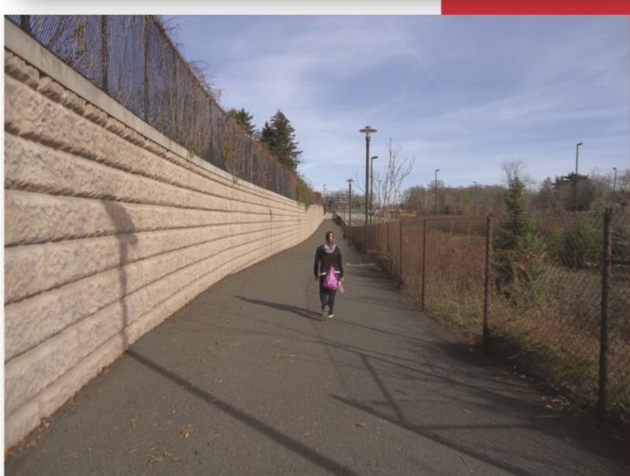

2013

How Do People Value Different Types of Pedestrian and Bicycle Infrastructure?

A Report from a Survey of Residents in Two New Jersey Regions

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INTRODUCTION

Large amounts of investments are made by state departments of transportation and other government agencies to build, improve, and maintain bicycle and pedestrian infrastructure. Some of these investments are made to improve safety of bicyclists and pedestrians, while other investments are made to promote walking and bicycling, and yet other investments are made to complement public transportation. In New Jersey alone, millions of dollars are spent annually to build, improve, and maintain sidewalks, crosswalks, bicycle paths, bicycle lanes, and trails for both pedestrians and bicyclists. These investments are being made on public roads as well as in recreational areas such as parks by the New Jersey Department of Transportation (NJDOT) and various counties and municipalities. The new and improved infrastructures funded by these agencies are being regularly used by New Jersey residents for both transportation and recreational purposes.

There is little doubt that the funds invested to build, improve, and maintain bicycle and pedestrian infrastructure in the state help to promote walking and bicycling and to make walking and bicycling safer. Yet, little is known about the way New Jersey residents value different types of bicycle and pedestrian infrastructure relative to competing types of infrastructure. For example, whether, or to what extent, New Jersey residents prefer a separated bicycle path over a bicycle lane is virtually unknown. Similarly, information on New Jersey residents' assessment of brick crosswalks relative to standard asphalt sidewalks, or their assessment of sidewalks with street furniture relative to sidewalks without street furniture is scant or non-existent. While some types of infrastructure are incomparable to other types because they serve different purposes, many types of infrastructure are in fact substitutes of other types of infrastructure. When certain types of infrastructure are substitutes of other types of infrastructure, it helps to know how people value different types of bicycling and pedestrian infrastructure.

While the information on New Jersey residents' valuation of different types of bicycle and pedestrian infrastructure is scant, even less is known about the reasons for their valuation. For example, some individuals' valuation of a sidewalk may be solely or mostly influenced by the surface material, whereas other individuals' assessment of the same may be influenced by the presence of lamp posts and benches.

Due to the limited availability of information on people's valuation of different types of bicycle and pedestrian infrastructure, the Alan M. Voorhees Transportation Center at Rutgers University undertook a survey of New Jersey residents by focusing on two large regions of the state, namely, the greater Bloomfield area of northern New Jersey and the greater Cherry Hill area of southern New Jersey. The survey respondents were selected by random sampling from mailing lists purchased from a private vendor. The primary objectives of the survey were the following:

a) Determine how the respondents value different types of bicycle and pedestrian infrastructure, such as separated bicycle paths, marked bicycle lanes, elevated bicycle lanes, bicycle sharrows, sidewalks, crosswalks, and trails.
b) Identify the factors that influence the respondents' valuation of different types of infrastructure, including surface material, separation from traffic, and the characteristics of the surrounding areas.

c) Determine how the respondents perceive the availability and quality of bicycling and pedestrian infrastructure in their neighborhood.
d) Determine how frequently and for what purpose the respondents use bicycling and pedestrian infrastructure of different types.
e) Identify the perceived barriers that deter the respondents from walking and bicycling for different purposes.
f) Determine how the respondents would like to distribute funds among different investment items to promote walking and bicycling.

This report presents some of the key findings from the survey. It specifically focuses on people's valuation of different types of bicycle and pedestrian infrastructure and the reasons for their valuation. The results from the analysis of other data collected through the survey will be presented in an expanded report.

SURVEY OF HOUSEHOLDS

Selection of the Survey Regions

The analysis in this report is based on a random survey of households conducted between September and November of 2012 in two regions of New Jersey: The greater Bloomfield region of north Jersey and the greater Cherry Hill region of south Jersey. Figure 1 shows the two regions in a state map for New Jersey, while Figure 2 shows the geographic distribution of the survey respondents in the greater Bloomfield region and Figure 3 shows the distribution of respondents in the greater Cherry Hill region. The greater Bloomfield region includes parts of Essex, Bergen, Passaic, and Hudson Counties, whereas the greater Cherry Hill region contains parts of Burlington and Camden Counties.

The reason for selecting one region from northern New Jersey and the other from southern New Jersey is geographic diversity. To ensure that the two regions, on the aggregate, are not too distinct from the state average, important socioeconomic and housing characteristics of the two regions were compared with the characteristics of the state by using data from the 2010 American Community Survey. The comparison of the two survey regions with the state is shown Table 1. Although the proportion of Hispanic persons and non-English speaking persons is lower in the greater Cherry Hill region than the state average, it was expected that the combined sample for the two regions would be reasonably close to the state average, due in part to the high percentage of individuals belonging to both categories in the greater Bloomfield area.

Table 1. Characteristics of the Surveyed Regions Compared to the State of New Jersey

Characteristics	New Jersey State	Greater Bloomfield Region	Greater Cherry Hill Region
Total Population	8,721,577	366,045	376,718
Percent African American	13%	11%	10%
Percent Hispanic	17%	23%	7%
Percent Non-English person	29%	40%	15%
Median Household Income	$69,811	$71,415	$74,266
Percent owned homes	67%	60%	76%
Percent detached homes	56%	47%	63%

Despite the best effort to generate a sample of respondents that resembles the state population, analysis of the survey data showed that the median household income for the survey respondents was approximately $103,200 for the two regions combined. Similarly, African American and Hispanic respondents constituted only 7% of the respondents who participated in the survey, although they constitute approximately 10% and 15% of the population, respectively, in the two regions combined. One of the reasons for the low participation among low-income and minority populations may be a lower availability of the Internet in such households. Among the survey participants, 45% were women and 55% were men.

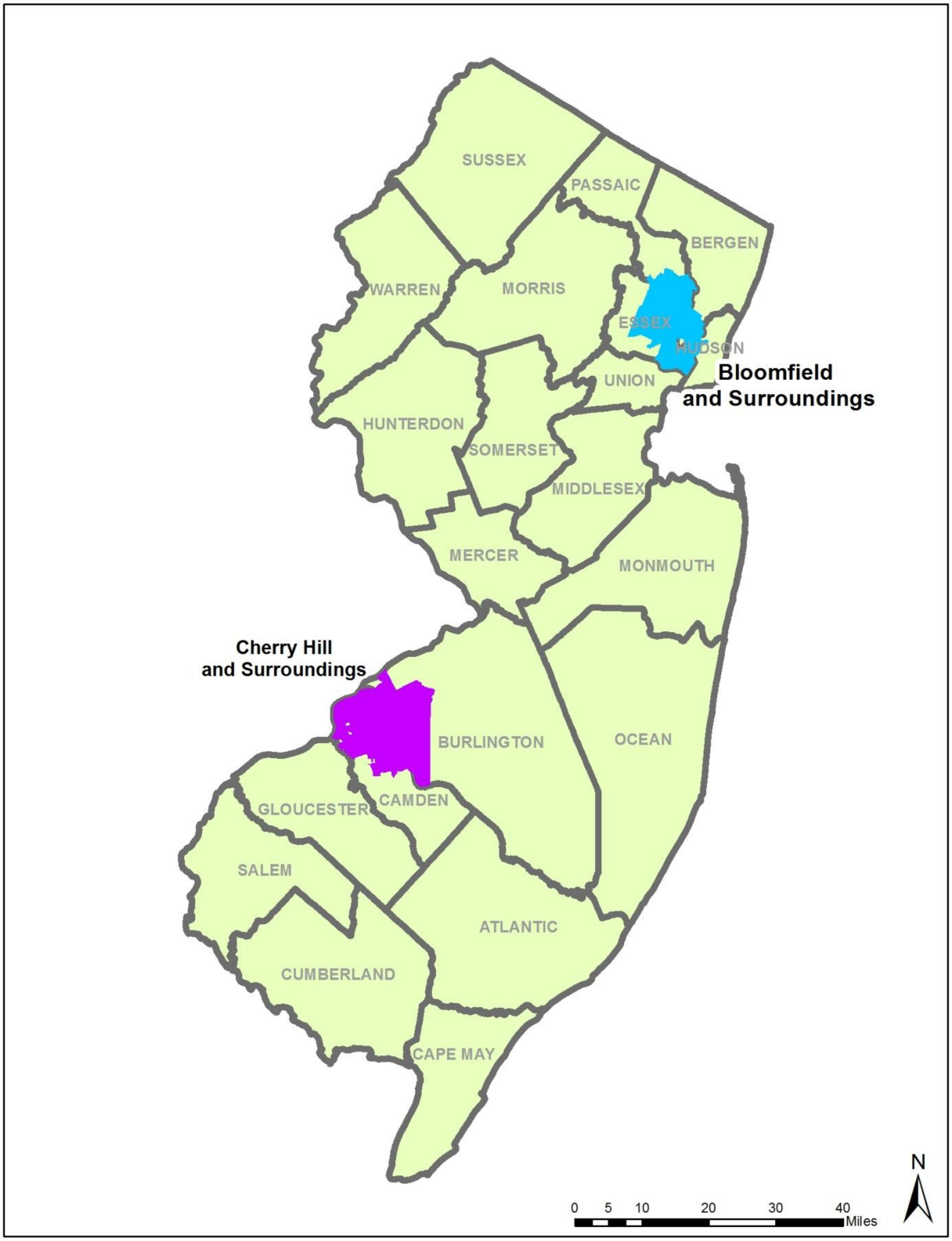

Figure 1. The Two Regions where the Survey was Conducted

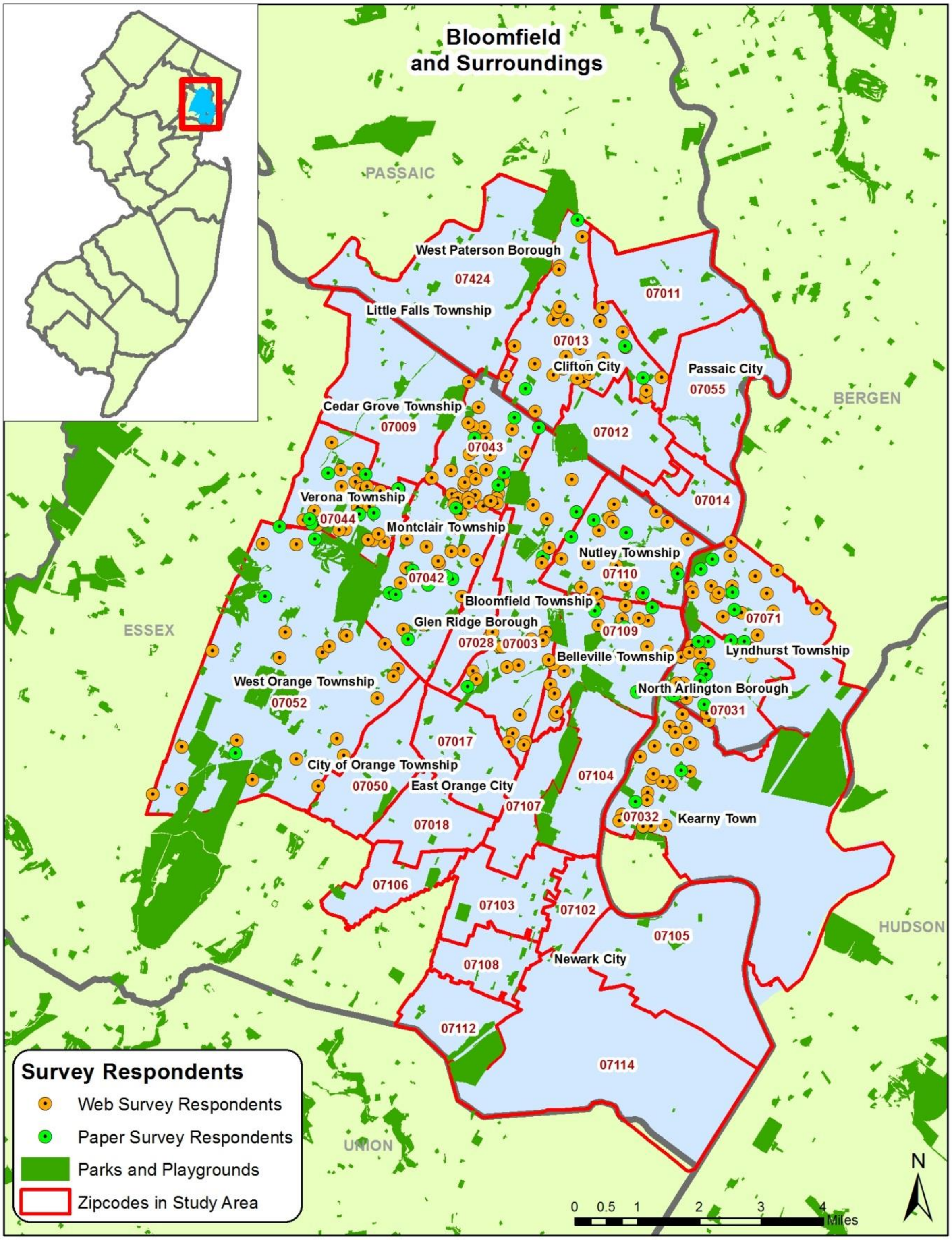

Figure 2. The Greater Bloomfield Region

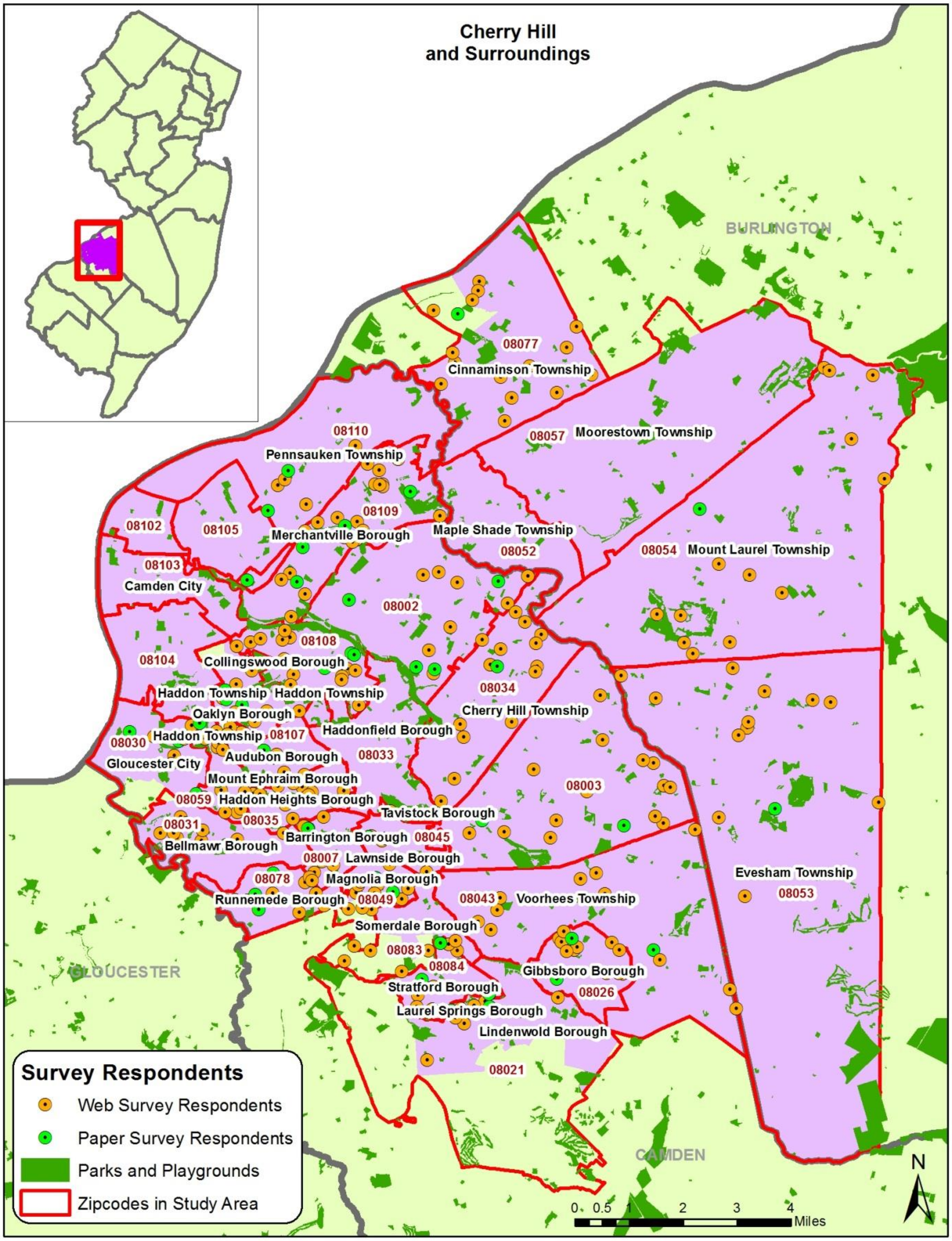

Figure 3. The Greater Cherry Hill Region

Implementation of the Survey

At the outset, a total of 3,000 households in the two regions were selected by random sampling. The selected households were mailed a link and password to enter a web survey on September 27, 2012. The survey recipients who did not take the web survey within a week of receiving the link and password were subsequently sent a reminder postcard. The respondents who still did not take the survey were subsequently sent an additional reminder postcard after two weeks. Finally, the recipients who did not take the web survey were mailed a printed survey instrument. The survey instrument mailed to the selected households did not include the web survey questions pertaining to types of infrastructure because it is impossible to randomize the infrastructure photographs in a printed survey. A total of 600 surveys were completed in the two regions, including the web version and the printed version. As shown in Table 2, of the 600 completed surveys, 495 were completed on the web (82.5%), while the remaining 105 were mailed back.

Table 2. Completed Surveys by Type and Location

	Greater Bloomfield Region	Greater Cherry Hill Region	Total
Web Survey	241	254	495
Mail Survey	58	47	105
Total	299	301	600

Based on returned mail, it was determined that 2,792 of the 3,000 survey recipients were authentic. The overall response rate of the survey for the two regions was 21.5% (600/2792). The response rate for the greater Bloomfield region was 21.6% (299/1387) and the response rate for the greater Cherry Hill region was 21.4% (301/1405).

The web survey included 35 photographs of pedestrian infrastructure and 13 photographs of bicycle infrastructure. Pedestrian infrastructure included different types of crosswalks, sidewalks, paths, trails, and bridge crossings, whereas bicycle infrastructure included different types of bicycle paths, bicycle lanes, bicycle sharrows, and trails. Respondents were asked to rate each type of infrastructure shown in the photographs and were consequently asked what was the primary reason for their rating of the infrastructure. Due to the need to include a large number of photographs in the survey, the photographs were divided into two strata and each respondent was randomly assigned to one stratum so that he or she had to view and rate only one of the two sets of photographs.

Following the questions pertaining to the infrastructure photographs, a series of questions probed the respondents about the quality of bicycle and pedestrian infrastructure near their homes, their frequency of using the infrastructure, their perceived barriers to using the infrastructure, their views on how bicycling and pedestrian investments should be made, and their demographic and socioeconomic characteristics. The analysis of the responses to these questions will be presented in an expanded report.

ANALYSIS OF THE RATING OF PEDESTRIAN INFRASTRUCTURE

As indicated previously, because of the large number of photographs of bicycle and pedestrian infrastructure included in the survey, the respondents were divided into two groups. Each group was asked to rate the infrastructure in a total of 30 photographs, of which roughly 2/3rd showed pedestrian infrastructure, while the remaining 1/3rd showed bicycle infrastructure. Because of the larger number of photographs of pedestrian infrastructure, with the exception of four photographs, two different sets of photographs were shown to each group of respondents. The other four photographs were shown to all respondents. In contrast, eight of the 13 photographs of bicycling infrastructure were shown to both groups and the other five were split between the two groups so that one group rated three and the other group rated two photographs. For the rating of infrastructure, respondents were given an ordinal scale with 11 points, so that the lowest score was 1, the highest was 11, and the median was 6. The respondents were asked to identify the most important reason for their rating of each infrastructure. The following options were given to the respondents to state the most important reason for their rating:

- Surface material
- Surface condition
- Width of the infrastructure
- Separation from traffic
- The surroundings
- Personal safety and security, and
- Other (specify)

Appendix 1 shows all the 35 photographs of pedestrian infrastructure shown to the survey respondents. The photographs are arranged according to the mean rating (score), beginning with the lowest rating and ending with the highest. It should be noted that some of the photographs show the same infrastructure twice under different environments (e.g., with pedestrian and without pedestrian on a trail, with stripes and without stripes in a crosswalk, with graffiti and without graffiti on a wall, etc.). The mean ratings (scores) shown in Appendix 1 are for all respondents who rated the photograph, irrespective of whether they also rated the companion photograph. The number of respondents who rated the photographs (N) and the primary reasons for their ratings are also shown in Appendix 1.

The ratings of the infrastructure and the reasons for the ratings in Appendix 1 make intuitive sense. The following are some of the broad patterns that emerge from the ratings of pedestrian infrastructure in Appendix 1.

a) Pedestrian infrastructures in recreational settings are often rated higher than infrastructures in urban settings, although high-quality urban infrastructure is also rated highly.
b) Separated pedestrian infrastructures receive higher ratings than un-separated infrastructures.
c) Newer infrastructures received higher ratings than older infrastructures.
d) The considerations for rating an infrastructure vary by the type of infrastructure. For example, personal safety and security is a major concern while rating crosswalks and secluded paths and trails, but not while other types of infrastructure are rated.

e) The physical attributes of the infrastructure, including width, surface material, surface condition, and separation from traffic are important considerations. However, width is a major consideration for sidewalks only.
f) Brick surfaces for both crosswalks and sidewalks are rated highly compared to asphalt and concrete surfaces.
g) In addition to the attributes of the infrastructure such as width and surface condition, respondents are also influenced by the surroundings when they judge an infrastructure. The focus on the surroundings is generally higher when recreational facilities are rated. Surroundings affect ratings in a positive way (trees along a path) as well as a negative way (graffiti on a wall by a path).

Comparison of Crosswalks

The 35 photographs of pedestrian infrastructure in Appendix 1 are arranged according to their mean rating, irrespective of type of infrastructure. Although informative, such an arrangement does not allow a convenient comparison of the ratings for alternatives within a class of infrastructure (e.g., brick crosswalk versus standard crosswalk). In this section, comparisons are made between types of crosswalks. In the subsequent sections, comparisons are made between types of sidewalks, recreational paths, and pedestrian bridge crossings.

The survey included photographs of crosswalks on four-lane roads as well as two-lane roads. Four photographs of crosswalks on four-lane roads and three photographs of crosswalks on two-lane roads were shown to the respondents. The seven photographs are presented in Table 3 with their mean scores from the survey as well as their overall ranking among all pedestrian infrastructures shown to the respondents (higher ranking is associated with higher mean score).

Table 3. Ratings for Different Types of Crosswalks on Four- and Two-Lane Roads

	No marking	Standard	Striped (Continental)	Brick
Four Lane Road				
	Pic #4	Pic #12	Pic #23	Pic #25
	Mean score: 4.98	Mean score: 5.85	Mean score: 6.94	Mean score: 7.11
	Striped (Zebra)	Standard	Brick	
Two Lane Road				
	Pic #14	Pic #19	Pic #30	
	Mean score: 6.02	Mean score: 6.62	Mean score: 8.61	

The following observations can be made from Table 3:

- Brick crosswalks on both four-lane and two-lane roads are favored over standard and striped crosswalks painted on asphalt.
- The striped crosswalk was rated higher than standard crosswalk on the four-lane road, but not on two-lane road. Thus the favorability of the two types may be determined by other considerations, such as surroundings.
- A comparison of the same intersection – once with and once without painted stripes –shows that stripes make a significant difference (Pic #4 and Pic #23).

The mean scores shown in Table 3 are not necessarily from the same respondents because (a) all respondents were not necessarily shown the same set of photographs, and (b) some respondents did not rate all photographs shown to them. To examine how a common set of respondents ranked alternative types of crosswalks, paired-sample t-tests were undertaken. Paired-sample t-tests demonstrate whether the difference between the mean scores from a common group of respondents for two types of infrastructure is statistically significant. The results of the t-tests are shown in Table 4.

Table 4. Paired-sample t-tests Comparing Mean Scores for Similar Types of Crosswalks

	No marking	Striped (Continental)	t-test results
Photographs compared			Respondents (N)=228 Difference in mean score=**1.93** Standard error of mean=.169 t-value=11.45 Significance of t = <.000
	Pic #4	Pic #23	
Mean score	4.99	6.92	
	Standard	Brick	t-test results
Photographs compared			Respondents (N)=240 Difference in mean score=**1.25** Standard error of mean=.156 t-value=8.04 Significance of t = <.000
	Pic #12	Pic #25	
Mean score	5.85	7.10	
	Striped (Zebra)	Brick	t-test results
Photographs compared			Respondents (N)=236 Difference in mean score=**2.51** Standard error of mean=.160 t-value=15.68 Significance of t = <.000
	Pic #14	Pic #30	
Mean score	6.05	8.56	

The t-tests for all three sets of photographs shown in Table 4 are statistically significant, indicating that the differences in the mean scores could not have occurred by chance. The comparison of the first pair of photographs (Pic #4 and Pic #23) shows that the same crosswalk is rated two points higher when the stripes are newly painted compared to when the stripes are worn off. This suggests that people value regular painting of crosswalks. The comparison of the second set of photographs (Pic #12 and Pic #25) shows that the brick crosswalk on a four-lane road is rated 1.25 points higher than the standard crosswalk on a similar road. The comparison of a striped crosswalk and a brick crosswalk on two-lane roads (Pic #14 and Pic #25) shows that the brick crosswalk is rated 2.51 points higher than the striped crosswalk, indicating a highly significant difference in rating. Thus, brick crosswalks appear to be preferred for both two-lane and four-lane roads. Although construction and maintenance costs between brick and asphalt crosswalks may vary, the survey results provide evidence that people prefer brick crosswalks over painted asphalt crosswalks.

Comparison of Sidewalks

Altogether ten photographs of sidewalks were shown to the survey respondents. These photographs can be classified into three types: (a) urban non-residential sidewalks, (b) sidewalks along major roads, and (b) sidewalks in residential areas. The ten photographs shown to the survey respondents are presented in Table 5 along with their mean rating or score.

Table 5. Ratings for Different Types of Sidewalks by Location

Urban non-residential sidewalks				
Concrete/Metal	Brick	Textured brick	Concrete	Concrete/Brick
				
Pic #2	Pic #22	Pic #24	Pic #27	Pic #29
Mean score: 4.13	Mean score: 6.80	Mean score: 7.10	Mean score: 7.77	Mean score: 8.57
Sidewalks along major roads				
Concerete/ wo pedestrian	Concerete/ w pedestrian	Brick		
				
Pic #11	Pic #15	Pic #32		
Mean score: 5.79	Mean score: 6.06	Mean score: 9.23		
Surburban residential sidewalks				
Old	New			
				
Pic #16	Pic #28			
Mean score: 6.11	Mean score: 8.16			

The following observations can be made from the ratings of the sidewalks in Table 5.

- The surface material of sidewalk matters. The sidewalk with the lowest rating contains metal plates.

- Although brick sidewalks are also rated high like brick crosswalks, they are not rated as high as brick crosswalks.
- Width of sidewalk matters, but plants, flowerbeds, street lamps, and glass façades along sidewalk seem to contribute more to higher rating.
- The condition of sidewalks, especially whether they are broken or un-broken, seems to influence ratings.

Paired-sample t-tests were undertaken to examine if the differences in ratings by a common set of respondents between types of sidewalks were statistically significant. The results are shown in Table 6. Among the urban sidewalks, the most preferred sidewalk (#27) has a new, brick-lined concrete surface with glass building façades and newly-planted trees. As with crosswalks, brick sidewalks appear to be heavily preferred. The comparison for sidewalks by highway also shows the respondents' liking of brick surface. The comparison of sidewalks in residential locations shows a high preference for newer surface compared to old and broken surface.

Table 6. Paired-sample t-tests Comparing Mean Scores for Similar Types of Sidewalks

	Brick/Downtown	Textured brick with glass façade/Downtown	t-test results
Photographs compared			Respondents (N)=226 Difference in mean score=.30 Standard error of mean=.120 t-value=2.50 Significance of t = .013
	Pic #22	Pic #24	
Mean score	6.81	7.11	
	Textured brick with glass façade/Downtown	Concrete with flowerbed	t-test results
Photographs compared			Respondents (N)=225 Difference in mean score=1.48 Standard error of mean=.117 t-value= 12.74 Significance of t = <.000
	Pic #24	Pic #27	
Mean score	7.10	8.59	
	Concrete/By Highway	Brick/By Highway	t-test results
Photographs compared			Respondents (N)=236 Difference in mean score=3.41 Standard error of mean=.180 t-value= 18.92 Significance of t = <.000
	Pic #11	Pic #32	
Mean score	5.81	9.22	
	Broken Concrete/ Residential	New concrete/ Residential	t-test results
Photographs compared			Respondents (N)=225 Difference in mean score=2.02 Standard error of mean=.129 t-value=15.63 Significance of t = <.000
	Pic #14	Pic #30	
Mean score	6.14	8.16	

Comparison of Pedestrian Lanes, Paths and Trails

The survey included 14 photographs of pedestrian lanes, paths, and trails, all located in recreational settings. These photographs and their mean scores are presented in Table 7.

Table 7. Ratings for Different Types of Recreational Paths and Trails

			
Pic #5	Pic #7	Pic #8	Pic #9
Mean score: 5.04	Mean score: 5.38	Mean score: 5.77	Mean score: 5.78
			
Pic #10	Pic #17	Pic #18	Pic #20
Mean score: 5.79	Mean score: 6.51	Mean score: 6.58	Mean score: 6.69
			
Pic #21	Pic #26	Pic #31	Pic #33
Mean score: 6.79	Mean score: 7.14	Mean score: 8.88	Mean score: 9.57
			
Pic #34	Pic #35		
Mean score: 9.59	Mean score: 9.73		

A number of observations can be made from the mean ratings score in Table 7 and the corresponding considerations of the respondents shown in Appendix 1. They are as flows:

- People prefer separated paths over pedestrian lanes drawn on the side of a road. When such lanes are shown with vehicles on the road, the ratings decrease further.
- People can be affected both negatively and positively by the surroundings when assessing recreational paths and trails. For example, all paths with graffiti in the surrounding are rated low, whereas paths with clean surroundings are rated high.
- People pay attention to the surface material of paths. The ratings in Table 7 show that trails with gravel surface are generally rated lower than paths with asphalt and concrete surface.
- Structures such as high walls and fences along paths seem to affect people's ratings negatively. It is evident that the paths with walls and fences adjacent to them are rated lower than paths without walls and fences.

The t-tests comparing the mean ratings by a common set of respondents for paired photographs of paths and trails are shown in Table 8. The following observations can be made from the comparison and the considerations of the respondents shown in Appendix 1:

- Graffiti in the surroundings of paths and trail significantly lowers the ratings. For Pic #18 was rated a statistically significant .80 higher than Pic #8 by the same group of respondents, even though the only difference between the two photographs is that the graffiti on the wall erased in Pic #18.
- Appendix 1 shows that people are concerned about personal safety/security on seemingly isolated trails and paths. The comparison of the rating for Pic #7 with Pic #10 and the comparison of Pic #17 with Pic #26 show that when people are present on such paths/trails, the mean score increases, indicating that the concern about personal safety and security diminishes in the presence of other users.
- The pedestrian lane received a lower rating when shown to the respondents with a vehicle on the adjacent road (Pic #5) than the same lane without a vehicle (Pic #9).

Table 8. Paired-sample t-tests Comparing Mean Scores for Recreational Paths and Trails

			t-test results
Photographs compared			Respondents (N)=233 Difference in mean score=.80 Standard error of mean=.127 t-value=6.30 Significance of t = <.000
	Pic #8	Pic #18	
Mean score	5.77	6.58	
			t-test results
Photographs compared			Respondents (N)=225 Difference in mean score=.40 Standard error of mean=.098 t-value= 4.10 Significance of t = <.000
	Pic #7	Pic #10	
Mean score	5.39	5.79	
			t-test results
Photographs compared			Respondents (N)=227 Difference in mean score=.60 Standard error of mean=.102 t-value=5.81 Significance of t = <.000
	Pic #17	Pic #26	
Mean score	6.49	7.09	
			t-test results
Photographs compared			Respondents (N)=235 Difference in mean score=.71 Standard error of mean=.151 t-value= 4.72 Significance of t = <.000
	Pic #5	Pic #9	
Mean score	5.05	5.76	

Comparison of Pedestrian Bridges

Three photographs of two pedestrian bridges (sidewalks on bridges that are separated from traffic by physical barriers) were shown to the respondents. Both bridges, shown in photographs in Table 9, are over the Raritan River, one between South Bound Brook and Bound Brook and the other between Highland Park and New Brunswick. The bridge between Highland Park and New Brunswick was shown twice, once with a pedestrian and once without a pedestrian.

Table 9. Ratings for Pedestrian Bridge Crossings

Fenced bridge with no pedestrian	Fenced bridge with pedestrian	Un-fenced bridge
		
Pic #3	Pic #6	Pic #13
Mean score: 4.83	Mean score: 5.38	Mean score: 5.94

Table 10. Paired-sample t-tests Comparing Mean Scores for Pedestrian Bridge Crossings

			t-test results
Photographs compared			Respondents (N)=217 Difference in mean score=.59 Standard error of mean=.109 t-value=5.36 Significance of t = <.000
	Pic #3	Pic #6	
Mean score	4.78	5.37	
			t-test results
Photographs compared			Respondents (N)=214 Difference in mean score=1.14 Standard error of mean=.162 t-value= 7.04 Significance of t = <.000
	Pic #3	Pic #13	
Mean score	4.79	5.93	

The paired-sample t-tests showing the comparison between pedestrian bridges are shown in Table 10. From Tables 9 and 10, the following observations can be made:

- Bridges that are not enclosed by fences are rated higher than bridges that are fenced in.
- When a fenced-in bridge is shown with pedestrians, its rating increases significantly compared to when the bridge is shown without pedestrians.
- Comparison of the pedestrian bridges with sidewalks reveals that bridges are generally rated lower than most sidewalks (presumably because of width and barriers).

ANALYSIS OF THE RATINGS FOR BICYCLE INFRASTRUCTURE

Altogether 13 photographs of bicycle infrastructure were shown to the respondents. The infrastructure included bicycle lanes along roads, separated paths, recreational roads shared by cars and bicycles, elevated bicycle lanes, and bicycle sharrows. The 13 photographs of bicycle infrastructure are shown in Appendix 2, where they are arranged according the order of their ratings in the survey. Pairwise comparison of certain types of bicycle infrastructure is shown in Table 11. From the rating of the bicycle infrastructure, the following observations can be made.

- Respondents highly value bicycle infrastructure that is physically separated from traffic. The bicycle infrastructures with the lowest rating are shared roads, whereas the infrastructures with the highest rating are separated paths.
- When bicycle infrastructure is not physically separated from traffic by a buffer or barrier, respondents prefer a clearly delineated bicycle lane over a shared lane or a marked sharrow.
- Respondents prefer bicycle lanes that are not adjacent to parking spaces along roads. When parking is allowed by the bicycle lane, they prefer a space between parked cars and the bicycle lane (presumably for the safety of bicyclists from opened car doors).
- Although trails are also completely separated from traffic like bicycle paths, they are not rated as highly as asphalt paths because of a greater concern about surface material.
- When a trail is shown to respondents as a pedestrian path, its rating is higher than the rating for the same trail when it is shown as a bicycle trail (compare ratings of Pic #20 and #21 in Appendix 1 with Pic #8 and #9 in Appendix 2).
- Bicycle sharrows appear to be the least popular among all types of bicycle infrastructure.

Table 11. Paired-sample t-tests Comparing Mean Scores for Bicycling Infrastructure

Photographs compared			Respondents (N)=209 Difference in mean score=.36 Standard error of mean=.118 t-value=3.04 Significance of t = .003
	Pic #2	Pic #3	
	3.83	4.19	
Photographs compared			Respondents (N)=433 Difference in mean score=.81 Standard error of mean=.099 t-value=8.10 Significance of t = <.000
	Pic #4	Pic #5	
Mean score	4.47	5.28	
Photographs compared			Respondents (N)=210 Difference in mean score=1.49 Standard error of mean=.160 t-value= 9.32 Significance of t = <.000
	Pic #3	Pic #7	
Mean score	4.19	5.68	
Photographs compared			Respondents (N)=224 Difference in mean score=3.05 Standard error of mean=.181 t-value= 16.82 Significance of t = <.000
	Pic #6	Pic #13	
Mean score	5.72	8.77	
Photographs compared			Respondents (N)=438 Difference in mean score=2.74 Standard error of mean=.129 t-value= 21.19 Significance of t = <.000
	Pic #6	Pic #13	
Mean score	5.79	8.53	

ANALYSIS OF SUGGESTED SPENDING ON PEDESTRIAN AND BICYCLING INFRASTRUCTURE

A question in the survey was aimed at examining how the respondents would like bicycle and pedestrian investments being made in their community. The responders were asked to distribute resources among 12 different types of transportation improvements so that the total investment added up to 100%. The investment items ranged from the improvement of existing traffic signals to the construction of new bicycle paths. The respondents were allowed to allocate resources on as many or as few items as they wished. The responses to the question are shown in Figure 4.

The distribution in Figure 4 shows that the respondents in both survey regions would like to allocate most resources (approximately 20%) on the construction of new bicycle paths, followed by the construction of new bicycle lanes (approximately 15%). The improvement of existing sidewalks received the highest allocation among investments related to pedestrians. The items with the lowest allocation from the respondents were the addition and improvement of traffic signals. One of the reasons for the low allocation on traffic signals could be that their benefits are far more location-specific than most other investment items presented to the respondents. For example, a bicycle path could be in close proximity to large number of households in a community, whereas a traffic signal could be in close proximity to only a limited number of households. The allocation on education and enforcement investments by the respondents was found to be moderate, but together they accounted for a substantial proportion of the total allocation.

The high allocation of investments on bicycle paths and lanes by the respondents may be due to the fact that such types of infrastructure are less prevalent than sidewalks and crosswalks. Since a large number of respondents already have sidewalks in their neighborhoods, they have no reason to allocate funds on new sidewalks. However, that may not be the case with bicycle infrastructure. Another reason for a high proportional allocation on the construction of bicycle paths and lanes may be the realization by the respondents that building new infrastructure costs far more than improving existing infrastructure. To examine if this realization may have been a reason for the high proportional allocation of *funds* on bicycle paths and lanes, the distribution of *respondents* allocating on those investment items was also examined. This distribution, presented in Figure 5, shows that the proportion of respondents who allocated resources on the construction of bicycle paths and lanes is also the highest, accounting for more than 50% of the respondents for each type of investment. Since the proportion of funds allocated and the proportion of respondents allocating funds are both the highest for bicycle paths and lanes, there is little doubt that the respondents strongly favor these types of investments.

To examine whether investments on bicycle paths and lanes are equally favored by bicyclists and non-bicyclists, the allocation of funds by the two groups on the 12 types of investment was further examined. For this analysis, bicyclists were defined as those who bicycled at least once during the two-week period prior to taking the survey, while the other respondents were defined as non-bicyclists. The results of the analysis, presented in Figure 6, reveal that the support for bicycle paths is very high among both bicyclists and non-bicyclists. Non-bicyclists allocated 20% of the funds on new bicycle paths, while bicyclists allocated a slightly higher proportion. However, a clear distinction between bicyclists and non-bicyclists is evident in the case of new bicycle lanes, as the proportion allocated by bicyclists on this investment item is twice as large as the proportion allocated by non-bicyclists (26% against 13%). Although the 13% allocation by non-bicyclists on new bicycle lanes is larger than their allocation on all other investment items except sidewalk improvement, the substantial difference between bicyclists and non-bicyclists in their allocation on new bicycle lanes needs further scrutiny. A potential reason for the large difference between the two groups could be that non-bicyclists are far more apprehensive of bicycling on bicycle lanes, whereas the experience of bicyclists makes them less fearful of bicycling on such infrastructure.

The other comparisons in Table 6 show that non-bicyclists generally allocate larger proportions on pedestrian-oriented improvements whereas bicyclists allocate relatively more on bicycling-related improvements. These differences are not surprising. However, the same cannot be said about the fact that both bicyclists and non-bicyclists made very large allocations on bicycle paths. The allocations overall indicate a clear support for bicycle paths in both regions.

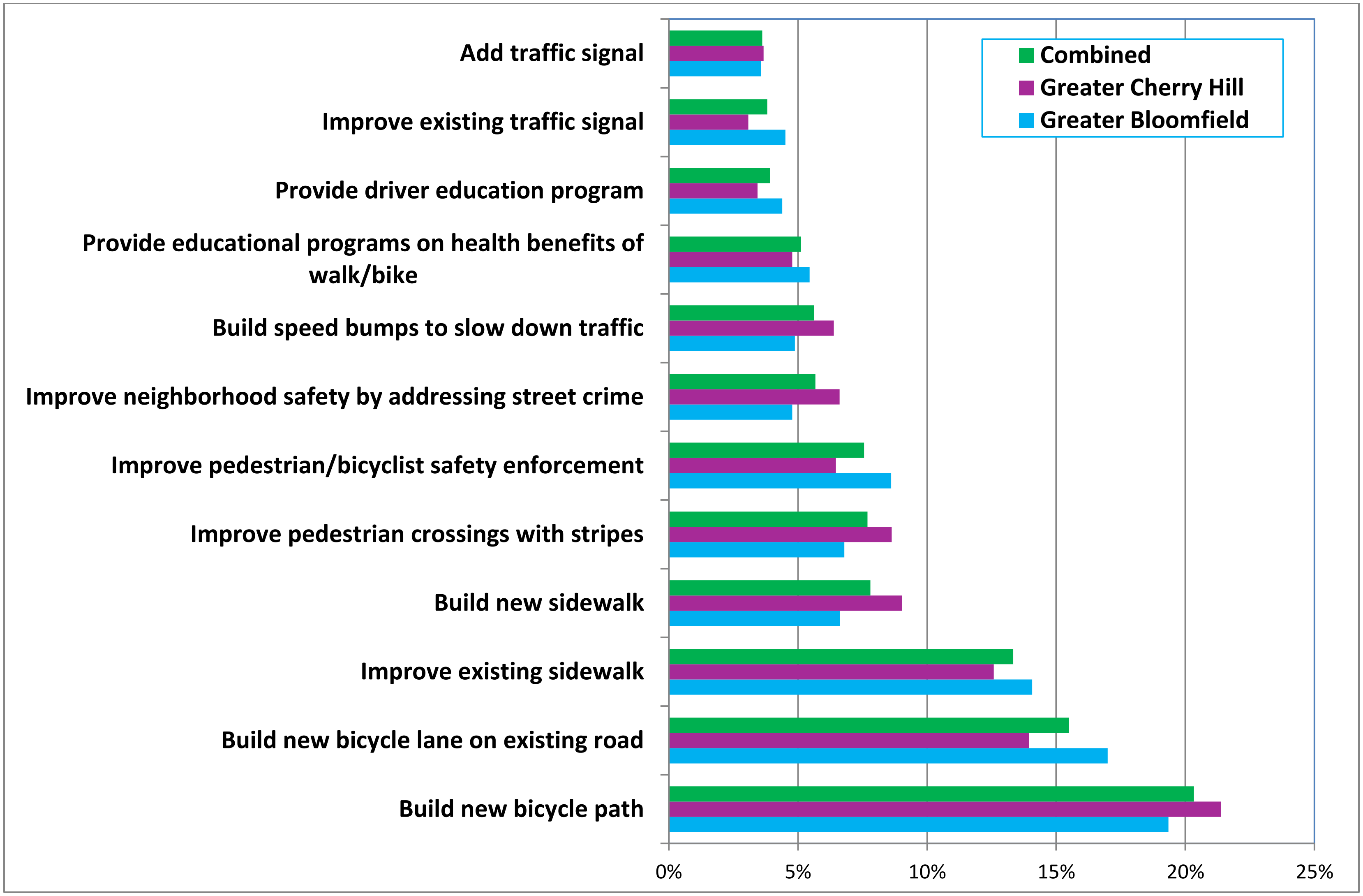

Figure 4 – Proportional Allocation of Funds on Bicycling and Pedestrian Investment Items by the Respondents

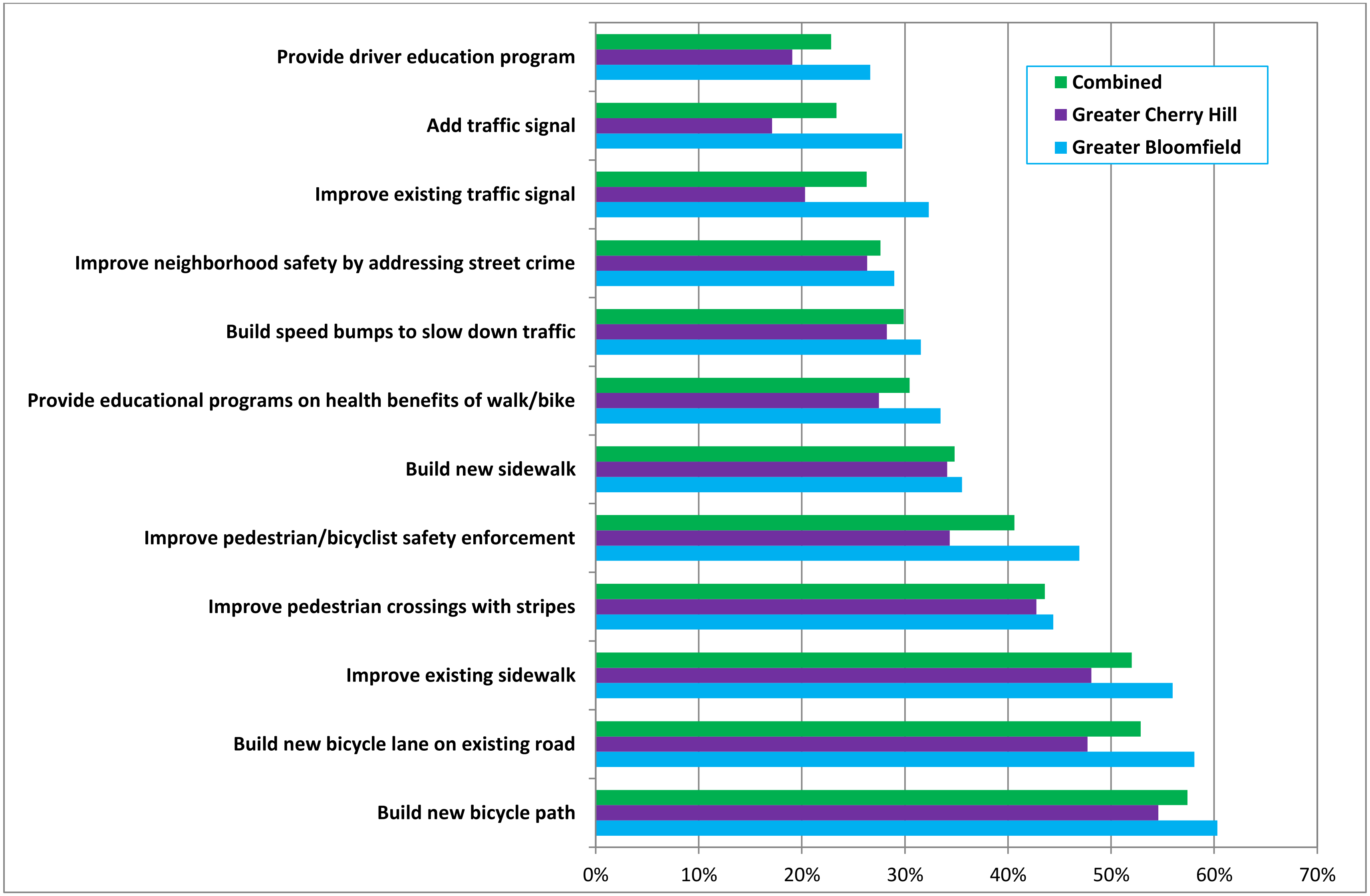

Figure 5 – Proportion of Respondents Allocating Funds on Different Investment Items

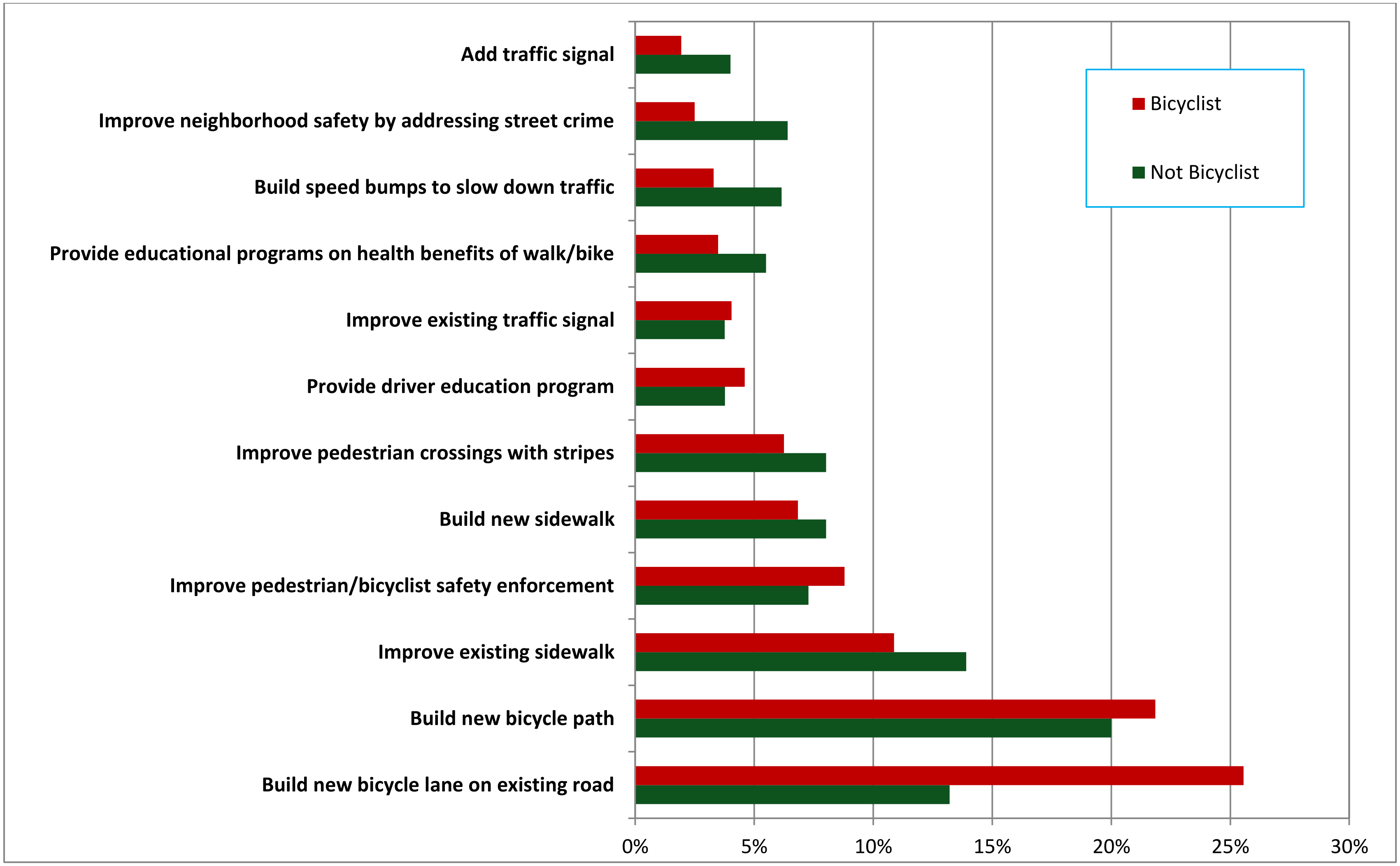

Figure 6 – Proportion of Funds Allocated By Bicyclists and Non-Bicyclists on Different Investment Items