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## ***EasyConnect: Low-Speed Modes Linked to Transit Planning Project***

**Susan A. Shaheen,  
Caroline J. Rodier**

**California PATH Research Report  
UCB-ITS-PRR-2008-17**

This work was performed as part of the California PATH Program of the University of California, in cooperation with the State of California Business, Transportation, and Housing Agency, Department of Transportation, and the United States Department of Transportation, Federal Highway Administration.

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California. This report does not constitute a standard, specification, or regulation.

Final Report for Task Order 6113

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*EasyConnect:*

**Low-Speed Modes Linked to Public Transit Field Test Results**

**Final Report**

**Task Order 6113**

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## **ABSTRACT**

Access from public transit stations to employment and home locations can be a significant barrier to public transportation use in many urban regions, which is also commonly known as the “first and last mile” problem. The *EasyConnect* field test operated from August 2005 to December 2006 to introduce shared-use electric bicycles, non-motorized bicycles, and Segway® Human Transporters (HTs) to employment centers in and around the Pleasant Hill BART District stations. *EasyConnect* linked 36 employees of 14 companies at the Contra Costa Centre and Fresenius Medical. Contra Costa Centre took over the management of the *EasyConnect* program, which is now called “Green Fleet” and is operating an expanded and upgraded fleet of Segway HTs, electric bicycles, and bikes.

Although the *EasyConnect* program was initially designed to bridge the barriers to access from public transit stations to employment locations, the results of the field test indicated higher participation demand by Day Users (e.g., lunch, business meetings, errands) rather than by commuters. This may have been a function of the institutional support available for the program in the area. The Contra Costa Centre, which is walking distance from the Pleasant Hill BART station, was able to provide significantly more support to the program relative to employers and business centers further away from the station. The availability of the low-speed modes for Day Use at the Contra Costa Centre, however, may have allowed for a higher level of public transit use and carpool commuting. Even without accounting for such mode shifts, the evaluation results indicate net benefits for both commute and Day Use program participants from reduced vehicle travel and increased physical activity. In the future, shared-use low speed mode programs, like *EasyConnect*, should continue to examine pedestrian concerns about the use of these modes on trails and sidewalks.

## **KEYWORDS**

Share-use modes, low-speed modes or devices, bicycle sharing, last mile, public transportation, intelligent transportation systems



## EXECUTIVE SUMMARY

Access from public transit stations to employment and home locations can be a significant barrier to public transportation use in many urban regions, which is also commonly known as the “first and last mile” problem. The 16-month *EasyConnect* field test was launched in August 2005 to introduce shared-use electric bicycles, non-motorized bicycles, and Segway® Human Transporters (HTs) to employment centers in and around the Pleasant Hill BART District stations. The goals of the field test were to test and evaluate the potential for a shared-use low-speed mode vehicle service at bridging the “last mile” from a public transit station to the workplace. The field test ended in December 2006. *EasyConnect* linked 36 employees of 14 companies at the Contra Costa Centre and Fresenius Medical. Contra Costa Centre took over the management of the *EasyConnect* program, which is now called “Green Fleet” and is operating an expanded and upgraded fleet of Segway HTs, electric bicycles, and bikes.

The exploratory evaluation of the *EasyConnect* project included analysis of initial questionnaires and travel diaries to gain insight into participants’ socio-economic attributes and travel patterns. Program participant service use logs also were collected. Finally, intercept surveys of travelers on the Iron Horse and Canal Trails and in downtown Pleasant Hill were conducted to understand potential bystander concerns. The following are the key results of the initial evaluation of the *EasyConnect* field test:

- Most participants were men aged 30 to 39 who reported relatively high general health levels and exercised frequently by walking, gym work-outs, and biking.
- Participants’ transportation-related attitudes indicated they were concerned about air pollution from vehicle travel, willing to change their own travel behavior to improve air quality, and were dissatisfied with their current commute mode.
- Participants primarily commuted by driving alone (67 percent) prior to joining the program; however, a number also sometimes commuted by bicycle or motorcycle (47 percent).
- Workplace parking availability and cost did not appear to be a significant problem for the majority of participants.
- Many participants made personal trips relatively frequently on weekdays, but fewer made business trips; most of the personal and business trips were made by a private vehicle with an average distance of 2.5 miles, which is within the range of the low-speed modes.
- Most participants joined the program to try new transportation modes and avoid driving during lunch or to run errands.
- Only six of the participants from one company planned to regularly use the program for commuting; the remaining participants worked very close to the Pleasant Hill BART station at the Contra Costa Centre and thus planned to use the program largely for Day Use (e.g., lunch, business meetings, errands).

For commute travel the analysis of participants' use patterns yielded a number of interesting findings:

- The electric bicycle had the highest low-speed mode share (68 percent) relative to the bicycle (20 percent) and Segway HT (12 percent) modes.
- Most participants used the program weekly; had a one-way commute trip distance of one-half to five miles; and would have commuted by car or bicycle if the *EasyConnect* low-speed modes were not available to them, indicating a likely net reduction in vehicle travel and health benefits among participants.
- The electric bicycle's speed and range are greater than that of the bicycle and Segway HT and thus appear to be used more frequently for longer commute trips.

For Day Use travel the analysis of participants' use patterns also yielded a number of results:

- The Segway HT had the highest low-speed mode share (52 percent) relative to the electric bicycle (36 percent) and bicycle (12 percent) modes.
- For shorter average distance Day Use trips, the Segway HTs had the highest use.
- Lunch was the most frequent purpose of travel (42 percent), followed by personal business, then by work-related business (17 percent), and finally for exercise and fun (6 percent).
- Seventy percent used the program with some regularity (at least once a month and at most four days a week), and thirty percent did not (less than once a month).
- Sixty-three percent of these trips would have been made by car, 19 percent by walking, 17 percent would not have made the trip, and one percent would have made the trip by bicycle.
- The mean trip distance for those trips that would have been made by car was 2.6 miles and by walking/biking was 1.4 miles, indicating a likely net reduction in vehicle travel among participants.
- Twelve percent of trips resulted in an increase in bicycle travel, and 36 percent resulted in an increase in electric bicycle travel, indicating an overall health benefit for participants.

Participants in the *EasyConnect* field test were allowed to travel on the Iron Horse and Canal Trails and in downtown Pleasant Hill. When the Segway HTs were first made available to the public there was significant debate about allowing this low-speed mode to share the sidewalks with pedestrians. As a result, a survey was conducted with individuals traveling on the Iron Horse Trail and in downtown Pleasant Hill to explore their attitudes towards low-speed modes. The survey results pointed to some key findings:

- About 20 percent indicated that they would stop using the trail or use it less if the Segway HT and the electric bicycle were commonly used on the trail, and about 70 percent indicated that this would have no effect on their use of the trail.
- The top concerns were accidents, the fast speed and quiet operation of low-speed modes, and improper use; however, many did appreciate the potential for these devices to reduce air pollution and reliance on petroleum-based fuels.
- Respondents indicated that Segway HT and electric bicycle users should be required to follow the same rules as bicycles (25 percent), slow down when approaching a pedestrian

(20 percent), use a noise device or callout when approaching pedestrians (18 percent), and take training courses (10 to 15 percent).

- Many respondents indicated that special lanes should be provided for the Segway HTs (30 to 32 percent), and some also responded that these modes should be allowed on the trails (22 to 23 percent), streets (15 to 18 percents), and sidewalks (14 to 15 percent).

Although the *EasyConnect* program was initially designed to bridge the barriers to access from public transit stations to employment locations or the “first and last mile” problem, the results of the field test indicated higher participation demand by Day Users rather than by commuters. This may have been a function of the institutional support available for the program in the area. The Contra Costa Centre, which is walking distance from the Pleasant Hill BART station, was able to provide significantly more support to the program relative to employers and business centers further away from the station. The availability of the low-speed modes for Day Use at the Contra Costa Centre, however, may have allowed for a higher level of public transit use and carpool commuting. Even without accounting for such mode shifts, the results of the evaluation indicate net benefits for both commute and Day Use program participants from reduced vehicle travel and increased physical activity. In the future, shared-use low speed mode programs like *EasyConnect* should continue to examine pedestrian concerns about the use of these modes on trails and sidewalks.





## 1.0 INTRODUCTION

Access from transit stations to employment and home locations can be a significant barrier to public transit use in many urban regions, which is also commonly known as the “first and last mile” problem. Most people are only willing to walk about a quarter of a mile from transit stations to their destination. Bus feeder services can increase access, but fixed routes and schedules significantly limit their appeal. An effective demand-responsive, easy-to-use system that links home, work, and other activity destinations with public transit stations may encourage greater use of transit and reduce both vehicle travel and emissions.

The *EasyConnect* field test was launched in August 2005 to introduce shared-use electric bicycles, non-motorized bicycles, and Segway® Human Transporters (Segway HTs) (collectively known as the “low-speed modes”) at the Pleasant Hill Bay Area Rapid Transit (BART) District station. The goals of the field test were to test and evaluate the potential for a shared-use low-speed modes service to bridge the “last mile” from a transit station to the workplace. *EasyConnect* enabled businesses within a four-mile radius of the Pleasant Hill BART station to access shared-use bicycles, electric bicycles, and Segway HTs for their employees to use for commute and daytime travel (or what we call “Day Use”). Instead of driving all the way to work, participants were able to take transit and carpool and thus potentially reduce fuel use, emissions, congestion, and demand for the limited parking in the area. Each morning, employees could check out a bicycle or Segway HT from an electronic locker at the Pleasant Hill BART station and then ride to work along the scenic Iron Horse and Canals Trails, for instance. Units were also available for use from nearby offices as well for off-site meetings, errands, or lunch appointments. At the end of the day, employees could ride the bicycles or Segway HTs back to the station, where they were stored and recharged in electronic lockers.

This field test was the result of a partnership among the University of California, Berkeley; the California Department of Transportation; the San Francisco BART District; the Metropolitan Transportation Commission; the Bay Area Quality Management District; the Contra Costa Centre; Contra Costa County; 511 Contra Costa; Segway, Inc.; and Giant Bicycles.

This report begins with a description of the field test and its operation, as well as background on similar programs internationally. Next, the methods of evaluation are described and followed by a discussion of the evaluation results. Finally, major findings are summarized in the conclusion.

## 2.0 FIELD TEST

August 2005 marked the debut of the *EasyConnect* field test, which provided shared-use electric bicycles, non-motorized bicycles, and Segway HTs to employment centers in and around the Pleasant Hill BART station. See Figure 1 below for a photograph of the existing Pleasant Hill BART station. The field test ended in December 2006, 16 months later. Contra Costa Centre took over the management of the *EasyConnect* program, which is now called “Green Fleet” and is operating an expanded and upgraded fleet of Segway HTs, electric bicycles, and bikes. For more information, see: [www.contracostacentre.com/com\\_pro5.html](http://www.contracostacentre.com/com_pro5.html)).



**FIGURE 1 Current site conditions, Pleasant Hill BART station.**

*EasyConnect* linked employees of Contra Costa Centre-based ABD Insurance, Avandae, Bank of the West, Great American Insurance Company, Kforce, Moody’s Investor Services, Reply, CB Richard Ellis, Central Garden, MWH, WildPackets, Vodafone, WWAL, and Inscoco Dico, as well as Fresenius Medical. The low-speed vehicles were stored nightly at the Pleasant Hill BART station in electronic lockers. Commuters were able to ride the units from the BART station to their offices in surrounding employment centers in the morning and back to the station at the end of the day (“Commuter Use”). The devices also were used to run personal and business errands during the day (Day Use). Some units were located directly at employment locations at the Contra Costa Centre to provide Day Use options to encourage commuting by vanpool or carpools. The field test included 36 active members.

There is an extensive paved trail network in the Pleasant Hill BART area. The East Bay Parks District granted permission to the research project to use the low-speed modes on the Iron Horse and Canal Trails. Access to the trails greatly enhanced the BART, employment, and shopping connections for the field test. See Figure 2 of rider on a bicycle trail in Pleasant Hill.



**FIGURE 2 Bicycle rider in Pleasant Hill.**

## **2.1 Attributes of the Segway HT and Electric Bicycles**

The maximum distance for the electric bicycles (the Giant Lite model) on one charge is 28 miles. The maximum distance for the Segway HT for a single charge is four miles under strenuous conditions (i.e., start-up driving and use on inclines and uneven terrain), eight miles under good conditions, and 12 miles under test conditions.

It takes approximately four hours to charge The Giant Lite, which uses a nickel metal hydride battery, with a life of 500 charges. It can take four to six hours to charge the Segway HT batteries, which are either lithium or nickel.

Segway HTs, which weigh 83 to 95 pounds, have three different keys that control top speed: six miles per hour (black), eight miles per hour (yellow), and 12.5 miles per hour (red). The EasyConnect field test only allowed the two lower speed keys. Segway HTs can go up and down hills with gradients as steep as 36 percent and turn with a curve radii as low as 15 feet. Its stopping distance is 18 feet. The electric bicycle's top assisted speed is 17 miles per hour. It weighs 45 pounds with its battery, which weighs seven pounds. Its hill climbing ability tops at a six percent slope.

## **2.2 Safety**

Safety concerns about the interaction of the low-speed modes and pedestrians during the initial phase of the project prompted a literature review. The results of a literature review conducted as part of an initial report for this project indicated that the risk of crashing on low-speed devices (bicycles, scooters, skates, and skateboards) is relatively small (less than three percent across all low-speed devices per 10,000 days of use) (Rodier et al., 2004). The crashes that do occur are most frequently the result of poor surface conditions, user error, obscured driver vision, and the design of the low-speed mode (Rodier et al., 2004). Many of these risk factors were minimized in the field test by careful selection of routes (in consultation with local police and planners), by required participant training, and by requiring participants to use safety equipment (Rodier et al., 2004).

### **3.0 BACKGROUND**

#### **3.1 Segway HT Shared-Use Programs**

Shared-use Segway HT programs have been used by many public and private organizations in the U.S. including, for example, postal delivery, meter reading, national park supervision, police and security services, warehouse and factory mobility, and tourism rentals. One other city-based program that explicitly links Segway HTs to transit stations and transit use is the “Oxygen Network” in Lille, France. An “Oxygen Station” and “Oxygen Boutique,” operated by a private company and funded by government subsidies, allow individuals to rent any of the 16 Segways HTs and 25 electric bicycles available in intervals ranging from one half-hour to monthly. Discounts are given to those who use public transportation. The Oxygen Boutique is conveniently located at a railway station, while the Oxygen Station resides near a parking lot, increasing the likelihood that the devices will be used to finish the final leg of trips.

#### **3.2 Bicycle Sharing Programs**

According to DeMaio (2001) and DeMaio and Gifford (2004), community bicycle sharing systems have evolved over three generations during the last 35 years. In 1968, the first generation began in Amsterdam, The Netherlands, with the “White Bicycle” program; however, this program lasted only a few days because of bicycle thefts. More than ten years later, in Milan, Italy, another bicycle sharing program was launched (1,000 bicycles), but this program also failed due to unreturned bicycles. Bicycle sharing programs also had a presence in the U.S. in the early 1990s, for example, in Portland, Oregon; Minneapolis/St. Paul, Minnesota; Boulder, Colorado; and Princeton, New Jersey. However, most of these programs are no longer in operation. (DeMaio, 2001; DeMaio and Gifford, 2004).

The key characteristics of these first generation bicycle sharing programs are described by DeMaio (2001):

1. Donated mass-market bicycles painted one color;
2. No specific location to return bicycles;
3. Free to users; and
4. Administered by community group sometimes with financial help from local government. (p. 2)

The advantage of these programs was that they were inexpensive to run due to donated materials and labor. However, drawbacks included unreliable service due to the absence of fixed parking locations as well as the lack of a security system that resulted in thefts and program closures (DeMaio, 2001).

The second generation was launched in 1995, in Copenhagen, Denmark, with a program named Bycklen. The program provided 2,000 bicycles (1 bicycle per 400 citizens) and 110 stations (DeMaio, 2001; DeMaio and Gifford, 2004). The key characteristics of the second generation programs included:

1. Bicycles specially designed, i.e., utilitarian and less maintenance;
2. Racks strategically located with displays in high density neighborhoods and central business districts;
3. Coin deposits to check out bicycles with deposits due upon the return of the bicycles; and
4. Administered by a non-profit organization, sometimes with financial help from local government and through advertising on wheels and displays. (p. 3)

The second generation programs tended to be more expensive than the first generation programs because of specially designed bicycles and racks. The fixed rack locations made these programs more reliable. However, theft continued to be a major problem because the coin deposit did not prove to be a strong enough deterrent, and there was no mechanism to track the bicycles (DeMaio, 2001).

The third generation, or “smart bicycle sharing,” was largely initiated in the early 2000s used technology to address the theft problems that plagued the first two generations. The leading programs are described in Table 1 below. The third generation programs have “electronic locking racks or bicycle locks, telecommunications systems, and smartcards or magnetic stripe cards to identify customer and improve tracking.” (DeMaio and Gifford, 2004, p. 3). Moreover, “customers who do not return the bicycle within the allotted time are required to pay for replacement costs” (DeMaio and Gifford, 2004, p. 3). In general, these programs are relatively expensive because of their advanced technology and specially designed equipment, but they are more reliable and secure because of fixed rack locations and tracking technology. These programs are typically run by advertising companies for local governments (DeMaio, 2001; DeMaio and Gifford, 2004).

Similar programs are in the planning stages throughout the U.S. in cities such as New York City, Seattle, and San Francisco. One program launched in Washington, D.C. in August 2008. Internationally, advanced bicycled sharing programs are planned to launch in Beijing for the 2008 Olympics, London, Seoul, and Cordoba and Seville in Spain.

The only empirical studies of third generation programs are the user survey evaluations of 1) the pilot *OYBike* program in London by Noland and Ishaque (2006) and 2) the Vélib program in Paris by TNS Sofres (2008). It is important to note that results are dependent on the qualities of the service location.

In London, Noland and Isahque (2006) found that users most frequently used the service rather than taking public transit and walking and less frequently rather than driving. Some also used the service to make trips that would not be possible without it. *OYBike* also was used as access and egress public transportation. It also was found that some used *OYBike* for commuting (11 percent) but many more for social and recreational trips (68 percent). The authors predict that this is likely to be the largest market for future use.

TNS Sofres (2008) found that 61 percent of long-term Vélib members use the program to go to work or school. In addition, 84 percent of users ride the bicycles to complement their use of public transportation and 20 percent drive their personal automobiles less often.

**TABLE 1 Examples of third generation bicycle sharing programs.**

<b>PROGRAM (LAUNCH DATE)</b>	<b>SIZE</b>	<b>COST</b>	<b>PAYMENT/RESERVATION TECHNOLOGY</b>	<b>OPERATING COMPANY</b>
<i>Velib</i> Paris, France (2007)	20,600 bicycles and 1,450 stations (every 330yds); 135 citizens/bicycle, 190,000 subscribers,	First ½ hour free; additional ½ hour paid; one-day, weekly & annual cards available	Smart card payment and reservation technology	JC Decaux
<i>Bicing</i> in Barcelona, Spain (2007); similar program, <i>Nbici</i> , in Pamplona	1500 bicycles and 100 stations; 1000 citizens/bicycle; attracted at least 62,000 registered users; expand to 3,000 bicycles by 2007	First ½ hour free; additional ½ hours; annual subscription	Smart card and optional credit card payment technology	Clear Channel Adshel
<i>Storstockholms Lokaltrafik</i> in Stockholm, Sweden (2006)	100 bicycles and 80 stations; 80 citizens/bicycle; complement to congestion pricing program	Daily and seasonal passes; initial check out free but penalties after three hour maximum rental time	Smart card payment	Clear Channel Adshel
<i>Velo'v</i> in Lyon, France (2005)	1500 bicycles & 350 stations	First ½ hour free; additional ½ hours paid	Smart card payment	JC Decaux
<i>OYBike</i> in London Borough of Hammersmith and Fulham, England (2004)	25 locking stations with 70 bicycles	First ½ hour free; additional ½ hour paid; 1-day, weekly, & annual cards available	Mobile phone technology	Public Agency
<i>Call-a-Bike</i> in Frankfurt (2003), Cologne and Munich, Germany	In Frankfurt: 720 bicycles, 66 stations, 900 citizens/bicycle; recently opened in two additional German cities	First ½ hour free; additional ½ hour paid; one-day, weekly, and annual cards available	Mobile phone technology	Die Bahn, national transportation agency

Source: <http://www.nybikeshare.org>

## **4.0 Evaluation Methods**

An exploratory analysis of participants' use of the *EasyConnect* project was conducted as part of the field test. Thirty-six in-take questionnaires and travel diaries were completed by individuals who attended the field test training class. These instruments were implemented from June 2005 to November 2006. The objective of the questionnaire and travel diary was to gain a preliminary understanding of participants' socio-economic attributes and their travel patterns, and thus the potential travel effects of the program. In addition, researchers collected daily use logs to represent typical weekly program use by participants. Logs from 29 participants were collected, and the field test manager reviewed the results. Finally, to understand potential concerns about sharing trails and sidewalks with the low-speed modes, researchers conducted intercept surveys on the Iron Horse and Canal Trails as well as in downtown Pleasant Hill during October and November 2006. See Appendices A to C.

## **5.0 EVALUATION RESULTS**

### **5.1 Demographic Attributes**

The initial questionnaires explored the demographic attributes of *EasyConnect* participants. As presented in Table 2, participants were more likely to be male (77 percent) than female (23 percent). Most fell within the 30 to 39 age category (40 percent); however, the distribution ranged from the 19 to 23 years of age (6 percent) to 50 to 59 (17 percent). Given the median age category, not surprisingly, participants most typically belonged to a household with a partner and children (40 percent). On average, participant households included 1.8 commuters, two drivers, and 2.5 vehicles. These households also were likely to have a gross income over \$110,000 (62.5 percent), and over 90 percent of participants had attained a college degree or higher. A high number of participants indicated recent Internet and mobile phone use.

**TABLE 2 Demographic Attributes of Participants**

<b>ATTRIBUTES</b>	<b>DISTRIBUTION OR MEAN</b>
<b>Gender</b>	<b>N=35</b>
Male	77.1%
Female	22.9%
<b>Age</b>	<b>N=35</b>
19 to 23	5.7%
24 to 29	11.4%
30 to 39	40.0%
40 to 49	25.7%
50 to 59	17.1%
<b>Household Members</b>	<b>N=35</b>
Self only	20.0%
Self and partner	28.6%
Self, partner, and child(ren)	40.0%
Self and child(ren)	8.6%
Self and roommate(s)	2.9%
<b>Household Commuters</b>	<b>N=35</b>
Mean	1.8
<b>Household Drivers</b>	<b>N=35</b>
Mean	2.0
<b>Household Vehicles</b>	<b>N=35</b>
Mean	2.5
<b>Household Income</b>	<b>N=32</b>
\$10,000 to \$49,999	9.4%
\$50,000 to \$79,999	15.6%
\$80,000 to \$109,999	12.5%
More than \$110,000	62.5%
<b>Highest Level of Education</b>	<b>N=35</b>
High/Trade School	8.6%
College	65.7%
Graduate/Professional School	25.7%
<b>Technology within Last Week</b>	<b>N=36</b>
Internet at work and home	94.4%
Mobile phone	88.9%
PDA	36.1%

Percentages may not add up to one hundred because of rounding error and multiple responses allowed.



## 5.2 Health

As shown in Table 3 below, more than 90 percent of participants in the *EasyConnect* project described their health as good to excellent, and most indicated that it was very good (40 percent). Over 50 percent of participants exercised three or more times a week, and the most popular methods of exercise include walking, gym workouts, and biking.

**TABLE 3 Health Attributes of Participants**

<b>ATTRIBUTES</b>	<b>DISTRIBUTION</b>
<b>General Health Rating</b>	<b>N=35</b>
Poor	2.9%
Fair	5.7%
Good	31.4%
Very good	40.0%
Excellent	20.0%
<b>Average Weekly Frequency of Physical Exercise</b>	<b>N=35</b>
None	2.9%
1 to 2 times	37.1%
3 to 4 times	42.9%
5 or more times	17.1%
<b>Top Five Primary Modes of Physical Activity</b>	<b>N=34</b>
Walking	41.2%
Gym workouts	26.5%
Jogging/running	8.8%
Other (work, squash)	8.8%
Aerobics/dance class/spin class	5.9%
<b>Top Six Secondary Modes of Physical Activity</b>	<b>N=34</b>
Biking	23.5%
Other (work, squash)	17.6%
Walking	11.8%
Aerobics/dance class/spin class	8.8%
Gym workouts	8.8%
Jogging/running	8.8%

Percentages may not add up to one hundred, as not all participants noted physical activity in the top five primary or six secondary modes of activity.

## 5.3 Transportation-Related Attitudes

As part of the initial survey, participants were asked a range of questions that explored transportation-related attitudes. See Table 4 below. Interestingly, the participants in this project indicated a relatively high level of concern about transportation-related air pollution and a willingness to change their travel behavior to reduce air pollution. However, many indicated a low level of comfort traveling by transit. Participants also were likely to agree that they were satisfied with their current commute mode, their commute mode provided freedom of movement,

and was too expensive. On average, participants did not agree that they were adventurous or seek new experiences.

**TABLE 4 Participants’ Transportation-Related Attitudes**

<b>ATTITUDES</b>	<b>SCORE</b>
Concerned about transportation-related pollution	1.1
Willing to change travel behavior to reduce pollution	1.1
Satisfied with current commute mode	0.9
Commute mode provides freedom of movement	0.8
Commute mode is too expensive	0.6
Adventurous or seeks new experiences	0.6
Auto ownership is a hassle	0.5
Comfortable using transit	0.2

Score: Average of -2 to +2 for answers that ranged from strongly disagree, disagree, neutral, agree, strongly agree.

## 5.4 Travel Patterns

### 5.4.1 Commute Travel

Most participants’ households were located in cities in the East San Francisco Bay Area, specifically in Walnut Creek, Pleasant Hill, Concord, Danville, and Lafayette. These participants, as shown in Table 5, commuted typically by their primary travel mode five or more days a week (65.7 percent), some of them three to four days a week (28.6 percent), and fewer participants only one to two days a week (5.7 percent). The primary commute mode, as presented in Table 6, was most likely to be drive alone (66.7 percent) with a mean travel time of 18.7 minutes and 11.29 miles or BART (19.4) with a mean travel time of 34 minutes and distance of 20.4 miles. Among those reporting use of a secondary commute mode, almost 80 percent used it one day or less a week. The secondary commute mode was most likely to be bicycle (35.3 percent), with a mean travel time of 24.2 minutes and distance of three miles or driving alone (23.5 percent), with a mean travel time of 27.8 minutes and distance of 16.8 miles.

**TABLE 5 Frequency of Use: Primary and Secondary Commute Mode**

<b>FREQUENCY</b>	<b>DISTRIBUTION</b>
<b>Primary Distribution</b>	<b>N=35</b>
1 to 2 days	5.7%
3 to 4 days	28.6%
5 or more days	65.7%
<b>Secondary Distribution</b>	<b>N=18</b>
Less than 1 day a week	33.3%
1 to 3 days a week	33.3%
1 day a week	11.1%
2 days a week	16.7%
3 or more days a week	5.6%

**TABLE 6 Primary and Secondary Commute Mode Share and Mean Travel Time and Distance (One Way)**

<b>PRIMARY COMMUTE (N=36)</b>	<b>MODE SHARE</b>	<b>MEAN TIME (MINUTES)</b>	<b>MEAN DISTANCE (MILES)</b>
Drive Alone	66.7%	18.7	11.3
BART	19.4%	34.3	20.4
Walk	5.6%	6.0	0.18
Carpool	5.6%	30.0	22.3
Bus	2.8%	40.0	2.50
<b>SECONDARY COMMUTE (N=17)</b>	<b>MODE SHARE</b>	<b>MEAN TIME (MINUTES)</b>	<b>MEAN DISTANCE (MILES)</b>
Bicycle	35.3%	24.2	3.1
Drive Alone	23.5%	27.7	16.8
BART	17.7%	31.2	21.0
Walk	11.8%	25.0	2.8
Other (motorcycle, telecommute)	11.8%	25.0	17.0
Bus	5.9%	20.0	3.5

Percentages may not add up to one hundred because of rounding error.

In Table 7 below, the daily commute results from the three-day travel diary are presented. These results are relatively consistent with those reported in Table 6, which represent participants reported typical commute travel. Most participants commuted by driving alone (67.2 percent) or by BART (20.9 percent), but fewer commuted by motorcycle (six percent), carpool (three percent), bicycle (1.5 percent), or walking (1.5 percent). The average commute travel distance was shorter for the drive alone mode (5.9 miles) relative to motorcycle (30.4 miles), BART (20.2 miles), and carpool (17.6) modes.

**TABLE 7 Daily Commute from Travel Diary: Trips, Mode Share, and Average and Total Distance (One Way)**

<b>DAILY TRAVEL (N=36)</b>	<b>DRIVE ALONE</b>	<b>BART</b>	<b>MOTOR-CYCLE</b>	<b>CARPOOL</b>	<b>BICYCLE</b>	<b>WALK</b>
Total Trips	45	14	4	2	1	1
Mode Share	67.2%	20.9%	6.0%	3.0%	1.5%	1.5%
Average Distance (miles)	5.9	20.2	30.4	17.6	5.0	0.5
Total Distance (miles)	451.3	282.1	60.8	35.2	10.0	1.0

Percentages may not add up to one hundred because of rounding error.

#### **5.4.2 Parking at Work**

As indicated in Table 8, most participants were provided free workplace parking by employers (84 percent), and most drove and parked at work regularly (more than 50 percent). Among those few participants who paid for parking, the mean daily cost was 8.4 dollars. In general, participants indicated that their workplace parking was easy to find and only a short walking distance from their office. Only about 15 percent indicated that if they left their parking space

during the work day, then it would be somewhat or very difficult to find parking upon their return.

**TABLE 8 Attributes of Workplace Parking**

<b>ATTRIBUTES</b>	<b>DISTRIBUTION</b>
<b>Frequency of Driving and Parking at Work</b>	<b>N=36</b>
Never	11.1%
Less than 1 day a month	8.3%
1 to 3 days a week	13.9%
1 to 3 days a month	11.1%
4 to 5 days a week	38.9%
More than 5 days a week	16.7%
<b>Type of Workplace Parking</b>	<b>N=31</b>
Free parking provided by my employer	83.9%
Free parking not provided by my employer	9.7%
Paid parking not provided by my employer	6.5%
<b>Parking Cost</b>	<b>N=4</b>
Mean dollars	8.4
<b>Finding Parking at Work</b>	<b>N=32</b>
0 to 5 minutes	93.8%
6 to 10 minutes	6.3%
<b>Walking from Parking to Workplace</b>	<b>N=32</b>
0 to 5 minutes	96.9%
6 to 10 minutes	3.1%
<b>If leave parking before 5:00 pm, how difficult to find a space when returning?</b>	<b>N=32</b>
Not difficult	84.4%
Somewhat difficult	12.5%
Very difficult	3.1%

Percentages may not add up to one hundred because of rounding error.

### **5.4.3 Workday Travel**

As presented in Table 9, about 53 percent of participants made personal trips during the workday three or more days a week, and 47 percent made personal trips two or fewer days per week. Business trips during the workday were made less frequently than personal trips; 95 percent made these trips two or fewer days per week. The average one-way travel time of personal trips was 14.5 minutes and of business trips was 24.9 minutes. Business trips and personal trips were made most frequently by driving in the participant's vehicles (59.4 percent for business and 39.2 percent for personal). Walking and carpooling also were used frequently for personal trips (24.3 and 21.6 percent, respectively).

**TABLE 9 Attributes of Personal and Business Trips Made by Participants During The Workday**

<b>ATTRIBUTES</b>	<b>BUSINESS</b>	<b>PERSONAL</b>
<b>Frequency (weekly)</b>	<b>N=23</b>	<b>N=35</b>
Less than 1 day	47.8%	22.2%
1 to 2 days	47.8%	25.0%
3 to 4 days	4.3%	27.8%
5 or more days	0.0%	25.0%
<b>One-Way Travel Time</b>	<b>N=18</b>	<b>N=33</b>
Mean minutes	24.9	14.5
<b>Modes</b>	<b>N=23</b>	<b>N=35</b>
My Vehicle	59.4%	39.2%
Public Transit	15.6%	5.4%
Friend/Coworker/Carpool Partner's Vehicle	9.4%	21.6%
Company Vehicle	6.3%	0%
Walking	6.3%	24.3%
Bicycle	3.1%	4.1%
Taxi	0%	1.4%
Other (running, razor scooter)	0%	4.1%

Percentages may not add up to one hundred because of rounding error.

In Table 10 below, the daily commute results from the travel diary are presented. These results are relatively consistent with those reported in Table 9. Most participants traveled to their personal or business activity by driving alone (62.2 percent) and fewer traveled by walking (20 percent) and by carpool (17.8 percent). The average travel distance was longer for the drive alone mode (2.5 miles) and carpool mode (1.8 miles) relative the bicycle mode (0.6 miles).

**TABLE 10 Daily Work-Based Personal and Business Trips Travel Diary: Trips, Mode Share, Average and Total Distance (One Way)**

	<b>DRIVE ALONE</b>	<b>CARPOOL</b>	<b>WALK</b>
Total Trips	28	8	9
Mode Share	62.2%	17.8%	20.0%
Average Distance (miles)	2.5	1.8	0.6
Total Distance (miles)	70.89	14.7	5.7

### **5.5 EasyConnect: Attitudes and Expected Use**

Participants were asked about their motivations for joining and their concerns about the *EasyConnect* field test. The results are presented in Table 11. The top motivations for joining *EasyConnect* included access to the Segway HT (28.6 percent), interest in exploring new methods of transportation (25.7 percent), not driving during lunch to run errands (20 percent), improving the environment (11.4 percent), and saving money on gas (11.4 percent). Participants indicated some concern about the safety of Segways HT during adverse weather conditions (26.7 percent) and difficulty obtaining a low-speed mode when they wanted it (20 percent). Most

participants anticipated using the program for personal and business trips during the day and fewer for commute trips, as described in Table 12.

**TABLE 11 Participants’ Motivations for and Concerns about Joining**

<b>MOTIVATIONS</b>	<b>PERCENT (N=35)</b>
Access to Segway HTs	28.6%
Interesting/explore new methods of transportation	25.7%
Not driving during lunch to run errands	20.0%
Environmental	11.4%
Save money/gas	11.4%
Efficiency	8.6%
Access to bicycle	5.7%
Access to electric bicycle	2.9%
Less driving	2.9%
Exercise	2.9%
<b>CONCERNS</b>	<b>PERCENT (N=15)</b>
Safety on Segway HTs/ poor weather	26.7%
Limited availability	20.0%
Too time consuming	13.3%
Funding/maintenance costs	13.3%
Not convenient	6.7%
Commuting with others difficult on a Segway HT	6.7%
Program will end	6.7%
Acceptance	6.7%

Note that the survey allowed more than one response.

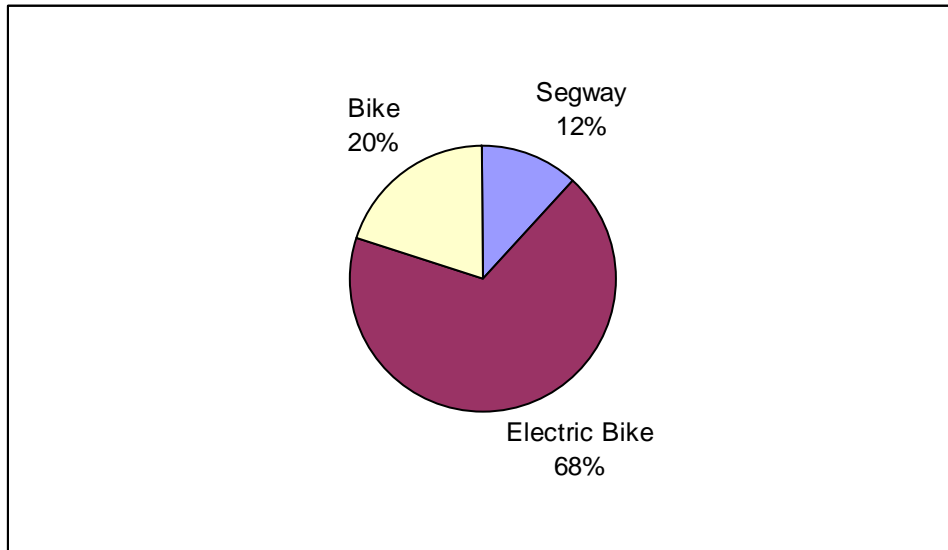
**TABLE 12 Anticipated Frequency of Use**

<b>FREQUENCY</b>	<b>COMMUTER: BART TO WORKPLACE (N=34)</b>	<b>DAY-USER: PERSONAL/WORK BUSINESS (N=36)</b>
Never	64.7%	2.8%
Less than 1 day a month	5.9%	8.3%
1 to 3 days a month	8.8%	27.8%
1 to 2 days a week	8.8%	41.7%
3 to 4 days a month	11.8%	19.4%

### **5.5 EasyConnect Use Patterns**

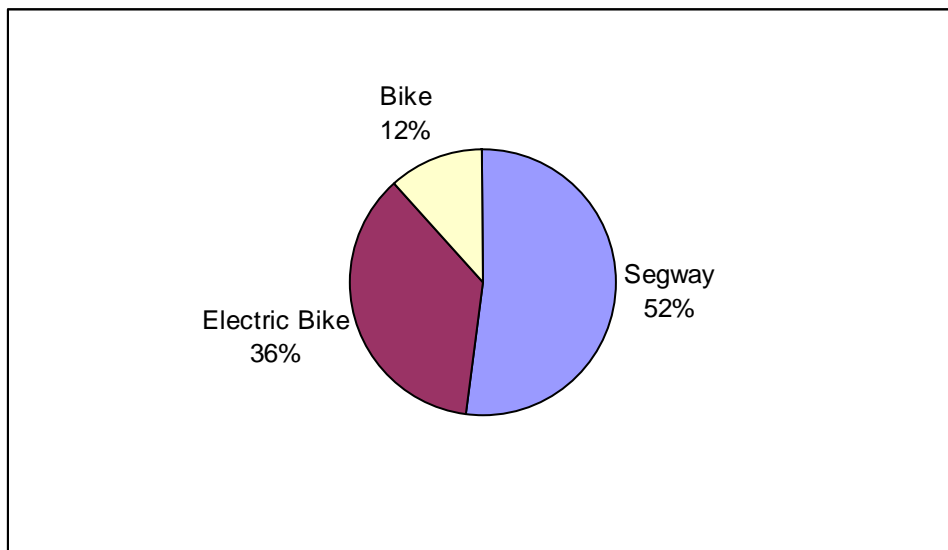
During the operation of the program, participants were asked to complete travel logs that documented their use of the available low-speed modes. Figure 3 below indicates the share of trips made by the low-speed modes for commute trips. Only six of the program participants, from one company, regularly used the program for commuting. The remaining participants worked very close to the Pleasant Hill BART station at the Contra Costa Centre. The electric bicycle had the highest low-speed mode share (68 percent) relative to the bicycle (20 percent) and Segway HT (12 percent) modes. The electric bicycle’s speed and range are greater to that of the bicycle and Segway HT and appeared to attract more use for commute trips. The maximum

commute trip distance was five miles and the minimum was half a mile. Participants indicated that they would have commuted by car or bicycle if the *EasyConnect* low-speed modes were not available to them. These participants used the program with a range of regularity: two used it one to three days a month; one used it one to two days a week; two used it three to four days a week; and one used it five days a week.



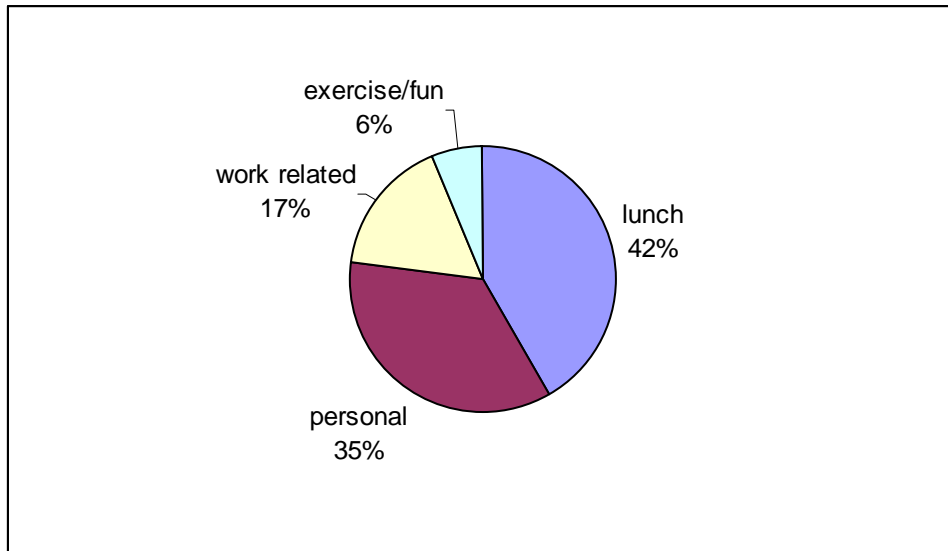
**FIGURE 3** *EasyConnect* commute mode share (N=6).

Figure 4 below indicates the share of trips made by the low-speed modes for Day Use trips. The Segway HT had the highest low-speed mode share (52 percent) relative to the electric bicycle (36 percent) and bicycle (12 percent) modes. For typical short average distance Day Use trips, the Segway HT was the predominant mode.



**FIGURE 4** *EasyConnect* Day Use mode share (N=23).

Figure 5 below illustrates participants' purposes for traveling by the *EasyConnect* modes. Lunch was the most frequent travel purpose (42 percent), followed by personal business, then by work-related business (17 percent), and finally for exercise and fun (6 percent).



**FIGURE 5 Purpose of travel for *EasyConnect* Day Use (N=23).**

Frequency of use as estimated from the daily travel logs is presented in Table 13 below. Sixty-eight percent used the program with some regularity (at least once a month and at most four days a week), and thirty percent did not (less than once a month). The mean frequency of use was one day per week.

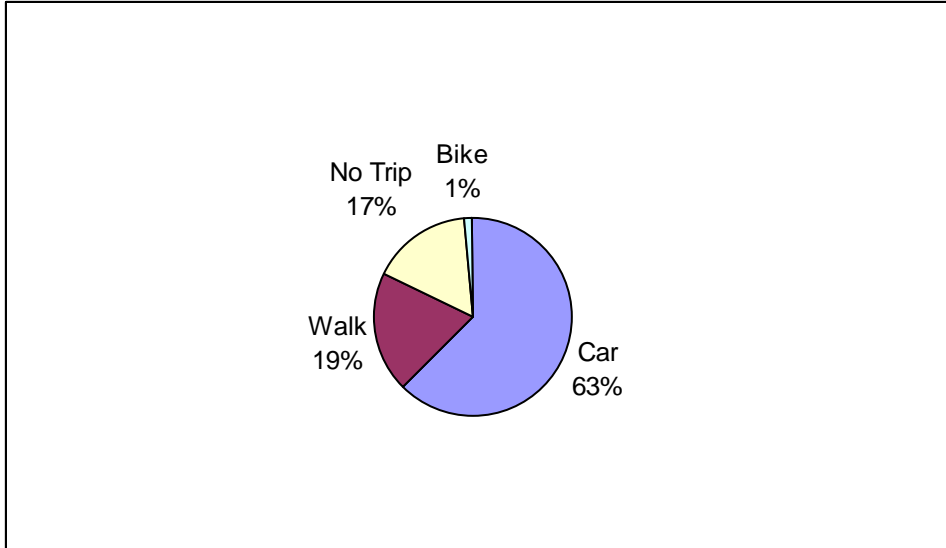
**TABLE 13 Frequency of Day Use Travel with *EasyConnect* (N=23)**

FREQUENCY	PERCENT
3 to 4 days per week	21%
1 to 2 days a week	17%
1 to 3 days a month	30%
Less than once a month	30%

Percentages may not add up to one hundred because of rounding error.

Figure 6 below indicates the modes participants would have used if *EasyConnect* modes were not available to them. Sixty-three percent of these trips would have been made by car, 19 percent by walking, 17 would not have made the trip, and one percent would have made the trip by bicycle. The mean trip distance for those trips that would have been made by car was 2.6 miles and by walking/biking was 1.4 miles.





**FIGURE 6 Modes used for Day Use without *EasyConnect* (N=23).**

### **5.6 Results of EasyConnect Bystander Surveys**

Participants in the *EasyConnect* program were allowed to travel on the Iron-Horse and Canal Trails and in downtown Pleasant Hill. When the Segway HTs were first made available to the public there was significant debate about allowing this low-speed mode to share the sidewalks with pedestrians. As a result, a survey was conducted with individuals traveling on the Iron-Horse Trail and in downtown Pleasant Hill to explore their attitudes towards low-speed modes.

The demographic characteristics of survey respondents are documented in Table 14. Respondents were somewhat more likely to be men than women (55 and 45 percent, respectively). Most respondents were also between the ages of 40 to 69. Respondents also were most likely to have a bachelor's degree or higher.

**TABLE 14 Demographic Attributes of Bystanders**

<b>ATTRIBUTES</b>	<b>DISTRIBUTION</b>
<b>Gender</b>	<b>N=109</b>
Male	55.1%
Female	44.9%
<b>Age</b>	<b>N=106</b>
up to 18 years old	1.0%
24 – 29	7.6%
30 – 39	12.3%
40 – 49	24.5%
50 – 59	24.5%
60 – 69	22.6%
70 – 79	5.7%
80 years or older	0.9%
Decline to respond	0.9%
<b>Highest Level of Education</b>	<b>N=103</b>
High school	8.7%
Trade school/Associate degree	12.6%
Bachelor's degree	35.9%
Graduate/Professional degree	41.8%
Other	1.0%

Respondents reported use of the trail is presented in Table 15. Over 50 percent used the trail four or more times a week. Most walked on the trail (48 percent) or rode a bicycle (38 percent) and fewer jogged or ran (13 percent) for recreation or exercise (approximately 75 percent).

**TABLE 15 Bystanders' Trail Use**

<b>ATTRIBUTE</b>	<b>DISTRIBUTION</b>
<b>Frequency of Travel</b>	<b>N=110</b>
Less than once a month	4.6%
1 to 3 days a month	5.5%
1 to 3 days a week	35.5%
4 or more days a week	54.6%
<b>Travel Mode</b>	<b>N=104</b>
Walk	48.1%
Jog/run	13.5%
Ride a bicycle	38.5%
<b>Purpose</b>	<b>N=110</b>
To commute to work	6.6%
To commute to school	2.2%
For exercise	49.2%
To go shopping	8.8%
For recreation	24.9%
Other	8.3%

Percentages may not add up to one hundred because of rounding error.

Respondents' previous experiences of the Segway HT and electric bicycles also were explored in the survey, and the results are documented in Table 16. Most respondents indicated that they had seen the Segway HT and the electric bicycle (78 and 65 percent, respectively) infrequently on the Iron Horse and Canal Trails, in downtown Pleasant Hill, and/or in the media. However, the electric bicycle was more likely to be seen on the Iron Horse and Canal Trails than in downtown Pleasant Hill and in the media. The opposite was true for the Segway HT. Few respondents reported seeing or experiencing a conflict with the Segway HT (3.3 percent) and electric bicycle (2.4 percent). About 20 percent indicated that they would stop using the trail or use it less if the Segway HT and the electric bicycle were commonly used on the trail, and about 70 percent indicated that this would have not effect on their use of the trail.

**TABLE 16 Bystander Low-speed Modes Experience**

<b>EXPERIENCE</b>	<b>SEGWAY HT</b>	<b>ELECTRIC BICYCLE</b>
<b>Seen Device?</b>	<b>N=106</b>	<b>N=105</b>
Yes	78.3%	64.8%
No	17.0%	33.3%
Unsure	2.0%	1.9%
I don't know what it is.	2.8%	0.0%
<b>Seen on Iron Horse and Canal Trails</b>	<b>N=21</b>	<b>N=42</b>
Once	53.9%	42.9%
Only 2-5 times	30.8%	45.2%
Monthly	7.7%	7.1%
Weekly	0.0%	2.4%
Multiple times a week	7.7%	2.4%
<b>Seen in Downtown Pleasant Hill</b>	<b>N=39</b>	<b>N=16</b>
Once	57.1%	50.0%
Only 2-5 times	28.6%	31.3%
Weekly	9.5%	6.3%
Multiple times a week	4.8%	12.5%
<b>Seen in the Media</b>	<b>N=47</b>	<b>N=27</b>
Once	19.2%	25.9%
Only 2-5 times	59.6%	51.9%
Monthly	15.0%	11.1%
Weekly	2.1%	0.0%
Multiple times a week	4.3%	11.1%
<b>Seen or Experience Conflict</b>	<b>N=91</b>	<b>N=85</b>
Yes	3.3%	2.4%
No	96.7%	97.7%
<b>If Use Common on Iron Horse Trail</b>	<b>N=102</b>	<b>N=99</b>
No effect	69.6%	70.7%
Use the trail less	19.6%	18.2%
Stop traveling on the trail	2.0%	3.0%
Other	8.8%	8.1%

Percentages may not add up to one hundred because of rounding error.

Respondents were asked what they liked and disliked about traveling with Segway HTs and electric bicycles (see Tables 17 and 18). Again, about 20 percent indicated that there was nothing that they liked about traveling with these modes. However, others did appreciate the potential for these devices to reduce air pollution (17 to 20 percent), decrease reliance on petroleum-based fuels (19 percent), enhance the use of new technology (15 to 18 percent), and encourage public transit use (nine to 11 percent). About 30 percent of respondents indicated that there was nothing they disliked about these modes on the trails. However, the top dislikes among those who did have concerns were accidents (12 percent), trails/sidewalks not meant for these modes (11 to 15 percent), their fast speed (10 percent), unable to hear them (nine to 10 percent), and improper use (five to six percent).

**TABLE 17 What Do You Like About Traveling with Segway HTs and Electric Bicycles?**

<b>LIKES (N=109)</b>	<b>SEGWAY HT</b>	<b>ELECTRIC BICYCLE</b>
Nothing	18.1%	22.0%
They help decrease traffic	1.4%	3.0%
They help decrease air pollution	20.3%	17.4%
Having them available will encourage transit use	9.4%	11.4%
They help decrease reliance on petroleum-based fuels	18.8%	18.9%
They utilize new technology	18.1%	15.2%
No opinion	8.7%	9.8%
Other	5.1%	2.3%

Percentages may not add up to one hundred because more than one answer was allowed.

**TABLE 18 What Do You Dislike About Segway HTs and Electric Bicycles?**

<b>DISLIKES (N=109)</b>	<b>SEGWAY HT</b>	<b>ELECTRIC BICYCLE</b>
Nothing	27.8%	30.8%
They go too quickly on the trail	9.9%	9.8%
I'm concerned about getting into an accident	12.6%	12.0%
I'm concerned about my children getting into an accident	2.0%	0.8%
I'm concerned I won't be able to hear them when they are near	9.3%	9.8%
They take up too much lane space	6.0%	3.8%
Trails are meant for non-motorized modes of transportation	15.2%	11.3%
Riders do not know how to use them properly	6.0%	4.5%
No opinion	9.9%	14.3%
Other	1.3%	3.0%

Percentages may not add up to one hundred because than one answer was allowed.

Respondents were also asked what should be required of Segway HT and electric bicycle users (see Table 19 below). The top requirements included following the same rules as bicycles (25 percent), slowing down when approaching a pedestrian (20 percent), using a noise device or calling out when approaching pedestrians (18 percent), and taking training courses (10 to 15 percent).

**TABLE 19 Segway HTs and Electric Bicycle Users Should Be Required To...**

REQUIREMENTS	SEGWAY HT	ELECTRIC BICYCLES
Take a training course	14.5%	10.6%
Get licensed	6.6%	7.9%
Slow down when approaching a pedestrian	20.2%	19.9%
Use noise devices or call out when approaching pedestrians	18.2%	18.5%
Use headlights	8.7%	9.7%
Follow the same rules as bicycles	25.2%	25.5%
Nothing should be required	0.4%	0.9%
No opinion	4.5%	5.1%
Other	1.7%	1.9%

Percentages may not add up to one hundred because of rounding error and more than one answer was allowed.

Respondents were also asked where they thought that Segway HTs should be allowed. The results are presented in Table 20 below. Many respondents indicated that special lanes should be provided for these modes (30 to 32 percent). Some also indicated that these modes should be allowed on the trails (22 to 23 percent), streets (15 to 18 percents), and sidewalks (14 to 15 percent).

**TABLE 20 In General, Where Do You Think Low-Speed Modes Should Be Allowed?**

ALLOWED LOCATIONS (N=109)	SEGWAY HT	ELECTRIC BICYCLES
No opinion	10.6%	10.1%
Sidewalks	14.9%	13.8%
Special lanes	29.8%	32.3%
Trails	23.4%	22.2%
Streets	14.9%	18.0%
Nowhere	5.3%	2.1%
Other	1.1%	1.6%

Percentages may not add up to one hundred because more than one answer was allowed.

## 6.0 CONCLUSION

Access from public transit stations to employment and home locations can be a significant barrier to public transportation use in many urban regions, which is also commonly known as the “first and last mile” problem. The 16-month *EasyConnect* field test was launched in August 2005 to introduce shared-use electric bicycles, non-motorized bicycles, and Segway HTs to employment centers in and around the Pleasant Hill BART District station. The goals of the field test were to test and evaluate the potential for shared-use low-speed vehicles service at bridging the “last mile” from a public transit station to the workplace. The field test ended in December 2006. *EasyConnect* linked 36 employees of 14 companies at the Contra Costa Centre and Fresenius Medical. Contra Costa Centre took over the management of the *EasyConnect* program,

which is now called “Green Fleet” and is operating an expanded and upgraded fleet of Segway HTs, electric bicycles, and bikes.

The exploratory evaluation of the *EasyConnect* project included analysis of initial questionnaires and travel diaries to gain insight into participants’ socio-economic attributes and travel patterns. Program participant *EasyConnect* travel logs were also collected. Finally, intercept surveys of travelers on the Iron Horse and Canal Trails and in downtown Pleasant Hill were conducted to understand potential bystander concerns. The following are the key results of the initial evaluation of the *EasyConnect* program:

- Most participants were men aged 30 to 39 who reported relatively high general health levels and exercised frequently by walking, gym work outs, and biking.
- Participants’ transportation-related attitudes indicated they were concerned about air pollution from vehicle travel, willing to change their own travel behavior to improve air quality, and were dissatisfied with their current commute mode.
- Participants’ primarily commuted by driving alone (67 percent) prior to joining the program; however, a number also sometimes commuted by bicycle or motorcycle (47 percent).
- Workplace parking availability and cost did not appear to be a significant problem for the majority of participants.
- Many participants made personal trips relatively frequently during the week day, but fewer made business trips; most of the personal and business trips were made by a private vehicle with an average distance of 2.5 miles, which is within the range of the low-speed modes.
- Most participants joined the program to try new transportation modes and avoid driving during lunch or to run errands.
- Only six of the participants from one company planned to regularly use the program for commuting; the remaining participants worked very close to the Pleasant Hill BART station at the Contra Costa Centre and thus planned to use the program largely for Day Use.

For commute travel the analysis of participants’ use patterns yielded a number of interesting findings:

- The electric bicycle had the highest low-speed mode share (68 percent) relative to the bicycle (20 percent) and Segway HT (12 percent) modes.
- Most participants used the program weekly; had a one-way commute trip distance of one-half to five miles; and would have commuted by car or bicycle if the *EasyConnect* low-speed modes were not available to them, indicating a likely net reduction in vehicle travel and health benefits among participants.
- The electric bicycle’s speed and range are greater than that of the bicycle and Segway HT and thus appear to be used more frequently for longer commute trips.

For day-use travel the analysis of participants' use patterns also yielded a number of results:

- The Segway HT had the highest low-speed mode share (52 percent) relative to the electric bicycle (36 percent) and bicycle (12 percent) modes.
- For shorter average distance Day Use trips, the Segway HTs had the predominant mode.
- Lunch was the most frequent purpose of travel (42 percent), followed by personal business, then by work-related business (17 percent), and finally for exercise and fun (6 percent).
- Seventy percent used the program with some regularity (at least once a month and at most four days a week), and thirty percent did not (less than once a month).
- Sixty-three percent of these trips would have been made by car, 19 percent by walking, 17 percent would not have made the trip, and one percent would have made the trip by bicycle.
- The mean trip distance for those trips that would have been made by auto was 2.6 miles and by walking/biking was 1.4 miles, indicating a likely net reduction in vehicle travel among participants.
- Twelve percent of trips resulted in an increase in bicycle travel, and 36 percent resulted in an increase in electric bicycle travel, indicating an overall health benefit for participants.

Participants in the *EasyConnect* program were allowed to travel on the Iron Horse and Canal Trails and in downtown Pleasant Hill. When the Segway HTs were first made available to the public, there was significant debate about allowing this low-speed mode to share the sidewalks with pedestrians. As a result, a survey was conducted with individuals traveling on the Iron Horse Trail and in downtown Pleasant Hill to explore their attitudes towards low-speed modes. The analysis of the survey results pointed to some key findings:

- About 20 percent indicated that they would stop using the trail or use it less if the Segway HT and the electric bicycle were commonly used on the trail, and about 70 percent indicated that this would have no effect on their use of the trail.
- The top concerns were accidents, the fast speed and quiet operation of low-speed modes, and improper use; however, many did appreciate the potential for these devices to reduce air pollution and reliance on petroleum-based fuels.
- Respondents indicated that Segway HT and electric bicycle users should be required to follow the same rules as bicycles (25 percent), slow down when approaching a pedestrian (20 percent), use a noise device or callout when approaching pedestrians (18 percent), and take training courses (10 to 15 percent).
- Many respondents indicated that special lanes should be provided for the Segway HTs (30 to 32 percent), and some also reported that these modes should be allowed on the trails (22 to 23 percent), streets (15 to 18 percents), and sidewalks (14 to 15 percent).

Although the *EasyConnect* program was initially designed to bridge the barriers to access from public transit stations to employment locations or the “first and last mile” problem, the results of the field test indicated higher participation demand by Day Users rather than by commuters. This result is consistent with the evaluation of a bicycle-sharing pilot in London (Noland and Ishaque, 2006). However, it may also have been a function of the institutional support available for the program in the area. The Contra Costa Centre, which is walking distance from the Pleasant Hill



BART station, was able to provide significantly more support to the program relative to employers and business centers further away from the station. The availability of the low-speed modes for Day Use at the Contra Costa Centre, however, may have allowed for a higher level of public transit use and carpool commuting. Even without accounting for such mode shifts, the evaluation results indicate net benefits for both commute and Day Use program participants from reduced vehicle travel and increased physical activity. In the future, shared-use low speed mode programs, like *EasyConnect*, should continue to examine pedestrian concerns about the use of these modes on trails and sidewalks.

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## **APPENDIX A: QUESTIONNAIRE**



## EasyConnect Program "Before" Questionnaire

Thank you for participating in the California Partners for Advanced Transit and Highways (PATH) EasyConnect research program. Your answers to this questionnaire are vital to helping us develop and evaluate the effectiveness of this program with respect to enhanced transportation services in and around the Pleasant Hill area. Please read and answer each question, unless otherwise noted to skip certain questions. All questions refer to your typical travel patterns before the start of this program. The questionnaire should take about 20 minutes to complete. Your responses will remain completely confidential. If you have any questions about this survey, please contact Caroline Rodier at [cjrodier@path.berkeley.edu](mailto:cjrodier@path.berkeley.edu).

***First, we begin by asking you some questions about your commute travel.***

- For your most frequent commute method to your primary work location, please provide the amount of time and number of miles you typically spend on each mode of travel for your one-way door-to-door commute trip. It is important to separately include all the distinct modes that make up your total commute: for example, 10 min and 5 miles to drive to BART; 25 min and 15 miles on BART; and 10 min and 0.5 miles to walk from BART to the office. Include any waiting times in your estimate: for example, a total BART travel time of 25 min could be 20 min riding time and 5 min waiting time. Estimate all distances to the best of your ability.

Transportation Modes for Primary Commute	Minutes	Miles
Drive by myself		
Carpool		
Vanpool		
Bus		
BART		
Amtrak		
MUNI		
Caltrain		
Taxi		
Walk		
Bicycle		
Dropped off to ride Transit/Vanpool/Carpool		
Other, please specify:		

- How many days a week do you use your primary commute method?  
 Less than 1 day     1 to 2 days     3 to 4 days     5 or more days
- Do you sometimes commute to work by a different method?     Yes     No

***If you use BART as part of your commute and answered NO to Question 3, please SKIP to Question 6 on page 2.***

***If you do NOT use BART as part of your commute and answered NO to Question 3, please SKIP to Question 12 on page 4.***

4. For your second most frequent commute mode to your primary work location, please provide the amount of time and number of miles you typically spend on a one-way commute trip.

Transportation Modes for Secondary Commute	Minutes	Miles
Drive by myself		
Carpool		
Vanpool		
Bus		
BART		
Amtrak		
MUNI		
Caltrain		
Taxi		
Walk		
Bicycle		
Dropped off to ride Transit/Vanpool/Carpool		
Other, please specify:		

5. How often do you use your secondary commute method?
- Less than 1 day a month
  - 1 to 3 days a month
  - 1 day a week
  - 2 days a week
  - 3 or more days a week

***If you have not used BART to commute to work within the last year, then SKIP to Question 12 on page 4.***

6. How do you typically get from your home to your most frequently used BART station?
- Drive myself and park at or near the station
  - Dropped off by someone
  - Carpool
  - Walk
  - Bus
  - Bicycle
  - Other, please specify: \_\_\_\_\_

7. What is your most frequently used home-end BART station? \_\_\_\_\_

***If you have not driven to and parked at your home-end BART station within the last year, please SKIP to Question 9 on page 3.***

8. Please check the response or responses that best represent your experience of parking at your most frequently used home-end BART station. Check all that apply.
- Parking is available when I want it
  - Parking is not available when I want it
  - Searching for parking is a hassle
  - Walking from my car to the BART station takes too long
  - The cost of BART monthly reserved parking is too high
  - No opinion
  - Other, please specify: \_\_\_\_\_
9. Overall, how satisfied are you with the services provided by BART?
- Very unsatisfied
  - Somewhat unsatisfied
  - Neutral
  - Somewhat satisfied
  - Very satisfied
10. Please rank the three primary advantages of using BART for your commute trip (#1 would be the most important, #2 the second most important, and #3 the third most important).
- Reduces the time I sit in traffic
  - Fits with my schedule better than buses/shuttles
  - Gives me time to work or relax during my commute
  - Saves me money
  - Means I do not have to buy another car
  - Helps me do my part to reduce congestion and air pollution
  - Parking at BART is easier than parking at my workplace
  - Parking at BART is less expensive than parking at my workplace
  - No opinion
  - Other, please specify: \_\_\_\_\_
11. Please rank the three primary disadvantages of using BART for your commute trip (#1 would be what you like least, #2 your secondary dislike, and #3 your tertiary dislike).
- The fares are too high
  - It takes me more time to go places
  - I'm unfamiliar with the transit systems
  - I can't easily transport personal items (e.g. gym bag, groceries, etc.)
  - I'm not able to be as spontaneous as I might like
  - I have concerns about station area safety at night
  - The trains don't run on time
  - The trains don't run frequently enough
  - I can't get a seat
  - No opinion
  - Other, please specify: \_\_\_\_\_

12. Please indicate how frequently you have used any type of public transit (e.g., BART, MUNI, bus, AMTRAK, etc.) within the past year for non-work travel (e.g., shopping, recreation, etc.).
- Never
  - Less than 1 day a month
  - 1 to 3 days a month
  - 1 to 3 days a week
  - 4 to 5 days a week
  - More than 5 days a week

***Now, we ask you some questions about parking at your workplace.***

13. Within the last year, how often have you driven to and parked at or near your workplace?
- Never
  - Less than 1 day a month
  - 1 to 3 days a month
  - 1 to 3 days a week
  - 4 to 5 days a week
  - More than 5 days a week

***If you answered NEVER to Question 13, please SKIP to Question 19 on page 5.***

14. Please indicate which of the following best represents the type of parking you typically use at or near your workplace.
- Free parking provided by my employer
  - Parking provided by my employer that I pay for
  - Free parking not provided by my employer
  - Paid parking not provided by my employer

***If you typically park for FREE at or near your work, please SKIP to Question 16.***

15. Please provide the typical cost of parking for whichever ONE of the time periods below is most familiar to you.
- \$ \_\_\_\_\_ per hour
  - \$ \_\_\_\_\_ per day
  - \$ \_\_\_\_\_ per week
  - \$ \_\_\_\_\_ per month
  - \$ \_\_\_\_\_ per year

16. How long does it typically take you to find parking at your workplace in the morning?
- 0 to 5 minutes
  - 6 to 10 minutes
  - 11 to 15 minutes
  - 16 to 20 minutes
  - More than 20 minutes



17. How long does it typically take you to walk from your parking space to your workplace?
- 0 to 5 minutes
  - 6 to 10 minutes
  - 11 to 15 minutes
  - 16 to 20 minutes
  - More than 20 minutes

18. If you leave your parking space at or near work and return before 5:00 pm (e.g., for business or personal purposes), how difficult is it for you to find a space when you return?
- Not difficult
  - Somewhat difficult
  - Very difficult
  - I never leave my space

*Now, we ask you some questions about your workplace related travel.*

19. Do you ever leave your workplace during the day for **business** purposes (e.g., meetings, sales calls, etc.) and return again?  Yes  No

*If you answered NO to Question 19, please SKIP to Question 23.*

20. How many days a week do you leave your workplace for **business** purposes on average?
- Less than 1 day  1 to 2 days  3 to 4 days  5 or more days

21. What is the typical one-way travel time for these **business** trips?
- \_\_\_\_\_ minutes/hours (circle one)

22. Please check all modes of transportation that you use to complete these **business** trips.

- |  |   |
|--|---|
| <input type="checkbox"/> My vehicle                                | <input type="checkbox"/> Taxi                         |
| <input type="checkbox"/> Company vehicle                           | <input type="checkbox"/> Walking                      |
| <input type="checkbox"/> Friend/coworker/carpool partner's vehicle | <input type="checkbox"/> Bicycle                      |
| <input type="checkbox"/> Public Transit                            | <input type="checkbox"/> Other, please specify: _____ |

23. Do you ever leave your workplace during the day for **personal** business (e.g., lunch, errands, doctor's appointments, etc.) and return again?  Yes  No

*If you checked NO to Question 23, please SKIP to Question 27 on page 6.*

24. How many days a week do you leave your workplace for **personal** business on average?
- Less than 1 day  1 to 2 days  3 to 4 days  5 or more days

25. What is the typical one-way travel time for these **personal** business trips?
- \_\_\_\_\_ minutes/hours (circle one)

26. Please check all modes of transportation that you use to complete these **personal** trips.

- |  |   |
|--|---|
| <input type="checkbox"/> My vehicle                                | <input type="checkbox"/> Taxi                         |
| <input type="checkbox"/> Company vehicle                           | <input type="checkbox"/> Walking                      |
| <input type="checkbox"/> Friend/coworker/carpool partner's vehicle | <input type="checkbox"/> Bicycle                      |
| <input type="checkbox"/> Public Transit                            | <input type="checkbox"/> Other, please specify: _____ |

*Next, we have a few questions related to your household vehicles.*

27. How many working motor vehicles (including cars, trucks, minivans, and motorcycles) are available to your household? \_\_\_\_\_

28. Consider the next vehicle your household might acquire. When do you think your household might buy or lease your next vehicle? Check one box below.

- less than 1 year
- 1 to 2 years
- 2 to 3 years
- 3 to 5 years
- More than 5 years
- Not applicable

29. What do you plan to do with your personal motor vehicle(s) once you have joined the EasyConnect program?

- No change in vehicle use
- Someone in my immediate family will use a vehicle more frequently.
- I plan to loan a vehicle to someone outside my immediate family.
- I plan to sell or store one or more of my personal vehicles.
- Other, please specify: \_\_\_\_\_

***Next, we have some questions related to your participation in the EasyConnect program.***

30. How long have you wanted to try a new method of traveling to work and/or around work?

- less than 1 year
- 1 to 2 years
- 2 to 3 years
- 3 to 5 years
- More than 5 years

31. Please indicate if one of the following particular events or life changes influenced you to try a different travel mode.

- Starting at a new job
- Moving to a new home
- Family changes (e.g., childbirth, marriage, etc.)
- My car broke down/I got rid of a car
- Other, please specify: \_\_\_\_\_
- No, there was no particular life event

32. Please describe your primary motivation(s) for joining the EasyConnect program.

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---

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33. Please describe any concern(s) that you might have about the EasyConnect program.

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34. How often do you anticipate using the bicycle, electric bicycle, and/or Segway HT?

*As a commuter from the Pleasant Hill BART station to your workplace:*

- Never
- Less than 1 day a month
- 1 to 3 days a month
- 1 to 2 days a week
- 3 to 4 days a week
- 5 days a week

*As a day-user from your workplace to conduct personal and/or work related business:*

- Never
- Less than 1 day a month
- 1 to 3 days a month
- 1 to 2 days a week
- 3 to 4 days a week
- 5 days a week

*Next, we have some questions about your attitudes and opinions.*

35. For each of the following statements, please check the one response that best expresses how strongly you disagree or agree with: *“My primary commute method (that is, the transportation mode(s) I typically use to get to work)...*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<i>...is enjoyable to me.”</i>					
<i>...allows me to visit friends when I want.”</i>					
<i>...fits my budget.”</i>					
<i>...allows me to be spontaneous.”</i>					
<i>...helps me go everywhere.”</i>					
<i>...says a lot about who I am.”</i>					
<i>...does not make me feel safe.”</i>					
<i>...gives me a sense of independence.”</i>					
<i>...is great for my lifestyle needs.”</i>					
<i>...allows me to quickly respond in an emergency.”</i>					
<i>...is comfortable.”</i>					
<i>...gives me a sense of freedom.”</i>					

36. Please rank the three things that you like least about your current transportation methods (#1 would be your primary dislike, #2 your secondary dislike, and #3 your tertiary dislike).

- \_\_\_\_\_ It’s too expensive.
- \_\_\_\_\_ Parking is a hassle.
- \_\_\_\_\_ I waste too much time in traffic.
- \_\_\_\_\_ Vehicle maintenance is a hassle.
- \_\_\_\_\_ It’s not reliable enough.
- \_\_\_\_\_ It takes too long to get places.
- \_\_\_\_\_ It’s not environmentally-friendly.
- \_\_\_\_\_ It’s not flexible enough.
- \_\_\_\_\_ Other, please specify: \_\_\_\_\_

37. For each of the following statements, please check the one response that best expresses how strongly you disagree or agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Does Not Apply
<i>I like to experiment with new ways of doing things.</i>						
<i>I sometimes don't drive because finding a parking space is difficult and frustrating.</i>						
<i>Transit is too expensive, so I don't use it much.</i>						
<i>I would like to reduce my auto use to reduce congestion and improve air quality.</i>						
<i>Once I am happy with something, I don't want to change it.</i>						
<i>I spend too much time dealing with car maintenance.</i>						
<i>Keeping licenses and smog checks current is relatively easy.</i>						
<i>I usually do not wait too long for buses and trains.</i>						
<i>I am willing to drive an electric or other clean-fuel vehicle to improve air quality if I can afford it.</i>						
<i>I use transit when it goes where I want to go.</i>						
<i>I'd be willing to ride a bicycle or take transit to help improve air quality.</i>						
<i>If friends and neighbors reduced their driving, I would follow their example.</i>						
<i>I know transit schedules and routes relatively well.</i>						
<i>It is time to change the way we live to help address environmental problems.</i>						
<i>The benefits of owning a car are higher than the costs.</i>						
<i>Traffic fumes are a major contributor to global warming, smog, and other environmental problems.</i>						
<i>I sometimes do not feel safe while using public transportation.</i>						

***Next, we have some questions about your health and exercise.***

38. How would you rate your general health?

- |                               |                                    |
|-------------------------------|------------------------------------|
| <input type="checkbox"/> Poor | <input type="checkbox"/> Very good |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Excellent |
| <input type="checkbox"/> Good | <input type="checkbox"/> Not sure  |

39. On average, how many times per week do you participate in physical exercise?

- |                                       |  |
|---------------------------------------|--|
| <input type="checkbox"/> None         | <input type="checkbox"/> 3 to 4 times    |
| <input type="checkbox"/> 1 to 2 times | <input type="checkbox"/> 5 or more times |

40. Please indicate your **primary** mode of physical activity. Check one category below.
- |  |  |
|--|--|
| <input type="checkbox"/> Walking         | <input type="checkbox"/> Aerobics/dance class/spin class |
| <input type="checkbox"/> Jogging/running | <input type="checkbox"/> Climbing/hiking                 |
| <input type="checkbox"/> Biking          | <input type="checkbox"/> Kayaking/canoeing/sailing       |
| <input type="checkbox"/> Swimming        | <input type="checkbox"/> Rollerblading/skating           |
| <input type="checkbox"/> Gym workouts    | <input type="checkbox"/> Other, please specify: _____    |
|  | <input type="checkbox"/> None                            |

41. Please indicate your **secondary** mode of physical activity. Check one category below.
- |  |  |
|--|--|
| <input type="checkbox"/> Walking         | <input type="checkbox"/> Aerobics/dance class/spin class |
| <input type="checkbox"/> Jogging/running | <input type="checkbox"/> Climbing/hiking                 |
| <input type="checkbox"/> Biking          | <input type="checkbox"/> Kayaking/canoeing/sailing       |
| <input type="checkbox"/> Swimming        | <input type="checkbox"/> Rollerblading/skating           |
| <input type="checkbox"/> Gym workouts    | <input type="checkbox"/> Other, please specify: _____    |
|  | <input type="checkbox"/> None                            |

***Finally, we have some demographic questions that help us categorize our data. The information you provide will remain completely confidential.***

42. What is the address of your primary residence? Remember to include zip code.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

43. Nearest cross-street to your primary residence: \_\_\_\_\_

44. Gender:  Female  Male

45. Please check the category below that best describes your household.

- |  |
|--|
| <input type="checkbox"/> Self only                               |
| <input type="checkbox"/> Self with spouse/partner                |
| <input type="checkbox"/> Self with spouse/partner and child(ren) |
| <input type="checkbox"/> Self with child(ren)                    |
| <input type="checkbox"/> Self with roommate(s)                   |
| <input type="checkbox"/> Other, please specify: _____            |

46. How many commuters, including yourself, are in your household? (A commuter is an adult who travels three or more days per week to and from work or school.) \_\_\_\_\_

47. How many people in your household drive a motor vehicle? \_\_\_\_\_

48. What is the highest level of school that you have completed?

- |                                       |   |
|---------------------------------------|---|
| <input type="checkbox"/> Grade School | <input type="checkbox"/> College                      |
| <input type="checkbox"/> High School  | <input type="checkbox"/> Graduate/Professional        |
| <input type="checkbox"/> Trade School | <input type="checkbox"/> Other, please specify: _____ |

49. What is your employment status?
- |                          |                    |                          |                              |
|--------------------------|--------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | Employed full-time | <input type="checkbox"/> | Student                      |
| <input type="checkbox"/> | Employed part-time | <input type="checkbox"/> | Other, please specify: _____ |
50. What category best describes your occupation?
- |                          |                                 |
|--------------------------|---------------------------------|
| <input type="checkbox"/> | Manager/administrator           |
| <input type="checkbox"/> | Service/repair                  |
| <input type="checkbox"/> | Clerical/administrative support |
| <input type="checkbox"/> | Sales                           |
| <input type="checkbox"/> | Professional/technical          |
| <input type="checkbox"/> | Production/construction/crafts  |
| <input type="checkbox"/> | Other, please specify: _____    |
51. Please indicate if you have used any of the following technologies **within the last week**.  
Check all that apply.
- |                          |                                      |
|--------------------------|--------------------------------------|
| <input type="checkbox"/> | Internet at work                     |
| <input type="checkbox"/> | Internet at home                     |
| <input type="checkbox"/> | Mobile telephone                     |
| <input type="checkbox"/> | PDA (hand-held electronic organizer) |
52. What is your age?
- |                          |                    |                          |                    |
|--------------------------|--------------------|--------------------------|--------------------|
| <input type="checkbox"/> | 19 to 23 years old | <input type="checkbox"/> | 40 to 49 years old |
| <input type="checkbox"/> | 24 to 29 years old | <input type="checkbox"/> | 50 to 59 years old |
| <input type="checkbox"/> | 30 to 39 years old |                          |                    |
53. How many individuals in your household are in each of the following age groups below, including yourself? In the spaces below, please indicate the number of people in each age group.
- |                          |                    |                          |                       |
|--------------------------|--------------------|--------------------------|-----------------------|
| <input type="checkbox"/> | 0 to 5 years old   | <input type="checkbox"/> | 30 to 39 years old    |
| <input type="checkbox"/> | 6 to 15 years old  | <input type="checkbox"/> | 40 to 49 years old    |
| <input type="checkbox"/> | 16 to 18 years old | <input type="checkbox"/> | 50 to 59 years old    |
| <input type="checkbox"/> | 19 to 23 years old | <input type="checkbox"/> | 60 to 69 years old    |
| <input type="checkbox"/> | 24 to 29 years old | <input type="checkbox"/> | 70 years old or older |
54. What was your household's 2005 gross (before taxes) income?
- |                          |                       |
|--------------------------|-----------------------|
| <input type="checkbox"/> | Under \$10,000        |
| <input type="checkbox"/> | \$10,000 to \$19,999  |
| <input type="checkbox"/> | \$20,000 to \$49,999  |
| <input type="checkbox"/> | \$50,000 to \$79,999  |
| <input type="checkbox"/> | \$80,000 to \$109,999 |
| <input type="checkbox"/> | More than \$110,000   |

***Thank you very much for taking the time to complete this questionnaire!***





## **APPENDIX B: TRAVEL DIARY**



## EasyConnect Three-Day Travel Diary

Thank you for agreeing to participate in the EasyConnect research program. The travel diary is a critical tool in helping the research staff evaluate current travel patterns in the Bay Area.

Please record your travel for either a **Thursday/Friday/Saturday** or a **Sunday/Monday/ Tuesday** combination of three consecutive days. (In other words, you must start the diary on a Thursday or Sunday.) Please do not use if you are taking an out-of-region business trip or vacation, or over a holiday weekend.

Here are some situations that should help clarify some questions you might have about filling out the diary:

- Note: Each destination should be recorded on a separate line, even if you stop at a location for a very short time, or are stopping en route to somewhere else. For example, if you leave work and drop a friend off at the BART station, then drive to the bank, then walk from the bank to buy a coffee, then walk back from the coffee shop to your car, and then drive home, these are all separate trips.
- Remember to record **all** walking trips. To help you remember, think of any walking trip that takes you from one location to another. Under-reported walking trips are the most common error associated with travel diaries.
- If you walk more than 5 minutes after parking your car to get to your destination, this is a new trip.
- Most trips on public transit have smaller ‘access trips’ on either side. For example, if someone drives you to the BART station in the morning, then you take BART to the station closest to your office, and then you walk from BART to your office, these are three separate trips. The Destination/Activity for all of these trips will be “Going to primary work place”
- Do not count bus-to-bus transfers as another trip. However, if you transfer between modes (e.g., from BART to bus), these should be indicated as separate trips.
- If you are driving, and you stop – even momentarily – to pick someone up, that constitutes the start of a new trip.
- If you ride in a carpool/vanpool, you do not need to show the stops to pick up or drop off riders. If you are the driver of a carpool/vanpool, please write down all of your stops.
- Please be as specific as possible (e.g., \$1.25 for one-way transit fare, or \$12 for 9 hours of parking) when entering the costs associated with a trip. If you pay for parking, enter the amount with the trip that you feel is most appropriate (i.e., either the trip that precedes or comes after the parking).

Please fill out the diary to the best of your ability. If there is a confusing situation, please jot down the details and we will be happy to help you figure out what is the best way to fill out the form. Feel free to contact Caroline Rodier at [cjrodier@path.berkeley.edu](mailto:cjrodier@path.berkeley.edu) with any questions.

Thank you very much for your cooperation.

# SAMPLE

east+connect  
TRAVEL DIARY  
DAY 1

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

## DESTINATION / ACTIVITY:

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

## MODE?

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: Caroline Rodier

Circle day of week: Thursday / Sunday

Date: Jan 26, 2006

I started the day at:  home  
 other, please indicate address:

I LEFT AT:	TO GO TO: <small>Full address of destination. Be as specific as possible. If you do not know the exact address, describe location or list cross streets (so that we can determine a location via the Internet).</small>	I GOT THERE AT:	DESTINATION / ACTIVITY:	MODE?	Driver or rider?	How many total in group?	\$\$\$?
					<small>Circle 'D' or 'R' if appropriate</small>	<small>Count yourself and others riding with you</small>	<small>If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.</small>
1 7:12	Stoneman School Loveridge Rd, Pittsburg	7:23	H	A	<input checked="" type="radio"/> D <input type="radio"/> R	2	
2 7:25	Work	8:14	A	A	<input checked="" type="radio"/> D <input type="radio"/> R	1	
3 12:04	N Bway + Ygnacio, Walnut Creek	12:13	E	A	<input checked="" type="radio"/> D <input type="radio"/> R	2	\$1 for 1 hour parking
4 12:47	N Civic Dr + Ygnacio	12:53	C	H	<input type="radio"/> D <input type="radio"/> R	2	
5 1:01	N Bway + Ygnacio	1:07	A	H	<input type="radio"/> D <input type="radio"/> R	2	
6 1:07	work	1:15	A	A	<input checked="" type="radio"/> D <input type="radio"/> R	2	
7 5:45	home	6:27	I	A	<input checked="" type="radio"/> D <input type="radio"/> R	1	
8 7:02	134 E 10 <sup>th</sup> St, Pittsburg	7:15	E	A	<input checked="" type="radio"/> D <input type="radio"/> R	4	
9 8:30	Movie Theater Lone Tree Way, Antioch	8:45	F	A	<input checked="" type="radio"/> D <input type="radio"/> R	4	
10 11:02	home	11:26	I	A	<input checked="" type="radio"/> D <input type="radio"/> R	4	



**TRAVEL DIARY - DAY 1**  
page 2

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

**DESTINATION / ACTIVITY:**

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

**MODE?**

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: \_\_\_\_\_

Circle day of week: **Thursday / Sunday**

Date: \_\_\_\_\_, 2005

<b>I LEFT AT:</b>  Time you began your trip	<b>TO GO TO:</b>  Name and full address of destination. For address, be as specific as possible. If you do not know the exact address, list cross streets, zip code, or describe location as best as possible.  Examples: Work; Home; Oak Grove @ Whitman in Concord; Orinda BART; Long's on Mt. Diablo Blvd in Lafayette; 2901 Ygnacio Valley Rd, Walnut Creek; etc.	<b>I GOT THERE AT:</b>  Time you finished your trip			<b>Driver or rider?</b>  Circle 'D' or 'R' if appropriate	<b>How many total in group?</b>  Count yourself and others riding with you	<b>\$\$\$?</b>  If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.
11					D R		
12					D R		
13					D R		
14					D R		
15					D R		
16					D R		
17					D R		
18					D R		
19					D R		
20					D R		



**TRAVEL DIARY - DAY 2**  
page 1

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

**DESTINATION / ACTIVITY:**

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

**MODE?**

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: \_\_\_\_\_

Circle day of week: **Friday / Monday**

Date: \_\_\_\_\_, 2005

I started the day at:  home  
 other, please indicate address:  
\_\_\_\_\_

<b>I LEFT AT:</b>  Time you began your trip	<b>TO GO TO:</b>  Name and full address of destination. For address, be as specific as possible. If you do not know the exact address, list cross streets, zip code, or describe location as best as possible.  Examples: Work; Home; Oak Grove @ Whitman in Concord; Orinda BART; Long's on Mt. Diablo Blvd in Lafayette; 2901 Ygnacio Valley Rd, Walnut Creek; etc.	<b>I GOT THERE AT:</b>  Time you finished your trip	<b>DESTINATION / ACTIVITY:</b>  A. Going to primary work place B. Work-related travel (off-site meeting, etc.) C. Shopping/Errands/ Stopping for gas D. Personal business (medical, banking, etc.) E. Meal/Snack outside the home F. Social/Entertainment/ Recreation G. Civic/Religious activities H. Picking up/Dropping off someone else I. Home Z. other, describe on appropriate line below	<b>MODE?</b>  A. Private Car/ Truck B. Carpool/ Vanpool C. Taxi/Shuttle D. Motorcycle/ Moped E. BART/ other train F. Public Bus G. Bicycle H. Walk Z. other, describe on appropriate line below	<b>Driver or rider?</b>  Circle 'D' or 'R' if appropriate	<b>How many total in group?</b>  Count yourself and others riding with you	<b>\$\$\$?</b>  If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.
1					D R		
2					D R		
3					D R		
4					D R		
5					D R		
6					D R		
7					D R		
8					D R		
9					D R		
10					D R		



**TRAVEL DIARY - DAY 2**  
page 2

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

**DESTINATION / ACTIVITY:**

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

**MODE?**

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: \_\_\_\_\_

Circle day of week: **Friday / Monday**

Date: \_\_\_\_\_, 2005

<b>I LEFT AT:</b>  Time you began your trip	<b>TO GO TO:</b> Name and full address of destination. For address, be as specific as possible. If you do not know the exact address, list cross streets, zip code, or describe location as best as possible.  Examples: Work; Home; Oak Grove @ Whitman in Concord; Orinda BART; Long's on Mt. Diablo Blvd in Lafayette; 2901 Ygnacio Valley Rd, Walnut Creek; etc.	<b>I GOT THERE AT:</b>  Time you finished your trip	<b>DESTINATION / ACTIVITY:</b> <ul style="list-style-type: none"> <li>A. Going to primary work place</li> <li>B. Work-related travel (off-site meeting, etc.)</li> <li>C. Shopping/Errands/ Stopping for gas</li> <li>D. Personal business (medical, banking, etc.)</li> <li>E. Meal/Snack outside the home</li> <li>F. Social/Entertainment/ Recreation</li> <li>G. Civic/Religious activities</li> <li>H. Picking up/Dropping off someone else</li> <li>I. Home</li> <li>Z. other, describe on appropriate line below</li> </ul>	<b>MODE?</b> <ul style="list-style-type: none"> <li>A. Private Car/ Truck</li> <li>B. Carpool/ Vanpool</li> <li>C. Taxi/Shuttle</li> <li>D. Motorcycle/ Moped</li> <li>E. BART/ other train</li> <li>F. Public Bus</li> <li>G. Bicycle</li> <li>H. Walk</li> <li>Z. other, describe on appropriate line below</li> </ul>	<b>Driver or rider?</b>  Circle 'D' or 'R' if appropriate	<b>How many total in group?</b>  Count yourself and others riding with you	<b>\$\$\$?</b>  If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.
11					D R		
12					D R		
13					D R		
14					D R		
15					D R		
16					D R		
17					D R		
18					D R		
19					D R		
20					D R		



**TRAVEL DIARY - DAY 3**  
page 1

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

**DESTINATION / ACTIVITY:**

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

**MODE?**

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: \_\_\_\_\_

Circle day of week: **Saturday / Tuesday**

Date: \_\_\_\_\_, 2005

I started the day at:  home  
 other, please indicate address:  
\_\_\_\_\_

	<b>I LEFT AT:</b>  Time you began your trip	<b>TO GO TO:</b>  Name and full address of destination. For address, be as specific as possible. If you do not know the exact address, list cross streets, zip code, or describe location as best as possible.  Examples: Work; Home; Oak Grove @ Whitman in Concord; Orinda BART; Long's on Mt. Diablo Blvd in Lafayette; 2901 Ygnacio Valley Rd, Walnut Creek; etc.	<b>I GOT THERE AT:</b>  Time you finished your trip	<b>DESTINATION / ACTIVITY:</b>	<b>MODE?</b>	<b>Driver or rider?</b>  Circle 'D' or 'R' if appropriate	<b>How many total in group?</b>  Count yourself and others riding with you	<b>\$\$\$?</b>  If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.
1						D R		
2						D R		
3						D R		
4						D R		
5						D R		
6						D R		
7						D R		
8						D R		
9						D R		
10						D R		





**TRAVEL DIARY - DAY 3**  
page 2

Please Remember:

- Use a new line for every 'leg' of a trip.
- Every stop, no matter how short, and every mode switch constitutes a new trip.
- Do not forget about walking trips.

**DESTINATION / ACTIVITY:**

- A. Going to primary work place
- B. Work-related travel (off-site meeting, etc.)
- C. Shopping/Errands/ Stopping for gas
- D. Personal business (medical, banking, etc.)
- E. Meal/Snack outside the home
- F. Social/Entertainment/ Recreation
- G. Civic/Religious activities
- H. Picking up/Dropping off someone else
- I. Home
- Z. other, describe on appropriate line below

**MODE?**

- A. Private Car/ Truck
- B. Carpool/ Vanpool
- C. Taxi/Shuttle
- D. Motorcycle/ Moped
- E. BART/ other train
- F. Public Bus
- G. Bicycle
- H. Walk
- Z. other, describe on appropriate line below

Name: \_\_\_\_\_

Circle day of week: **Saturday / Tuesday**

Date: \_\_\_\_\_, 2005

<b>I LEFT AT:</b>  Time you began your trip	<b>TO GO TO:</b> Name and full address of destination. For address, be as specific as possible. If you do not know the exact address, list cross streets, zip code, or describe location as best as possible.  Examples: Work; Home; Oak Grove @ Whitman in Concord; Orinda BART; Long's on Mt. Diablo Blvd in Lafayette; 2901 Ygnacio Valley Rd, Walnut Creek; etc.	<b>I GOT THERE AT:</b>  Time you finished your trip	<b>DESTINATION / ACTIVITY:</b> <ul style="list-style-type: none"> <li>A. Going to primary work place</li> <li>B. Work-related travel (off-site meeting, etc.)</li> <li>C. Shopping/Errands/ Stopping for gas</li> <li>D. Personal business (medical, banking, etc.)</li> <li>E. Meal/Snack outside the home</li> <li>F. Social/Entertainment/ Recreation</li> <li>G. Civic/Religious activities</li> <li>H. Picking up/Dropping off someone else</li> <li>I. Home</li> <li>Z. other, describe on appropriate line below</li> </ul>	<b>MODE?</b> <ul style="list-style-type: none"> <li>A. Private Car/ Truck</li> <li>B. Carpool/ Vanpool</li> <li>C. Taxi/Shuttle</li> <li>D. Motorcycle/ Moped</li> <li>E. BART/ other train</li> <li>F. Public Bus</li> <li>G. Bicycle</li> <li>H. Walk</li> <li>Z. other, describe on appropriate line below</li> </ul>	<b>Driver or rider?</b>  Circle 'D' or 'R' if appropriate	<b>How many total in group?</b>  Count yourself and others riding with you	<b>\$\$\$?</b>  If you paid anything, such as parking, transit fare, tolls (but not gas) for this trip, indicate how much, and per what unit of usage.
11					D R		
12					D R		
13					D R		
14					D R		
15					D R		
16					D R		
17					D R		
18					D R		
19					D R		
20					D R		



## **APPENDIX C: BYSTANDER SURVEY<sup>1</sup>**

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<sup>1</sup> Note that the instrument implemented in the downtown Pleasant Hill area substituted this location for the Iron Horse trail to the survey appended here.



SURVEY  
NUMBER:

## Easy Connect Survey *Iron Horse Trail*

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Approximate Location: \_\_\_\_\_

*Each question will indicate whether or not they require single or multiple responses.*

### ***A. Questions about your travel on the trail***

1. How often do you travel on the trail? **(select one)**
  - Less than once a month
  - 1 to 3 days a month
  - 1 to 3 days a week
  - 4 or more days a week
  
2. Why do you most frequently travel on the trail? **(select all that apply)**
  - To commute to work
  - To commute to school
  - For exercise
  - To go shopping
  - For recreation
  - Other (please specify): \_\_\_\_\_
  
3. How do you **most** frequently travel on the trail? **(select one)**
  - Walk
  - Jog/run
  - Ride a bike
  - Ride a non-motorized scooter
  - Other (please specify): \_\_\_\_\_
  
4. Do you ever travel on the trail with children? **(select one)**
  - Yes, ***if yes then how frequently? (select one)***
    - Less than once a month
    - 1 to 3 days a month
    - 1 to 3 days a week
    - 4 or more days a week
  - No
  
5. What time of day do you most frequently travel on the trail? **(select one)**
  - Morning (5am – 11 am)
  - Lunchtime (11am – 2pm)
  - Afternoon (2pm – 4pm)
  - Evening (4pm – 10pm)

***B. Questions on your thoughts about new transportation methods on the trail***

6. Have you seen a Segway before?
- Yes (*continue to question 7*)
  - No (*skip to question 8*)
  - Unsure (*skip to question 8*)
  - I don't know what a Segway is. (*Please ask the researcher to explain, then skip to question 8*)
7. If you have seen a Segway before, where? (**select all that apply**)
- On the Iron Horse trail. *If yes, how often? (select one)*
    - Once
    - 2-5 times
    - Monthly
    - Weekly
    - Multiple times a week
  - In downtown Pleasant Hill. *If yes, how often? (select one)*
    - Once
    - 2-5 times
    - Monthly
    - Weekly
    - Multiple times a week
  - In the media. *If yes, how often? (select one)*
    - Once
    - 2-5 times
    - Monthly
    - Weekly
    - Multiple times a week
  - Other locations (please specify): \_\_\_\_\_
8. Have you seen an electric bike before?
- Yes (*continue to question 10*)
  - No (*skip to question 11*)
  - Unsure (*skip to question 11*)
  - I don't know what an electric bike is. (*Please ask the researcher to explain, then skip to question 10*)

9. If you have seen electric bikes before, where? **(select all that apply)**

- On the Iron Horse trail. *If yes, how often?(select one)*
  - Once
  - 2-5 times
  - Monthly
  - Weekly
  - Multiple times a week
- In downtown Pleasant Hill. *If yes, how often? (select one)*
  - Once
  - 2-5 times
  - Monthly
  - Weekly
  - Multiple times a week
- In the media. *If yes, how often? (select one)*
  - Once
  - 2-5 times
  - Monthly
  - Weekly
  - Multiple times a week
- Other locations (please specify): \_\_\_\_\_

10. In general, what do you like about Segways and electric bikes traveling on the trail? **(select all that apply)**

Segways

- Nothing
  - They help decrease traffic on trails
  - They help decrease air pollution
  - Having them available will encourage transit use
  - They help decrease reliance on petroleum-based fuels
  - They utilize new technology
  - No opinion
  - Other (please specify):
- \_\_\_\_\_

Electric bikes

- Nothing
  - They help decrease traffic on trails
  - They help decrease air pollution
  - Having them available will encourage transit use
  - They help decrease reliance on petroleum-based fuels
  - They utilize new technology
  - No opinion
  - Other (please specify):
- \_\_\_\_\_

11. In general, what do you dislike about Segways/electric bikes traveling on the trail? **(select all that apply)**

Segways

- Nothing
  - They go too quickly on the trail
  - I'm concerned about getting into an accident
  - I'm concerned about my children getting into an accident
  - I'm concerned I won't be able to hear them when they are near
  - They take up too much lane space
  - Trails are meant for non-motorized modes of transportation
  - Riders do not know how to use them properly
  - No opinion
  - Other (please specify):
- 

Electric bikes

- Nothing
  - They go too quickly on the trail
  - I'm concerned about getting into an accident
  - I'm concerned about my children getting into an accident
  - I'm concerned I won't be able to hear them when they are near
  - They take up too much lane space
  - Trails are meant for non-motorized modes of transportation
  - Riders do not know how to use them properly
  - No opinion
  - Other (please specify):
- 

12. If you have seen a Segway or electric bike before, have you seen or experienced any conflicts with Segway and/or electric bike riders? **(select one)**

Segways

- Yes
- No

If yes, please describe: \_\_\_\_\_

---

Electric bikes

- Yes
- No

If yes, please describe: \_\_\_\_\_

---

13. Segway/electric bike users on the trail should be required to: **(select all that apply)**

Segways

- Take a training course
  - Get licensed
  - Slow down when approaching a pedestrian
  - Use noise devices or call out when approaching pedestrians
  - Use headlights
  - Follow the same rules as bikes
  - Nothing should be required
  - No opinion
  - Other (please specify):
- 

Electric bikes

- Take a training course
  - Get licensed
  - Slow down when approaching a pedestrian
  - Use noise devices or call out when approaching pedestrians
  - Use headlights
  - Follow the same rules as bikes
  - Nothing should be required
  - No opinion
  - Other (please specify):
-



14. In general, where do you think Segways/electric bikes should be allowed?  
(select all that apply)

Segways

- No opinion
  - Sidewalks
  - Special lanes, like bike lanes
  - Trails, such as the Iron Horse trail
  - Streets
  - Nowhere
  - Other (please specify)\_\_\_\_\_
- 

Electric Bikes

- No opinion
  - Sidewalks
  - Special lanes, like bike lanes
  - Trails, such as the Iron Horse trail
  - Streets
  - Nowhere
  - Other (please specify)\_\_\_\_\_
- 

15. When should Segways/electric bikes not be allowed on the trail?  
(select all that apply)

Segways

- Should always be allowed
- Should never be allowed
- Morning (5am – 11 am)
- Lunchtime (11am – 2pm)
- Afternoon (2pm – 4pm)
- Evening (4pm – 10pm)

Electric bikes

- Should always be allowed
- Should never be allowed
- Morning (5am – 11 am)
- Lunchtime (11am – 2pm)
- Afternoon (2pm – 4pm)
- Evening (4pm – 10pm)

16. If Segways/electric bikes became common on the trail, how would it affect your use of the trail? (select one)

Segways

- No effect
  - Use the trail less
  - Stop traveling on trail
  - Other (please specify):
- 

Electric bikes

- No effect
  - Use the trail less
  - Stop traveling on trail
  - Other (please specify):
- 

***C. Demographic questions to help us categorize the survey responses***

17. What is your gender?

- Male
- Female
- Decline to respond

18. What is your (a) home zip code? \_\_\_\_\_ (b) work zip code? \_\_\_\_\_

19. What is your age?

- |   |   |
|---|---|
| <input type="checkbox"/> up to 18 years old | <input type="checkbox"/> 50 – 59            |
| <input type="checkbox"/> 19 – 23            | <input type="checkbox"/> 60 – 69            |
| <input type="checkbox"/> 24 – 29            | <input type="checkbox"/> 70 – 79            |
| <input type="checkbox"/> 30 – 39            | <input type="checkbox"/> 80 years or older  |
| <input type="checkbox"/> 40 – 49            | <input type="checkbox"/> Decline to respond |

20. What is the highest level of school that you have completed?

- |  |  |
|--|--|
| <input type="checkbox"/> Grade school                  | <input type="checkbox"/> Bachelor's degree             |
| <input type="checkbox"/> High school                   | <input type="checkbox"/> Graduate/Professional degree  |
| <input type="checkbox"/> Trade school/Associate degree | <input type="checkbox"/> Other (please specify): _____ |
| <input type="checkbox"/> Decline to respond            |  |

21. Are you employed? If so, what category best describes your occupation?

- |  |   |
|--|---|
| <input type="checkbox"/> Manager/administrator           | <input type="checkbox"/> Professional/technical         |
| <input type="checkbox"/> Service/repair                  | <input type="checkbox"/> Production/construction/crafts |
| <input type="checkbox"/> Clerical/administrative support | <input type="checkbox"/> Sales                          |
| <input type="checkbox"/> Not employed                    | <input type="checkbox"/> Other (please specify)         |
| <input type="checkbox"/> Decline to respond              |   |

***Thank you very much for taking this survey!***