%	73%
Total	100%	100%	100%	100%	100%	100%	100%

Appendix D. References

- Howard Needles Tammen and Bergendoff: "Transportation Master Plan for the Boulder Valley"; October 1989.
- Charlier Associates, Inc.: "Transportation Master Plan Update for the Boulder Valley"; July 1996.
- City of Boulder, LSA Associates, Inc: "Transportation Master Plan 2003", September 2003.
- City of Boulder, LSA Associates, Inc: "Transportation Master Plan 2008", September 2008.
- Miller MA, Miller TI: "The 1990 Diary Study of Boulder Valley"; January 1991.
- Miller MA, Miller TI. "Modal Shift in the Boulder: 1990 to 1992"; January 1993.
- Miller MA: "Modal Shift in the Boulder Valley: 1990 to 1994"; February 1995.
- Caldwell EM: "Modal Shift in the Boulder Valley: 1990 to 1996"; March 1997.
- Caldwell EM: "Modal Shift in the Boulder Valley: 1990 to 1998"; February 1999.
- Parker D, Baron D: "Modal Shift in the Boulder Valley: 1990 to 2000"; February 2001.
- Caldwell EM: "Modal Shift in the Boulder Valley: 1990 to 2003"; 2004.
- Caldwell EM, Paula M: "Modal Shift in the Boulder Valley: 1990 to 2006"; July 2007.
- Puget Sound Council of Governments: "Household Travel Surveys, 1985-1988 Puget Sound Region"; June 1990.
- S(T)F3 Data, 2000 and 1990 U.S. Census of Population and Housing, U.S. Census Bureau.
- 2010 American Community Survey, U.S. Census Bureau.
- U.S. Department of Transportation, Federal Highway Administration: "Summary of Travel Trends, 2009 National Household Travel Survey, FHWA-PL-11-022, Washington, DC; 2011.

Appendix E. Study Methodology

The 2012 travel diary study used similar materials to that used in the previous implementations of the study (1990, 1992, 1994, 1996, 1998, 2000, 2003, 2006 and 2009).

Study Design

The Study Materials

The diary materials (see *Appendix F. Data Collection Materials*) were mailed to potential participants a week in advance, describing the study, explaining the materials and assigning a travel day. The subjects were instructed to call the research staff if they had any questions or problems.[8]

Selecting Survey Recipients

Approximately 7,000 households within the Boulder Valley were invited to participate in the travel study. This number was selected based on the number of people desired to eventually participate, factoring for the probable non-response and drop out rates of households. The goal was to get 1,200 residents to return travel diaries.

An address listing service was contracted to prepare the sample using a database containing all postal customers in the Boulder Valley. Addresses in the database were stratified as needed, and then a systematic sample[9] of households to contact for participation was produced.[10]

An additional 700 students were selected from students in the University of Colorado at Boulder dormitories. According to the University of Colorado's Research and Analysis website, just over 6,600 CU-Boulder students live in the dormitories.[11]

Recruitment

In implementations prior to 2003, selected households were mailed a letter from Boulder's Mayor inviting the adult member of the household who most recently had a birthday[12] to participate in a travel study by keeping track of his or her travel for one day during a week in September. Two weeks later a second letter was sent from the Mayor prompting those who had

[8] In 2000, a small change was made to the study design. The travel diaries were mailed a week in advance, but most arrived the next day to participants' homes. In the past, since these materials are mailed "bulk rate", materials arrived a few days before the study; Audit and Evaluation staff were worried in 2000 that since materials arrived rather far in advance of the actual date respondents were to keep the diary that some would forget. Thus, participants were given reminder calls the night before their assigned travel day. If the respondent was not at home, a message was left on an answering machine or voice mail, if such existed.

[9] Systematic sampling is a procedure where a complete list of all possible items is sorted through, selecting every Nth one until the appropriate amount of items is selected.

[10] In 1990, 1992 and 1994, attached units were over sampled at a rate of 5:3 compared to detached units. This was because attached units typically under respond to surveys. However, on the citizen surveys conducted by the Center, it was noticed that response rates were becoming more similar for the unit types, and so this over sampling was dropped beginning in 1996.

[11] http://www.colorado.edu/pba/records/zip/

[12] Asking the person who most recently had a birthday to participate is a method used to randomly select a person within a household. In this manner, people from varying age groups and household roles participate and provide a more representative sample of an area's population

not responded yet to please do so. Enclosed in both letters was a postcard for the appropriate person to return agreeing to participate and listing his or her name and phone number. The postcards of those agreeing to participate were entered in a database to prepare for the mailing of the diary materials. Each participant was randomly assigned a day of the week to travel. The number of participants assigned to each day was roughly equal.

Beginning in 2003, no invitation was mailed. Instead, residents were mailed a pre-notification postcard informing them they had been randomly selected to participate in the Travel Diary Study. One week after residents received the pre-notification postcard, the full travel study packets were sent to all households selected for the study.

In travel diary study implementations prior to 2006, the dorm students were contacted by phone because they were not in town when diary invitations were mailed to the other residents. However, beginning in 2006, the telephone directory of dormitory students was no longer publicly available. The housing director was contacted in the summer of 2006 and agreed to provide the mailing addresses of dormitory students. However, despite repeated contacts and assurances that such a list would be forthcoming, it was not delivered. Thus, the prior dormitory mailing list was used. Many of these addresses, however, were returned as undeliverable. In 2009 and 2012, a mailing list was provided to research staff.

Also prior to 2003, students in fraternities and sororities were contacted through their house leader, and travel diaries were dropped off and picked up from these students. However, starting in 2003, the Greeks were mailed travel diary packets. Each packet consisted of seven diaries (one for each day of the week), and were mailed to the President of each of the fraternities and sororities. The President was asked to distribute the diaries to randomly selected members of their organization. In 2006, many of these packets were returned as undeliverable, as most of the fraternities are currently not operating on the CU campus. In 2009, the packets were delivered, but very few completed diaries were returned. No attempt was made to contact the Greek houses in 2012.

Response Rates

Figure 96 displays the response rates for the 2012 study. If the undeliverable addresses are eliminated from the sample, about 7,317 households or students in group quarters were contacted to participate in the study. Of these, 1,101 returned a usable travel diary and/or household survey, representing 15% of everyone contacted. Figure 97 (on the next page) displays the response rates obtained in each of the study years. Response rates have been slowly declining over time.

Figure 96: Response Rate for the 2012 Travel Diary Study

Housing Type	Sampled	Returned with Undeliverable Address	Eligible to Participate	Returned a Usable Travel Diary	Response Rate
Households	7,000	376	6,624	1,075	16.23%
CU-Boulder Dormitories	700	7	693	26	3.75%
Total	7,700	383	7,317	1,101	15.05%

Figure 97: Comparison of Response Rates Across Study Years

	Year									
Response Rates	**2012**	**2009**	**2006**	**2003**	**2000**	**1998**	**1996**	**1994**	**1992**	**1990***
Percent agreeing to participate (returning the postcard)	N/A**	N/A**	N/A**	N/A**	30%	27%	29%	30%	32%	36%
Percent of those who agreed to participate who completed a travel diary	N/A**	N/A**	N/A**	N/A**	64%	72%	67%	64%	64%	70%
Percent of entire sample who completed a travel diary	15%	15%	18%	18%	19%	19%	18%	20%	20%	25%

**Note: 1990 response rates are for households only, and do not include the response rates of students in group quarters (dormitories and Greek houses). Response rates among these groups are much lower than among those in households, and thus 1990 response rates are probably inflated compared to the other years.*
***Not applicable starting in 2003.*

Analysis of Results

Cleaning and Coding of Data

Once received, the diaries were prepared for the analysis. Every diary was examined to ensure that it was filled out correctly with accurate trip descriptions. A very common mistake in all study years was to count round trips as one trip rather than two. For ease in keypunch the diary data were transferred to coding sheets, disregarding origin and destination data which would not be used for this report. Three other variables were coded at this time: 1) the type of trip made (HW, HO or NH), 2) if the trip was a "link" in the work commute, and 3) if the trip had both origin and destination outside the Valley boundaries (see *Appendix F. Data Collection Materials*). In 1996, a few changes were made to the survey instruments. It was felt that respondents were not using the "truck" category correctly in previous study years, and quite often trips recorded as having been made in a truck were changed to automobile, because staff believed respondents were using the truck category to record trips made in their sports utility vehicle or pick-up truck. Thus, to reduce the number of this type of error, the categories for "travel method" on the recording form were changed as follows:

1990-1994	**1996-2009**
1 car (driver)	1 car or light truck (driver)
2 car (passenger)	2 car or light truck (passenger)
3 bus (transit)	3 bus (transit)
4 school bus	4 school bus
5 motorcycle	6 motorcycle
6 taxi (passenger)	7 taxi (passenger)
7 truck (driver)	5 large truck
8 truck (passenger)	
9 bicycle	8 bicycle
10 walk only	9 walk only
11 other _____	10 other _____

As in years' past, the instructions explained that the truck category was to be used for large commercial trucks, although more even more explanation was added in 1996 (see *Appendix F. Data Collection Materials* for a copy of all the travel diary materials).

Estimating Trip Length

An important element in travel studies such as this one is the length of the trips. Early in the study's history, elaborate and expensive geocoding schemes were most often used by coding origins and destinations by Census tract or transportation zone and inputting these codes into a complex database which calculates mileage. In the 1990 Diary Study, after researching previous studies and discerning the difficulties and large expense associated with database systems, the research staff devised a geocoding scheme which was more attractive in price as well as accuracy.[13] On the diary document the participants were asked to estimate how many miles each trip had taken them. At baseline (1990), uncertain of how accurate people are at estimating miles traveled, the research staff geocoded a random subset of 400 trips, 300 in motorized vehicles and 50 on bike and foot each. The geocoding was performed with rulers and Boulder Valley maps, where the staff member literally measured the journey by hand. A rule of thumb derived from transportation planning was used to save the effort of deciphering which path the participant made to a various destination: multiplying the distance calculated between locations as the crow flies by 1.5. This formula was believed to work fairly accurately 90% of the time.[14]

The geocoded miles were then correlated with the miles estimated by the participants. The estimates were found to be extremely accurate;[15] on average the people overestimated the trips by only .12 miles or 17% of the trip distance. To correct for this overestimation, data extracted from the regression equation was used to reduce the estimates.[16] The adjusted estimates were used for all analyses using trip length. The same statistical adjustments were made in subsequent years.

Prior to 2000, when trip distance was missing, it was estimated, when possible, by study staff using the same hand geocoding methodology described above. Beginning in 2000, however, the internet-based program "MapQuest" (www.mapquest.com/directions) was used to estimate trip distances, replaced by Google Maps (maps.google.com) in 2009.

Data Entry, Weighting and Analysis

The data from the travel diary coding sheets and household travel surveys were data entered into electronic datasets using a key and verify methodology. This means that the data were entered twice and the two datasets compared. Where there were discrepancies, the results were compared to the hard copy survey and keyed correctly. These plain-text datasets were then imported into SPSS®, a statistical software package, for analysis.

---

[13] When coding origins and destinations into Census tracts or transportation zones, there is an ambiguous amount of error associated with the amount of area a zone encompasses. For example, if one Census tract is 5 square miles, and a bordering tract is 3 square miles, a trip from one zone to the other may range from less than 1 mile to 8 miles. A database would produce the same estimate of miles for both circumstances

[14] Chuck Green, DRCOG

[15] Simple Correlation of 0.9, $p < .001$.

[16] Equation used to adjust motorized vehicles: adjusted miles = (.88 x estimated miles) + .20
Equation used to adjust non-motorized vehicles: adjusted miles = (.86 x estimated miles) + .10

Using the assigned unique identifier, the household travel survey responses were matched with the travel diary information. Two types of datasets were created: a trip-level dataset, where every record in the dataset represented a single trip, and a person-level dataset, where every record in the dataset represented a single person.

Due to the differences in travel behavior by various socioeconomic groups, the participants' responses were statistically weighted. Using the data from the 2010 Census, the results were adjusted to give more weight to the travel of those who were under represented in the sample. Figure 98 below displays the sociodemographic profile of the 2012 study participants using unweighted and weighted data compared to the 2010 Census data for comparison. Rows which are shaded indicate the variables used for the weighting.

Figure 98: Comparison of 2012 Weighted and Unweighted Data to 2010 Census Population Estimates

Characteristic	Population Profile*	Unweighted Data	Weighted Data
Tenure in Housing Unit			
Owner-Occupied	47.7%	65.1%	49.5%
Renter-Occupied	52.3%	34.9%	50.5%
Age			
18-34 years of age	48.7%	22.7%	48.7%
35-54 years of age	28.3%	29.2%	28.3%
55+ years of age	23.0%	48.1%	23.0%
Sex			
Male	51.6%	42.3%	51.6%
Female	48.4%	57.7%	48.4%
CU-Boulder Student Status			
Not a CU Student	81.0%	91.4%	83.9%
CU-Boulder Student (in Boulder)	19.0%	8.6%	16.1%
Population Age 18+ in Housing Units OR CU Boulder Residence Halls			
In Housing Units	92.0%	97.8%	92.0%
In College/University Group Quarters Housing***	8.0%	2.2%	8.0%

** 2010 Census ** Only of the population in housing units *** http://www.colorado.edu/pba/records/zip/*

For the most part, simple descriptive statistics (e.g., averages and frequencies) are reported in the body of the report. Crosstabulations and crossbreak analyses (e.g, chi-square and anova) are shown in *Appendix B. Modal Split by Trip and Respondent Characteristics*. In that appendix, differences between subgroups were considered "statistically significant" if the p-value from the statistical test was less than 0.05; that is, that there was a less than 5% probability that differences observed were due to chance alone.

A market segmentation analysis was performed on the data. The results of this analysis are shown in *Appendix C. Transportation Market Segmentation*. The statistical technique most commonly used to derive segments from survey data is cluster analysis. The analysis itself sorts cases (respondents) into the "clusters," that is, groups in which cases are most similar to other cases within the same group and different from cases in other groups.

For this dataset, the SPSS procedure "K-Means Cluster Analysis" was used. The algorithm employed by this procedure allows larger datasets to be analyzed into "clusters." Clusters are formed by comparing responses to a set of selected variables. The procedure seeks patterns of response that are shared by a number of individuals and that are distinct from other groups of individuals. These groups are the clusters. This procedure uses continuous (numeric) variables. For this analysis, the variables used were the percent of trips made by the respondent on the assigned travel day by each mode: percent of trips made by driving alone, percent of trips made by carpooling, percent of trips made by transit, percent of trips made by bicycling, and percent of trips made by walking.

Appendix F. Data Collection Materials

This appendix contains the instruments and materials used for the data collection of the 2012 Travel Diary Study. Included are:

Pre-notification postcard

Diary packet cover letter to Boulder Valley residents

Travel Diary instructions

Travel Diary card

Travel Diary Overflow sheet

Household Survey

Dear Boulder Valley Resident:

Travel is something we all do and can be frustrating at times. I am inviting a member of your household to be part of a small group of residents who will keep a simple travel log for a single day during the week of September 10, 2012. Basically, the log will show how you get where you're going and how long it takes you to get there. This will help the city better understand existing travel patterns and work to improve your travel experience.

Your household was chosen at random and your participation will be completely confidential. We are only mailing travel logs to a small number of Boulder Valley residents, so your participation is extremely important. The results will be used for transportation planning to improve our community.

Your travel log will arrive the week of September 3rd at which time you'll receive your assigned log day. Many thanks in advance for your help.

Sincerely,

Matthew Appelbaum, Mayor

Dear Boulder Valley Resident:

Travel is something we all do and can be frustrating at times. I am inviting a member of your household to be part of a small group of residents who will keep a simple travel log for a single day during the week of September 10, 2012. Basically, the log will show how you get where you're going and how long it takes you to get there. This will help the city better understand existing travel patterns and work to improve your travel experience.

Your household was chosen at random and your participation will be completely confidential. We are only mailing travel logs to a small number of Boulder Valley residents, so your participation is extremely important. The results will be used for transportation planning to improve our community.

Your travel log will arrive the week of September 3rd at which time you'll receive your assigned log day. Many thanks in advance for your help.

Sincerely,

Matthew Appelbaum, Mayor

Dear Boulder Valley Resident:

Travel is something we all do and can be frustrating at times. I am inviting a member of your household to be part of a small group of residents who will keep a simple travel log for a single day during the week of September 10, 2012. Basically, the log will show how you get where you're going and how long it takes you to get there. This will help the city better understand existing travel patterns and work to improve your travel experience.

Your household was chosen at random and your participation will be completely confidential. We are only mailing travel logs to a small number of Boulder Valley residents, so your participation is extremely important. The results will be used for transportation planning to improve our community.

Your travel log will arrive the week of September 3rd at which time you'll receive your assigned log day. Many thanks in advance for your help.

Sincerely,

Matthew Appelbaum, Mayor

Dear Boulder Valley Resident:

Travel is something we all do and can be frustrating at times. I am inviting a member of your household to be part of a small group of residents who will keep a simple travel log for a single day during the week of September 10, 2012. Basically, the log will show how you get where you're going and how long it takes you to get there. This will help the city better understand existing travel patterns and work to improve your travel experience.

Your household was chosen at random and your participation will be completely confidential. We are only mailing travel logs to a small number of Boulder Valley residents, so your participation is extremely important. The results will be used for transportation planning to improve our community.

Your travel log will arrive the week of September 3rd at which time you'll receive your assigned log day. Many thanks in advance for your help.

Sincerely,

Matthew Appelbaum, Mayor

City of Boulder

CITY OF BOULDER, COLORADO
c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360

Presorted
First Class Mail
US Postage
PAID
Boulder, CO
Permit NO. 94

City of Boulder

CITY OF BOULDER, COLORADO
c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360

Presorted
First Class Mail
US Postage
PAID
Boulder, CO
Permit NO. 94

City of Boulder

CITY OF BOULDER, COLORADO
c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360

Presorted
First Class Mail
US Postage
PAID
Boulder, CO
Permit NO. 94

City of Boulder

CITY OF BOULDER, COLORADO
c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360

Presorted
First Class Mail
US Postage
PAID
Boulder, CO
Permit NO. 94

CITY OF BOULDER
OFFICE OF THE CITY COUNCIL

Mayor Matthew Appelbaum
Deputy Mayor Lisa Morzel

Council Members: Suzie Ageton, KC Becker, Macon Cowles, Suzanne Jones, George Karakehian, Tim Plass, Ken Wilson

---

September 2012

Dear Boulder Valley Resident:

We all travel and transportation has been an important concern in Boulder Valley for many years. The City works to accommodate your travel desires by conducting studies, preparing plans, and making transportation improvements. To meet your travel needs, we've built and repaired roads, bicycle and pedestrian paths, and added bus routes. Periodically, we also turn to our residents to get information on their travel so that we can understand existing travel patterns and work to improve your travel experience. This survey is the primary data source for understanding the travel patterns of Boulder Valley residents.

Now you can help! I am inviting a member of your household to be a part of a small group of Boulder Valley residents who will keep a simple travel log ***on Monday September 10, 2012***. It's similar to one of the Nielson diaries for logging television viewing but it has a different purpose. Basically, the log will show how you get where you're going and how long it takes you to get there. Your household was chosen at random and your participation will be completely confidential.

Because we want to know what the travel circumstances are for all of Boulder Valley, we need a representative sample of residents in our community. **That's why it's so important that the person in your household who completes the travel diary be a household member who is in town on that day, age 16 or older, and who most recently had a birthday. Year of birth is not to be considered.**

If that person (the one who's at least 16 and most recently had a birthday) is willing to help with this simple but very important project, he or she should complete the enclosed household survey, read the enclosed instructions and complete the travel diary on **Monday September 10.**

The completed survey and travel diary should be mailed to National Research Center, Inc. (the company conducting the study) using the enclosed postage-paid envelope. If you have questions, call Athena at 303-444-7863 and she'll be happy to talk with you.

Thank you very much! The log is easy to complete and will be helpful to our community.

Sincerely,

Matthew Appelbaum
Mayor

Enclosure: Postage-Paid Envelope to National Research Center, Inc.

P.O. Box 791 · Boulder, Colorado 80306-0791 · www.bouldercolorado.gov · (303)441-3002 · Fax (303)441-4478

CITY OF BOULDER
OFFICE OF THE CITY COUNCIL

Mayor Matthew Appelbaum
Deputy Mayor Lisa Morzel

Council Members: Suzie Ageton, KC Becker, Macon Cowles, Suzanne Jones, George Karakehian, Tim Plass, Ken Wilson

September 2012

Dear University of Colorado Student:

We all travel and transportation is an important concern in Boulder Valley. The city works to accommodate your travel desires by conducting studies, preparing plans, and making transportation improvements. To meet your travel needs, we've built and repaired roads, bicycle and pedestrian paths, and added bus routes. Periodically we also turn to our residents to get information on their travel so that we can understand existing travel patterns and work to improve your travel experience. This survey is the primary data source for understanding the travel patterns of Boulder Valley residents.

Now you can help! I am inviting you to be a part of a small group of Boulder Valley residents who will keep a simple travel log ***on Monday, September 10, 2012***. Basically, the log will show how you get where you're going and how long it takes you to get there. You were chosen at random and your participation will be completely confidential.

Students at the University are a large part of Boulder's population, and it is essential that the city get information about students' transportation behavior in order to plan for this important segment of our community.

Your assigned travel day is **Monday, September 10.**

The completed survey and travel diary should be mailed to National Research Center, Inc. (the company conducting the study) using the enclosed postage-paid envelope. If you have questions, call Athena at 303-444-7863 and she'll be happy to talk with you.

Thank you very much! The log is easy to complete and will be helpful to our community.

Sincerely,

Matthew Appelbaum
Mayor

Enclosure: Postage-Paid Envelope for National Research Center, Inc.

P.O. Box 791 · Boulder, Colorado 80306-0791 · www.bouldercolorado.gov · (303)441-3002 · Fax (303)441-4478

2012 Travel Diary Study
TRAVEL SURVEY INSTRUCTIONS

Please review the materials briefly before continuing to read the instructions. If any materials are missing, please call Athena of National Research Center, Inc. at 303-444-7863, and materials will be mailed to you. This packet contains:

☐ Cover letter & these instructions ☐ Travel Diary ☐ Travel Diary overflow sheet
☐ Household Travel Survey ☐ Postage paid return envelope

COMPLETE THE TRAVEL DIARY ON YOUR ASSIGNED DAY

- Complete the travel diary on **MONDAY, SEPTEMBER 10, 2012**, regardless of the weather or the number and type of activities planned for that day.
- Take the Travel Diary with you on your assigned day. It is the 8½" x 11" card included in this packet.
- If you will be out of town or forgot to complete the diary on assigned day, you may complete the diary on the same day of the next week (Monday, September 17).
- Report every trip you make that is longer than a city block:
  - Whether you are a passenger, driver or pedestrian.
  - Whether it is recreational (e.g. going for a run) or has a specific destination.
- Start the diary after 12:01 am (right after midnight) and continue until 12:00 midnight on your assigned day.
- Do not change your travel behavior because you are keeping this diary.

WHAT IS A "TRIP"?

- **A trip is a one-way journey.**
- **Round-trips count as two trips**. If you drive to the grocery store and back, record two trips on your diary.
- In addition to round trips, you may need to record one journey as more than one trip if:
  - **You make multiple stops.** For example, if you walk your child to school, then catch the bus outside the school to the grocery store, and then return home, stopping to pick up a prescription at the drugstore, this would count as four trips with the following destinations: the school, the grocery store, the drugstore and then home.
  - **You change travel method** (not including bus transfers). For instance, if you walk more than one block to a bus stop to take the bus to work, count the bus stop as the first destination and the purpose of that trip as "change travel mode". The next trip destination is work and the purpose is "work commute."
  - **You pick up or drop off a passenger.** This should be treated as two trips. The purpose of the first trip is "drive passenger."
  - If you are on a recreational or exercise loop (walk, run or bike ride) then your "destination" is the half-way point.

QUICK TIPS

- For your destination, you may **use an address, nearest intersection or commonly recognized buildings**, stores or other specific and unique locations (e.g. "McGuckin Hardware", or "Table Mesa Park and Ride")
- Keep good estimates of the **start and end times**. Use the start and end times of the TRIP and don't include the time you spend at the destination. For example, if you go to the store, don't count the time you are in the store. When you arrived is the end of the first trip and when you left the store is the start of the second trip.
- If using a car or light truck for your trip, don't forget to **mark if you were a passenger or driver** and fill in the number of adults (include yourself, 16 or 17 year olds with drivers licenses and those over age 18) and the number of children in the vehicle.
- To **record mileage**, use a vehicle odometer if possible at the beginning and end of each trip. If you wish, you can record the number of blocks instead of miles if it is easier, but PLEASE write in "blocks" on your form, so we don't mistake it for miles.

(continued on reverse side)

HOW DO I DESCRIBE THE TRIP TYPE?

Go Home	A trip from some other location to your usual place of residence.
Personal Business	Travel which is made to obtain services, not products. (E.g. bank, post office, doctor, auto repair.)
Shopping	Travel to shop or to purchase products.
School	Travel by a student to college or school. Travel to school by a teacher or other school employee is a work commute trip. If you are driving a student to school, the trip should be classified as "drive a passenger."
Work Commute	Travel to or from your workplace.
Other Work/ Business	Travel done for work, to someplace other than the workplace. (E.g., sales calls, trips to purchase office supplies for work.)
Social/ Recreation	Trips made when no business is transacted. (E.g., parties, participatory sports, cultural or athletic events, church activities, visits to friends.)
Eat a Meal	Examples include going to a restaurant, going to a friend's house for dinner, or home from work for lunch. Stops for snacks or refreshments should be classified as "social/recreation".
Drive a Passenger	Use this category for trips or stops to pick up or deliver someone to a specific location. (E.g., taking a friend to the store, picking up a child from school.)
Change Travel Mode	If you drive your car, walk more than one block, or ride your bike to catch the bus, this is a "change travel mode" trip. However, if you transfer from one bus to another, it should not be included in this category because you traveled in buses without changing travel modes. (Be sure to record all the routes you used to make the trip.)
Other	Any trip you make which does not seem to fit in the categories listed should be put in the "other" category. Please list what the trip purpose was in the blank provided. Also, if you have a question as to where to put a certain trip because you can't decide between two categories, list it in the "other" category.

SPECIAL CIRCUMSTANCES

What if you don't make any trips during the day assigned to you? On the travel diary, fill out your name, address and the assigned diary date, check the box to indicate that you made no trips. Please continue on the Household Survey. It is important that we get an accurate picture of travel patterns within Boulder, including the number of people who make no trips.

What if you make more than 9 trips during the day assigned to you? The Travel Diary has space to record up to 9 trips. If you take more than 9 trips on your assigned day, please use the overflow sheet. If you make more than the 21 trips than can be recorded on the Diary and overflow sheet, call Athena and she will record your trips over the phone or send you more overflow sheets, or you can make a copy of the overflow sheet and use that.

What if you work a job that requires frequent travel on the day assigned to you? If you work a job that requires you to make many trips during the 24-hour period (e.g., cab driver, pizza delivery driver, sales person), please call National Research Center. Athena will give you special instructions for completing your Travel Diary.

The **EXAMPLE OF A COMPLETED TRAVEL DIARY** on the following page, gives a detailed example that may help you in completing your form.

If you have ANY questions, please contact Athena at National Research Center, Inc. at 303-444-7863

Thank you very much for your participation in this study.

EXAMPLE OF A COMPLETED TRAVEL DIARY

In the first half of her day, Jane Smith drove from her home at 3523 N. 16th Street to work at CU, first dropping her 9 year old daughter at University Hill Elementary School.

At noon, Jane walked to the Hill for lunch (5 blocks from the building on campus where she works).

The Travel Diary example shows how Jane's form would be completed. Please note the following:

1. Jane's travel to work with her daughter is counted as **two** trips; the first is with her daughter to the elementary school -- this trip is designated as "drive a passenger"; the second is from the school to work.
2. Although Jane is going to a "school" (CU), it is for the purpose of work, and is designated as a "work commute" trip.
3. Jane records her trip (walking) **to** lunch as well as her trip **from** lunch back to work (two trips). Her trip back to the school is recorded as "work commute", because she is returning to her workplace, although she did not come straight from home.

EXAMPLE OF A COMPLETED TRAVEL DIARY, Page 1

Record the location at which you are beginning your travel for the day. If it is your home (the same address as in the information box), you may just write "SAME" however be sure to include the Nearest Cross Streets.

Please remember to fill in the date of the day you complete the travel diary!

Don't include the amount of time you were at the destination.

2012 Travel Diary

Please record all of your trips, whether you are a passenger, driver, or pedestrian.
The information on the first row is included only as an example. Please refer to the instructions if you are not sure how to record your trip.

Name: Jane Smith
Address: 3523 N. 16th Street
City/State/Zip: Boulder, CO 80302
DIARY DATE: 9/10/12

STARTING POINT ADDRESS
Street Address: SAME
City/State/Zip:
Nearest Cross Streets: 16th & Kalmia

I did not leave the house today: ❑

If using motor vehicle, list odometer reading:
at beginning of day: 79645
at end of day: 79661

trip #	DESTINATION (address, building or nearest cross streets)	trip start time hour:min	am/pm	trip end time hour:min	am/pm	trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself) children	adults
1	Uni. Hills School Broadway & 16th Street	7:30	AM	7:50	AM	1. go home; 2. personal business; 3. shopping; 4. school; 5. work commute; 6. other work/business; 7. social/recreation; 8. eat a meal; 9. drive passenger; 10. change travel mode; 11. other:	1. car or light truck (driver); 2. car or light truck (passenger); 3. bus/transit (route(s)): ; 4. school bus; 5. large commercial truck; 6. motorcycle; 7. taxi (passenger); 8. bicycle; 9. walk; 10. other:	4	1	1
2	CU - Old Main & 	7:55	AM	8:05	AM	1. go home; 2. personal business; 3. shopping; 4. school; 5. work commute; 6. other work/business; 7. social/recreation; 8. eat a meal; 9. drive passenger; 10. change travel mode; 11. other:	1. car or light truck (driver); 2. car or light truck (passenger); 3. bus/transit (route(s)): ; 4. school bus; 5. large commercial truck; 6. motorcycle; 7. taxi (passenger); 8. bicycle; 9. walk; 10. other:	1	0	1
3	The Hill (Abo's) College & 13th Street	12:00	Noon	12:10	PM	1. go home; 2. personal business; 3. shopping; 4. school; 5. work commute; 6. other work/business; 7. social/recreation; 8. eat a meal; 9. drive passenger; 10. change travel mode; 11. other:	1. car or light truck (driver); 2. car or light truck (passenger); 3. bus/transit (route(s)): ; 4. school bus; 5. large commercial truck; 6. motorcycle; 7. taxi (passenger); 8. bicycle; 9. walk; 10. other:	5 blocks		
4	CU - Old Main & 	12:55	PM	1:05	PM	1. go home; 2. personal business; 3. shopping; 4. school; 5. work commute; 6. other work/business; 7. social/recreation; 8. eat a meal; 9. drive passenger; 10. change travel mode; 11. other:	1. car or light truck (driver); 2. car or light truck (passenger); 3. bus/transit (route(s)): ; 4. school bus; 5. large commercial truck; 6. motorcycle; 7. taxi (passenger); 8. bicycle; 9. walk; 10. other:	5 blocks		

You can also select that you were a passenger in a car or light truck, if appropriate.

Don't forget to include yourself as an adult in the vehicle.

(example continued on reverse side)

In the second part of Jane's day, she finished work and picked up her daughter and drove home.

She jogged for two miles in her neighborhood before dinner.

When dinner was over, Jane and her family rode their bikes to the Willow Springs Shopping Center for ice cream.

On the example form, note the following:

1. After work, Jane's trip to pick up her daughter (even though the daughter is not in the car) is designated as a trip to "drive a passenger".
2. Jane counts her jog in the neighborhood as **two** trips, even though she made no stops between leaving home and returning home. "Jogging" and "running" are considered "walking" for the purposes of this travel diary.
3. When the family rides their bikes to the shopping center for an ice cream, this is a "snack" and is designated as "social/recreation" rather than eating a meal.

EXAMPLE OF A COMPLETED TRAVEL DIARY, Page 2

trip #	DESTINATION (address, building or nearest cross streets)	trip start time hour:min	trip start time am/pm	trip end time hour:min	trip end time am/pm	trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself) children	number of people in vehicle (inc. yourself) adults
5	Uni. Hills School Broadway & 16th Street	5:05	PM	5:15	PM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	1	0	1
6	Home &	5:20	PM	5:35	PM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	4	1	1
7	Orchard & 19th Street	5:50	PM	6:05	PM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle ~~7. taxi (passenger)~~ 8. bicycle 9. walk 10. other:	1		
8	Home &	6:05	PM	6:20	PM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle ~~7. taxi (passenger)~~ 8. bicycle 9. walk 10. other:	1		
9	Willow Springs Shopping Center Iris & 28th	7:15	PM	7:40	AM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	10 blocks		
10	Home &	8:05	PM	8:30	PM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10. change travel mode 11. other:	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	10 blocks		

If you have ANY questions, please contact Athena at National Research Center, Inc. at 303-444-7863

Thank you very much for your participation in this study.

2012 Travel Diary

Please record all of your trips, whether you are a passenger, driver, or pedestrian.
The information on the first row is included only as an example. Please refer to the instructions if you are not sure how to record your trip.

Name: _____
Address: _____
City/State/Zip: _____
DIARY DATE: _____

STARTING POINT ADDRESS
Street Address: _____
City/State/Zip: _____
Nearest Cross Streets: _____ **&** _____

I did not leave the house today: ❑

If using motor vehicle, list odometer reading:
at beginning of day: _____
at end of day: _____

trip #	DESTINATION (address, building or nearest cross streets)	trip start time hour:min	trip start time am/pm	trip end time hour:min	trip end time am/pm	trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself) children	number of people in vehicle (inc. yourself) adults
example	Foothill Elementary Broadway & Grape	7:13	AM	7:22	AM	1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: →	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: →	3 miles	1	1
1	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: →	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: →			
2	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: →	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: →			
3	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: →	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: →			

trip #	DESTINATION (address, building or nearest cross streets)	trip start time		trip end time		trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
4	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: _____			
5	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
6	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
7	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
8	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
9	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			

Overflow Sheet

trip #	DESTINATION (address, building or nearest cross streets)	trip start time		trip end time		trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
10	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
11	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
12	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
13	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
14	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
15	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			

trip #	DESTINATION (address, building or nearest cross streets)	trip start time		trip end time		trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
16	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
17	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
18	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
19	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
20	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			
21	_____ _____ & _____	___ : ___		___ : ___		1. go home 2. personal business 3. shopping 4. school 5. work commute 6. other work/business 7. social/recreation 8. eat a meal 9. drive passenger 10.change travel mode 11. other: → _____	1. car or light truck (**driver**) 2. car or light truck (**passenger**) 3. bus/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: → _____			

c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360
303-444-7863

2012 Travel Diary Study
HOUSEHOLD TRAVEL SURVEY

Please complete the following survey regarding your household and return it with your Travel Diary in the enclosed postage-paid envelope. The survey should take only a few minutes. It is important because it will help research staff to gauge how representative the people who participate in the diary study are in relation to Boulder Valley residents as a whole. It also provides additional information on the travel patterns of Boulder Valley residents. Your answers to this survey will be kept in strict confidence and only used in the aggregate. Thank you for your time and help.

GENERAL TRAVEL INFORMATION

1. **On the day you completed the travel diary**, did you have any goods or services delivered to your work or home, such as a meal (pizza, etc.), groceries, haircuts or other goods and services? (Please include deliveries for items you ordered by phone, through a mail order catalogue, or by Internet.)
   - ❑ no → *Go to question #3*
   - ❑ yes → From how many different sources did you receive deliveries? [ ] sources

2. Did the delivery or deliveries substitute for a travel trip you might have made to seek the good or service?
   - ❑ no
   - ❑ yes

3. In the last week, about how frequently have you ridden a bicycle:

To Shop, Get a Meal or Run Errands	For Commuting	For Fun or Exercise
❑ 5 or more times	❑ 5 or more times	❑ 5 or more times
❑ 3 to 4 times	❑ 3 to 4 times	❑ 3 to 4 times
❑ Once or twice	❑ Once or twice	❑ Once or twice
❑ Not at all	❑ Not at all	❑ Not at all

4. Are you eligible to have an Eco-Pass, an annual pass that allows you unlimited bus rides? (Please check all that apply.)
   - ❑ yes, through my employer
   - ❑ yes, through my neighborhood
   - ❑ yes, a CU Boulder student Buff One pass
   - ❑ yes, CU Boulder faculty/staff Buff One pass
   - ❑ yes, other pass: _____
   - ❑ no, I am not eligible for an Eco-Pass → *go to #7*

5. Did you pick up an Eco-Pass or Buff One pass (or passes)?
   - ❑ yes
   - ❑ no → *go to question #7*

6. About how often, on average, do you use your Eco-Pass?
   - ❑ more than once a week
   - ❑ about once a week
   - ❑ about once every two weeks
   - ❑ about once a month
   - ❑ less often than once a month

7. Are you employed?
   - ❑ no → *Go to question #13*
   - ❑ yes, part-time
   - ❑ yes, full-time

8. Please indicate the city in or nearest to your primary work place.
   - ❑ Boulder ❑ Louisville
   - ❑ Denver ❑ Longmont
   - ❑ Broomfield ❑ Lafayette
   - ❑ I work from my home
   - ❑ Other city, specify: _____

9. Please write in the address, building and/or nearest cross streets of your primary work place.

   Building or address: _____

   Nearest cross streets: _____

   & _____

10. Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or phone) for work-related travel. How often, if ever, do you telecommute for work? *(Note: do not include times you take work home to do in the evenings, only times you work from home instead of traveling to a workplace.)*
    - ❑ Every work day (I always work from my home)
    - ❑ 3 to 4 times per week
    - ❑ 2 to 3 times per week
    - ❑ Once or twice a month
    - ❑ Occasionally
    - ❑ Never

11. Did you telecommute on the day you completed the travel diary?
    - ❑ no → *Go to question #13*
    - ❑ yes → About how many:_____

12. Did working at home reduce the number of single-occupancy vehicle (drive alone) trips you made on the day you completed the travel diary compared to days you do not telecommute?
    - ❑ no, I made the same number of drive alone trips
    - ❑ yes, reduced about 2 drive-alone trips
    - ❑ yes, reduced more than 2 drive-alone trips

HOUSEHOLD INFORMATION

13. How many passenger cars, vans and light trucks does your household own or normally have use of?

    [ ] vehicles

14. How many usable bicycles does your household have?

    [ ] bicycles

15. About how much was the TOTAL 2011 income before taxes for your household as a whole? In the total, please include income before taxes as well as money from all sources for all persons living in your household. (For example, include everyone's income from self-employment, gifts, interest on savings, social security, AFDC, the value of food stamps received, pension or disability benefits, child support, as well as wages, tips and salary.)

    - ❑ Less than $10,000
    - ❑ $10,000 to $19,999
    - ❑ $20,000 to $29,999
    - ❑ $30,000 to $39,999
    - ❑ $40,000 to $49,999
    - ❑ $50,000 to $74,999
    - ❑ $75,000 to $99,999
    - ❑ $100,000 to $149,999
    - ❑ $150,000 or more

16. Please check the one choice below which best describes the kind of residence in which you live.

    - ❑ a detached single family home
    - ❑ a duplex or triplex
    - ❑ an apartment
    - ❑ a condominium or townhouse
    - ❑ a mobile home
    - ❑ group quarters (e.g., dormitory, nursing home) → *go to question #20*
    - ❑ other: _____

17. Do you rent or own your residence?

    ❑ rent ❑ own

18. Please record the number of household members in each of the following age categories. (Please remember to include yourself.)

Age category	Number in household
0 to 6 years	_____
7 to 14 years	_____
15 to 17 years	_____
18 to 24 years	_____
25 to 34 years	_____
35 to 44 years	_____
45 to 54 years	_____
55 to 64 years	_____
65 or older	_____

19. Are any of the household members students at the University of Colorado, Boulder campus?

    - ❑ no
    - ❑ yes ➔ How many are full-time?

      [ ] full-time students

      How many are part-time?

      [ ] part-time students

INDIVIDUAL INFORMATION

20. How many years have you lived in Boulder? *(Please write "0" if less than 6 months.)*

    [ ] Years

21. Are you a student at the University of Colorado, Boulder campus?

    - ❑ no
    - ❑ yes

22. What is your gender?

    - ❑ male
    - ❑ female

23. Which category contains your age?

    - ❑ 16 to 24 years old
    - ❑ 25 to 34 years old
    - ❑ 35 to 44 years old
    - ❑ 45 to 54 years old
    - ❑ 55 to 64 years old
    - ❑ 65 years or older

24. How much education have you completed?

    - ❑ 0 to 11 years of school
    - ❑ high school
    - ❑ some college or associate's degree
    - ❑ bachelor's degree
    - ❑ graduate/professional degree

Thank you very much for taking the time to complete this survey. Please return this with your travel diary in the postage-paid envelope provided.