

# Neighborhood Design & Mode Choice



Michael Rose

Field Area Paper  
Masters of Urban and Regional Planning  
Portland State University  
Spring 2004

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Readers:  
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# Abstract

This paper compares the mode choices of residents living in neighborhoods with different design characteristics. A mail-out mail-back survey is used to determine the mode choices made by residents of three Portland Area neighborhoods. One is a new-urbanist style community while the other two are standard suburban developments. The results are analyzed and reported using raw numbers, various methods of statistical comparison as well as GIS tools. The residents of the new urbanist neighborhood made more walking trips and fewer personal vehicle trips during the survey week than the residents of the other neighborhoods. Proximity to destinations, household structure and neighborhood design seem to have the strongest influences on mode choice.

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# Introduction

A number of new urbanist communities have been built in the United States since the mid-1990's. Some of the most well known include Laguna West, near Sacramento California, Kentlands in Gaithersburg, Maryland, and Seaside in Walton County, Florida. These communities are designed to mimic the traditional development patterns of communities prior to the era of the automobile. They include higher densities, mixing of uses, and pedestrian oriented design to encourage walking within the community. This style of neighborhood is also intended to reduce reliance on the automobile and decrease overall vehicle miles traveled (VMT). Portland, Oregon also has a few examples of New Urbanism. Fairview Village, on the northeastern fringe of the Portland region, is one of the most highly regarded examples in the metro area. The community was the recipient of the 2001 National Association of Home Builders "Best Smart Growth Community in the U.S." Gold Award. The community has not yet reached buildout, but the earliest residents of the community have been living there since 1996. Many of the neighborhoods nearby were built at about the same time, but in the style of typical auto-oriented suburbs. The close proximity of a new urbanist community and an auto-oriented community of similar vintage creates a unique opportunity to study the differences between the travel choices of the residents.





# Background

Studies in this field prior to about the year 2000 are based on traditional communities built prior to WWII in comparison to modern auto-oriented communities built in the 1960's, 70's and 80's. This is because there were no new urbanist communities from which data could be gathered. Writings on the subject of new urbanism, "Pedestrian Pockets" and Transit Oriented Developments (TOD) (Calthorpe, 1989, 1993) had sparked debate and a number of empirical studies in the field.

In 1994 a number of studies were published using empirical data gathered from existing traditional communities. Friedman et al.(1994) used data from the Bay Area Transportation Survey and were able to determine that traditional neighborhoods in this study area averaged two fewer trips per day than auto-oriented neighborhoods. This study also showed that 64% of trips in traditional neighborhoods were auto trips vs 86% in the auto-oriented neighborhoods.

Ewing (1994) studied six communities in Florida. The study concluded that when destinations are more accessible either by proximity or connectivity there is an inverse relationship with VMT and vehicle hours traveled (VHT). He recommends that new communities should internalize shopping and services to reduce VMT.

Frank & Pivo (1994) used data collected in the Puget Sound, Washington region to study the relationship between density and single occupancy vehicle (SOV) use. They concluded that higher densities do result in lower rates of SOV trips. They recommend that studies need to be done at a finer level of detail than the census tract, as theirs was, to validate these findings.

A study of neighborhoods in Austin, Texas used a mailout/mailback survey to gather travel and household data (Handy, 1996). The analysis showed residents of the traditional communities were more likely to make a walking trip, although walking trips in all communities were most likely to be for recreational or exercise purposes. Of the trips that were to a specific destination, 75% were in place of an automobile trip in the traditional communities. Self-selection, the idea that people who like to walk are choosing to live in walkable communities, is discussed, along with the implications for the effectiveness of new urbanist communities at reducing VMT.

Cervero and Radisch (1996) studied a traditional and an auto oriented community in the Bay Area. Using a two-day travel survey they determined that the traditional community generated more walking trips. There was also some suggestion that the residents were substituting walking trips for trips that would have been made by automobile. They called for more paired neighborhood studies to create a larger body of literature from which to evaluate the effectiveness of traditional development in reducing VMT.

Some studies use simple observation, pedestrian counts (Moudon et al. 1996) and pedestrian intercept surveys to do their analysis (Shriver, 1997). These studies show that the numbers of pedestrians are higher in the traditional neighborhoods, and their purpose is more often something more than just the walk itself. One conclusion is that people will walk in auto-oriented suburbs if good pedestrian facilities exist (Moudon et al. 1996).

Kockelman (1997), argues that higher density alone is not the reason for decreased VMT in traditional communities. Her Bay Area study shows that a mix of land uses can further reduce VMT. She suggests that a growth containment strategy can also help to reduce VMT.

Local shopping, restaurants and other services are important to create a mix of land uses, although residents may not always choose to use these local shopping options, or choose to drive to them even if they are within walking distance. (Handy 2001; Lund 2003). Local shopping may not be the key to reducing VMT.

Yet another Bay Area study determined that density and a mix of land uses are important to VMT reduction, but shows that attitudes of the residents are important variables too, (Kitamura et al, 1997). The results indicate that the residents of the traditional community are driving less because of their attitudes toward transit, the environment and other factors. Their findings suggest that traditional community residents choose to live in those neighborhoods because they best fit their desires.

Another study, using Portland, Oregon as a case study, found that residents of traditional communities are likely to own fewer automobiles than their auto-oriented suburban counterparts (Hess and Ong, 2002). Households in mixed-use areas are 31% more likely to be without a car and people without cars may be choosing to live in mixed-use environments.

In 1997, evaluations of some newly built new urbanist communities began to appear. (Southworth, 1997). A discussion of new urbanist communities, Laguna West and Kentlands, and a traditional community, Elmwood, questions whether the new neighborhoods are just suburbs with a new look. Southworth notes the need for empirical studies to determine if these new communities only look like the traditional ones, or if they behave like them too.

A new argument for increasing the walkability of our environment has emerged in recent years. The increasing rates of obesity among Americans have caused health professionals to consider urban form as a potential cause and possibly a solution to the problem (Saelens, et al, 2003). Urban design factors leading to increases in physical activity could help to create healthy communities.

# Methodology

This study is different from the others in several very important ways. First, all three of the subject neighborhoods have similar pedestrian amenities including sidewalks, street trees and identical street widths. Second, they were all built in the late 1990's and are in close proximity to one another. In fact, the children in two of the communities attend the same elementary school. Third, the median home value, and home size are similar among the three neighborhoods. Fourth, none of the neighborhoods have a street network that is entirely a grid. Finally, all three have a park within 1/4 mile of most of the residents. The primary differences in the neighborhoods are house style and access to retail and other commercial destinations.

## **RESEARCH QUESTION**

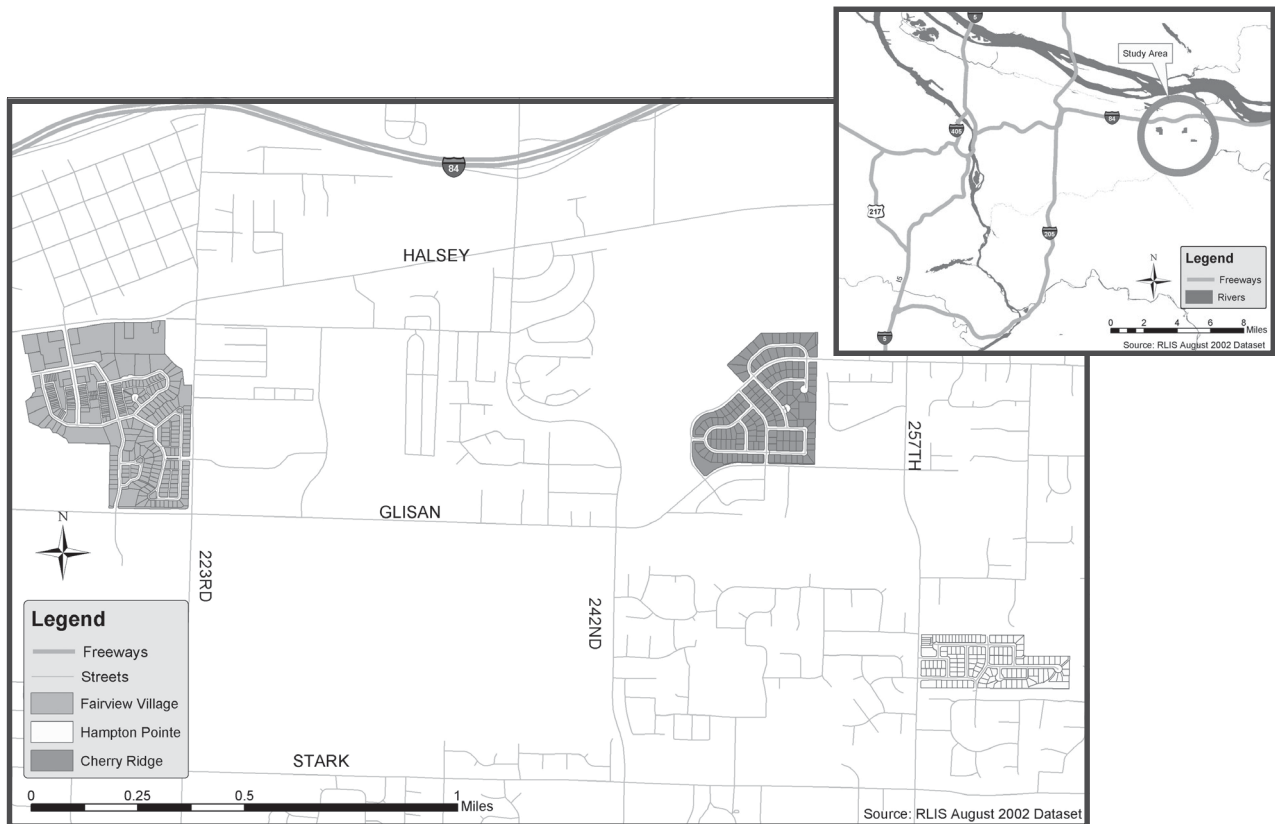
Do residents of a new urbanist community use alternative modes of transportation more than residents of auto-oriented communities?

## **NEIGHBORHOOD SELECTION**

The point of the study is to compare travel choices of the residents of Fairview Village to an auto-oriented neighborhood. Starting with Fairview Village as the base, the control neighborhood needed to be as similar as possible, but auto-oriented. A number of things needed to be similar for a neighborhood to be suitable, including; home value, home size, lot size, and year built. Additionally, having the neighborhoods in close proximity would make this study unique, because the residents of the neighborhoods would likely be shopping at the same grocery stores and have children attending the same schools. By visually searching the area, two neighborhoods, Cherry Ridge and Hampton Point, looked to be suitable. Using the Regional Land Inventory System (RLIS), a Geographic Information System (GIS) database maintained by the regional government of the Portland Metro Area (Metro), the home values, sizes and ages could be easily compared. Both neighborhoods met all the criteria, and were chosen to be included in the study. The tax lots in Cherry Ridge are larger than the other two neighborhoods, but all the other important values are similar. Cherry Ridge also has a number of stores, restaurants and other destinations within walking distance which makes it more valuable for comparison with the other two neighborhoods. Table 1 shows the comparison of the neighborhood statistics and features. All three neighborhoods are located in East Multnomah County, Oregon. Figure 1 shows the regional and local context of these communities. They are all located within 2 miles of one another and in the same school district.

**Table 1. Neighborhood Statistics and Features**

	Fairview Village	Cherry Ridge	Hampton Point
Total Acres	27.33	30.66	16.81
Units	230	154	126
Dwelling units per Acre	8.42	5.02	7.5
Mean lot size (sq. ft.)	5,132	9,201	5,802
Mean property value	\$202,336	207,499	206,071
Mean year built	1999	1996	1997
Mean slope	2.1%	6.8%	3.1%
Destinations within 1/2 mile	19	21	1
Neighborhood street width	32'	32'	32'
Mailbox style	Individual	Group	Group
Street trees	Yes	Varies	Varies
Sidewalks	Yes	Yes	Yes
Garages off alleys	Yes	No	No
Front porches	Yes	No	No
Homes set close to street	Yes	No	No



**Figure 1. Context of selected neighborhoods**

Based on data gathered from the surveys, the household population varies among the neighborhoods. Table 2 shows the mean population of the three communities. Fairview Village has fewer adults, children and total household residents. The availability of rowhouses in the community likely makes it a more attractive location for people without children or those with grown children no longer living at home. The residents of the apartments were not included in this study.

**Table 2 Mean household population**

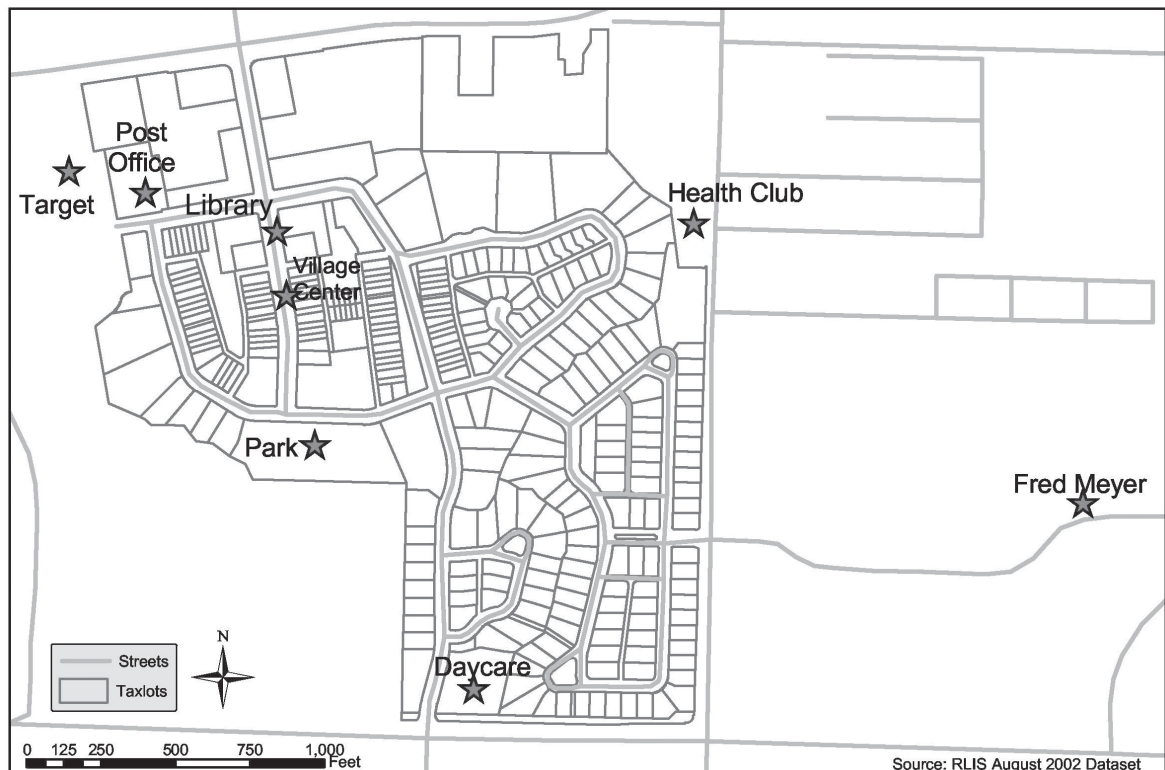
	Adults	Children	Total
Fairview Village*	1.74	0.25	1.82
Cherry Ridge	2.24	0.93	2.98
Hampton Point	2.03	0.56	2.41

*\*statistically different from both neighborhoods in all categories at a .05 level of significance*

## NEIGHBORHOOD DESCRIPTIONS

### Fairview Village

Fairview Village, the catalyst for this study, is an award winning new urbanist community. Figure 2 shows the layout of the community and key points of interest. It is named for the City of Fairview in which it is located. Construction started in the mid 1990's and residents



**Figure 2. Fairview Village context map**

started moving into the new homes in 1996. A walk through the neighborhood reveals single family homes with front porches set close to the street. The garages are often detached and accessed from alleys behind the homes. The streets have sidewalks with planting strips complete with street trees, shrubbery, flowers and grass. Curb cuts for driveway access are noticeably absent and each home has its own mailbox located within a few steps of the front porch. The streets are a narrow 32 feet wide in most places and parking is allowed on both sides of the street. The street network in Fairview Village is not a grid, as one would expect of a new urbanist development, but the streets are well connected and pedestrian paths are in place to provide connections where a street is not available. The type of housing in the community varies. Rowhomes with shared walls and apartments are located in the northern portion of the site. Along with this higher density housing are mixed use buildings including live work facilities with apartment homes above storefronts. These are located in the part of the neighborhood known as the “Main Street”.

The “Main Street” area currently is home to 11 business including a coffee shop, eye care center, and a variety of shops. There are 11 more storefronts currently available and many more under construction. Other significant destinations within the neighborhood include the Fairview Post Office, the Columbia Library, a community park and Fairview City Hall which also houses the Fairview Police Station. Within about ¼ mile of the community is a large retail variety store (Target), a fitness center, and a combined grocery and variety store (Fred Meyer). Figures 3 – 6 show images of the community.



**Figure 3. Typical neighborhood street**



**Figure 4. “Main Street”**



**Figure 5. Garages off alleys**



**Figure 6. Neighborhood Park**

### **Hampton Point**

Hampton Point is located in the City of Troutdale, southeast of Fairview Village. Figure 7 shows the layout and key points of interest in this neighborhood. The streets in this neighborhood are also 32 feet wide and sidewalks are present on both sides of the street. However, the most noticeable feature of this neighborhood is the dominance of the automobile



**Figure 7. Hampton Point context map**

in the design of the homes and in the visual appearance of the street. Nearly all the homes in Hampton Point have a two car garage fronting the street with the front door of the house set farther back from the street than the garage. A home built with this configuration is sometimes referred to as a “snout house” as shown in Figure 8.



**Figure 8. “Snout House” in Hampton Point**

The homes themselves also have larger setbacks than those seen in Fairview Village. The setback is the distance from the street to front of the house. While the homes do have a covered entry area at the front door it would be difficult to consider them front porches like those seen in Fairview Village. The front entries are often difficult to see from the street because they are blocked by the garage or vegetation. The driveway in front of the garage doubles as the walkway from the street to the front door. Many of the homes have two cars parked in the driveway, effectively blocking any paved path to the front door. There are some trees on the street, but they are not at regular intervals and look to have been planted by individual homeowners. The



**Figure 9. Group mailboxes**

mailboxes are the standard United States Postal Service (USPS) group mail boxes with locks. As shown in Figure 9. These mailboxes usually have sixteen or more locked boxes for the mail of nearby residents. They are located at intervals of approximately 200-300 feet along the street. Residents commonly drive up to the mailbox on their way home to pick up their mail rather than make a walking trip to the mailbox.

There are no shopping or employment destinations within 1/4 mile of any of the homes in this neighborhood. However, there is one very large park accessible via a trail at the east end of the neighborhood. The park includes picnic facilities, open space and paved walking trails as seen in Figure 10. There is a second much smaller nature trail at the southeast end of the neighborhood that connects Hampton Point to an adjacent neighborhood. Figure 11 shows a typical street in the Hampton Point Neighborhood.





**Figure 10. Park adjacent to Hampton Point**



**Figure 11. Typical street in Hampton Point**

### **Cherry Ridge**

Cherry Ridge, also in Troutdale, is located about a mile directly east of Fairview Village and north of Hampton Point. Figure 12 shows the layout and key points of interest in this neighborhood. Sidewalks can be found on both sides of the 32' wide streets, and like Hampton Point, large garage doors front the street. This neighborhood is built on a substantial slope.



**Figure 12. Cherry Ridge context map**

The front entries of the homes in this neighborhood are usually hidden behind the garages or require climbing as many as 15 steps to get to the front door. There are some street trees, but they are not at regularly spaced intervals. Cherry Ridge also has group mailboxes.

Across the street to the southwest of the neighborhood is a shopping center. This facility includes a grocery store, a church, 2 banks, 7 restaurants and 11 other retail and service businesses. This shopping center is within 1/4 mile walking distance of most of the homes in the community and within 1/2 mile of all of them. Reynolds High School is located south of the neighborhood along with all of the supporting facilities like sports fields. Reynolds Little League uses these fields for baseball games on the weekends. Also near the high school is a playground, built by the community, known as Imagination Station, see Figure 13. This playground is a very popular place with the children and parents in the neighborhood. This play area and the sports fields are just a short walk from the Cherry Ridge Community. Figures 14-16 show the nearby shopping center and a typical street in the neighborhood.



**Figure 13. Imagination Station**



**Figure 14. Access point to shopping center**



**Figure 15. Shopping Center adjacent to Cherry Ridge**



**Figure 16. Typical street in Cherry Ridge**

## **SURVEY**

The survey consisted of three parts. A copy of the survey instrument is included in **Appendix A**. The first part was a general household survey to be completed by the head of household. This form included questions about housing choice, auto ownership and household income. The second part was a survey to be completed by each adult in the household. This form included questions about trips made from home during the previous week. The last form was a survey to be completed by children in the home age 5-17. This section also included questions about trips made during the previous week, and a question about how they usually get to school. Unfortunately, very few of child surveys were returned and therefore the child trip data have not been included in this study.

The survey packet included a postage paid return envelope and an opportunity to be included in a drawing for a \$100 gift certificate to a local department store for completing the survey. The survey was distributed once in May 2003 and again, in June 2003, to the homes not responding to the first distribution. The weather during the two time periods was normal for late spring in the Willamette Valley and similar for both weeks. Highs temperatures were in the 60's and 70's with scattered showers throughout the week. The survey response rates are shown in Table 3.

Once the surveys were returned the data was entered into a spreadsheet and cleaned. Basic statistics such as minimum, maximum and mean were calculated for each column to find errors or anomalies in the data. A few data entry errors were corrected by referring back to the original surveys to get the correct responses. Some of the residents made errors when completing their surveys. In some cases the data could not be used, and in others we were able to recode responses into a usable format. For example, in the table asking for numbers of trips to destinations by mode, a few respondents did not use numbers but instead marked the

**Table 3 Survey Response Rates**

	Distributed	Returned	Rate
Fairview Village	327	104	32%
Cherry Ridge	151	45	30%
Hampton Point	124	34	27%
Total	602	183	30%

box with an x. Those were each coded as one trip and if the mark was in the box for mode to work it was coded as five trips. A few respondents indicated five trips to work by car and five trips to work by transit. It is reasonable to believe that they drove to a park and ride and took transit from there. At least two residents indicated that was the case with a written note next to their responses. For each of these, the transit trips were recoded as zero since these trips originated as auto trips from home.

### **GEOCODING**

The data was also geocoded into a GIS database to allow spatial display of the quantitative variables in the database. The RLIS tax lot data includes a unique 10-digit number for each tax lot. Before distribution, the surveys were assigned a unique 4-digit tracking number. This number was then inserted into the database created from the RLIS data. As the surveys came back the response data was linked back to the tax lots in RLIS. This link makes it possible to graphically display and analyze the results of the survey responses.

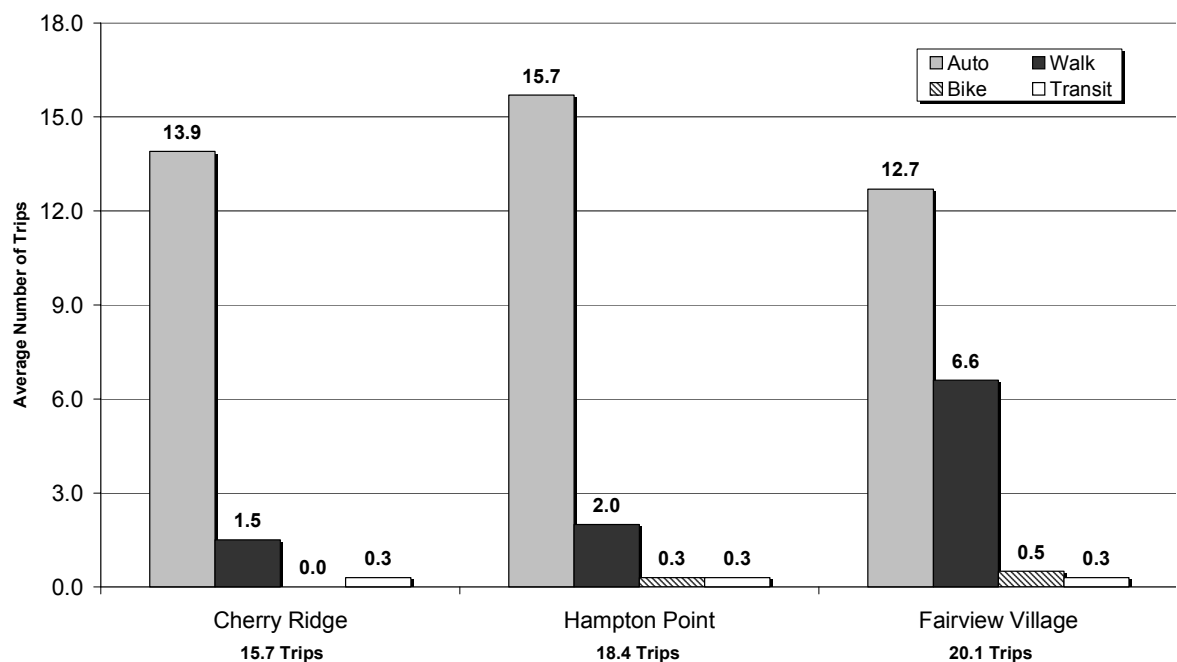
# Findings

## OVERVIEW

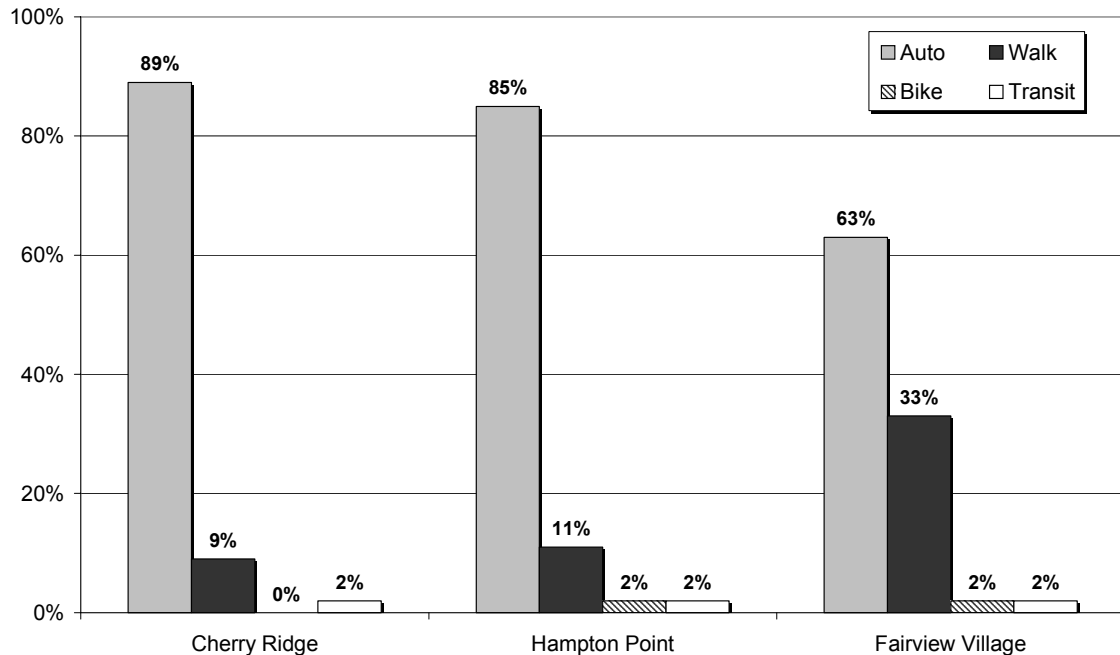
The data shows that there are significant differences in trip making and mode choices among the residents of the three neighborhoods. While not all of these differences can be directly attributed to neighborhood design, it is clearly a strong influence. The findings include statistical comparison of the number of trips by mode by neighborhood as well as comparison of trips to specific destinations. Next, maps displaying the origin of walking trips made in each neighborhood are used to spatially show the distribution and frequency of those trips and their proximity to destinations. Then, five different regression models are used to estimate trip frequency by mode, including a discussion of the significant variables. Finally, self-selection is discussed based on the rankings given by survey respondents to lists of factors that might have influenced their decision to live in a particular neighborhood.

The data shows that residents of Fairview Village make more overall trips than the residents of the other two neighborhoods. However, more of those trips are made by walking as shown in Figures 17 and 18. The numbers and percentages of bicycle and transit trips are very low for all three neighborhoods. None of the three communities is well served by transit, and those using transit are likely to drive to a park and ride, which is reported as an automobile

**Figure 17. Average Trips per Person Per Week by Mode**



**Figure 18. Percentage of Trips per Week per Person by Mode**



trip in the survey. In Fairview Village one-third of the weekly trips are made on foot, as opposed to Cherry Ridge and Hampton Point, where about one-tenth of the trips are made by walking.

### **WALKING AND PERSONAL VEHICLE TRIPS**

Statistical analysis reveals differences in trip making patterns among the three neighborhoods. Table 4 compares the average number of trips for specific purposes made by walking and by personal vehicle. The reported number of bicycle and transit trips were very low and were not analyzed.

The analysis of the walking trips to specific destinations shows that Fairview Village residents are making many more walking trips to destinations than the residents of the other two communities. This result is not surprising when comparing Fairview Village and Hampton Point, considering that the latter has virtually no destinations within walking distance. Cherry Ridge and Fairview Village do have some similar destinations within walking distance, but only trips to a store are not statistically different. Comparing the averages shows that Cherry Ridge residents make fewer trips to a store per person per week despite having a greater variety of stores near them. There may be something more than just proximity to destinations in the mode choices of Cherry Ridge residents.

**Table 4 Average number of trips by mode by neighborhood**

	Fairview Village	Cherry Ridge	Sig.	Fairview Village	Hampton Point	Sig.	Cherry Ridge	Hampton Point	Sig.
<b>Personal Vehicle Trips</b>									
Work	3.22	2.97	0.512	3.22	3.54	0.433	2.97	3.54	0.167
Personal Business	1.97	1.92	0.871	1.97	2.35	0.360	1.92	2.35	0.232
Store	2.14	2.45	0.203	2.14	2.43	0.286	2.45	2.43	0.930
Post Office	0.49	0.44	0.742	0.49	0.30	0.218	0.44	0.30	0.283
Restaurant/Café	1.07	1.40	0.111	1.07	1.54	0.052	1.40	1.54	0.635
Health Club	0.44	0.45	0.952	0.44	0.93	0.030	0.45	0.93	0.068
Library	0.09	0.17	0.198	0.09	0.20	0.120	0.17	0.20	0.716
Recreation	0.36	0.43	0.677	0.36	0.39	0.881	0.43	0.39	0.807
Park	<b>0.03</b>	<b>0.13</b>	<b>0.041</b>	<b>0.03</b>	<b>0.17</b>	<b>0.015</b>	0.13	0.17	0.679
School	0.50	0.75	0.256	0.50	0.61	0.664	0.75	0.61	0.628
Daycare	<b>0.01</b>	<b>0.12</b>	<b>0.046</b>	<b>0.01</b>	<b>0.20</b>	<b>0.015</b>	0.12	0.20	0.537
Entertainment	0.44	0.34	0.332	0.44	0.41	0.778	0.34	0.41	0.513
Visit Friends/Family	1.19	1.31	0.548	1.19	1.76	0.026	1.31	1.76	0.128
Other	0.70	0.99	0.187	0.70	0.87	0.427	0.99	0.87	0.689
All personal vehicle trips in survey week	12.65	13.88	0.213	<b>12.65</b>	<b>15.69</b>	<b>0.008</b>	13.88	15.69	0.145
<b>Walking Trips</b>									
Work	0.18	0.01	0.119	0.18	0.00	0.159	0.01	0.00	0.404
Personal Business	0.13	0.04	0.284	0.13	0.04	0.363	0.04	0.04	0.962
Store	0.40	0.27	0.345	<b>0.40</b>	<b>0.02</b>	<b>0.009</b>	<b>0.27</b>	<b>0.02</b>	<b>0.005</b>
Post Office	<b>0.72</b>	<b>0.01</b>	<b>0.000</b>	<b>0.72</b>	<b>0.02</b>	<b>0.000</b>	0.01	0.02	0.801
Restaurant/Café	<b>0.69</b>	<b>0.09</b>	<b>0.000</b>	<b>0.69</b>	<b>0.09</b>	<b>0.002</b>	0.09	0.09	0.985
Health Club	<b>0.52</b>	<b>0.01</b>	<b>0.001</b>	<b>0.52</b>	<b>0.04</b>	<b>0.008</b>	0.01	0.04	0.489
Library	<b>0.47</b>	<b>0.00</b>	<b>0.000</b>	<b>0.47</b>	<b>0.00</b>	<b>0.000</b>	0.00	0.00	--
Recreation	<b>1.92</b>	<b>0.60</b>	<b>0.001</b>	1.92	1.31	0.227	<b>0.60</b>	<b>1.31</b>	<b>0.037</b>
Park	<b>1.05</b>	<b>0.16</b>	<b>0.000</b>	<b>1.05</b>	<b>0.39</b>	<b>0.016</b>	0.16	0.39	0.136
School	0.06	0.05	0.883	0.06	0.00	0.390	0.05	0.00	0.404
Daycare	0.02	0.00	0.466	0.02	0.00	0.542	0.00	0.00	--
Entertainment	0.00	0.01	0.172	0.00	0.00	--	0.01	0.00	0.404
Visit Friends/Family	0.23	0.05	0.069	0.23	0.02	0.059	0.05	0.02	0.516
Other	0.18	0.14	0.811	0.18	0.04	0.419	0.14	0.04	0.282
All walk trips in survey week	<b>6.56</b>	<b>1.45</b>	<b>0.000</b>	<b>6.56</b>	<b>1.96</b>	<b>0.000</b>	1.45	1.96	0.380
All bike trips in survey week	<b>0.47</b>	<b>0.00</b>	<b>0.006</b>	0.47	0.35	0.615	<b>0.00</b>	<b>0.35</b>	<b>0.012</b>
All transit trips in survey week	0.33	0.32	0.958	0.33	0.33	1.000	0.32	0.33	0.967
All trips in survey week	<b>20.01</b>	<b>15.66</b>	<b>0.001</b>	20.01	18.33	0.296	15.66	18.33	0.054
	144	77		144	55		77	55	

*Significance based on 2-tailed t-test at .05 level of significance - Significantly different means are in bold*

Fairview Village is similar to the other two communities in the numbers of personal vehicle trips made for most purposes. Trips to the park and daycare are the only two purposes that are significantly different from the other two communities. The difference in daycare trips can be explained by the low numbers of children in Fairview Village, but the vehicle trips to the park are more interesting because a park is the only common destination within walking distance of all homes in all neighborhoods. Hampton Point residents also make significantly more vehicle trips than those in Fairview Village. This is likely due to the lack of destinations within walking distance of the homes in that neighborhood.

A previous study suggests that the walking trips in new urbanist communities are more likely to be for recreational/exercise purposes rather than to a destination (Handy 1996). Sixty-seven percent of the walking trips in Fairview Village are to a destination, as opposed to 53% and lower for the other two neighborhoods; See Table 5.

**Table 5 Walking trips: Destination vs. Exercise**

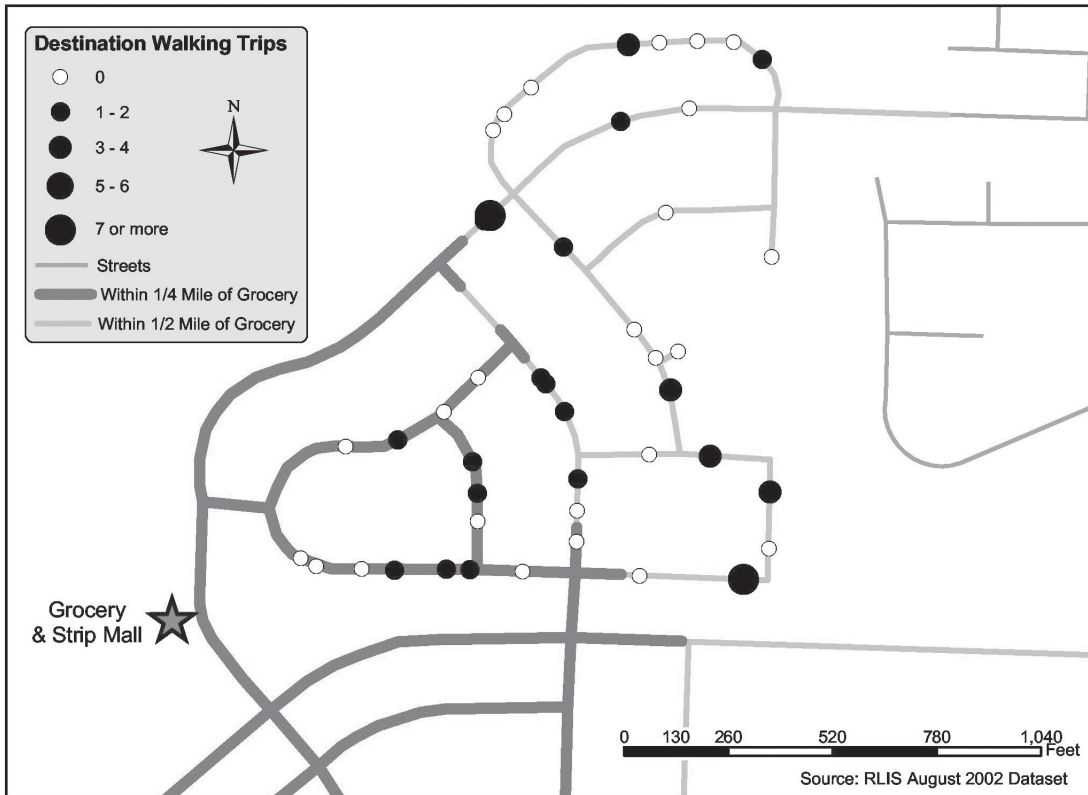
	Mean Walking Trips	Mean Destination Walking Trips	Mean Exercise Walking Trips	Percentage of Destination Trips
Fairview Village	6.6	4.4	2.2	67%
Cherry Ridge	1.5	0.8	0.7	53%
Hampton Point	2.0	0.6	1.4	30%

## **SPATIAL ANALYSIS OF WALKING TRIPS**

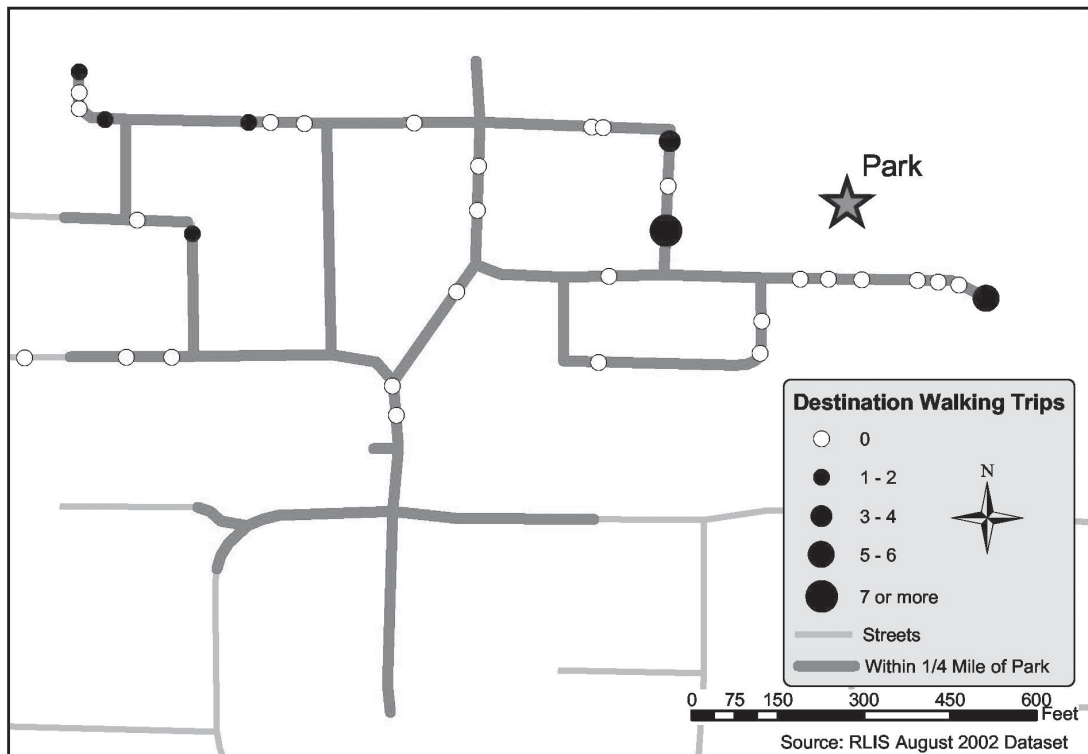
As explained earlier, the method of data collection in this study allows for spatial analysis of trips made by the residents of all three communities. Figures 19-21 are maps displaying the average number of trips per person by household to destinations. Each dot on the street network indicates a survey response from a household near that location. The specific tax lot relating to the data point is not shown to preserve the anonymity of the survey responders. The hollow dots indicate that zero destination walking trips were made from that location during the survey week. The rest of the dots are sized according to the average number trips per person made by the residents of a home near that location.

Data pertaining to modes other than walking is not displayed. It is difficult to determine where automobile trips are ending. A shopping trip via automobile is likely to be relatively

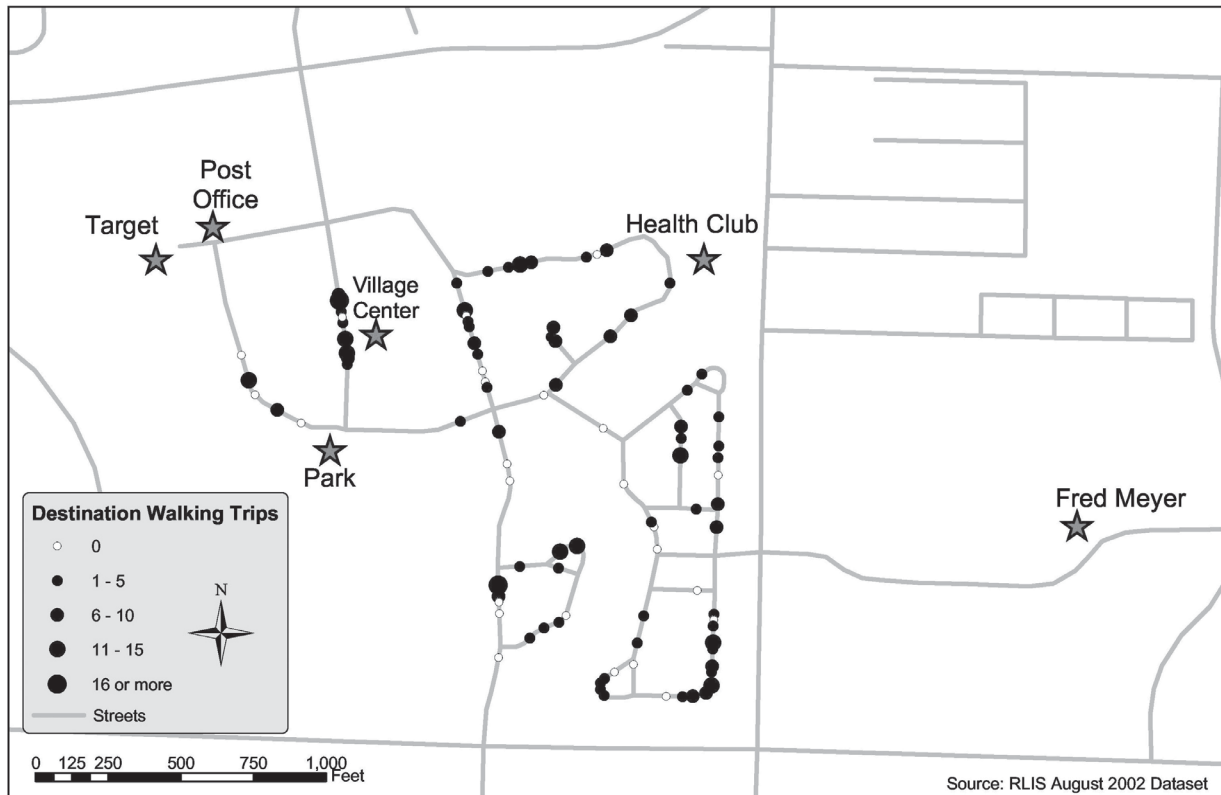




**Figure 19. Mean number of destination walking trips in Cherry Ridge per person by household**



**Figure 20. Mean number of destination walking trips in Hampton Point per person by household**



**Figure 21. Mean number of destination walking trips in Fairview Village per person by household**

short, but it could be ending anywhere in the metro area. The number of automobile trips is more important than the specific destination. The survey data regarding bike and transit trips shows that very few residents are biking or using transit. This data is not displayed because the numbers are low and the maps would be of little use.

Pedestrian service areas are often defined as a 1/4 mile walking distance to a location. Some studies consider a 1/2 mile walking distance as a service area. For the purposes of this survey the assumption is that the walking trips made to specific destinations are to the destinations within the 1/2 mile service area of their community. One expected outcome was that people who live nearest to a desirable destination will make more trips to that destination. By looking at the spatial display of the data one can see that this pattern is not necessarily true. None of our study neighborhoods measure more than 1/2 mile from end to end, so those small differences in distance seem to have no significant impact on mode choice. The number of overall trips to these destinations from the neighborhood is more important to consider than the specific origin of these trips.

In Cherry Ridge (Figure 19) less than one-half of the residents made a destination walking trip, even though much of the community is within one-quarter mile of the nearby shopping center. The number of trips in Hampton Point (Figure 20) are even lower. Of course the only destination within 1/4 mile of any of the residents is a park. Fairview Village has many potential destinations and each resident is within 1/4 mile of at least one of them and within 1/2 mile of almost all of them. The

number of destination walking trips is significantly higher than the other neighborhoods. The most popular destinations are the park and the post office.

Proximity to destinations seems to be contributing factor in the decision to walk to a destination for distances greater than ½ mile, as shown by the lack of destination walking trips in Hampton Point. However, it does not seem to be as much of a factor for distances shorter than ½ mile. The Fairview Village map shows a large cluster of residents making many walking trips from the southeast corner of the village. This is the location in the community that is farthest away from all the potential destinations.

A greater number of destination walking trips would suggest that some people are replacing trips they would usually make in an automobile if they lived somewhere else. If this is the case, weekly VMT should be lower in Fairview Village than in the other neighborhoods, and vehicle ownership might be lower as well. Table 6 shows that there are differences in the VMT among the neighborhoods. Like all the data in the survey the weekly VMT is self reported for all vehicles owned in the household. This can be a difficult number to estimate and may not be as reliable some of the other variables in the study. Nonetheless, the VMT is lowest in Fairview Village and highest in Hampton Point. Considering only VMT per adult, the difference between Fairview Village and Hampton Point is about 40 miles per adult per week and over 2,000 miles annually. Vehicle ownership is also slightly lower when considering vehicles per adult in the household.

## **ESTIMATION OF TRIP FREQUENCY BY MODE**

**Table 6 Vehicle Miles Traveled and Vehicles Per Person**

	VMT Per Person	VMT Per Adult	Vehicles Per Person	Vehicles Per Adult
Fairview Village	106.0	114.9	0.91	0.99
Cherry Ridge	109.9	137.0	0.87	1.08
Hampton Point	111.4	155.0	0.91	1.11

Using the survey data, four different regression models are used to estimate trip frequency by mode, and one model for all modes. In each model the number of trips per person per week by the given mode is the dependant variable. The independent variables in each model are vehicles available, age, number of children, neighborhood, and gender.

The independent variables were chosen because they were the most likely to have an effect on the mode choice of the residents. The most notable missing independent variable is household income. In the survey a large number of respondents chose not to respond to the income question. Including that variable would exclude the residents not responding to the

**Table 7 Selected Variables**

<b>Dependent Variables</b>	<b>Independent Variables</b>
All Trips-All Modes	Vehicles Available
Personal Vehicle Trips	Age
Walking Trips	Children
Bicycle Trips	Hampton Point (Dummy Variable)
Transit Trips	Cherry Ridge (Dummy Variable)
	Male (Dummy Variable)

income question, reducing the sample size. Vehicles available serves as a proxy for income since people with higher incomes tend to own more vehicles.

The frequency distribution of all trips-all modes and personal vehicle trips is approximately normal. Walking trips, bicycle trips, and transit trips have a Poisson distribution. The frequency distributions of all the dependant variables are shown in **Appendix B**.

All trips-all modes and personal vehicle trips can both be estimated using an Ordinary Least Squares (OLS) regression model. The Poisson distribution of the walking trips, bicycle trips, and transit trips requires a Poisson regression model. Tables 8 and 9 show the results of the models.

In Model A, all modes-all trips is the dependent variable. The negative coefficients show that residents living in both Hampton Point and Cherry Ridge are likely to make fewer trips per week than those living in Fairview Village. The positive coefficient for vehicles available indicates that residents will make about 2.5 more trips per week with each additional vehicle available in any neighborhood. The other three variables are not significant.

Model B, personal vehicle trips, has only two significant variables. The results suggest that people living in Hampton Point are likely to make 2.4 more personal vehicle trips per week than the residents of the other neighborhoods. Age is also a significant variable, and the coefficient shows that 30 year old person will make one more vehicle trip per week than a 55 year old person.

**Table 8 Estimation of Trip Frequency by Mode**

Model	A		B		C		D		E	
	All Modes		Personal Veh.Trips		Walking Trips		Bicycle Trips		Transit Trips	
	OLS	OLS	OLS	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
	<b>B</b>	<b>B</b>	<b>B</b>	<b>E</b>	<b>B</b>	<b>E</b>	<b>B</b>	<b>E</b>	<b>B</b>	<b>E</b>
Constant	17.294	13.874	0.942	0.610	-1.492	-3.446	0.514	0.402		
Hampton Point	<b>-3.249</b>	<b>2.406</b>	<b>-1.318</b>	-2.736	<b>-0.847</b>	-1.333	-0.297	-0.346		
Cherry Ridge	<b>-6.369</b>	0.192	<b>-1.685</b>	-4.392	n/a	n/a	-0.192	-0.212		
Vehicles Available	<b>2.534</b>	0.872	<b>0.313</b>	0.682	<b>-0.578</b>	-1.260	<b>0.543</b>	1.184		
Age	-0.0456	<b>-0.068</b>	<b>0.008</b>	0.371	<b>-0.029</b>	-1.344	-0.012	-0.556		
Male	-0.274	0.438	<b>-0.243</b>	-0.275	<b>1.101</b>	0.667	-0.07	-0.073		
Children	0.419	0.283	0.018	0.010	0.127	0.074	-0.205	-0.119		
R-Square	0.096	0.070	0.248		0.115		0.058			
N	244	244	244	244	244	244	244	244		

Statistically significant results at the .05 level of significance shown in **bold**. Two Tailed Test

**Table 9 Descriptive Statistics**

Variable	Mean	Standard Deviation	N
All Trips/All Modes	18.40	9.32	244
Personal Vehicle Trips	13.50	6.91	244
Walking Trips	4.25	6.71	244
Bicycle Trips	0.26	1.13	244
Transit Trips	0.37	1.25	244
Vehicles Available	2.18	0.81	244
Age	46.34	13.51	244
Children	0.58	1.05	244

Five out of six of the variables in Model C, walking trips, are significant. This model also has the highest r-square value among the five. As expected, living in Hampton Point or Cherry Ridge will result in about 1.3 and 1.7 fewer walking trips per week respectively. It is interesting that Cherry Ridge has a larger negative coefficient than Hampton Point, because there are far fewer destinations within walking distance of the Hampton Point neighborhood. Another unexpected result is that residents with more vehicles available make more walking trips. The number of walking trips increases by about one-third of a trip for each additional vehicle. Perhaps the vehicles available variable, in this case, is indicating that people with higher incomes make more walking trips. Lastly, if a person is male they are less likely to make a walking trip.

Bicycle trips, estimated in Model D, does not include the Cherry Ridge variable. None of residents of Cherry Ridge reported a bicycle trip during the survey week. However, the model shows that male residents make about one more bicycle trip per week than female residents. Living in Hampton Point, having more vehicles available, and being older all reduce the number of bicycle trips made in a week.

The last model, Model E, estimates transit trips. Oddly, the only significant variable in the model is vehicles available. The results indicate that a person with more vehicles available is more likely to make a transit trip. This is quite the opposite of what would be expected and might be a result of survey error. As discussed earlier, a few respondents indicated that they drove to a park and ride to use transit. In the data cleaning process those responses were recoded as personal vehicle trips. However, there are likely to be other respondents that did not give that information on their surveys and those trips were recorded as transit trips. This model also has the lowest r-square value among all the models used.

The variable, children, is not significant in any of the models. However, the coefficient in Model A shows that people with two children will make about one more trip per week than those without children. This probably would not come as a surprise to any parent. The children coefficient has the least effect in estimating walking trips.

The frequency of transit trips and bicycle trips among the neighborhoods was very low. The regression models D and E, even with the Poisson transformation have a very low r-square value and may not be good estimations of the trip-making of the residents.

Across Models A, B and C the dummy variables for neighborhood, Hampton Point and Cherry Ridge, have the strongest effect on estimating the trips. The neighborhood variables

actually represent many influences in one. As discussed previously, each neighborhood has a specific set of design characteristics, like slope, density, and pedestrian amenities. Those variables were not included in the model individually because they do not change within the neighborhood. The result is a set of dummy variables for the neighborhoods representing all the distinguishing features and community connections. One of the most notable missing variables is the distance to the destination. This information would be difficult to gather, but would likely have a strong influence on the mode choice.

## **SELF-SELECTION**

Neighborhood self-selection is always an issue in studies like this. The decision to purchase or rent a home is complex and a number of factors contribute to the final choice made by a resident. People are likely to choose a location that best fits their budget, tastes and lifestyle. Therefore people who like to walk to the store, park, and other destinations will be more likely to choose to live in a place like Fairview Village. Table 10 shows the mean scores of the survey questions pertaining to the housing decisions of the survey respondents. The scores are shown in rank order by neighborhood in Tables 11-13.

Neighborhood Safety scored highest in all neighborhoods with Price/Rent and Style of Neighborhood scoring second or third in all neighborhoods. Having destinations within walking distance ranked significantly higher in Fairview Village than in the other two neighborhoods. Four out of the five lowest ranked factors in Cherry Ridge and Hampton Point were having a destination within walking distance. The only destination that ranked low among all three neighborhoods was a school, although there is a school within walking distance of Fairview Village and Cherry Ridge. Size of yard was ranked significantly higher in Cherry Ridge than both of the other neighborhoods. Cherry Ridge does have the largest tax lots among the neighborhoods. The importance of having stores within walking distance is statistically different among all three neighborhoods. The score was highest in Fairview Village, where there are stores within easy walking distance, lowest in Hampton Point, with no stores within a reasonable walking distance, and in between in Cherry Ridge, where the stores are located across a street and parking lot. The ranking of the factors for each neighborhood is similar to the design and amenities offered by each. This suggests that people did indeed choose where to live based on the neighborhood that best met their wants and needs. However, it is also possible that in the desire to feel good about the place they have chosen to live the rankings reflect an ex-post rationalization of the purchasing decision by the respondents.

**Table 10 Ranking of importance of factors in choosing a home**

Average ranking by Neighborhood	Cherry Ridge	Fairview Village	Sig.	Hampton Point	Fairview Village	Sig.	Cherry Ridge	Hampton Point	Sig.
Size of house/apartment	5.89	5.71	0.354	5.68	5.71	0.899	5.89	5.68	0.400
Size of yard	<b>5.80</b>	<b>4.98</b>	<b>0.004</b>	5.03	4.98	0.880	<b>5.80</b>	<b>5.03</b>	<b>0.009</b>
Price/rent	5.96	5.90	0.792	6.12	5.90	0.353	5.96	6.12	0.505
Property taxes	<b>5.58</b>	<b>4.88</b>	<b>0.012</b>	5.18	4.88	0.359	5.58	5.18	0.181
Style of house/apartment	5.71	5.83	0.546	5.59	5.83	0.322	5.71	5.59	0.665
Style of neighborhood	6.04	6.19	0.327	5.85	6.19	0.056	6.04	5.85	0.351
Sense of community	5.62	5.77	0.470	5.56	5.77	0.375	5.62	5.56	0.813
Quality of schools	5.56	4.15	0.000	4.59	4.15	0.312	<b>5.56</b>	<b>4.59</b>	<b>0.030</b>
Neighborhood safety	6.27	6.29	0.889	6.38	6.29	0.633	6.27	6.38	0.592
Having stores within walking distance	<b>4.49</b>	<b>5.21</b>	<b>0.008</b>	<b>3.35</b>	<b>5.21</b>	<b>0.000</b>	<b>4.49</b>	<b>3.35</b>	<b>0.002</b>
Having cafes/restaurants within walking distance	<b>3.31</b>	<b>4.79</b>	<b>0.000</b>	<b>2.85</b>	<b>4.79</b>	<b>0.000</b>	3.31	2.85	0.161
Having a library within walking distance	<b>3.07</b>	<b>5.23</b>	<b>0.000</b>	<b>2.29</b>	<b>5.23</b>	<b>0.000</b>	<b>3.07</b>	<b>2.29</b>	<b>0.030</b>
Having a post office within walking distance	<b>2.91</b>	<b>5.08</b>	<b>0.000</b>	<b>2.12</b>	<b>5.08</b>	<b>0.000</b>	2.91	2.12	0.018
Having schools within walking distance	3.70	3.31	0.282	2.76	3.31	0.168	<b>3.70</b>	<b>2.76</b>	<b>0.038</b>
Location relative to work	4.09	4.41	0.372	4.68	4.41	0.504	4.09	4.68	0.139
Location relative to friends/relatives	4.00	4.13	0.698	4.00	4.13	0.726	4.00	4.00	1.000
Neighborhood parks	<b>4.43</b>	<b>5.24</b>	<b>0.003</b>	<b>4.09</b>	<b>5.24</b>	<b>0.000</b>	4.43	4.09	0.346
Amount of car traffic on my street	5.93	5.85	0.756	5.57	5.85	0.356	5.93	5.57	0.209
Layout and size of the neighborhood streets	5.30	5.59	0.291	<b>4.91</b>	<b>5.59</b>	<b>0.043</b>	5.30	4.91	0.324
Being close to public transit	<b>3.00</b>	<b>4.11</b>	<b>0.004</b>	<b>2.95</b>	<b>4.11</b>	<b>0.009</b>	3.00	2.95	0.912
Quick access to the freeway	5.40	5.68	0.257	<b>4.91</b>	<b>5.68</b>	<b>0.009</b>	5.40	4.91	0.148
Having bike lanes and paths nearby	<b>3.37</b>	<b>4.51</b>	<b>0.001</b>	3.74	4.51	0.057	3.37	3.74	0.427
Having sidewalks in my neighborhood	5.73	5.86	0.651	<b>5.13</b>	<b>5.86</b>	<b>0.028</b>	5.73	5.13	0.156
	N=	45	103	34	103	45	34	34	45

Significance based on 2-tailed t-test at .05 level of significance  
Significantly different means are in **bold**.



**Table 11**  
**Fairview Village**  
**Average Ranking of Importance of Factors in Choosing a Home**

Rank	Factors	Average Score
1	Neighborhood safety	6.29
2	Style of neighborhood	6.19
3	Price/rent	5.90
4	Having sidewalks in my neighborhood	5.86
5	Amount of car traffic on my street	5.85
6	Style of house/apartment	5.83
7	Sense of community	5.77
8	Size of house/apartment	5.71
9	Quick access to the freeway	5.68
10	Layout and size of the neighborhood streets	5.59
11	Neighborhood parks	5.24
12	Having a library within walking distance	5.23
13	Having stores within walking distance	5.21
14	Having a post office within walking distance	5.08
15	Size of yard	4.98
16	Property taxes	4.88
17	Having cafes/restaurants within walking	4.79
18	Having bike lanes and paths nearby	4.51
19	Location relative to work	4.41
20	Quality of schools	4.15
21	Location relative to friends/relatives	4.13
22	Being close to public transit	4.11
23	Having schools within walking distance	3.31

**Table 12**  
**Cherry Ridge**  
**Average Ranking of Importance of Factors in Choosing a Home**

Rank	Average ranking by Neighborhood	Average Score
1	Neighborhood safety	6.27
2	Style of neighborhood	6.04
3	Price/rent	5.96
4	Amount of car traffic on my street	5.93
5	Size of house/apartment	5.89
6	Size of yard	5.80
7	Having sidewalks in my neighborhood	5.73
8	Style of house/apartment	5.71
9	Sense of community	5.62
10	Property taxes	5.58
11	Quality of schools	5.56
12	Quick access to the freeway	5.40
13	Layout and size of the neighborhood streets	5.30
14	Having stores within walking distance	4.49
15	Neighborhood parks	4.43
16	Location relative to work	4.09
17	Location relative to friends/relatives	4.00
18	Having schools within walking distance	3.70
19	Having bike lanes and paths nearby	3.37
20	Having cafes/restaurants within walking distance	3.31
21	Having a library within walking distance	3.07
22	Being close to public transit	3.00
23	Having a post office within walking distance	2.91

**Table 13**  
**Cherry Ridge**  
**Average Ranking of Importance of Factors in Choosing a Home**

Rank	Average ranking by Neighborhood	Average Score
1	Neighborhood safety	6.27
2	Style of neighborhood	6.04
3	Price/rent	5.96
4	Amount of car traffic on my street	5.93
5	Size of house/apartment	5.89
6	Size of yard	5.80
7	Having sidewalks in my neighborhood	5.73
8	Style of house/apartment	5.71
9	Sense of community	5.62
10	Property taxes	5.58
11	Quality of schools	5.56
12	Quick access to the freeway	5.40
13	Layout and size of the neighborhood streets	5.30
14	Having stores within walking distance	4.49
15	Neighborhood parks	4.43
16	Location relative to work	4.09
17	Location relative to friends/relatives	4.00
18	Having schools within walking distance	3.70
19	Having bike lanes and paths nearby	3.37
20	Having cafes/restaurants within walking distance	3.31
21	Having a library within walking distance	3.07
22	Being close to public transit	3.00
23	Having a post office within walking distance	2.91

**Table 14 Residents ranking walking as unimportant, but are now walking more.**

	Ranking <=4	Walk More	Percentage
Fairview Village	23	17	74%
Cherry Ridge	30	13	43%
Hampton Point	37	20	54%

Self-selection complicates the answer to the original research question about the influence of design on mode choice. Looking into the ranking given by residents to the questions about having things within walking distance might indicate a change in behavior by those residents in Fairview Village. Table 14 shows the number of residents ranking having destinations within walking distance as 4 or lower. It also shows the number of residents that indicated they now walk more in this neighborhood than where they previously lived. Seventy-four percent of those ranking walking as unimportant now walk more in Fairview Village than in their previous neighborhood. Some reasons given for walking more included a feeling of safety, nearby destinations, and a nice environment for walking.



# Conclusions

The data shows that residents of Fairview Village walk more and drive less than the residents of the other two neighborhoods. However, the reasons why are not easily determined. One likely reason seems to be the proximity to desirable destinations. Since they live in a place where they can walk to many destinations they do not have a reason to drive as often as those in the other communities. Another likely reason is the makeup of the households. There are fewer children, and smaller households in Fairview Village. Having smaller households makes it much easier to make a quick walk to the store or coffee shop.

The research question asks if neighborhood design features have an impact on mode choice. By analyzing the results I realized that the way our study was conducted it is impossible to determine if individual design features have any impact on mode choice. However, the overall pedestrian environment does seem to have some influence. Many of the residents of Cherry Ridge are closer to a better variety of destinations than the residents of Fairview Village. Cherry Ridge also ranked being within walking distance of stores fairly important in their decision to live in that community. The numbers and the maps have shown that these residents are not walking nearly as much as the residents of Fairview Village. I conclude that the unfriendly pedestrian environment and auto-oriented shopping mall near the neighborhood is keeping those that would like to walk from doing so.

Another benefit that cannot be overlooked is the potential to increase overall health by building communities like Fairview Village. The data shows that Fairview Village residents are taking advantage of the increased opportunities for physical activity by walking more than the residents of the other communities. Further study focusing more specifically on the links between health and urban form should be conducted to determine if neighborhood design does have an impact on health.

Self-selection is clearly at least one factor at work in the increased number of walking trips in Fairview Village. It makes it very difficult for researchers to determine if it is the neighborhood changing the behavior, or people who like walking, moving to the neighborhood. However, that does not mean communities like this are failures and should not continue to be built. The residents of Fairview Village have obviously found a community in which they can live in the manner they choose. Having a choice to live in this community is a great thing for those that choose to do so. Other people with a preference for a more auto-oriented community will have no shortage of options in the foreseeable future. The increased number of walking trips shows that Fairview Village is a success at creating an environment that is conducive to using a mode other than a personal vehicle.



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# Appendices



# Appendix A

## **SURVEY INSTRUMENT**



# Household Survey

The head of your household should answer the following questions.

1. How long have you lived at this address?  
 \_\_\_\_\_ Years  
 or \_\_\_\_\_ Months (if less than one year)
2. Do you own or rent your home? (circle one answer)
  1. Own
  2. Rent
3. On a scale of 1 to 7, 1 = not at all important and 7 = extremely important, please rate the following factors in your decision to purchase or rent your current home. Circle one number for each factor.



	Not at all important						Extremely important
Size of house/apartment	1	2	3	4	5	6	7
Size of the yard	1	2	3	4	5	6	7
Price/rent	1	2	3	4	5	6	7
Property taxes	1	2	3	4	5	6	7
Style of house/apartment	1	2	3	4	5	6	7
Style of the neighborhood	1	2	3	4	5	6	7
Sense of community	1	2	3	4	5	6	7
Quality of schools	1	2	3	4	5	6	7
Neighborhood safety	1	2	3	4	5	6	7
Having stores within walking distance	1	2	3	4	5	6	7
Having cafes/restaurants within walking distance	1	2	3	4	5	6	7
Having a library within walking distance	1	2	3	4	5	6	7
Having a post office within walking distance	1	2	3	4	5	6	7
Having schools within walking distance	1	2	3	4	5	6	7
Location relative to work	1	2	3	4	5	6	7
Location relative to family/friends	1	2	3	4	5	6	7
Neighborhood parks	1	2	3	4	5	6	7
Amount of car traffic on my street	1	2	3	4	5	6	7
Layout and size of the neighborhood streets	1	2	3	4	5	6	7
Being close to public transit	1	2	3	4	5	6	7
Quick access to the freeway	1	2	3	4	5	6	7
Having bike lanes and paths nearby	1	2	3	4	5	6	7
Having sidewalks in my neighborhood	1	2	3	4	5	6	7

*Please continue on the other side.*

4. Are there other factors that were important in your decision to purchase or rent your current home? If so, please list them:

	Not at all important					Extremely important	
	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7

5. Please complete the following information for the vehicles your household owns or leases. If you have more than three vehicles, list the ones that you drive the most.

Vehicle Type	Model Year (ex: 1991 or 2002)	When at home, where is this vehicle usually parked?	Approximate number of miles driven per week
1. Car or station wagon 2. Pick-up truck 3. Sport utility vehicle (SUV) 4. Van or minivan 5. Motorcycle 6. Other (describe): _____		1. Garage 2. Driveway 3. Street 4. Parking Lot 5. Other _____	_____ miles
1. Car or station wagon 2. Pick-up truck 3. Sport utility vehicle (SUV) 4. Van or minivan 5. Motorcycle 6. Other (describe): _____		1. Garage 2. Driveway 3. Street 4. Parking Lot 5. Other _____	_____ miles
1. Car or station wagon 2. Pick-up truck 3. Sport utility vehicle (SUV) 4. Van or minivan 5. Motorcycle 6. Other (describe): _____		1. Garage 2. Driveway 3. Street 4. Parking Lot 5. Other _____	_____ miles

6. How many people currently live in your home? (enter a number on each line)

- \_\_\_ Adults (18 and older)
- \_\_\_ Children 5-17 years old
- \_\_\_ Children under 5 years old

7. What was your household income in 2002 before taxes? (circle one answer)

- 1. Less than \$20,000
- 2. \$20,000 to 29,999
- 3. \$30,000 to 39,999
- 4. \$40,000 to 49,999
- 5. \$50,000 to 59,999
- 6. \$60,000 to 69,999
- 7. \$70,000 to 79,999
- 8. \$80,000 to 89,999
- 9. \$90,000 or more

# Adult Survey

1. How did you travel *from your home* to the following places last week? Please write a number in each column for the number of times you used the following forms of transportation to go to these locations **from home** last week – Sunday May 11th through Saturday May 17<sup>th</sup>.

**Example:** If you drove to work from home four times last week you would enter 4 in the work row under the personal vehicle column. If you walked or jogged around your neighborhood once last week you would enter 1 in the recreation/exercise row under the walk column. If your answer is zero for any box you may leave it blank.

	Personal Vehicle	Bike	Walk	Tri-Met
Work				
Personal business: Bank, dry cleaner, salon etc.				
Shopping/Store				
Post Office				
Restaurant/coffee				
Health Club				
Library				
Recreation/exercise				
Park				
School				
Daycare				
Entertainment/movie/show				
Visit friends				
Other places				

2. I walk more often in this neighborhood than where I used to live. (circle one answer)
1. No
  2. Yes If yes, please describe why:
3. I ride a bike more often in this neighborhood than where I used to live. (circle one answer)
1. No
  2. Yes If yes, please describe why:
4. I use transit more often in this neighborhood than where I used to live. (circle one answer)
1. No
  2. Yes If yes, please describe why:
5. Do you have a valid Driver's License?
1. Yes
  2. No

*Please continue on the other side.*

6. Please circle the number (1-5 or ?) that most closely matches your feelings about the following statements.

	Strongly Disagree			Strongly Agree			Don't know
I think my neighborhood is a good place for me to live.	1	2	3	4	5	?	
I can recognize most of the people who live on my street.	1	2	3	4	5	?	
I feel at home in this neighborhood.	1	2	3	4	5	?	
Very few of my neighbors know me.	1	2	3	4	5	?	
I care about what my neighbors think of my actions.	1	2	3	4	5	?	
I have influence over what this neighborhood is like.	1	2	3	4	5	?	
If there is a problem in this neighborhood people who live here can get it solved.	1	2	3	4	5	?	
It is very important to me to live in this particular neighborhood.	1	2	3	4	5	?	
People in this neighborhood get along with each other.	1	2	3	4	5	?	
I expect to live in this neighborhood for a long time.	1	2	3	4	5	?	
My neighborhood has good access to schools.	1	2	3	4	5	?	
My neighborhood has good access to parks.	1	2	3	4	5	?	
My neighborhood has good access to shopping.	1	2	3	4	5	?	
I have difficulty finding a place to park on my street	1	2	3	4	5	?	
People who visit me have difficulty finding a place to park on my street	1	2	3	4	5	?	
I feel safe walking or biking in my neighborhood. Why or why not?	1	2	3	4	5	?	
I feel safer in this neighborhood than where I previously lived. Why or why not?	1	2	3	4	5	?	

To make sure we have a representative sample, we would like to know a little more about you. Remember, your answers will be kept confidential.

6. What is your gender? (circle one answer)
1. Male
  2. Female
7. What is your age? \_\_\_\_\_ years
8. How would you describe your race/ethnicity? (circle one answer)
1. White/Caucasian
  2. African American
  3. Native American
  4. Hispanic/Latino
  5. Asian American
  6. Other: \_\_\_\_\_
9. How many years of school have you completed? (circle one answer)
- |                 |             |             |                 |
|-----------------|-------------|-------------|-----------------|
| 1 2 3 4 5 6 7 8 | 9 10 11 12  | 13 14 15 16 | 17+             |
| Grade school    | High school | College     | Advanced Degree |
10. Do you currently work outside the home? (circle one answer)
1. Yes, full-time
  2. Yes, part-time
  3. No
11. Is there anything else you would like to tell us about your neighborhood?



## Child Survey (5 – 17 year olds)

**Parents, please feel free to help if needed.**

- How did you travel *from your home* to the following places last week? Please write a number in each column for the number of times you used the following forms of transportation to go to these locations **from home** last week – Sunday May 11th through Saturday May 17<sup>th</sup>. Include places you went with your parent(s) or other people.

	Personal Vehicle	Bike	Walk (including skateboard, scooter, rollerblade)	Tri-Met or school bus
School				
Daycare				
Park				
Entertainment/movie/show				
Recreation/Sports				
Library				
Visit Friends				
Store				
Post Office				
Restaurant/coffee shop				
Work				
Health Club				
Personal business: Bank, dry cleaner, salon etc.				

- Do you usually ride a school bus to school?      1. Yes      2. No
- Are you a:      1. Boy      2. Girl
- How old are you?      \_\_\_\_\_ years
- How would you describe your race/ethnicity? (circle one answer)
 

1. White/Caucasian	4. Hispanic/Latino
2. African American	5. Asian American
3. Native American	6. Other: _____
- What grade are you in? (circle one answer)
 

K	1 2 3 4 5 6 7 8	9 10 11 12
	Grade/Middle School	High School

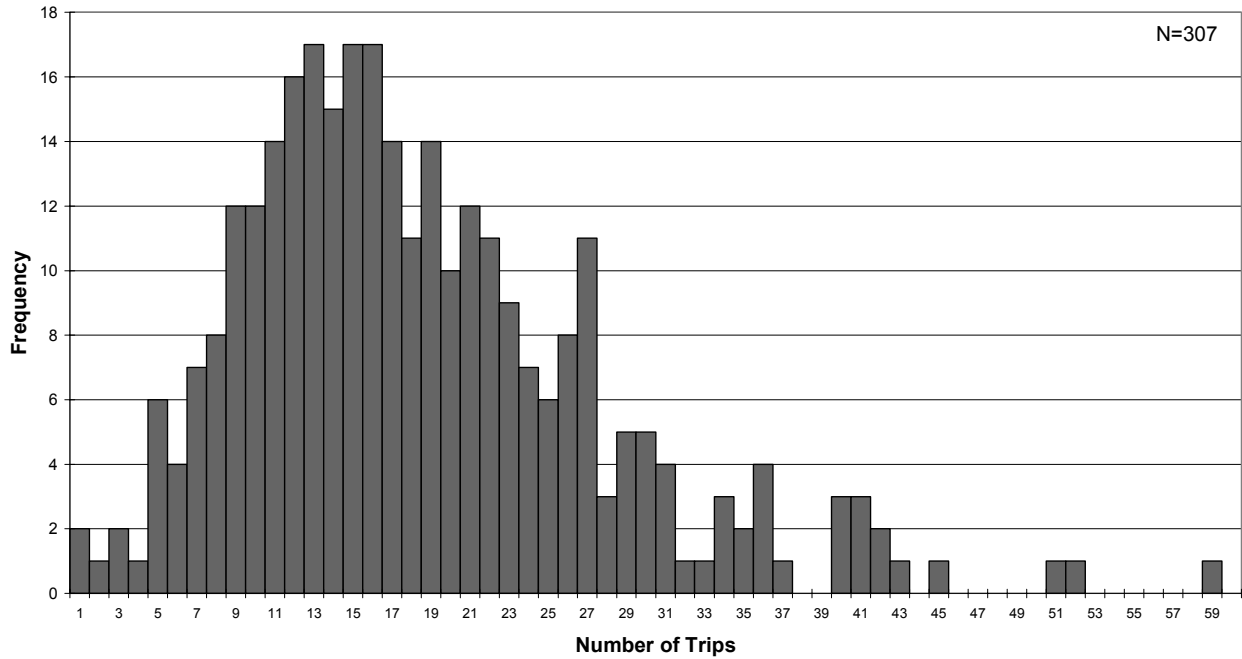


# Appendix B

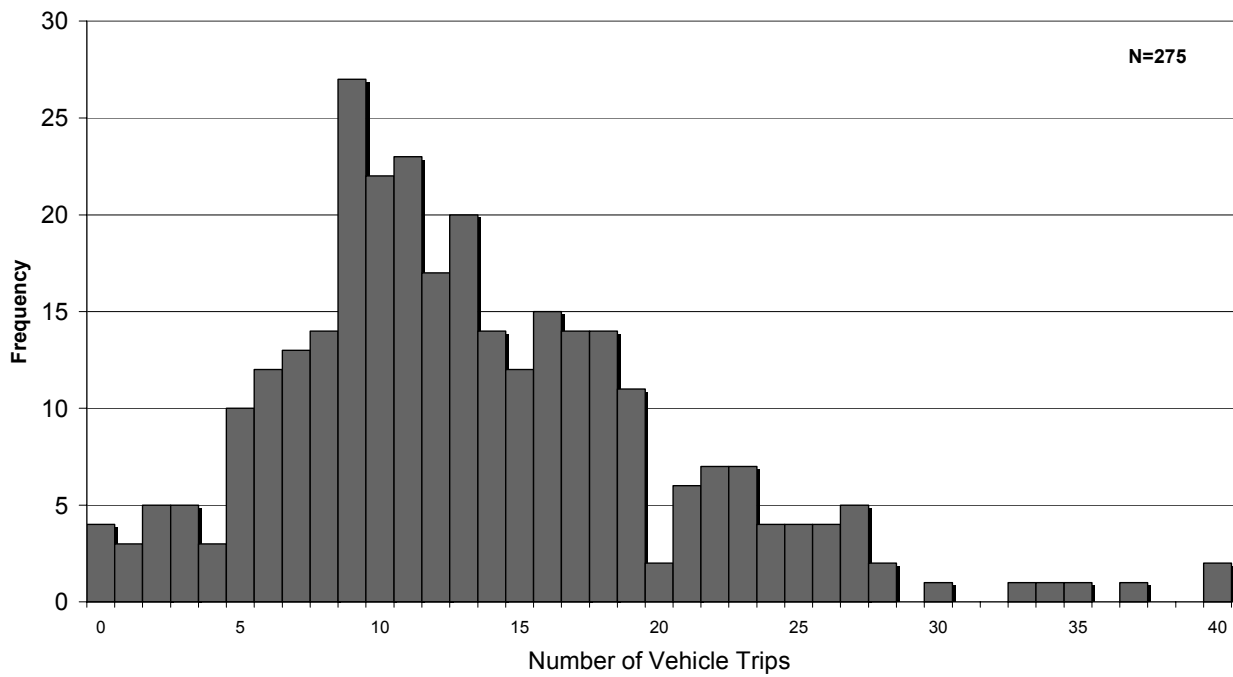
## **TRIP FREQUENCY DISTRIBUTION**



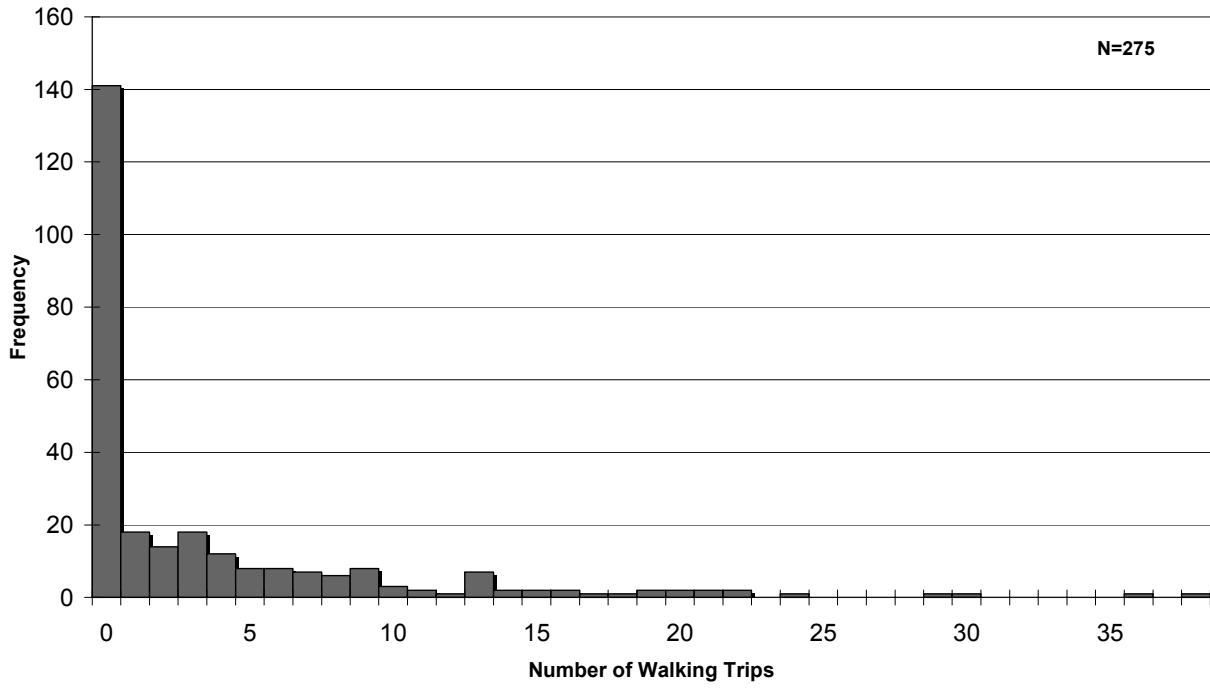
### Weekly Trips by All modes in All Neighborhoods



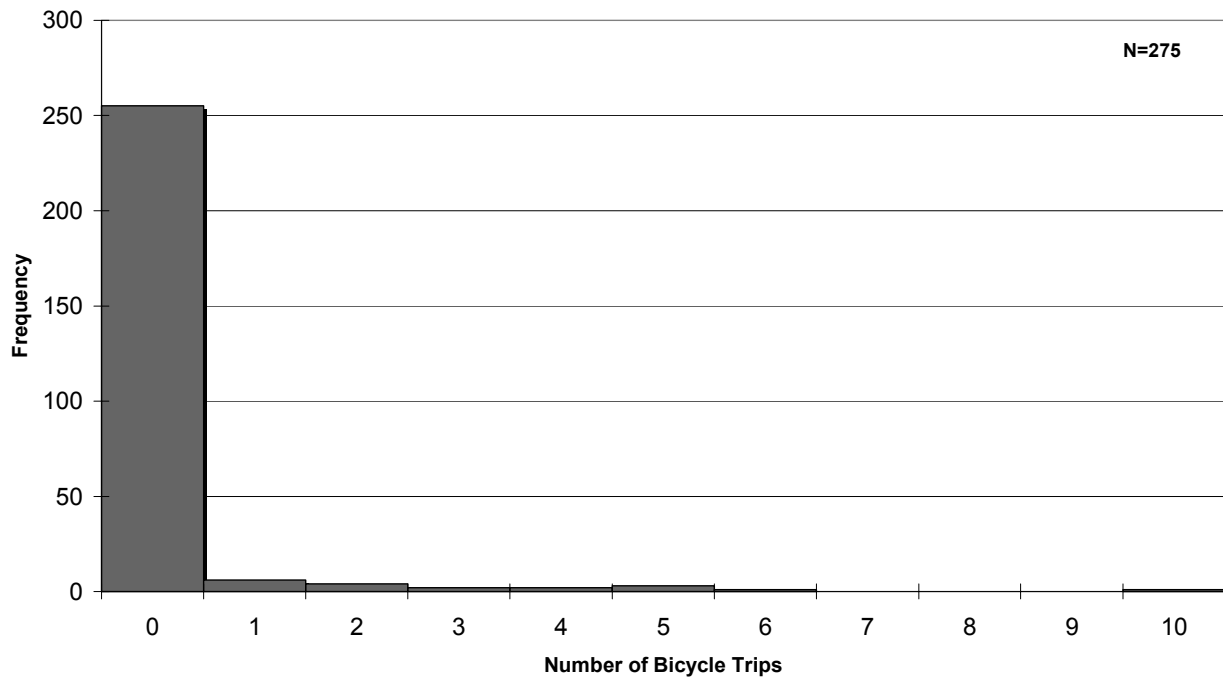
### Weekly Vehicle Trips in All Neighborhoods



### Weekly Walking Trips in All Neighborhoods



### Weekly Bicycle Trips in All Neighborhoods



### Weekly Transit Trips for All Neighborhoods

